GE Fanuc Automation

Programmable Control Products

CIMPLICITY® 90-ADS
Alphanumeric Display System

User's Manual

GFK–0499D March 1994

Warnings, Cautions, and Notes as Used in this Publication

Warning

Warning notices are used in this publication to emphasize that hazardous voltages, currents, temperatures, or other conditions that could cause personal injury exist in this equipment or may be associated with its use.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

Caution

Caution notices are used where equipment might be damaged if care is not taken.

Note

Notes merely call attention to information that is especially significant to understanding and operating the equipment.

Preface

This manual provides setup, installation, and configuration information needed to install and use the CIMPLICITY™ 90-ADS software to build a custom operator interface system for the Series 90™-70 or Series 90-30 (Model 331 or Model 341) Programmable Logic Controller. The CIMPLICITY 90-ADS software runs on the Alphanumeric Display Coprocessor (ADC) module, and communicates over the Series 90-70 or Series 90-30 PLCs backplane to monitor and optionally modify data tables in the PLC. This manual also contains information on viewing demonstration systems and step-by-step development tutorials to acquaint you with the features and capabilities of the CIMPLICITY 90-ADS system.

Revisions to This Manual

Changes have been made to this manual to reflect the features of Version 4.01 of the CIMPLICITY 90-ADS Alphanumeric Display System. Emphasis has been changed from the ADC-Based Builder to using the PC-Based Builder. Many screens have been changed to reflect Version 4.01. Additionally, corrections and text changes have been made where necessary to enhance the readability of the manual. Following is a list of changes to version D (GFK-0499D) as compared to version C (GFK-0499C).

- Page 1-3, under "Product Organization", changed "three components" to "two components, and changed bulleted items to: PC-Based Builder and ADC-Based Executor.
- Page 3-2, under number 5 in list, added "Lucas Deeco ST-2200".
- Page 4-1, added "Section 5. Lucas Deeco ST-2200" to list of display terminal sections.
- Page 4-4, deleted second paragraph under STEP 6.
- Page 4-5, added paragraph beginning with "If you have ..." to STEP 1.
- Page 4-6, deleted second paragraph under STEP 6.
- Page 4-7, deleted second paragraph under STEP 4.
- Page 4-10, start of text for new section "Using a Lucas Deeco Model ST-2200".
- Page 5-2, added reference to Lucas Deeco ST-2200 to paragraph one of STEP 6. In second paragraph of STEP 6, changed "200,000 bytes" to "120,000 bytes".
- Page 5-3, added entry for "LUDCO" to table.
- Page 5-4, in first paragraph under STEP 7, added \ADS_PC\<demo system>.PCM to directories. Change text in CAUTION to read "Version 2 or later".
- Page 5-5, added Section 2, "Using the Operator Interface Products Menu".
- Page 5-7, changed STEP 9 to Section 3 "Configuring PCOP to ADC Communications", changed ADC_SET at bottom of page to OI_MENU, added reference to pulling down the ADS menu and selecting TERMSET, and added screen example.
- Page 5-9, Section 2 changed to Section 4. Under STEP 1, changed ADSSETUP to OI_MENU .... and added screen examples.
- Page 5-12, added entry for "Lucas Deeco ST-2200" to table and deleted footnote at bottom of table.

- Page 5-14, changed ”Section 3” to ”Section 5”.
- Page 5-15, Change first sentence and added a new screen example.
- Page 5-16, under STEP 6 - deleted second paragraph, changed screen example and added text to last paragraph beginning with ”Type in...”.
- Page 5-18, added entry for Lucas Deeco to table.
- Page 5-20, in NOTE - changed directory name from ”\ADS_PC\DEMO.PCM” to ”\ADS_PC\<demosystem>.PCM”.
- Page 6-1, changed text of first paragraph.
- Page 6-2, under STEP 3, changed ”ADS” to ”OI_MENU” and added following paragraph.
- Page 6-3, under STEP 6, in the first paragraph added .PCM to folder name and changed paragraph two to read ”Type in TUTOR...”.
- Page 6-4, beginning with STEP 9 rest of chapter has been completely changed from the previous version.
- Page 7-1, added second paragraph and screen example at top of page.
- Page 7-3, second paragraph, changes [F10] to [Esc]. Deleted ”typically” after ”environment is...” from last sentence in first paragraph.
- Page 7-4, added paragraph at top of page.
- Page 7-5, in first paragraph, deleted rest of second sentence beginning with ”(see below...”.
- Page 7-8, first paragraph, added ”LUDCO” after VT100.
- Page 7-9, added entry for Lucas Deeco to table, deleted footnotes at bottom of table and added ”LUDCO” after VT100 in paragraph following the table.
- Page 7-10, added ”LUDCO” after VT100.
- Page 7-11, added sentence in second paragraph beginning with ”The only difference between ...”
- Page 8-1, previous chapter 8 has been completely replaced by the text and screen examples in this chapter 8.
- Page 9-5, added text and two screen examples beginning with ”There are two ...”.
- Page 10-1 added text and two screen examples at top of page beginning with ”There are two methods ...”.
- Page 11-1, added chapter 11.
- Page A-1, added ”or a Lucas Deeco ...” to last sentence in first paragraph.
- Page A-2, added terminal setup requirements for the Lucas Deeco terminal, added text beginning with ”either through the ...” to second bulleted item, added screen example, and in last bulleted item, changed ”PCOP is accessed ...” to ”PCOP can be directly...”.
- Page A-4, added text beginning with ”either through the ...” to first sentence and added screen example after first sentence. In the sentence beginning with ”If you have ...”, changed ADS_SET (TERMSET) to TERMSET., added the text beginning with ”or by choosing ...” after TERMF, followed by a new screen example.
- Page D-1, in second sentence of second paragraph, added statement after first PCOP beginning with ”either via the ...”.
- Page D-6, in fourth paragraph after the word file, added text beginning with ”execute the ...” and a new screen example. In last sentence in last paragraph after the word file, added text beginning with ”execute the ...” and screen example.

- Page D-8, deleted ”At the DOS ...” and the following command - replaced with ”Access TERMSET as indicated above”.

Content of this Manual

This manual contains the following information:

Chapter 1. Introduction to CIMPLICITY 90-ADS: Provides an overview of features of the CIMPLICITY 90-ADS Alphanumeric Display System.

Chapter 2. Getting Started - Series 90-70 PLC Users: Describes how to install the ADC module in a Series 90-70 rack and configure it in Logicmaster 90-70 configuration software.

Chapter 3. Getting Started - Series 90-30 PLC Users: Describes how to install the ADC module in a Series 90-30 baseplate and configure it in Logicmaster 90-30 configuration software.

Chapter 4. Setting Up and Connecting the Display Terminal: Describes the display terminals that can be used with your CIMPLICITY 90-ADS Operator Interface System and how to connect them to your CIMPLICITY 90-ADS system.

Chapter 5. Installing the CIMPLICITY 90-ADS Software: Describes how to install CIMPLICITY 90-ADS software on your computer, how to download the ADS software to the Series 90-30 and Series 90-70 Alphanumeric Display Coprocessor module, and how to use the ADS Software Setup Utility to customize the ADS for your application. It also tells you how to run the Demonstration Systems provided on the ADS software which allows you to view the ADS features for your terminal type.

Chapter 6. Development Tutorial - Creating Your First OIT System: This is a tutorial that walks you through the steps required to create an example of an operator interface system.

Chapter 7. Using the ADS Setup Utility: Describes how to customize the ADS software to fit the needs of your particular application.

Chapter 8. ADS Offline PC-Based Builder: Describes the differences between the PC-Based Builder and the ADS Builder on the ADC module.

Chapter 9. ADS Help Utility: Describes how to create and invoke context-sensitive help screens for your ADS operator interface systems.

Chapter 10. ADS Cross Reference Utility: Describes how to create a listing of the PID loop definitions and a listing of all cross references in the ADS operator interface system.

Chapter 11. Operator Interface Products Menu: Describes how to access and use the Operator Interface Products Menu which provides easy menu-driven access to several operator interface tools and utilities.

Appendix A. Terminal Setup: Provides setup information for the terminals which may be used with the CIMPLICITY 90-ADS System. It also contains information on TERMF, the terminal emulation software package.

Appendix B. ASCII Codes: Provides a list of standard ASCII codes.

Appendix C. Serial Port Pin Assignments and Cabling Diagrams: Describes the pin assignments for the serial ports for both the Series 90-70 and Series 90-30 ADC module and provides the information required to build serial cables for the system.

Appendix D. Changing Default Port Settings: Describes how to change the serial port settings to parameters other than the default settings.

Appendix E. Converting a Version 1 System to Version 2: Describes how to convert systems created with the 1.01, 1.02, 1.03 or 1.04 ADS software to the new form needed with Version 2 or later ADS software.

Related Publications

- *GFK-0641: CIMPLICITY™ 90-ADS Alphanumeric Display System Reference Manual* Provides the reference information for each sub-menu which allows you to build your own operator interface system. It also tells you how to execute a system, once it has been built and saved.
- *GFK-0255: Series 90™ Programmable Coprocessor and Support Software User's Manual*. Provides information required for configuration, programming and operation of the Series 90 Programmable Coprocessor Module (PCM).
- *GFK-0262: Series 90™-70 Programmable Controller Installation Manual*. Provides the information required for system planning and installation. Describes the hardware components of a system and system configuration, and provides installation and field wiring information for planning purposes and actual system installation.
- *GFK-0401: Workmaste™ II PLC Programming Unit Guide to Operation*. Describes installation and operation of the Workmaster II computer, specifically when used as the programming device for a Series 90 Programmable Logic Controller.
- *GFK-0263: Logicmaster™ 90-70 Programming Software User's Manual*. Explains how to use the Logicmaster 90 software to configure the Series 90-70 Programmable Logic Controller and create application programs.
- *GFK-0265: Series 90™-70 Programmable Controller Reference Manual*. Describes the programming instructions used to create application programs for the Series 90-70 Programmable Logic Controller.
- *GFK-0466: Logicmaster™ 90 Series 90-30 and 90-20 Programming Software User's Manual*. Explains how to use the Logicmaster 90-30 software to configure the Series 90-30 Programmable Logic Controller and create application programs.
- *GFK-0467: Series 90™-30/90-20 Programmable Controllers Reference Manual*. Describes the programming instructions used to create application programs for the Series 90-30 Programmable Logic Controller.
- *GFK-0487: Series 90™ PCM Development Software (PCOP) User's Manual*. Describes how to use the PCM programmer software (PCOP) and provides details for developing applications for the PCM.
- *GFK-0505: Operator Interface Terminal (OIT)*. Explains how to install, startup, and program the OIT.
- *GFK-0361: Operator Interface Terminal, Mini OIT Supplement*. Explains how to power up, operate, and configure the Mini OIT.

We Welcome Your Comments and Suggestions

At GE Fanuc automation, we strive to produce quality technical documentation. After you have used this manual, please take a few moments to complete and return the Reader's Comment Card located on the next page.

Henry A. Konat
Senior Technical Writer

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Chapter 1 Introduction to CIMPLICITY® 90-ADS

Section 1: Product Summary

The CIMPLICITY® 90-ADS (catalog number IC697ADS701 for Series 90-70; catalog number IC693ADS301 for Series 90-30), is a low cost, character based operator interface generator system for use with Series 90-70 and Series 90-30 (Model 331) PLCs. The ease of use of the CIMPLICITY 90-ADS software package makes it very attractive and easy to use for all levels of operators, even those with minimal computer experience. User programming is not required to create an operator interface system. Entry of data is easy - it is entered by following a progression of self explanatory screens with simple fill-in-the-blanks data entry forms. Your screens are created using a simple built-in text editor. Since no user programming is required, ADS is an attractive alternative to producing specialized MegaBasic™ or OptiBASIC™ programmed solutions. It's lower cost and simpler operation as compared to CIMPLICITY models I, W, D, and U make it well suited for those applications which do not need the high level bit-mapped graphics and capabilities of the other CIMPLICITY models.

External Interface

The CIMPLICITY 90-ADS software runs on the Series 90-70 Alphanumeric Display Coprocessor (ADC) module (catalog number IC697ADC701), or the Series 90-30 Alphanumeric Display Coprocessor module (catalog number IC693ADC311). Both modules have two serial ports for connection to external devices. Port 1 is used to connect to a Workmaster® II computer, or an IBM® or compatible Personal Computer (typically only needed for initial installation or for archiving a user-built system) or (optionally) to a printer. Port 2 connects to the display device that will function as the terminal for the system. Note that when using a computer as the terminal device, the simplest configuration would be to use it connected to Port 1 (since it must be connected to Port 1 to initially install the ADS Software anyway) and optionally connect the printer to Port 2. Figure 1-1 is a block diagram of a typical hardware configuration supporting the ADS software.

™MegaBasic is a trademark of Christopher Cochran; OptiBASIC is a trademark of Nematron Corporation.
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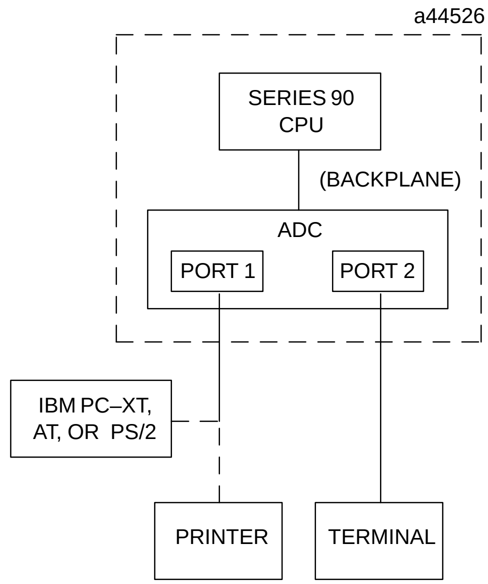

Figure 1-1. Typical CIMPLICITY 90-ADS Hardware Configuration

In a Series 90-70 PLC system, the ADC module may reside in either the main rack with the CPU or in an expansion rack. In a Series 90-30 PLC system, the ADC module must reside in a model 331 CPU baseplate; it cannot reside in an expansion baseplate. All communications between the ADC module and the CPU are carried out over the rack's backplane.

The Workmaster II, IBM PC / XT, AT, PS / 2® or compatible computer is used primarily to initially load the CIMPLICITY 90-ADS software onto the ADC module. It can also be used (when running TERMF) to function as a remote disk drive (PC:) for the archival storage and retrieval of systems or as a printer (print file stored on disk). Information on TERMF can be found in Appendix B in this manual, and in the Series 90 PCM User's Manual (GFK-0255).

The printer must supply a serial connection in order to be used with the ADC module. Line drawing characters, etc., will be converted to printable characters before being sent to the printer.

One of several different terminals may be connected to the ADC module. These include the GE Fanuc 12 inch OIT (color or monochrome), Mini OIT, Mini Touch OIT, any VT100 equivalent terminal, a Workmaster I or IBM PC-XT, a Workmaster II or IBM PC-AT, PS / 2 or compatible (color or monochrome) computer running TERMF, Nematron 12″ color touch terminals IWS-1511T and IWS-1513T and 12″ monochrome touch terminals IWS-1011T and IWS-1013T.

Some of the terminals listed above may be better than others for certain applications - see Appendix A for details.

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Product Organization

The ADS software is organized into two major components:

- PC-Based Builder
- ADC-Based Executor.

Both components are required to build or modify a system; they are included in the software (IC641SWP771). Only the Executor component is needed to execute a completed system. The Series 90 PCOP programming software contains a screen (see following chapter, **Installing the ADC**, for details) which allows you to either install all three components onto the ADC module for the development environment, or only the Executor component for an execute only environment. Each of the components is explained in detail in the chapters which follow.

Product Capacity

The following list gives the major maximum capacity numbers for the CIMPLICITY 90-ADS software product.

- Screens - 999 † (40 - 60 typical)
- User-Defined Function Keys - 15 per screen
- Alarm Pages - 999 † (10 - 20 typical)
- Reports - 999 † (10 - 20 typical)
- PLC Data Sources - Limited only by available memory (250 - 400 typical)
- PLC Alarm Sources - Limited only by available memory (100 - 200 typical)

† The maximum available to a particular system will be limited by available memory.

In addition, the fastest that a PLC data or alarm source may be scanned is once every 250 milliseconds.

Note

Typical numbers are based on (1) a system resident on the ADCs RAM: disk, (2) the ADS software installed on the ADC in “execute only” mode and (3) no option modules other than the print spooler being used. Use of the Fault Tables option module reduces the “typical” numbers by about 20%; use of the PID module reduces them by about 23%.

Chapter 2

Getting Started - Series 90-70 PLC Users

This chapter explains how to install and set up your CIMPLICITY 90-ADS Display system on your Series 90-70 PLC system.

The chapter is divided into two sections. The necessary equipment and software packages required for the installation process are described first. After that, separate sections describe the installation procedure for installing your ADC module and configuring it in Logicmaster 90-70 software.

Section 1. Installing the Alphanumeric Display Coprocessor (ADC) module in a Series 90-70 PLC rack.

Section 2. Configuring the ADC module in Logicmaster 90 configuration software. Explains how to add an ADC module to the Series 90-70 I/O configuration file.

What You Will Need

Before you can begin the installation procedure, you must have the following items:

1. A Series 90-70 Programmable Logic Controller (PLC).
2. A computer with a hard disk. This may be:
   - A Workmaster II industrial computer or IBM Personal System/2 (PS/2) personal computer.
   - An IBM PC/XT or AT personal computer with an 83-key or 101-key keyboard.
   - An industrial IBM AT computer with a standard 101-key keyboard.
   - A Workmaster or Cimstar I industrial computer with an 83-key or 101-key keyboard.
3. A Logicmaster 90 system, including software, hardware, and appropriate cables. Refer to the *Logicmaster 90-70 Programming Software User's Manual* (GFK-0263).
4. CIMPLICITY 90-ADS package (IC697ADS701) which includes:
   - An Alphanumeric Display Coprocessor Module (ADC) to install: catalog number IC697ADC701 for a Series 90-70 PLC.
   - CIMPLICITY 90-ADS software
   - Manual - GFK-0449, CIMPLICITY 90-ADS Alphanumeric Display System User's Manual.
   - PCM Utility software (PCOP), IC641SWP061 and User's Manual.
   - The following three RS-232 cables:
     - IC690CBL701 for a Workmaster industrial computer;
     - IC690CBL702 for an IBM PC-AT or compatible personal computer;
     - IC690CBL705 for a Workmaster II or an IBM Personal System/2 personal computer.
5. One of the following terminals or computers:
   - GE Fanuc OIT (color or monochrome)
   - Mini or Mini Touch Screen OIT
   - VT100 compatible terminal
   - Workmaster or IBM PC-XT computer with a monochrome or color display
   - Workmaster II or IBM PC-AT, PS/2, or compatible computer with a monochrome or color display
   - Nematron 12″ color OptiTOUCH terminal IWS-1511T or IWS-1513T
   - Nematron 12″ monochrome OptiTOUCH terminal IWS-1011T or IWS-1013T
   - Lucas Deeco ST-2200 terminal

The steps required for installing the ADC module, configuring the ADC module, connecting and setting up external hardware, and installing the CIMPLICITY 90-ADS software in the appropriate PLC system are described in the following sections.

The first step in the installation procedure is to physically install the Alphanumeric Display Coprocessor module in a Series 90-70 PLC rack, and verify that it is working properly.

Section 1: Installing the Series 90-70 ADC Module

The following steps should be followed for installation of the ADC module in your Series 90-70 PLC.

STEP 1

Remove the ADC module from its box. Next, refer to Figure 2-1 and become familiar with the location of the items on the module which are described following the figure.

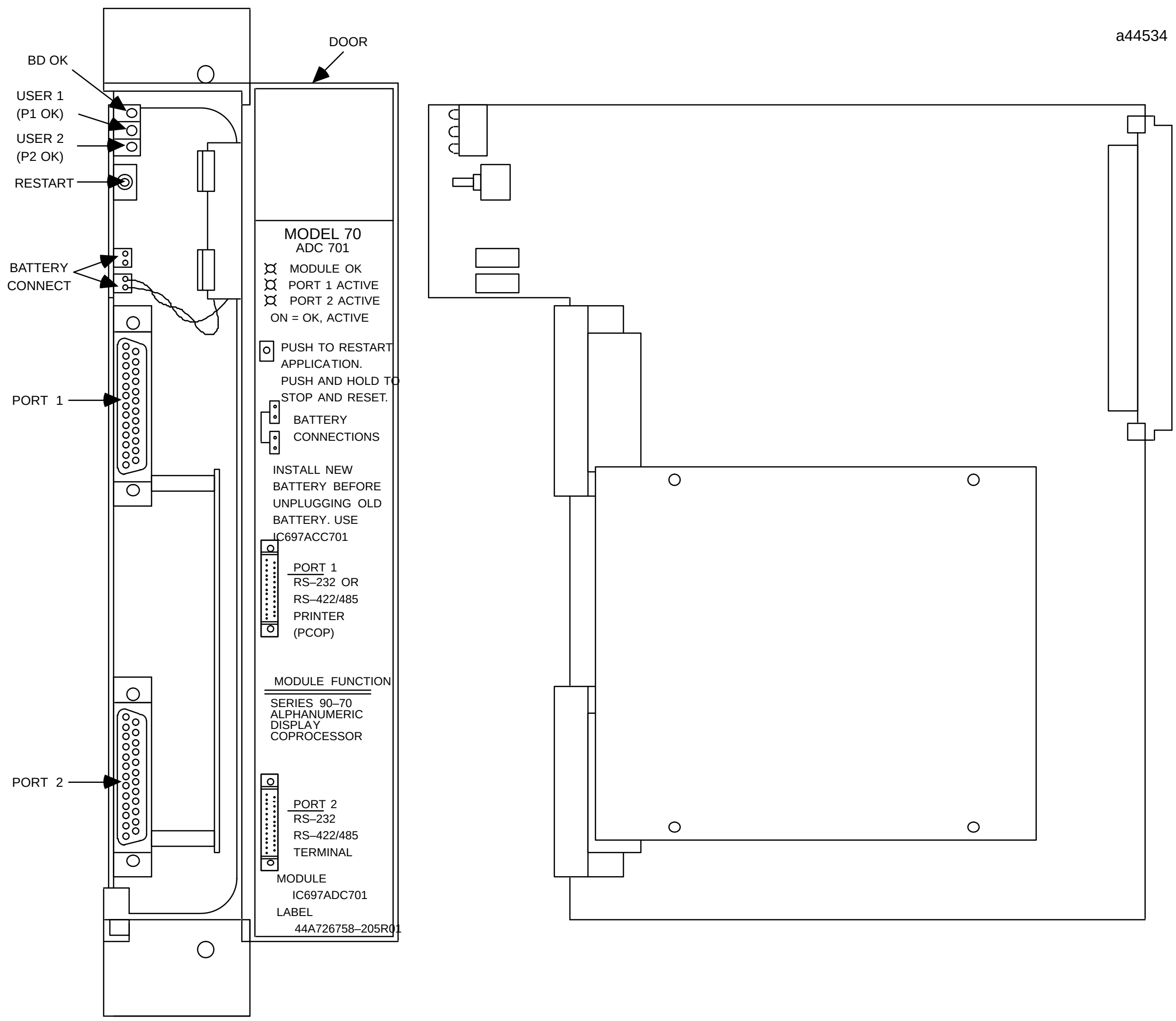


Figure 2-1. Series 90-70 ADC Module

Lithium Battery

A lithium battery (IC697ACC701) is installed as shown in Figure 2-1. This battery maintains user memory when power is removed from the PLC. If a low battery is detected, it is reported in the PLC fault table.

When replacing a battery, be sure to install the new battery in the unused battery connector before removing and discarding the old battery.

Note

When the ADC will be stored for an extended period of time, the battery should first be disconnected. However, if it is to be stored as a spare for a running application, you may wish to retain memory already stored on the module. If this is the case you would keep the battery connected.

The shelf life of the lithium battery, when not connected on the ADC, is 10 years at 20°C (68°F). If the battery is connected on an ADC module to retain memory while the module is being stored, the life of the battery is about 6 months (without power applied).

Caution

Do not discard the lithium battery in fire. Do not attempt to recharge the battery. Do not short the battery. The battery may burst or burn, or release hazardous materials.

Three LED Indicators

The three LED indicators, as shown in figure 2-1, are mounted along the top front edge of the ADC board.

Module OK (OK) LED

The MODULE OK LED indicates the current status of the ADC board. It has three possible conditions:

Off: When the LED is off, the ADC is not functioning. This is the result of a hardware malfunction, i.e., the diagnostic checks detect a failure, the ADC fails, or the PLC is not present. Corrective action is required in order to get the ADC functioning again.

On: When the LED is steady on, the ADC is functioning properly. Normally, this LED should always be on, indicating that the diagnostic tests were successfully completed and the configuration data for the module is good.

Flashing: The LED flashes during power-up diagnostics.

Note

The ADC has a watchdog timer that is periodically reset by the ADC software. If the watchdog timer expires, the ADC will cease functioning and the MODULE OK (BD OK) LED will turn off.

Serial Port Activity LEDs (PORT 1 and PORT 2)

The other two LED indicators, PORT 1 (PORT 1 ACTIVE) and PORT 2 (PORT 2 ACTIVE), blink to indicate activity on the two serial ports. PORT 1 blinks when port 1 either sends or receives data; PORT 2 blinks when port 2 either sends or receives data.

Restart/Reset Pushbutton

The Restart / Reset pushbutton on the front of the ADC board is a multifunction pushbutton, which can be pressed to use a different function of the ADC.

If the Restart / Reset pushbutton is depressed for less than 5 seconds, when the MODULE OK (BD OK) LED is on, the ADC will restart the CIMPLICITY 90-ADS software if it has been installed on the module. This reset is referred to as a ”soft” reset. A power cycle will also cause the CIMPLICITY 90-ADS software to restart if it has been installed on the module.

If the Restart / Reset pushbutton is depressed continuously for 5 seconds or more, when the MODULE OK (BD OK) LED is on, the ADC will perform a reset operation and reinitialize to the factory default configuration. This reset is referred to as a ”hard” reset. The hard reset is used to establish communications with the ADC module and an attached computer.

A hard reset does not erase the module - it only stops the execution of the ADS software.

Table 2-1. Comparison of Hard and Soft Reset

Reset Type	Press the Restart/Reset Pushbutton	Result	Purpose
Hard	More than 5 seconds	Will permit programmer attachment. Has the ability to restart using a soft reset. Utilizes factory default communications settings.	CIMPLICITY90-ADS software installation and serial port communications configuration modification.
Soft	Less than 5 seconds	CIMPLICITY90-ADS software will be restarted if installed.	Normal operating mode.

Two Serial Communication Ports

The two connectors on the ADC module provide access to the serial ports which are used to communicate with external devices. Both of the ports can be used for either RS-232 or RS-485 modes of operation. Refer to Appendix B for detailed serial port information and pin assignments.

STEP 2

Install the battery on the ADC module.

STEP 3

Power down the Series 90-70 PLC system.

STEP 4

Locate the desired rack and slot in which you wish to install the ADC module and follow the module installation information below.

Important ADC Installation Information

In a Series 90-70 PLC single rack system, the ADC resides in the same rack as the CPU. In a multiple rack system, the ADC can reside in either the Series 90-70 CPU rack or in an I / Oexpansion rack.

The following illustration shows one possible system configuration for installing a Series 90-70 ADC in a main or expansion rack.

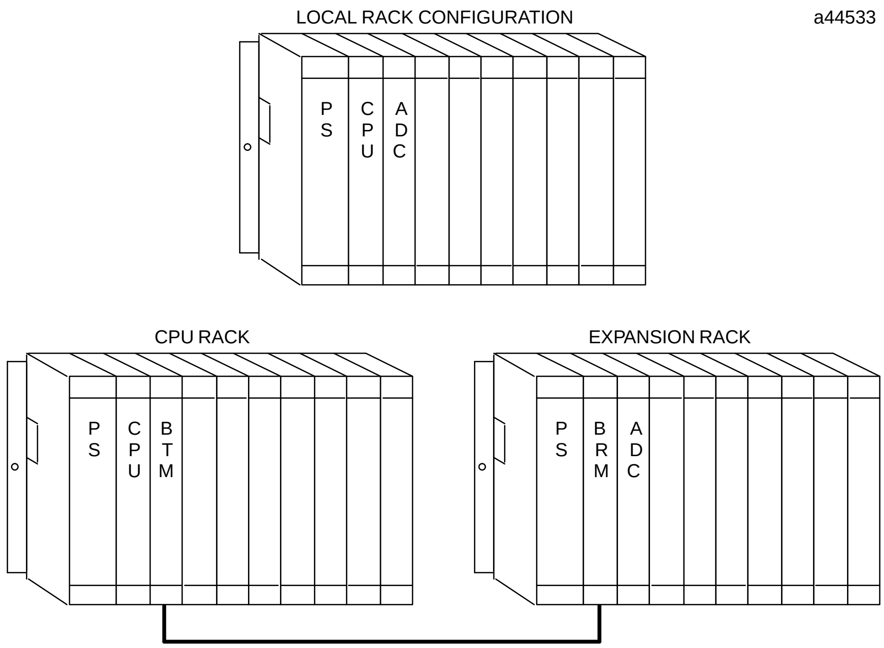


Figure 2-2. Examples of Series 90-70 ADC Module Location in a Rack

The Alphanumeric Display Coprocessor Module may be placed in any slot not already allocated in any rack, with the following cautions:

- The maximum number of ADC modules per Series 90-70 PLC system is 63.
- When ADCs are installed in a Series 90-70 rack, all the slots between the ADC module and the CPU module must be occupied. If any of these slots are empty, the ADC module will not be able to communicate across the backplane to the Series 90-70 PLC CPU.

STEP 5

Slide the ADC completely into the card guide in the slot. The three LEDs will be at the top of the board.

STEP 6

Align the board with the connector on the rack backplane and slide it towards the connector until it has started to seat.

STEP 7

Place one thumb on the left side of the top plastic flange and the other thumb on the left side of the bottom plastic flange. Push the board into the connector until the top and bottom latches click onto the rack rails. Visually inspect the board to be sure that it has seated properly.

STEP 8

Before turning-on power to the Series 90-70 PLC, set the CPU Run / Stop switch to STOP. This will prevent your application program, if any, from initiating any command that may affect the operation of the ADC module.

STEP 9

Power up the PLC rack. The top green LED (MODULE OK) on the faceplate of the ADC module will flash during power-up diagnostics. Once the ADC is ready, this LED will stop flashing and remain ON. If the LED continues to flash or does not come on, refer to the **Troubleshooting** information for help.

STEP 10

Repeat this procedure for each ADC module that you wish to install.

Congratulations- you have now completed installing your Series 90-70 ADC module or modules. After verifying that all of the MODULE OK LEDs are ON, you must tell the PLC CPU that the modules are there. This is done by configuring the ADCs using Logicmaster 90 software.

You should now go on to Section 2 of this chapter for instructions on how to configure the ADC module using the Logicmaster 90 Programming Software package.

Troubleshooting

After completing the above steps to install the ADC and replace and / or connect the battery, when power is turned-on, the MODULE OK (OK) LED should be on steady. If it is not, the problem may be either that the LED is burned out, or the board has not passed diagnostics. Use the following procedure to determine the cause of the problem.

6. Make sure that power to the rack is on, the PLC is okay, and that the ADC is seated properly.
7. Power off and then back on, or hard reset the ADC. Try to access the ADC using PCOP (refer to page 5-10 for more information). You should enter PCOP and verify that the ONLINE indication is displayed at the bottom of the screen. If PCOP goes ONLINE, then the problem is simply a burned out LED.
8. Power off and remove the battery; short out the circuit board connector leads with a screwdriver. This will delete everything from the battery-backed RAM. All user programs and files will be deleted. (Because memory can be maintained through the backplane connection on the Series 90-70 ADC, you may need to physically remove the module from the rack.) Then, reconnect the battery, power up again, hard reset the ADC and try to access the ADC using PCOP. You should enter PCOP and verify that the ONLINE indication is displayed at the bottom of the screen.

Warning

Do not short the battery itself. The battery may burst or burn, or release hazardous materials.

9. If the flag at the bottom of the PCOP screen still does not display ”ONLINE,” the board may be defective. You should return it for repair.
10. Check the PLC fault table in the Logicmaster 90 software. If there is a bad or missing module fault, the board may be defective; otherwise, contact the GE Fanuc hotline for assistance.

Section 2: Configuring the ADC Module in Logicmaster 90-70 Software

The second step in the CIMPLICITY 90-ADS installation procedure is to add the ADC module(s) you have installed in the PLC racks to the Series 90-70 I/O configuration file using Logicmaster 90 configuration software.

Note

The following steps are for installing the ADC module only. These steps should not be performed unless you are familiar with Logicmaster 90 configuration software which is described in GFK-0263, Logicmaster 90 Programming Software User's Manual.

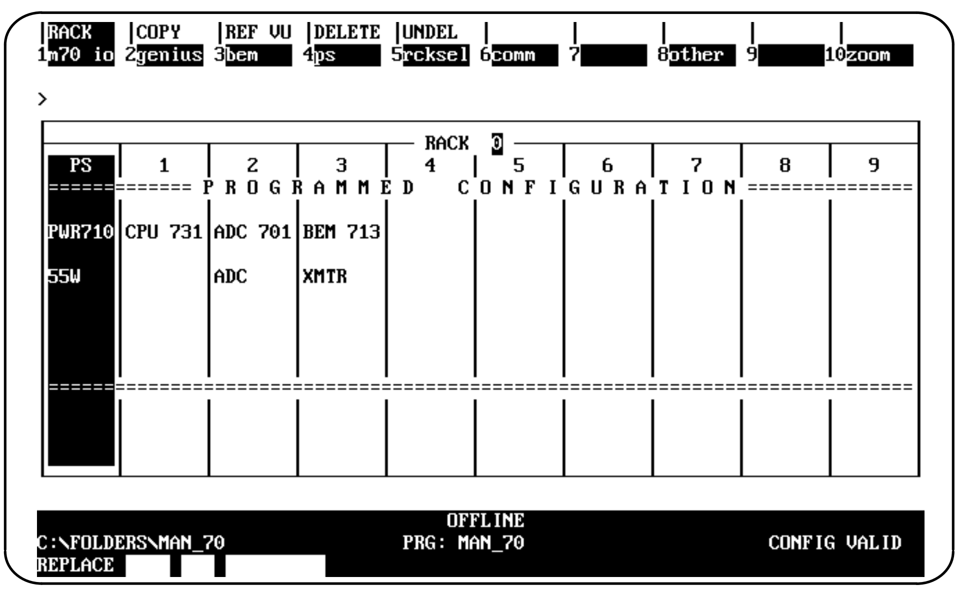
STEP 1

Start-up your Logicmaster 90 software on your computer and enter the Logicmaster 90-70 Configuration package.

STEP 2

Choose F1 to enter I/O Configuration. A setup screen representing the modules in a rack will be displayed.

The following example screen represents a sample Series 90-70 PLC system:



STEP 3

Move the cursor to the slot where you have an ADC module installed.

STEP 4

Press F8 (other).

STEP 5

Press F4 (oi). This abbreviation stands for Operator Interface.

STEP 6

Choose IC697ADC701 Alphanumeric Display Coprocessor. Depending on your version of Logicmaster 90-70 software, the module name may be Alphanumeric Display Coprocessor or Access 90 Display Coprocessor, however the catalog number will always be IC697ADC701. Module names may sometimes change, catalog numbers DO NOT change, so you should always select modules in the configuration by their catalog number.

Note

Repeat steps 3, 4, 5, and 6 for each ADC module you have installed.

STEP 7

Press the [ESC] key to exit this screen. This will also automatically SAVE this configuration to disk.

Note

You do not have the ability to zoom into this module - all module configuration will be downloaded with the ADS software. This will be discussed later in this chapter.

CONFIG VALID is displayed in the lower right corner of the screen after the configuration is successfully validated. When CONFIG INVALID is displayed, the file can not be stored to the PLC. A CONFIG INVALID status is most likely to occur where:

- A slot in the PLC rack is vacant between the CPU and ADC module.

For more details regarding CONFIG INVALID, refer to your Logicmaster 90-70 Programming Software User's manual, GFK-0263.

STEP 8

Go to the Logicmaster 90-70 Utilities Menu and STORE your configuration to the PLC.

You have now completed configuring your Series 90-70 ADC module(s) in Logicmaster 90. Go on to Chapter 4 which tells you how to set up and connect your display terminal.

Chapter 3 Getting Started - Series 90-30 PLC Users

This chapter explains how to install and set up your CIMPLICITY 90-ADS Display system on your Series 90-30 PLC system.

The chapter is divided into two sections. The necessary equipment and software packages required for the installation process are described first. After that, separate sections describe the for installing your ADC module in a Series 90-30 baseplate and configuring it in Logicmaster 90-30 configuration software.

Section 1. Installing the Alphanumeric Display Coprocessor (ADC) module in a Series 90-30 PLC baseplate.

Section 2. Configuring the ADC module in Logicmaster 90 configuration software. Explains how to add an ADC module to the Series 90-30 I/O configuration file.

What You Will Need

Before you can begin the installation procedure, you must have the following items:

1. A Series 90-30 Model 331 or Model 341 Programmable Logic Controller (PLC).
2. A computer with a hard disk. This may be:
   - A Workmaster II industrial computer or IBM PersonalSystem / 2(PS / 2)personal computer.
   - An IBM PC / XT or AT personal computer with an 83-key or 101-key keyboard.
   - An industrial IBM AT computer with a standard 101-key keyboard.
   - A Workmaster or Cimstar I industrial computer with an 83-key or 101-key keyboard.
3. A Logicmaster 90 system, including software, hardware, and appropriate cables. Refer to either the *Logicmaster 90-30 Programming Software User's Manual* (GFK-0466), for more information.
4. CIMPLICITY 90-ADS package (IC693ADS301) which includes:
   - An Alphanumeric Display Coprocessor Module (ADC) to install and test: catalog number IC693ADC311 for a Series 90-30 PLC.
   - CIMPLICITY 90-ADS software
   - Manual - GFK-0449, CIMPLICITY 90-ADS Alphanumeric Display System User's Manual.
   - PCM Utility software (PCOP), IC641SWP061 and User's manual.
   - The following three RS-232 cables:
     - IC690CBL701 for a Workmaster industrial computer;
     - IC690CBL702 for an IBM PC-AT or compatible personal computer;
     - IC690CBL705 for a Workmaster II or an IBM Personal System / 2 personal computer.
5. One of the following terminals or computers:
   - GE Fanuc OIT (color or monochrome)
   - Mini or Mini Touch Screen OIT
   - VT100 compatible terminal
   - Workmaster or IBM PC-XT computer with a monochrome or color display
   - Workmaster II or IBM PC-AT, PS / 2, or compatible computer with a monochrome or color display
   - Nematron 12″ color OptiTOUCH terminal IWS-1511T or IWS-1513T
   - Nematron 12″ monochrome OptiTOUCH terminal IWS-1011T or IWS-1013T
   - Lucas Deeco ST-2200 terminal

The first step in the installation procedure is to physically install the Alphanumeric Display Coprocessor module in a Series 90-30 baseplate, and verify that it is working properly.

Section 1: Installing the Series 90-30 ADC Module

The following steps should be followed for installation of the ADC module in your Series 90-30 PLC. Remember - the ADC can only be installed in a Model 331 or Model 341 Series 90-30 PLC.

STEP 1

Remove the Alphanumeric Display Coprocessor module from its box. Refer to Figure 3-1 and become familiar with the location of the items on the module described following the figure.

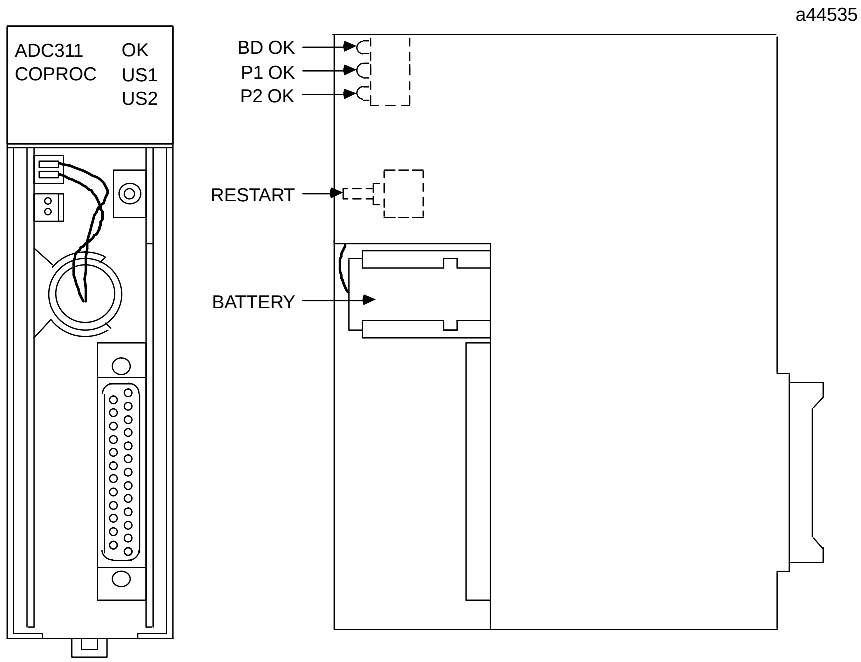


Figure 3-1. Series 90-30 ADC Module

Lithium Battery

A lithium battery (IC697ACC701) is installed as shown in Figure 3-1. This battery maintains user memory when power is removed from the PLC. If a low battery is detected, it is reported in the PLC fault table.

When replacing a battery, be sure to install the new battery in the unused battery connector before removing and discarding the old battery.

Note

When the ADC will be stored for an extended period of time, the battery should first be disconnected. However, if it is to be stored as a spare for a running application, you may want to retain memory already stored on the module. If this is the case you would keep the battery connected.

The shelf life of the lithium battery, when not connected on the ADC, is 10 years at 20°C (68°F). If the battery is connected on an ADC module to retain memory while the module is being stored, the life of the battery is about 6 months (without power applied).

Warning

Do not discard the lithium battery in fire. Do not attempt to recharge the battery. Do not short the battery. The battery may burst or burn, or release hazardous materials.

Three LED Indicators

The three LED indicators, as shown in Figure 3-1, are mounted along the top front edge of the ADC board.

Module OK (OK) LED

The MODULE OK (OK) LED indicates the current status of the ADC board. It has three possible conditions:

Off: When the LED is off, the ADC is not functioning. This is the result of a hardware malfunction, i.e., the diagnostic checks detect a failure, the ADC fails, or the PLC is not present. Corrective action is required in order to get the ADC functioning again.

On: When the LED is steady on, the ADC is functioning properly. Normally, this LED should always be on, indicating that the diagnostic tests were successfully completed and the configuration data for the module is good.

Flashing: The LED flashes during power-up diagnostics.

Note

The ADC has a watchdog timer that is periodically reset by the ADC software. If the watchdog timer expires, the ADC will cease functioning and the MODULE OK (BD OK) LED will turn off.

Serial Port Activity LEDs (PORT 1 and PORT 2)

The other two LED indicators, PORT 1 (PORT 1 ACTIVE) and PORT 2 (PORT 2 ACTIVE), blink to indicate activity on the two serial ports. PORT 1 blinks when port 1 either sends or receives data; PORT 2 blinks when port 2 either sends or receives data.

Restart/Reset Pushbutton

The Restart/Reset pushbutton on the front of the ADC board is a multifunction pushbutton, which can be pressed to use a different function of the ADC.

If the Restart/Reset pushbutton is depressed for less than 5 seconds, when the MODULE OK (BD OK) LED is on, the ADC will restart the CIMPLICITY 90-ADS software if it has been installed on the module. This reset is referred to as a “soft” reset. A power cycle will also cause the CIMPLICITY 90-ADS software to restart if it has been installed on the module.

If the Restart / Reset pushbutton is depressed continuously for 5 seconds or more, when the MODULE OK (BD OK) LED is on, the ADC will perform a reset operation and reinitialize to the factory default configuration. This reset is referred to as a “hard” reset. A hard reset is used to establish communications with the ADC module and an attached computer.

A hard reset does not erase the module - it only stops the execution of the ADS software.

In factory mode, CIMPLICITY 90-ADS software installation and serial port communications configuration development are performed. The CIMPLICITY 90-ADS software may be restarted by a doing a soft reset or cycling power to the rack.

Table 3-1. Comparison of Hard and Soft Reset

Reset Type	Press the Restart/Reset Pushbutton	Result	Purpose
Hard	More than 5 seconds	Will permit programmer attachment. Has the ability to restart using a soft reset. Utilizes factory default communications settings.	CIMPLICITY 90-ADS software installation and serial port communications configuration modification.
Soft	Less than 5 seconds	CIMPLICITY 90-ADS software will be restarted if installed.	Normal operating mode.

Two Serial Communication Ports

The Series 90-30 ADC module has a single serial port connector which supports two serial ports. This single port connector is divided into two serial ports using the WYE cable (labeled PCM COMM CABLE, IC693CBL305A) which is included in your CIMPLICITY 90-ADS package (see figure 3-2). The two serial ports are used to communicate with external devices. Both of the ports can be used for either RS-232 or RS-485 modes of operation. Refer to Appendix B for detailed port information and pin assignments.

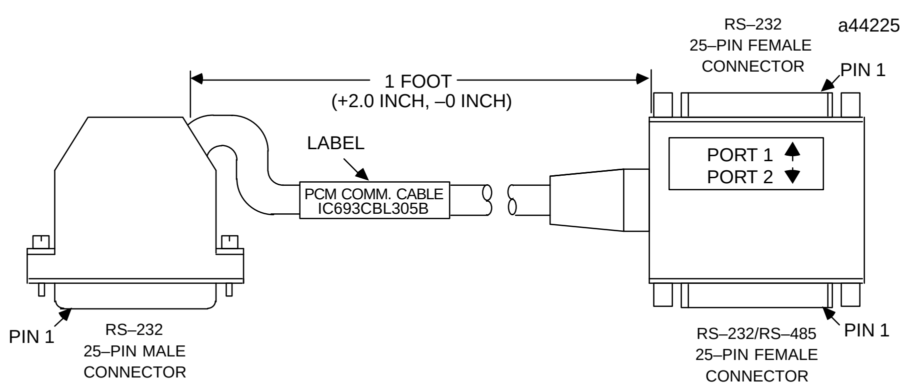


Figure 3-2. Series 90-30 Wye Cable

STEP 2

Install the battery on the ADC module.

STEP 3

Use Logicmaster 90 software or the Hand-Held Programmer to stop the PLC.

STEP 4

Power down the Series 90-30 PLC system.

STEP 5

Locate the desired baseplate and slot in which you want to install the ADC module and follow the module installation information below.

The Series 90-30 ADC module can only be used in a Model 331 or Model 341 PLC system and must be installed in the main baseplate with the CPU. It **cannot** be installed in an expansion baseplate.

STEP 6

Install the Series 90-30 ADC module using the following instructions:

- Grasp the module firmly with the terminal board toward you and with the rear hook facing away from you. The three LEDs will be at the top of the board.
- Align the ADC module with the desired baseplate slot and connector. Tilt the module upwards so that the top rear hook of the module engages the slot on the baseplate.
- Swing the module downward until the module and baseplate connectors mate and the lock-lever on the bottom of the module snaps into place fully engaging the baseplate notch.
- Visually inspect the module to be sure that it it properly seated.

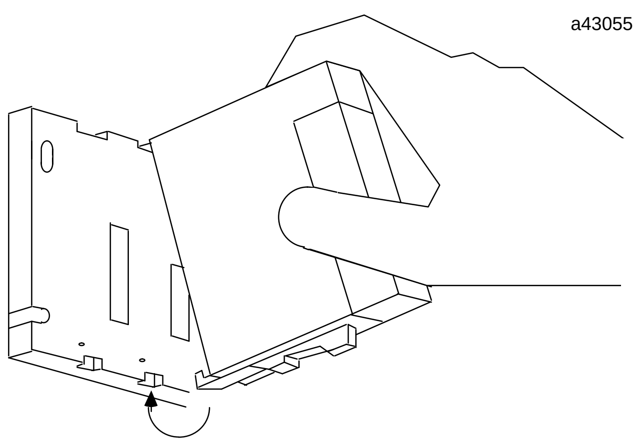


Figure 3-3. Inserting a Module

STEP 7

Power up the PLC rack. The top green LED (MODULE OK) on the faceplate of the ADC module will flash during power-up diagnostics. Once the ADC is ready, this LED will stop flashing and remain ON. If the LED continues to flash or does not come on, refer to the **Troubleshooting** information for help.

STEP 8

Repeat this procedure for each ADC module that you want to install. The maximum number of ADC modules you can install in a Series 90-30 PLC system is 4 (only in a Model 331 or Model 341).

Troubleshooting

After completing the above steps to install the ADC and replace and / or connect the battery, when power is turned-on, the MODULE OK (OK) LED should be on steady. If it is not, the problem may be either that the LED is burned out, or the board has not passed diagnostics. Use the following procedure to determine the cause of the problem.

1. Make sure that power to the rack is on, the PLC is okay, and that the ADC is seated properly.
2. Power off and then back on, or hard reset the ADC. Try to access the ADC using PCOP (refer to page 5-10 for more information). You should enter PCOP and verify that the ONLINE indication is displayed at the bottom of the screen. If PCOP goes ONLINE, then the problem is simply a burned out LED.
3. Power off and remove the battery; short out the circuit board connector leads with a screwdriver. This will delete everything from the battery-backed RAM. All user programs and files will be deleted. Because memory can be maintained through the backplane connection on the Series 90-30 ADC, you may need to physically remove the module from the baseplate.) Then, reconnect the battery, power up again, hard reset the ADC and try to access the ADC using PCOP. You should enter PCOP and verify that the ONLINE indication is displayed at the bottom of the screen.
4. Do not short the battery itself. The battery may burst or burn, or release hazardous materials.
5. If the flag at the bottom of the PCOP screen still does not display “ONLINE,” the board may be defective. You should return it for repair.
6. Check the PLC fault table in the Logicmaster 90 software. If there is a bad or missing module fault, the board may be defective; otherwise, contact the GE Fanuc hotline for assistance.

Congratulations- you have now completed installing all of your ADC modules into your Series 90-30 PLC system. After verifying that all of their MODULE OK LEDs are ON, you must now tell the PLC CPU that they are there. This is done by configuring the ADC modules in Logicmaster 90-30 software.

You should now go to the next section for instructions on how to configure the ADC module using the Logicmaster 90 Programming Software package

Section 2: Configuring the ADC Module in Logicmaster 90-30 Software

The second step in the CIMPLICITY 90-ADS installation procedure is to add the ADC module(s) you have installed to the Series 90-30 I/O configuration file using Logicmaster 90 configuration software.

Note

The following steps are for installing the ADC module only. These steps should not be performed unless you are familiar with Logicmaster 90-30 configuration software which is described in GFK-0466, Logicmaster 90-30 Programming Software User's Manual. You do not have to perform the following steps for a Series 90-30 ADC module using Logicmaster 90-30 configuration software. You can configure the module using the Hand-Held Programmer. If you are going to use Logicmaster 90 software for configuration, refer to the information on module configuration in Chapter 10 of GFK-0466, the Logicmaster 90-30 Programming Software User's Manual.

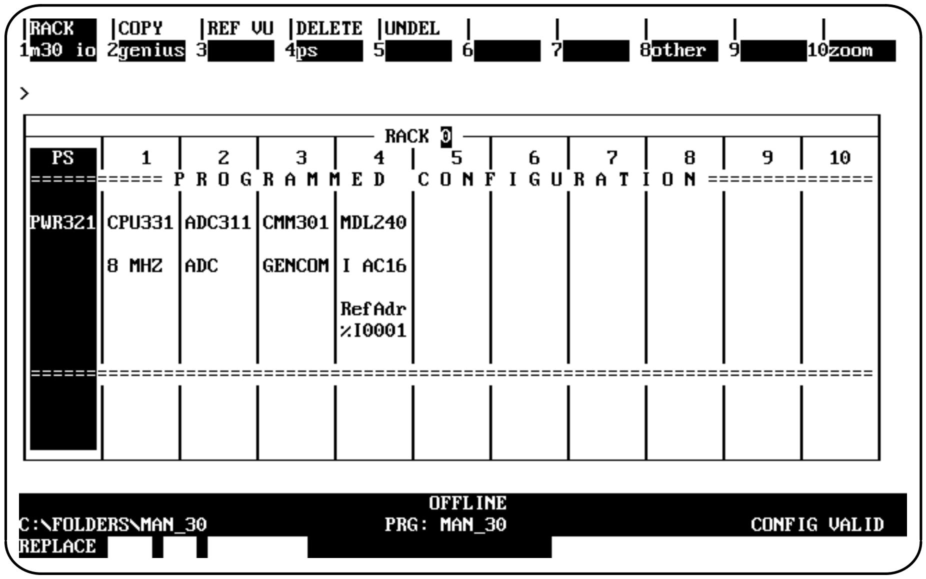
STEP 1

Start-up your Logicmaster 90 software on your computer and enter the Logicmaster 90-30 Configuration package.

STEP 2

Choose F1 to enter I/O Configuration. A setup screen representing the modules in a baseplate will be displayed.

The following example screen represents a sample Series 90-30 PLC system:



STEP 3

Move the cursor to the slot where you have an ADC module installed.

STEP 4

Press F8 (other).

STEP 5

Press F4 (oi). This abbreviation stands for Operator Interface.

STEP 6

Choose IC693ADC311 CIMPLICITY 90-ADS Coprocessor. Depending on your version of Logicmaster 90-30 software, the module name may be Alphanumeric Display Coprocessor or Access 90 Display Coprocessor, however the catalog number will always be IC693ADC311.

Note

Repeat steps 3, 4, 5, and 6 for each ADC module you have installed.

STEP 7

Press the [ESC] key to exit this screen. This will also automatically save this configuration to disk.

Note

You Do NOT have the ability to zoom into this module - all module configuration will be downloaded with the ADS software. This is discussed later in this chapter.

CONFIG VALID is displayed in the lower right corner of your display screen after the configuration is successfully validated. When CONFIG INVALID is indicated, the file can not be stored to the PLC. A CONFIG INVALID status is most likely to occur where:

- A slot in the PLC is vacant between the CPU and an ADC module.

You have now completed configuring your Series 90-30 ADC module(s) in Logicmaster 90-30. Go on to Chapter 4 which tells you how to set up and connect your display terminal.

Chapter 4 — Setting Up and Connecting the Display Terminal

This chapter provides you with the steps required to connect your display terminal to the Series 90 ADC module and set up the terminal for operation.

Find the terminal you are using in the following list, go to that section and follow the steps to set up your terminal and connect it to the ADC module. Refer to Appendix A for a description of the terminals and advantages to using one as opposed to another.

Note

> Before any of the steps in the following sections are performed, the ADC module must have already been installed in the PLC and properly configured as described previously. If you have not done this, go back to Chapter 2 (for Series 90-70 users) or Chapter 3 (for Series 90-30 users) and follow the steps for module installation and configuration in Logicmaster software before proceeding any further.

Section 1. GE Fanuc Monochrome OIT (IC600KD510 or IC600KD513, or IC600KD530 or IC600KD533); GE Fanuc Color OIT (IC600KD512 or IC600KD514, or IC600KD532 or IC600KD534); Nematron 12″ color OptiTOUCH terminal IWS-1511T or IWS-1513T and 12″ monochrome OptiTOUCH terminals IWS-1011T or IWS-1013T.

Section 2. GE Fanuc Mini OIT (IC600KD515); GE Fanuc Mini Touch OIT (IC600KD516)

Section 3. VT100 or compatible

Section 4. Monochrome IBM or compatible personal computer running TERMF; Color IBM or compatible personal computer running TERMF

Section 5. Lucas Deeco ST-2200

Section 1: Using a GE Fanuc Monochrome or Color OIT

If the terminal you have selected is a GE Fanuc monochrome or color OIT, or a Nematron OptiTOUCH color or OptiTOUCH monochrome, use the following steps. Note that the CIMPLICITY 90-ADS software refers to the GE Fanuc monochrome OIT as MOIT, the GE Fanuc color OIT as COIT, the Nematron OptiTOUCH color terminal as TCOIT, and the Nematron OptiTOUCH monochrome terminal as TMOIT.

Note

The following steps should be used as a quick reference for CIMPLICITY 90-ADS use only. These steps should not be performed without first reviewing Chapters 1, 2, and 3 of your Operator Interface Terminal User's Manual, GFK-0505 (for IC600KD53X terminals), or GEK-90817 for IC600KD51X terminals, or the applicable Nematron color touch or monochrome touch terminal manual.

STEP 1

Make sure that the OIT power is turned off. Connect an IBM XT compatible keyboard to the applicable connector on the back of your OIT. Note that the keyboard may have either DIN or phone jack style connector.

Many IBM AT compatible keyboards have a switch which allows it to perform as an XT style keyboard. One such keyboard is the GE Fanuc Cimstar keyboard, IC642PKB250B (B Revision or later only; not the A Revision).

STEP 2

Turn on the OIT.

STEP 3

Press the [Ctrl-1] keys (press and hold Ctrl then press 1) on the attached keyboard. The OIT Configuration Menu will be displayed on the screen. Note that for the IC600KD53X terminals only, you must press the F7 function key when the Main Menu is displayed to select the Configuration Menu.

STEP 4

Fill in the Configuration Menu as follows:

```
                         Firmware Release X.X        27FEB91

MODE                     ONLINE   ANSI NO ECHO      SEND ANY CASE
DATE/TIME                27FEB91  NO DISPLAY      14:51  NO DISPLAY
END LINE/COLOR           NO WRAP   NO AUTO LF      COLOR
CURSOR/SCREEN            NO CURSOR             CRT SAVER OFF
STATUS/CONTROLS          ONE
PRINT SCREEN             KEY OFF     GENERIC ASCII     PORT 1
KEYBOARD                 ONE
PORT 1                   19.2K NONE 8 BIT 1 STOP SOFT PT TO PT
PORT 2                   19.2K NONE 7 BIT 1 STOP HARD PT TO PT
PORT 3                   19.2K NONE 7 BIT 1 STOP NONE
CONFIGURATION            SAVE
CONFIDENCE TESTS         DIAGNOSTIC
EXTENDED MEMORY          SAVE   SCREENS 00 TO SCREENS 00


 -UP-     -DOWN-     -LEFT-     -RIGHT-    -SELECT-   -PERFORM-
UP KEY   DOWN KEY   LEFT KEY   RIGHT KEY     HOME       ENTER

_____________________________________________________________________________
  MAIN                      SAVE   RECALL                          RUN
   F1      F2      F3      F4      F5      F6      F7      F8      F9     F10
 Power-up Status:  DISPLAY MAIN MENU
```

Note

The display on the screen may be slightly different than the one shown above as determined by the firmware revision of your OIT. However, all of the information is the same and should be set as shown. For the COLOR entry, substitute MONOCHROME for COLOR if you have a monochrome terminal. The date and time display may be enabled if you so desire. If you are using an OIT with version 1.6 or earlier firmware, the parity setting must be set to ZERO rather than to NONE.

The OIT Port 1 setting is set to match the default setting of Port 2 on the Alphanumeric Display Coprocessor module so that they can communicate.

The Configuration Menu specifies the serial communications parameters, ports, and other parameters for the OIT. Use the cursor to move through the items on the screen. Use the [spacebar] to toggle through the available option settings for an item before saving the settings you select (this is described further below).

For example, if the cursor does not already cover the first field on the screen (displaying the ANSI setting as shown above on the screen), use the cursor control keys to move the cursor (up, down, right, or left) to that field.

When you are on the selected field, press the [spacebar] to display the available settings, which in this case are: ANSI, VT100, and VT52.

Verify that all of the settings are correct as shown above. If any of them are different, change them to match the settings shown.

Note

> If you are using a Nematron color or monochrome OptiTOUCH terminal, the KEYBOARD field should be set to 5 (Programmable) instead of 1 as shown.

After verifying the settings, press the [F5] SAVE function key to store the settings you just specified. The SAVE function key is highlighted as the menu is saved. For some firmware revisions, you will need to cursor to the SAVE field on the screen and then press the [ENTER] key.

STEP 5

Press the [F7] or the [Home] key to exit the Configuration Menu screen and put the OIT Online.

STEP 6

Connect the OIT to the ADC module. Use the IC690CBL705 cable supplied with your CIMPLICITY 90-ADS package. Connect the female end of the cable to the port labeled **PRIMARY DTE** on the back of the OIT, then connect the other end of the cable to PORT 2 on the ADC module. If you are using the IC690CBL705 cable to connect your IBM PS/2 or GE Fanuc Workmaster II computer to the ADC, you must order another of the same cable to connect to your OIT (or make your own cable). If you are making your own cable, the applicable wiring diagrams are provided in Appendix B.

This completes the installation of your terminal. Go on to Chapter 5 which tells you how to copy the ADS software onto your computer and install it on your ADC module(s).

Section 2: Using a GE Fanuc MINI OIT or Mini Touch OIT

If the terminal you have selected is a GE Fanuc Mini OIT or Mini Touch OIT, use the following steps. Note that the CIMPLICITY 90-ADS software refers to the Mini OIT terminal as MINI and the Mini Touch OIT as TMINI.

Note

The following steps should be used as a quick reference and for CIMPLICITY 90-ADS use only. These steps should not be performed without first reviewing Chapters 1, 2, and 3 of your Mini Operator Interface Terminal User's Manual, GFK-0361.

STEP 1

Make sure that the MINI OIT power is turned off. Connect an IBM XT compatible keyboard (requires a keyboard with a DIN connector) to the applicable connector on the back of your MINI OIT.

Note

Many IBM AT compatible keyboards have a switch that allows it to perform as an XT style keyboard. One such keyboard is the GE Fanuc Cimstar keyboard, IC642PKB250B (B Revision or later only; not the A Revision).

If you have an IC600KD516 Mini Touch OIT, version B or later, or if the firmware has been upgraded to version 2.5 - 31 or later, a keyboard will not be needed for configuration. All configuration can be done via the touch screen interface.

STEP 2

Turn on the MINI OIT.

STEP 3

Press the [Ctrl-1] keys (press and hold Ctrl then press 1) on the attached keyboard. The MINI OIT Configuration Menu will be displayed on the screen.

STEP 4

Fill in the Configuration Menu as follows:

```
  GE FANUC OPERATOR INTERFACE TERMINAL   - REL 2.3-39 -       27FEB91
-------------------------------------------------------------------------------
   MODE OF OPERATION             ONLINE     ANSI    NO ECHO    SEND ANY CASE
   END LINE                      NO WRAP  NO AUTO LF
   CURSOR/SCREEN                 NO CURSOR
   KEY CODES                     FIVE
   SERIAL PORT CONFIGURATION     19.2K    NONE  8 BIT  1 STOP SOFT PT TO PT
   PARALLEL PORT MODE            PARALLEL IS AUX, SERIAL IS PRIMARY
   CONFIGURATION                 SAVE
   TESTS                         DIAGNOSTIC
   MEMORY                        SAVE      SCREENS 00  TO  SCREENS 00

-------------------------------------------------------------------------------

    -UP-    -DOWN-     -LEFT-     -RIGHT-    -SELECT-   -PERFORM-   -EXIT-
     F1      F2         F3         F4          F5          F6         F7
```

The MINI OIT Serial Port setting is set to match the default setting of Port 2 on the Alphanumeric Display Coprocessor module.

The Configuration Menu specifies the serial communications parameters, ports, and other parameters for the OIT. Use the cursor to move through the items on the screen. Use the [spacebar] to toggle through the available option settings for an item before saving the settings you select (this is described further below).

For example, if the cursor does not already cover the first field on the screen (displaying the ANSI setting as shown above on the screen), use the cursor control keys to move the cursor (up, down, right, or left) to that field.

When you are on the selected field, press the [spacebar] to display the available settings, which in this case are: ANSI, VT100, and VT52.

Verify that all of the settings are correct as shown above. If any of them are different, change them to match the settings shown.

After verifying the settings, cursor to the SAVE field and press the [ENTER] key. The SAVE field will be shown in reverse video while the settings are saved.

Note

The display on the screen may be slightly different than the one shown above as determined by the firmware revision of your MINI OIT.

The Key Codes setting should be set to FIVE for the Mini Touch OIT and to ONE for the non-touch version.

STEP 5

Press the [F7] or the [Home] key to exit the Configuration Menu screen and put the MINI OIT Online.

STEP 6

Connect the OIT to the ADC module. Use the IC690CBL705 cable supplied with your CIMPLICITY 90-ADS package. Connect the female end of the cable to the port labeled **PRIMARY DTE** on the back of the OIT, then connect the other end of the cable to PORT 2 (bottom connector) on the ADC module. If you are using the IC690CBL705 cable to connect your IBM PS/2 or GE Fanuc Workmaster II computer, you must order another of the same cable to connect to your OIT (or make your own cable). If you are making your own cable, the applicable wiring diagrams are provided in Appendix B.

This completes the installation of your Mini OIT terminal. Go on to Chapter 5 which tells you how to copy the ADS software onto your computer and install it on your ADC modules.

Section 3: Using a VT100 Standard Terminal

If the terminal you have selected is a VT100 or compatible terminal use the following steps. Note that the CIMPLICITY 90-ADS software refers to this terminal as: VT100.

The following steps should be used as a quick reference and for CIMPLICITY 90-ADS use only. These steps should not be performed without first reviewing the applicable chapters of your VT100 compatible Terminal manual.

STEP 1

Turn on the VT100 or compatible terminal and press the SETUP key to display the SETUP MENU.

STEP 2

Press the SETUP A / B key.

STEP 3

Fill in the Configuration Menu as follows:

```
1 0100 2 0011 3 0000 4 0010  T SPEED 19200  R SPEED 19200
```

Bit definitions for parameters 2 and 4 are:

```
Parameter 2                  Parameter 4

   0011                         0010
     ||                           |
     ||__S/W Handshaking          |__8 bits/character
     |
     |___ANSI Escape Sequences
```

STEP 4

Connect the VT100 to the ADC module. Use the IC690CBL705 cable supplied with your CIMPLICITY 90-ADS package. Connect the female end of the cable to the appropriate serial port on the back of the VT100, then connect the other end of the cable to PORT 2 (bottom connector) on the ADC module. If you are using the IC690CBL705 cable to connect your IBM PS / 2 (or compatible) or GE Fanuc Workmaster II computer, you must order another of the same cable to connect to your VT100 (or make your own cable). If you are making your own cable, the applicable wiring diagrams are provided in Appendix B.

This completes the installation of your terminal. Go on to Chapter 5 which tells you how to copy the ADS software onto your computer and install it on your ADC modules.

Section 4: Using a Monochrome or Color IBM Personal Computer (or Compatible) for the Display Terminal

If the terminal you have selected is an IBM or compatible personal computer with either a monochrome or color display, use the following steps. Note that the CIMPLICITY 90-ADS software refers to a color IBM PC compatible computer as CIBM and a monochrome one as MIBM. In the ADS SETUP UTILITY (see Chapter 5 and 7) you will need to set up the host computer as either color or monochrome and the target terminal as COM1:.

Refer to your computer's reference manuals for detailed information on your computer. For detailed information on using TERMF and TERMSET refer to GFK-0255, which is the Series 90 Programmable Coprocessor Module User's Manual. Note that TERMF is a terminal/fileserver program which will be copied to your hard disk during the installation process in Chapter 5. TERMF allows your computer to function both as a terminal and as a hard disk for the ADC module.

Note

The following steps should be used as a quick reference and for CIMPLICITY 90-ADS only. These steps should not be performed without first reviewing the applicable chapters of your IBM compatible computer's Reference manual.

STEP 1

All the setup needed will be performed by following the sequence of instructions given in Chapter 5. The computer should be attached to Port 1 on the ADC module; refer to page 5-14 for selecting the proper cable.

Note that there are two different BAT files which will be copied to your hard disk during the installation process in Chapter 5 which are useful for using your computer as a terminal. ADS.BAT allows you to access the PCOP programming software; TERMF is accessible from its main menu. IBM_TERM.BAT runs the TERMF program directly. TypicallyADS.BAT will be used during the development of your ADS operator interface system and IBM_TERM.BAT when you have set your ADS software up to automatically begin executing when the ADC module is reset or power cycled.

This completes the installation of your IBM monochrome or color terminal. Go on to Chapter 5 which tells you how to copy the ADS software onto your computer and install it on your ADC modules.

Caution

If you used a computer as a terminal with ADS software Versions 1.01, 1.02, 1.03 or 1.04, there is an additional change you will need to make. With ADS V1 software your computer had to be connected to Port 2 of the ADC module for it to function as a terminal. Typically the handshaking for Port 2 was set to hardware (rather than the default of software) and the fileserver was set up to execute on Port 2 (rather than the default of Port 1). These settings need to be returned to their defaults as you will now be able to leave your computer attached to Port 1 when using it as a terminal. To use the default values again, type the following command in at the MS-DOS prompt, and press the [Enter] key:

COPY \PCOP\BAT\ADS_CDF.ORG \PCOP\ADS.PCM\ADS.CDF

Section 5: Using a Lucas Deeco Model ST-2200

If the terminal you have selected is a Lucas Deeco model ST-2200 terminal use the following steps. Note that the CIMPLICITY 90-ADS software refers to this terminal as **LUDCO**.

NOTE

The following steps should be used as a quick reference and for CIMPLICITY 90-ADS use only. These steps should not be performed without first reviewing the applicable chapters of your Lucas Deeco model ST-2200 terminal manual.

STEP 1

Turn on the Lucas Deeco model ST-2200 terminal. Wait for the text "SELF-TEST OK" to appear in the upper left-hand corner of the screen.

STEP 2

Touch the lower right-hand corner of the touch screen to activate the QWERTY-style touch keyboard.

STEP 3

Touch the "PAD" touch area located in the upper right-hand corner of the QWERTY-style touch keyboard. This will activate the function pad touch keyboard.

STEP 4

Touch the "Setup" touch area, the third touch box to the right of the upper left-hand corner of the function pad touch keyboard. This will activate the setup menus.

STEP 5

The following setup information should be entered; it is broken down by the applicable setup category. Any configuration item not explicitly detailed can be ignored.

General

Terminal Mode:	VT320 7B
Lock Keys:	NO
Lock Features:	NO
New Line:	NO

Display

Control Chars:	INTERPRET
Auto-Wrap:	OFF
Status Line:	NONE

Keyboard

Key Click:	YES*
Auto Repeat:	OFF*

*These are the suggested settings; most users should find them optimal.

Communications

Local Echo:	OFF
XMIT Baud:	19200*
RECV Baud:	19200*
Data Bits:	8*
Parity:	NONE*
Stop Bits:	1*
XON/XOFF:	XOFF AT 128*
IO TYPE:	RS232, DATA*
Limit XMIT:	NO

* These match the ADC module default settings.

STEP 6

Connect the Lucas Deeco ST2200 to the ADC module. Use the IC690CBL705 cable supplied with your CIMPLICITY 90-ADS package. Connect the female end of the cable to the serial port on the back of the ST2200, then connect the other (male) end of the cable to port 2 (bottom connector) on the ADC module. If you are using the IC690CBL705 cable to connect your computer to port 1 of the ADC module you either must order another of the same cable to connect to your ST2200 or make your own equivalent cable. If you are making your own cable, the applicable wiring diagrams are provided in Appendix B.

This completes the installation of your terminal. Go on to Chapter 5 which tells you how to copy the ADS software onto your computer and how to install it on your ADS module(s).

Chapter 5 Installing the CIMPLICITY 90-ADS Software

Now that you have the Alphanumeric Display Coprocessor (ADC) module installed in the PLC and configured in Logicmaster 90 software, the next step is to install the CIMPLICITY 90-ADS software onto your computer and download it to the ADC module.

Section 1: Installing CIMPLICITY 90-ADS Software Onto Your Computer

STEP 1

Open the shrink-wrapped package labeled "PCM DEVELOPMENT SOFTWARE", fill out the registration form included in the package and mail it today to ensure that your software is registered with GE Fanuc.

The PCM development software (PCOP) is the communications software used to communicate with the ADC module. Its purpose is to install the CIMPLICITY 90-ADS software onto the ADS module and to load, save, and archive your database (system).

STEP 2

Insert the PCM Development Software (PCOP) diskette into drive A of your computer.

STEP 3

At the MS-DOS prompt type the following:

```
A:\INSTALL
```

Note

STEP 3 above installs the PCOP Development Software onto your hard disk. This software is required when using the CIMPLICITY 90-ADS software. If you already have PCOP installed perform this step anyway to make sure that you have the most recent version of PCOP installed on your hard disk.

The following PCOP Installation Program screen will be displayed.

```
                    GE FANUC  AUTOMATION
                     NORTH AMERICA, INC.


                PCOP (c)  INSTALLATION PROGRAM


   COPYRIGHT (c) 1988  GE FANUC AUTOMATION NORTH AMERICA, INC.
   Published in  a limited, copyright  sense and  all  rights,
   including trade  secret rights  are reserved.  Unauthorized
   use of the information  or program is strictly  prohibited.

   Installation of  this software reaffirms  acceptance of the
   terms and conditions of  the license agreement  distributed
   with this product.



    PRESS <ENTER> TO CONTINUE INSTALLATION OR <ESC> TO EXIT
```

STEP 4

When the PCOP software is finished being installed open the shrink-wrapped package labeled “CIMPLICITY 90-ADS SOFTWARE”, fill out the registration card and mail it today to ensure that this software is registered with GE Fanuc.

STEP 5

Insert the CIMPLICITY 90-ADS software diskette into drive A of your computer.

STEP 6

You will need to tell the ADS installation program two things: the drive id of your computer’s hard drive on which you want the software installed, and which demonstration systems you want copied to your hard drive. Demonstration systems are available for the GE Fanuc color OIT (COIT), the GE Fanuc monochrome OIT (MOIT), the GE Fanuc mini OIT (MINI), the GE Fanuc touch mini OIT (TMINI), VT100 compatible (VT100), color computer (CIBM), monochrome computer (MIBM), Nematron color OptiTOUCH (TCOIT), Nematron monochrome OptiTOUCH (TMOIT), and the Lucas Deeco ST-2200 (LUDCO) terminals.

Each of the demonstration systems will require approximately 120,000 bytes of storage on your hard disk. During the installation process you can elect to either (a) copy all the demonstration systems, (b) copy none of the demonstration systems or (c) copy your choice of from one to three of the demonstration systems.

The table below identifies the keywords to use to indicate your choice(s) to the installation program.

Table 5-1. Specifying Demonstration Systems to View

Keyword	Demonstration System Copied
ALL	Copy all seven demonstration systems.
NONE	Don't copy any of the demonstration systems.
COIT	Copy the demonstration system for the GE Fanuc color OIT.
MOIT	Copy the demonstration system for the GE Fanuc monochrome OIT.
MINI	Copy the demonstration system for the GE Fanuc mini OIT.
TMINI	Copy the demonstration system for the GE Fanuc touch mini OIT.
VT100	Copy the demonstration system for the VT100 compatible.
CIBM	Copy the demonstration system for the color IBM PC compatible.
MIBM	Copy the demonstration system for the monochrome IBM PC compatible.
TCOIT	Copy the demonstration system for the Nematron color OptiTOUCH.
TMOIT	Copy the demonstration system for the Nematron monochrome OptiTOUCH.
LUDCO	Copy the demonstration system for the Lucas Deeco ST-2200.

For example, to copy the ADS software to hard disk drive C along with all the demonstration systems, type the following at the MS-DOS prompt:

```
A:\INSTALL C ALL
```

To copy the ADS software to hard disk drive C along with the demonstration systems for the GE Fanuc color OIT, the GE Fanuc touch mini OIT and the color IBM PC compatible computer, type the following at the MS-DOS prompt:

```
A:\INSTALL C COIT TMINI CIBM
```

Regardless of your choice of demonstration systems, the hard drive you specify should be the same as the one on which you previously installed the PCOP software (steps 1-3 above).

The initial screen that will be displayed is the copyright screen shown below.

```
                    GE FANUC AUTOMATION
                    NORTH AMERICA, INC.

   CIMPLICITY (TM) 90-ADS SYSTEM SOFTWARE INSTALLATION PROCEDURE

    COPYRIGHT (c) 1991 GE FANUC AUTOMATION NORTH AMERICA, INC.
    Published in a limited, copyright sense  and  all  rights,
    including trade secret rights are reserved.   Unauthorized
    use of the information or program is strictly  prohibited.

    Installation of this software reaffirms acceptance of  the
    terms and conditions of the license agreement  distributed
    with this product.

    If you wish to cancel the installation of  this  software,
    hold down the CTRL key and press C.   When  prompted  with
    "Terminate batch job (Y/N)?", press Y.

To continue with the installation,
Strike a key when ready . . .
```

STEP 7

Press the [Enter] key and the files included in the CIMPLICITY 90-ADS software will be copied to the \PCOP\ADS.PCM, \PCOP\BAT, \ADS_PC, \ADS_PC\DEMO.PCM and \ADS_PC\<demo system>.PCM directories of your hard drive, which in this case is drive C.

The CIMPLICITY 90-ADS software has now been installed onto your hard drive. The next step is to verify that your MS-DOS PATH has been specified properly.

Caution

If you have an ADS operator interface system created with ADS Version 1.01, 1.02, l.03 or l.04 software that you want to use with the ADS Version 2 or later software, it MUST be converted first to the new file formats used by the Version 2 or later software. Refer to Appendix E, Converting a Version 1 System to Version 2, for more details.

STEP 8

You should verify that you have a PATH statement in the AUTOEXEC.BAT file resident at the root of your computer's hard drive. The directory

```
\PCOP\BAT
```

should be included as part of the PATH specification. If not, it must be added in order to properly execute the PCOP and ADS software. Consult your MS-DOS manual for details on the PATH statement.

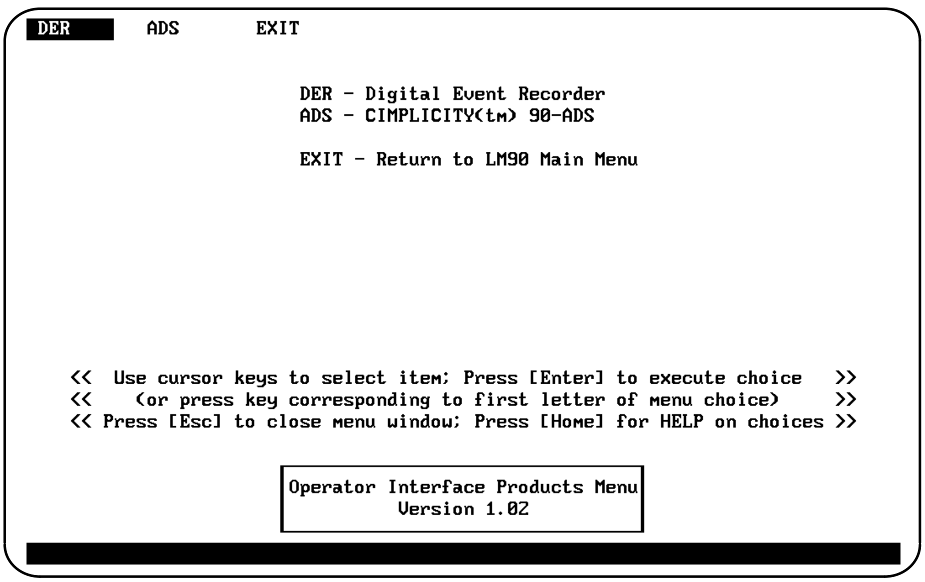
Section 2: Using the Operator Interface Products Menu

In the sections which follow you will need to use several ADS utility programs to complete the configuration of your system. The Operator Interface Products Menu provides a simple interface for accessing each of the utilities you will need. Only the information needed to complete your initial system configuration is provided here. For details on all the capabilities of the Operator Interface Products Menu, see Chapter 11.

To access the Operator Interface Products Menu, either press the [OI] softkey on the Logicmaster 90 main menu or type in the command

```
OI_MENU
```

at the MS-DOS prompt. In either case, you should see the following initial display:



To access the ADS menu, first press the [→] key to highlight it.

```
DER          ADS          EXIT

                                 DER - Digital Event Recorder
                                 ADS - CIMPLICITY(tm) 90-ADS

                                 EXIT - Return to LM90 Main Menu

     <<  Use cursor keys to select item; Press [Enter] to execute choice   >>
     <<    (or press key corresponding to first letter of menu choice)     >>
     << Press [Esc] to close menu window; Press [Home] for HELP on choices >>

                          Operator Interface Products Menu
                                    Version 1.02
```

Pressing the [Enter] key will ”pull down”, or open, the ADS menu of available options.

```
DER          ADS          EXIT
             BUILD
             PCOP-ADS            DER - Digital Event Recorder
             ADSSETUP            ADS - CIMPLICITY(tm) 90-ADS
             TERMSET
             CREATHLP            EXIT - Return to LM90 Main Menu
             XREF
             TERMF

     <<  Use cursor keys to select item; Press [Enter] to execute choice   >>
     <<    (or press key corresponding to first letter of menu choice)     >>
     << Press [Esc] to close menu window; Press [Home] for HELP on choices >>

                          Operator Interface Products Menu
                                    Version 1.02
```

To execute a particular menu option, use the [↑] and [↓] cursor keys to highlight the option and then press the [Enter] key to execute it. At any point in time, the [Esc] key may be used to cancel an operation or to close a menu.

After exiting an option that you have executed, you will be returned to the Operator Interface Products Menu with the ADS menu highlighted, but not pulled down.

Section 3: Configuring PCOP to ADC Communications

Depending on your computer, you may or may not need to change PCOPs default terminal emulation configuration file before executing PCOP. By default, the following configuration settings will be in effect for your computer:

1. COM1: (of your computer) is communications port to ADC port 1
2. video adapter is CGA with snow (setting works for all but MDA adapters)
3. will communicate to a Series 90-70 ADC module
4. 19200 baud, 1 stop bit, 8 data bits, no parity, hardware handshaking

Of the four items above, only the first three may be changed when your computer is to be used to install the ADS software onto the ADC module. Possible reasons for changing the first three are given below, along with directions for how to change them.

Typically you will want to use your computer's COM1: port as the communications port. However, if your computer supports a second serial port, COM2:, it may be used instead if desired.

Most computers available today have either a CGA (with or without snow), EGA or VGA video adapter card installed in them. The default setting for PCOP, CGA with snow, functions as a "lowest common denominator" and will work for any of the designated video cards. You may still want to change this item for slightly better screen response when using your computer as a terminal (CIBM or MIBM terminal tables). If your computer has a monochrome video adapter (MDA) card you MUST change this item. Executing PCOP on a computer using an MDA video adapter card with the video adapter selected as any other type will lead to a blank display on your computer screen.

Note

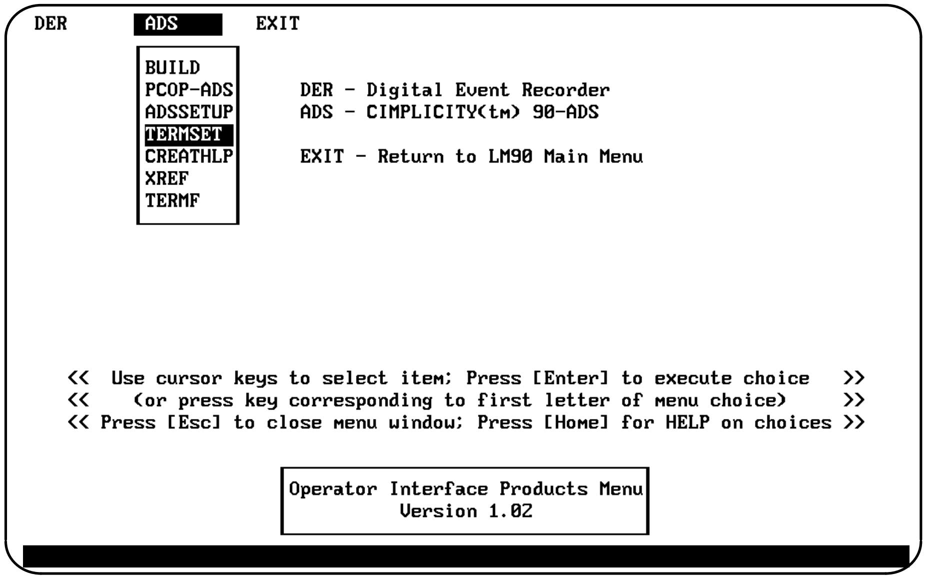
> Your computer may have a CGA, EGA or VGA video adapter card even if it uses a monochrome monitor (e.g., the GE Fanuc Workmaster II, which has a VGA video adapter but a monochrome monitor). You should be certain that your computer has an MDA video adapter before configuring PCOP as MDA.

By default PCOP assumes you will be communicating with a Series 90-70 ADC module. If you communicate with a Series 90-30 ADC module instead, PCOP will warn you of this fact. This warning is harmless, and can be ignored. However, if desired this setting may be changed to avoid receiving the warning.

If you want to make any changes to PCOPs terminal configuration file, type the command

```
OI_MENU
```

at the MS-DOS prompt, pull down the ADS menu and select the "TERMSET" option, then follow the directions given in "Using TERMSET" in appendix D of this manual for how to use TERMSET.



The next step is to tell ADS some of the details of your configuration. You should now proceed to Section 4.

Section 4: Using the ADS Software Setup Utility

The ADS software may be run in a number of different configurations on a number of different terminals. The ADS Setup Utility provides you a method of customizing the ADS software to fit your particular application. Only the information needed to run the demonstration systems provided with the software and to follow the development tutorial in Chapter 6 is provided here. For details on all the capabilities of the ADS Setup Utility, see Chapter 7.

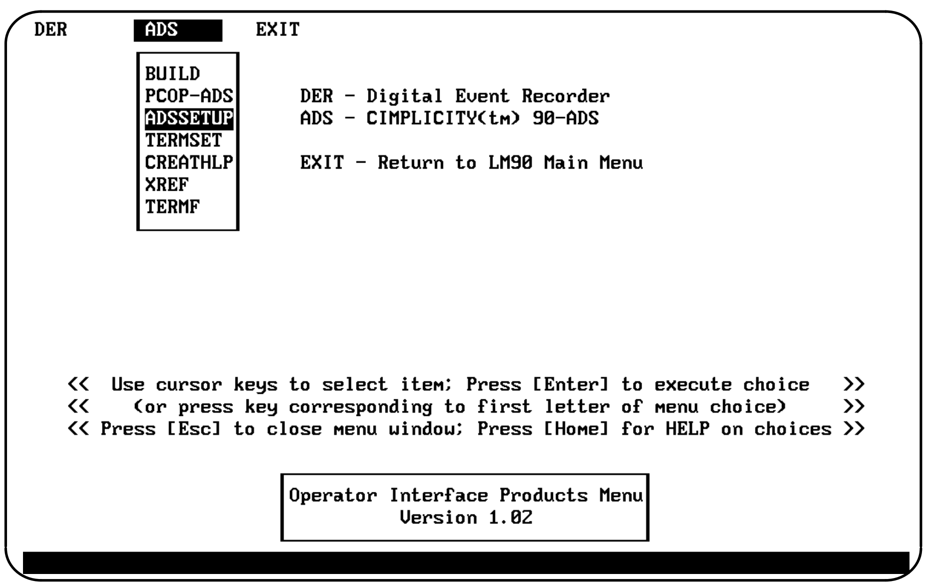
With the ADS Setup Utility you will tell ADS about your host computer (the computer you just installed the ADS software on), your target terminal and indicate what major software features you intend to use.

STEP 1

To enter the ADS Setup Utility type the following command at the MS-DOS prompt (your current default disk drive should be the hard drive on which you installed the PCOP and ADS software):

```
OI_MENU
```

Pull down the ADS menu and select the “ADSSETUP” option.



The following screen will be displayed:

```
                 CIMPLICITY (tm) 90-ADS Setup Utility
                             Version 4.01

DEVELOPMENT VERSION SELECTIONS:         EXECUTE-ONLY VERSION SELECTIONS:
  Menu                       78672        Executor              246144
  Builder                   257040        Fault Table Module     93136
  Executor                  199248          Max System (bytes):  293312
    Max System (bytes):      97632




                                              Development Version Selections
                                              Execute-Only Version Selections
                                              Page 2 Selections
                                              Leave Setup

                             PAGE 1 OF 2
```

You will see five different categories of setup information on the screen organized on two screen pages: *development version selections*, *execute-only version selections*, *host computer selections*, *target terminal selections*, and *target printer selections*. A selection menu is displayed in the lower right hand corner of the screen. Each of the selections is explained below.

The first two, development version selections and execute-only version selections are available on page 1 and specify what major software features are available for the two operating modes of the ADS software. These modes, and how to customize them, are explained in detail in Chapter 7. You will not need to change them now, as the default selections of Menu, Builder, and Executor for the development version, and Executor and Fault Table Module for the execute-only version, are those which are needed to support the demonstration systems, and the development tutorial you will initially be working with.

The host computer selections are available on page 2 and indicate whether you have a computer with a monochrome or color display among other things. If the currently displayed selection does not match your actual hardware, you will need to change it. Either cursor to the Page 2 Selections menu entry and press the [Enter] key, or just press the [P] key. Then, if you need to change the host computer monitor selection, either cursor to the Host Computer Selections menu entry and press the [Enter] key, or just press the [H] key.

The following will be displayed on your computer screen:

```
                 CIMPLICITY (tm) 90-ADS Setup Utility
                             Version 4.01
HOST COMPUTER SELECTIONS:
  Monochrome                                  Generic ASCII Printer
  Normal IBM Character Set

TARGET TERMINAL SELECTIONS:
  COM2:
  Terminals Supported:  COIT   MOIT   TMINI  CIBM


TAR──── Host Computer Selections ────────────────────────────────
  P
     Host Computer Monitor:  Monochrome    MONOCHROME
                                           COLOR
     Host Computer Character Set:  Normal

     Host Printer Type:  Generic ASCII Printer

                           PAGE 2 OF 2
```

You can use the cursor keys to select your choice of either Monochrome or Color and then press the [Enter] key, or just press the [M] or [C] key (M for monochrome, C for color). Your choice will be recorded for the *next* time you run the ADS set-up package. Neither the host computer character set nor the host printer type need be changed at this time. Pressing the [Enter] key twice will complete the Host Computer Selections modifications.

The target terminal selection tells ADS where it should expect to find your target display terminal. Its location will depend on the type of terminal you are using. Refer to the following table to determine the selection that is right for your terminal.

Table 5-2. Target Terminal Port Selection

Terminal	Terminal Table	Current Target Terminal Port Selection
GE Fanuc color OIT	COIT	COM2:
GE Fanuc monochrome OIT	MOIT	COM2:
Nematron OptiTOUCH color terminal	TCOIT	COM2:
Nematron OptiTOUCH monochrome terminal	TMOIT	COM2:
GE Fanuc Mini OIT	MINI	COM2:
GE Fanuc Mini Touch OIT	TMINI	COM2:
VT100	VT100	COM2:
Lucas Deeco ST-2200	LUDCO	COM2:
IBM PC with color display	CIBM	COM1:
IBM PC with monochrome display	MIBM	COM1:

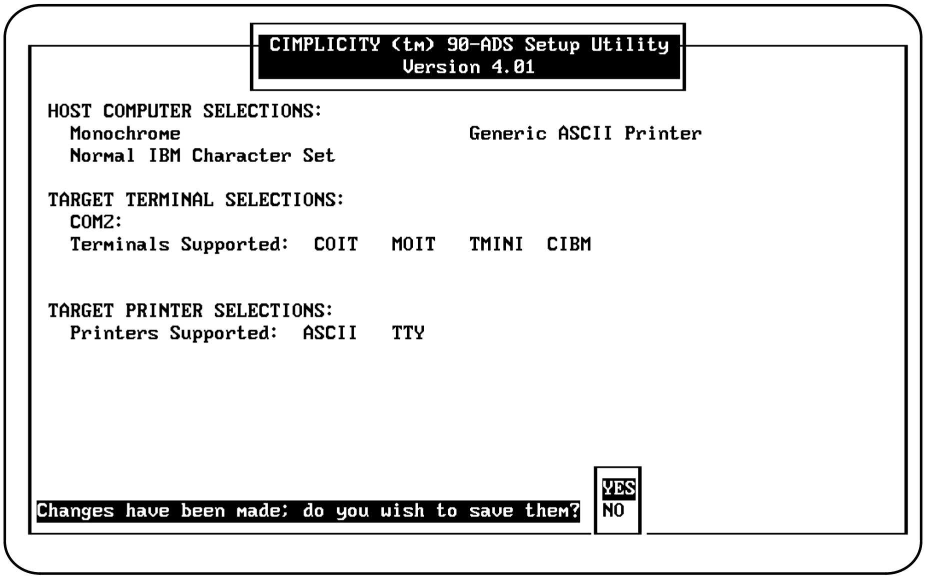
If you need to change the default setting of COM2:, either cursor to the Target Terminal Selections menu entry (on page 2) and press the [Enter] key, or just press the [T] key. The following will be displayed on your computer screen:

```
                CIMPLICITY (tm) 90-ADS Setup Utility
                            Version 4.01

HOST COMPUTER SELECTIONS:
  Monochrome                                Generic ASCII Printer
  Normal IBM Character Set
                     Target Terminal Selections
TARGET TERMINAL
  COM2:             Terminal Connected To:  COM2:   COM1:
  Terminals Sup                                     COM2:
                    MIBM.TBL:   Not Included

TARGET PRINTER      MINI.TBL:   Not Included
  Printers Supp
                    TCOIT.TBL:  Not Included

                    TMOIT.TBL:  Not Included

                    VT100.TBL:  Not Included

                    LUDCO.TBL:  Not Included
```

Use the cursor keys to select the desired choice of either COM1: or COM2:, and then press the [Enter] key.

If you need to use either the MIBM, MINI, TCOIT, TMOIT, VT100, or LUDCO terminal table (see table 5-2 above), you will also need to include it here. Again, the cursor keys are used to select either “Included” or “Not Included”, and pressing the [Enter] key registers the choice.

Once you have made any necessary changes, you should exit the ADS set-up package. To do this, either use the cursor keys to go to the Leave Setup menu entry and then press the [Enter] key, or press the [L] key. If you have made any changes to the selections, you will be prompted to confirm that you want to save them.



Now press the [Enter] key to save the changes you have made and exit the setup utility. You are now ready to proceed with the demonstration systems described in the following section, and the development tutorial (see Chapter 6).

Section 5: Executing a Demonstration System on the ADC Module

A set of demonstration systems is provided with the ADS software, and were copied to your computer's hard disk during the ADS software installation process. Demonstration systems are provided for each of the terminal types supported by ADS that will show you features of the ADS and provide you with useful techniques pertinent to your equipment. These systems do not write to any memory in your PLC, and require no special program in the PLC to animate them.

If you do not want to view the demonstration systems at this time, skip the following procedures and go directly to Chapter 6, which is the Development Tutorial.

Use These Steps to Download the CIMPLICITY 90-ADS Software

STEP 1

Connect the serial port of your computer to PORT 1 of the ADC module.

- Series 90-70 PLC Users:
  - PORT 1 on the ADC module is the top port - see the label inside of the module's door.
- Series 90-30 PLC User's:
  - PORT 1 is labeled on the "T" end of the Wye cable - see the figure on page 3-5 in this manual.

Select one of the cables listed in the table below. All 3 of these cables are included in your CIMPLICITY 90-ADS system package.

If Your Computer is:	You Use This Cable
A GE Fanuc Workmaster II or an IBM PS / 2	IC690CBL705 ADC / PCMtoWorkmaster II
A GE Fanuc Workmaster or an IBM PC-XT	IC690CBL701 ADC / PCMtoWorkmaster
An IBM PC-AT personal computer	IC690CBL702 ADC / PCMtoPC-AT

STEP 2

Make sure that the power is ON to your PLC. Hard reset the ADC module by pressing the Reset / Restart pushbutton on the front of the module continuously for more than 5 seconds.

STEP 3

From the Operator Interface Products Menu (OI_MENU) pull down the ADS menu and select the option ”PCOP–ADS”.

```
DER        ADS        EXIT

           BUILD
           PCOP-ADS       DER - Digital Event Recorder
           ADSSETUP       ADS - CIMPLICITY(tm) 90-ADS
           TERMSET
           CREATHLP       EXIT - Return to LM90 Main Menu
           XREF
           TERMF

  <<  Use cursor keys to select item; Press [Enter] to execute choice   >>
  <<    (or press key corresponding to first letter of menu choice)     >>
  << Press [Esc] to close menu window; Press [Home] for HELP on choices >>

                  Operator Interface Products Menu
                            Version 1.02
```

The following screen will be displayed:

```
     G E   F A N U C   A U T O M A T I O N ,   I N C O R P O R A T E D

       P R O G R A M M A B L E   C O P R O C E S S O R   M O D U L E

        COPYRIGHT 1988, 1989 GE FANUC AUTOMATION NORTH AMERICA, INC.

        Published in only a limited, copyright sense and all rights,
        including  trade secret  rights, are reserved.  Unauthorized
        use of this information or  program is  strictly prohibited.

        PCOP Version     2.06
                                   ONLINE                        FACTORY
INSERT                  << Press ENTER to continue >>
```

STEP 4

Verify that the system is ONLINE in the bottom center of the screen as shown. If OFFLINE is displayed, hard reset the module again as described in STEP 2.

STEP 5

When ONLINE is displayed, press the [Enter] key to continue. The screen shown below will be displayed next.

```
|CONFIG |MB     |TERMF  |STATUS |CTL    |       |       |FOLDER |UTILTY |
1fsel   2fdel   3       4fbakup 5frestr 6       7fclear 8       9fdir   10fcopy
    Enter name of existing or new program folder

       S E L E C T   O R   C R E A T E   A   P R O G R A M   F O L D E R

Program Folder:

Folders Currently in Drawer D:\ADS_PC

     DEMO.PCM       LUDCO.PCM      CIBM.PCM       COIT.PCM       MOIT.PCM
     MINI.PCM       TMINI.PCM      VT100.PCM      MIBM.PCM       TCOIT.PCM



                << Press Enter Key to Start the Select Function >>
NOTE: A folder extension of .PCM is required. If an extension is not provided an
      extension of .PCM will be added; any other extension is an error.
                                      ONLINE                                FACTORY

INSERT                              PCM ID:         RACK: 0 SLOT: 3  PLC ID:ADSTEST
```

STEP 6

In this screen you are prompted to enter the name of a CIMPLICITY 90-ADS program folder. The following screen will be displayed.

```
|CONFIG |MB     |TERMF  |STATUS |CTL    |       |       |FOLDER |UTILTY |
1config 2mb     3termf  4status 5ctl    6       7       8folder 9utilty10

      S E R I E S   9 0   P C M   P R O G R A M M I N G   S O F T W A R E

                   F1  ... Configure the PCM

                   F2  ... Develop/Execute a MegaBasic Program
                   F3  ... Terminal Emulation

                   F4  ... Operating Status of PCM
                   F5  ... Control Functions

                   F8  ... Folder Functions
                   F9  ... Utility: Save/Load/Clear/Etc.

                   Esc ... Exit PCM Software

                                      ONLINE                              FACTORY
C:\ADS_PC\DEMO.PCM
INSERT                              PCM ID:        RACK: 0 SLOT: 3  PLC ID:ADS
```

This screen is the PCOP software main menu. Type in <demo system>, where <demo system> is one of the system names listed in Table 5-3, and then press the [Enter] key. Note that if \ADS_PC is not listed as the current drawer, you will need to specify the folder as \ADS_PC\<demo system>.

STEP 7

Now press the [F9] key to enter the Utility Menu. The following screen will be displayed.

```
|CONFIG |MB     |TERMF  |STATUS |CTL    |       |       |FOLDER |UTILTY |
1save   2load   3       4mdir   5       6mdel   7clear  8       9ads    10gds

              P R O G R A M   U T I L I T Y   F U N C T I O N S

F1  ... Save File(s) From PCM to Current Folder
F2  ... Load File(s) To PCM from Current Folder

F4  ... Directory of Files Currently Resident on PCM and in Current Folder

F6  ... Delete File(s) from PCM or Current Folder
F7  ... Delete All Files from PCM

F9  ... Cimplicity (tm) 90 Alphanumeric Display System
F10 ... Graphics Display System

                                     ONLINE                           FACTORY
C:\ADS_PC\DEMO.PCM
INSERT                            PCM ID:        RACK: 0 SLOT: 3  PLC ID:ADS
```

STEP 8

Press the [F9] key to go to the CIMPLICITY 90-ADS System installation and environment selection screen shown below.

```
|CONFIG |MB     |TERMF  |STATUS |CTL    |       |       |FOLDER |UTILTY |
1save   2load   3       4mdir   5       6mdel   7clear  8       9ads    10gds
    Press Tab/Shft TAB to select DEVELOPMENT or EXECUTE ONLY

                     C I M P L I C I T Y   (TM)   9 0 - A D S

ADS Environment: DEVELOPMENT  (DEVELOPMENT or EXECUTE ONLY)

               Listing of Files in ADS Folder (PC:\PCOP\ADS.PCM)

    ADS.CDF        ADSB.EXE       ADSBM.HLP      ADSDEV.DAT     ADSDM.ENV
    ADSDM.EXE      ADSE.EXE       ADSEXE.DAT     ADS_MENU       ADS_MENU.ENV
    ADS_RUN        ASCII.TBL      CIBM.TBL       COIT.TBL       MBX.ENV
    MBX.EXE        MENU.EXE       MIBM.TBL       MINI.TBL       MOIT.TBL
    OIT.TBL        SPOOL.EXE      VT100.TBL      ADSE.ENV       SPOOL.ENV
        Total Bytes Available: 5826560    Folder Size: 445901   Bytes

               << Press Enter Key to Begin ADS Installation >>
 < EXECUTE ONLY fields default to RAM:EMPTY, OIT.TBL, ASCII.TBL, respectively >
             << Press PgUp or PgDn Key to Scroll Listing of Files >>
                                     ONLINE                         FACTORY
C:\ADS_PC\DEMO.PCM
INSERT                            PCM ID:        RACK: 0 SLOT: 3  PLC ID:ADS
```

This screen allows you to select either the Development version or the Execute Only version of the CIMPLICITY 90-ADS software. By default, the CIMPLICITY 90-ADS installation and environment selection screen is set to install the Development version of the CIMPLICITY 90-ADS software onto the Alphanumeric Display Coprocessor module. Pressing the [Tab] key allows you to toggle between Development and Execute Only.

STEP 9

Choose the Execute-Only environment by pressing the [Tab] key.

The following screen will be displayed:

```
|CONFIG |MB      |TERMF   |STATUS |CTL     |        |        |FOLDER |UTILTY |
1save   2load    3        4mdir   5        6mdel    7clear   8        9ads    10gds
     Press Tab/Shft TAB to select DEVELOPMENT or EXECUTE ONLY

                C I M P L I C I T Y   (TM)   9 0 - A D S

ADS Environment: EXECUTE ONLY (DEVELOPMENT or EXECUTE ONLY)
     System Name:          Terminal Table:
     Printer Table:

               Listing of Files in ADS Folder (PC:\PCOP\ADS.PCM)

      ADS.CDF         ADSB.EXE        ADSBM.HLP       ADSDEV.DAT      ADSDM.ENV
      ADSDM.EXE       ADSE.EXE        ADSEXE.DAT      ADS_MENU        ADS_MENU.ENV
      ADS_RUN         ASCII.TBL       CIBM.TBL        COIT.TBL        MBX.ENV
      MBX.EXE         MENU.EXE        MIBM.TBL        MINI.TBL        MOIT.TBL
      OIT.TBL         SPOOL.EXE       VT100.TBL       ADSE.ENV        SPOOL.ENV
           Total Bytes Available: 5822464     Folder Size: 445901   Bytes

               << Press Enter Key to Begin ADS Installation >>
 < EXECUTE ONLY fields default to RAM:EMPTY, OIT.TBL, ASCII.TBL, respectively >
              << Press PgUp or PgDn Key to Scroll Listing of Files >>
                                 ONLINE                                  FACTORY
 C:\ADS_PC\DEMO.PCM
 INSERT                    PCM ID:          RACK: 0 SLOT: 3  PLC ID:ADS
```

The cursor keys are used to move among the system name, terminal table, and printer table fields. Both the system name and the terminal table fields should be filled out as shown in the table below.

Table 5-3. System Name and Terminal Table Selections

Terminal	System Name	Terminal Table
GE Fanuc Color OIT	COIT	COIT
GE Fanuc Monochrome OIT	MOIT	MOIT
GE Fanuc Mini OIT	MINI	MINI
GE Fanuc Touch Mini OIT	TMINI	TMINI
VT100	VT100	VT100
IBM PC with color display	CIBM	CIBM
IBM PC with monochrome display	MIBM	MIBM
Nematron Color OptiTOUCH	TCOIT	TCOIT
Nematron Monochrome OptiTOUCH	TMOIT	TMOIT
Lucas Deeco ST-2200	LUDCO	LUDCO

The printer table field does not need to be filled out. After the system name and terminal table fields have been filled in, press [Enter] to begin installing the ADS software on the ADC module.

The CIMPLICITY 90-ADS files will now be loaded onto the ADC module. A prompt is displayed near the top of the screen indicating that the procedure will take several minutes, and requesting that you confirm the install. Press the [Y] key to continue with the installation.

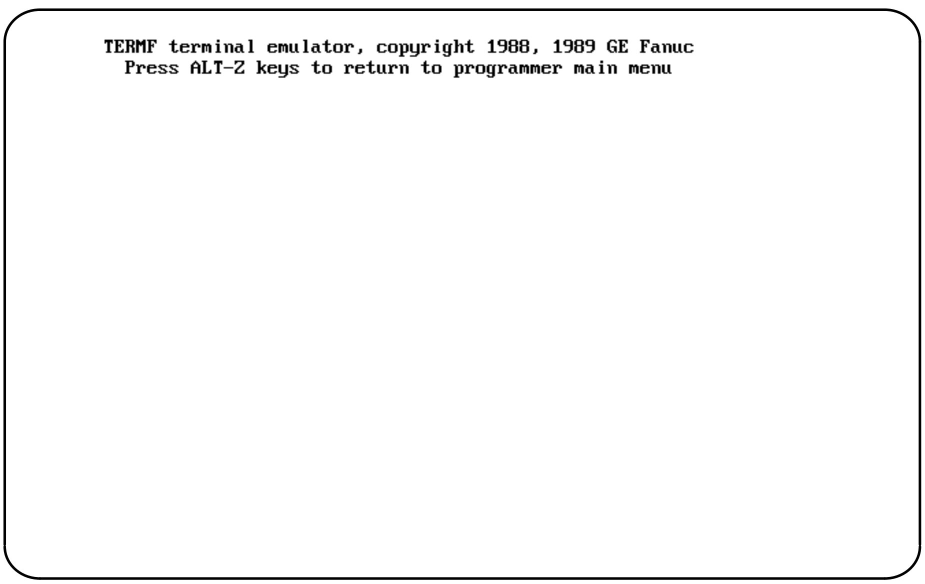
Default port settings are downloaded to the ADC module during the installation: they are as shown below.

Table 5-4. Serial Port Default Settings

Setting	Port 1	Port 2
Interface	RS232	RS232
Data Rate	19200	19200
Parity	None	None
Flow Control	Hardware	Software
Stop Bits	1	1
Bits / Character	8	8

After your installation is complete, refer to Appendix D if you want to modify the default port settings.

The installation is complete when your computer displays the screen shown below.



The screen shown above indicates that your computer has been placed in Terminal Emulation/File Server mode. This is called TERMF and is part of your PCOP software. The CIMPLICITY 90-ADS software automatically starts TERMF when the installation process is complete.

At this point, the ADS software will begin loading the demonstration system you have selected to the ADC module. After a pause of about one minute, you will begin seeing activity on your target terminal. Note that the "long" load time of the system is due to the fact that the system is being loaded from your computer. When a system is loaded from the ADCs RAM disk, the load time is much shorter.

When you are finished viewing the demonstration system, exit the system from the main menu (use the [F10] function key on your terminal to go there). After a short pause (about 3 seconds with a Series 90-70 ADC, about 20 seconds with a Series 90-30 ADC) you will see a –> prompt on the TERMF screen of your computer, as shown in the example screen below:

```
        TERMF terminal emulator, copyright 1988, 1989 GE Fanuc
          Press ALT-Z keys to return to programmer main menu
->
```

The –> prompt indicates that communications has been restored between your computer and the ADC module. If you want to execute the demonstration system again, press the [Alt-E] key (press the [Alt] key, and while holding it down, simultaneously press the [E] key) on your computer's keyboard. If you do not want to view the demonstration system again, press the [Alt-Z] key to return to the PCOP main menu.

Note

If you found the demonstration system helpful, and would like to see how certain operations were implemented, each demonstration system that was installed can be found in the \ADS_PC\<demo system>.PCM directory of your computer's hard disk. You can use the ADS Builder to view and print out portions (or all) of the system which are of interest.

Chapter 6 Development Tutorial - Creating Your First Operator Interface System

A good way to learn a new system is to walk through a tutorial. The following pages provide you with a step-by-step tutorial to creating and executing an ADS system. Section 1 contains a sequence of steps which are common to all the supported target terminals. Section 2 presents an overview of how the ADS software will be used, describes some key concepts and terminology and outlines the application which will be implemented in the tutorial. Section 3 will be followed by those of you who are using a terminal that does NOT have a touch screen interface. Section 4 will be followed by those of you who are using a terminal with a touch screen interface.

Note

If you just completed executing one of the demonstration systems in the previous chapter, you may skip directly to Step 5 in Section 1. The folder select screen in Step 5 is accessed from the PCOP main menu by pressing [F8] to access the FOLDER menu and then [F1] to access the folder selection screen.

Section 1: Downloading the Software to the ADC Module

Use These steps to Download the CIMPLICITY 90-ADS Software

STEP 1

Connect the serial port of your computer to PORT 1 of the ADC module.

- Series 90-70 PLC Users:
  - PORT 1 on the ADC module is the top port - see the label inside of the module's door.
- Series 90-30 PLC User's:
  - PORT 1 is labeled on the "T" end of the Wye cable - see the figure on page 3-5 in this manual.

Select one of the cables listed in the table below. All 3 of these cables are included in your CIMPLICITY 90-ADS system package.

If Your Computer is:	You Use This Cable
A GE Fanuc Workmaster II or an IBM PS/2	IC690CBL705 ADC/PCMtoWorkmasterII
A GE Fanuc Workmaster or an IBM PC-XT	IC690CBL701 ADC/PCMtoWorkmaster
An IBM PC-AT personal computer	IC690CBL702 ADC/PCMtoPC-AT

STEP 2

Make sure that the power is ON to your PLC. Hard reset the ADC module by pressing the Reset/Restart pushbutton on the front of the module continuously for more than 5 seconds.

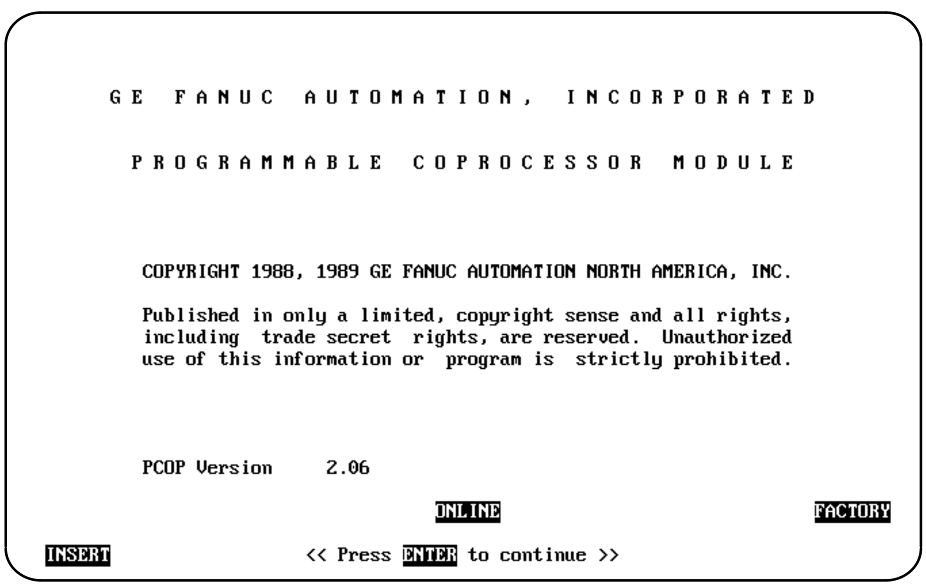
STEP 3

Now type the following command at the MS-DOS prompt:

```
OI_MENU
```

Pull down the ADS menu and select the "PCOP-ADS" menu option. If you didn't execute a demonstration system as described in the previous chapter you should refer back to Section 2 in Chapter 5 for information on using the Operator Interface Products Menu.

The following screen will be displayed:



STEP 4

Verify that the system is ONLINE in the bottom center of the screen as shown. IF OFFLINE is displayed, hard reset the module again as described in STEP 2.

STEP 5

When ONLINE is displayed, press the [Enter] key to continue. The screen shown below will be displayed next (unless you execute the ADS command when the default MS-DOS directory is a PCM folder; in that case, this screen will be skipped).

```
|CONFIG |MB      |TERMF   |STATUS |CTL     |        |        |FOLDER |UTILTY |
1fsel   2fdel    3        4fbakup 5frestr  6        7fclear  8        9fdir   10fcopy
    Enter name of existing or new program folder

      S E L E C T   O R   C R E A T E   A   P R O G R A M   F O L D E R

Program Folder:

Folders Currently in Drawer C:\ADS_PC

     CONST.PCM      V2D.PCM        TOUCH.PCM      BAR.PCM        LOOP.PCM
     RCKSL.PCM      UNIVS.PCM      TOIT.PCM       DEMO.PCM       FAULT.PCM
     DEMOV.PCM      POWER.PCM      TEST.PCM       SAVE.PCM       IPC.PCM
     STATW.PCM      SCAN.PCM       SYFLT.PCM      CL930.PCM      STATE.PCM
     STEST.PCM      STICK.PCM      REAL.PCM       JEFF.PCM       TEXT.PCM

               << Press Enter Key to Start the Select Function >>
NOTE: A folder extension of .PCM is required. If an extension is not provided an
      extension of .PCM will be added; any other extension is an error.
                                       ONLINE                              FACTORY

 INSERT                         PCM ID:        RACK: 0 SLOT: 3  PLC ID:ADS
```

STEP 6

In this screen you are prompted to enter the name of a CIMPLICITY 90-ADS program folder. While any folder may be specified, it is recommended that C:\ADS_PC\TUTOR.PCM be used as the folder.

Type in TUTOR and press the [Enter] key.

Note

If you have not created the TUTOR folder previously, you will be asked to confirm its creation. After responding that the folder should be created, the following screen will be displayed.

```
|CONFIG |MB      |TERMF   |STATUS |CTL     |        |        |FOLDER |UTILTY |
1config 2mb      3termf   4status 5ctl     6        7        8folder 9utilty10

     S E R I E S   9 0   P C M   P R O G R A M M I N G   S O F T W A R E

                  F1  ... Configure the PCM

                  F2  ... Develop/Execute a MegaBasic Program
                  F3  ... Terminal Emulation

                  F4  ... Operating Status of PCM
                  F5  ... Control Functions

                  F8  ... Folder Functions
                  F9  ... Utility: Save/Load/Clear/Etc.

                  Esc ... Exit PCM Software

                                 ONLINE                              FACTORY
 C:\ADS_PC\TUTOR.PCM
 INSERT                       PCM ID:        RACK: 0 SLOT: 3  PLC ID:ADS
```

This screen is the PCOP software main menu.

STEP 7

Now press the [F9] key to enter the Utility Menu. The following screen will be displayed.

```
|CONFIG |MB      |TERMF  |STATUS |CTL     |        |       |FOLDER |UTILTY |
1save   2load    3       4mdir   5        6mdel    7clear  8       9ads    10gds

           P R O G R A M   U T I L I T Y   F U N C T I O N S

 F1  ... Save File(s) From PCM to Current Folder
 F2  ... Load File(s) To PCM from Current Folder

 F4  ... Directory of Files Currently Resident on PCM and in Current Folder

 F6  ... Delete File(s) from PCM or Current Folder
 F7  ... Delete All Files from PCM

 F9  ... Cimplicity (tm) 90 Alphanumeric Display System
 F10 ... Graphics Display System

                                 ONLINE                              FACTORY
 C:\ADS_PC\TUTOR.PCM
 INSERT                       PCM ID:        RACK: 0 SLOT: 3  PLC ID:ADS
```

STEP 8

Press the [F9] key to go to the CIMPLICITY 90-ADS System installation and environment selection screen shown below.

```
|CONFIG |MB     |TERMF  |STATUS |CTL    |       |       |FOLDER |UTILTY |
1save   2load   3       4mdir   5       6mdel   7clear  8       9ads    10gds
    Press Tab/Shft TAB to select DEVELOPMENT or EXECUTE ONLY

                  C I M P L I C I T Y   (TM)   9 0 - A D S

ADS Environment: DEVELOPMENT  (DEVELOPMENT or EXECUTE ONLY)


               Listing of Files in ADS Folder (PC:\PCOP\ADS.PCM)

    ADS.CDF        ADSB.EXE       ADSBM.HLP      ADSDEV.DAT     ADSDM.ENV
    ADSDM.EXE      ADSE.EXE       ADSEXE.DAT     ADS_MENU       ADS_MENU.ENV
    ADS_RUN        ADSPRNT.EXE    STARTUP.EXE    PCMEXEC.BAT    ADSSETUP.DAT
    ADSFLT.EXE     MENU.EXE       ADSPID.EXE     SPOOL.ENV      ADSE.ENV
    SPOOL.EXE
          Total Bytes Available: 7032832    Folder Size: 628570   Bytes

               << Press Enter Key to Begin ADS Installation >>
 < EXECUTE ONLY fields default to RAM:EMPTY, OIT.TBL, ASCII.TBL, respectively >
             << Press PgUp or PgDn Key to Scroll Listing of Files >>
                                   ONLINE                                FACTORY
 C:\ADS_PC\TUTOR.PCM
 INSERT                           PCM ID:        RACK: 0 SLOT: 3  PLC ID:ADS
```

This screen allows you to select either the Development version or the Execute Only version of the CIMPLICITY 90-ADS software. By default, the CIMPLICITY 90-ADS installation and environment selection screen is set to install the Development version of the CIMPLICITY 90-ADS software onto the Alphanumeric Display Coprocessor module. Pressing the [Tab] key allows you to toggle between Development and Execute Only.

STEP 9

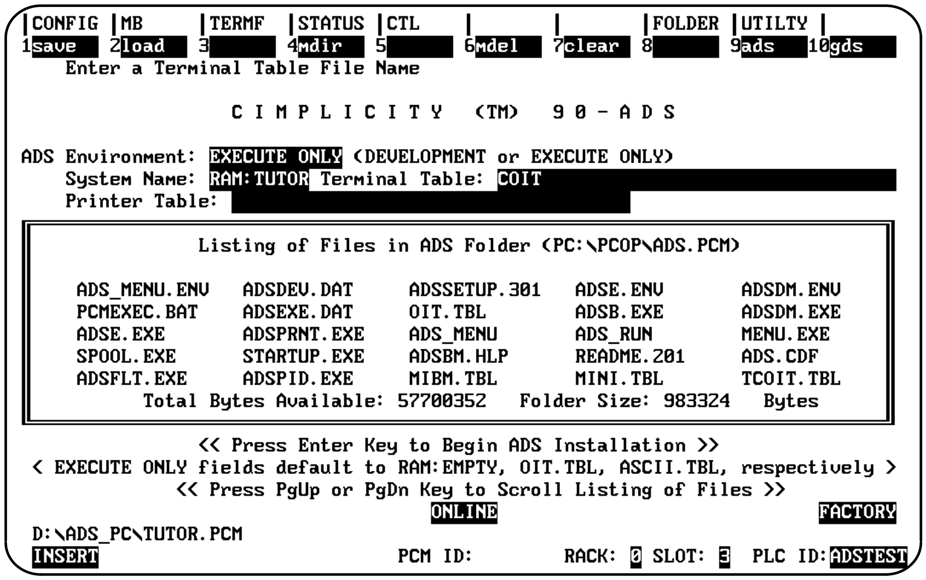
Choose the *Execute Only* environment by pressing the [Tab] key.

```
|CONFIG |MB     |TERMF  |STATUS |CTL    |       |       |FOLDER |UTILTY |
1save   2load   3       4mdir   5       6mdel   7clear  8       9ads    10gds
    Press Tab/Shft TAB to select DEVELOPMENT or EXECUTE ONLY

                  C I M P L I C I T Y   (TM)   9 0 - A D S

ADS Environment: EXECUTE ONLY (DEVELOPMENT or EXECUTE ONLY)
    System Name:          Terminal Table:
    Printer Table:

               Listing of Files in ADS Folder (PC:\PCOP\ADS.PCM)

    ADS_MENU.ENV   ADSDEV.DAT     ADSSETUP.301   SPOOL.ENV      ADSDM.ENV
    PCMEXEC.BAT    ADSEXE.DAT     OIT.TBL        ADSB.EXE       ADSDM.EXE
    ADSE.EXE       ADSPRNT.EXE    ADS_MENU       ADS_RUN        MENU.EXE
    SPOOL.EXE      STARTUP.EXE    ADSBM.HLP      README.201     ADS.CDF
    ADSFLT.EXE     ADSPID.EXE     MIBM.TBL       MINI.TBL       TCOIT.TBL
          Total Bytes Available: 57741312   Folder Size: 983324   Bytes

               << Press Enter Key to Begin ADS Installation >>
 < EXECUTE ONLY fields default to RAM:EMPTY, OIT.TBL, ASCII.TBL, respectively >
             << Press PgUp or PgDn Key to Scroll Listing of Files >>
                                   ONLINE                                FACTORY
 D:\ADS_PC\TUTOR.PCM
 INSERT                           PCM ID:        RACK: 0 SLOT: 3  PLC ID:ADSTEST
```

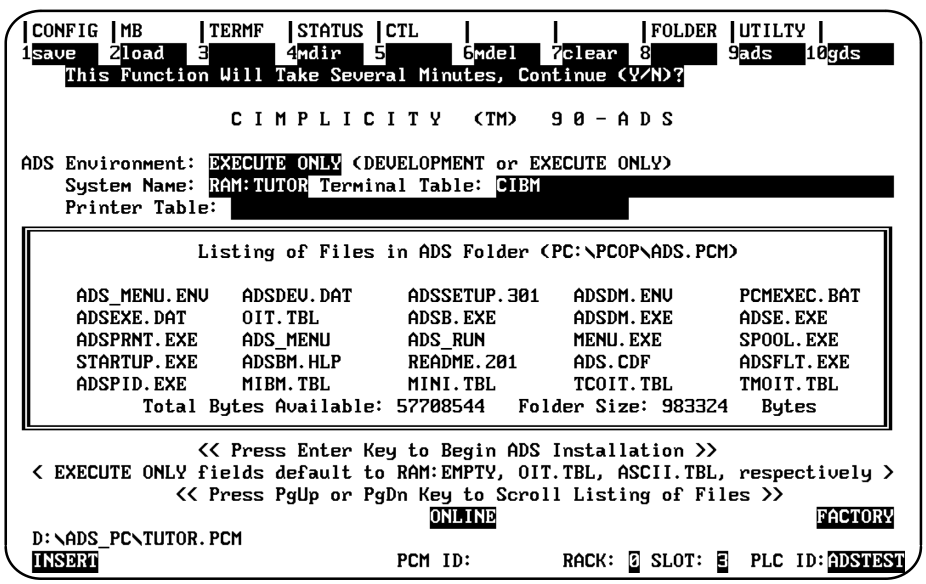
Press the [↓] key to select the *System Name* field and type in the text

RAM:TUTOR

Then, press the [↓] key again to select the *Terminal Table* field and type in the appropriate terminal table as determined from table 5–3. For this tutorial the *Printer Table* field will not need to be filled out.



Press the [Enter] key to begin the ADS software installation process. You will be prompted to confirm the operation.



After pressing the [Y] key to continue, the ADS software installation process will commence. If you previously executed a demonstration system as outlined in Chapter 5, this process will complete very quickly; otherwise, several minutes will be required to complete the installation. While PCOP is loading files to the ADC module, the port 1 LED on the module should be blinking and the message "Loading File to PCM" should be displayed on your computer screen. When the installation is completed you should see the following screen on your computer's display,

```
        TERMF terminal emulator, copyright 1988, 1989 GE Fanuc
          Press ALT-Z keys to return to programmer main menu
```

and this display on your target terminal. The error message "Error opening system configuration file RAM:TUTOR.CFG" means that the ADS Executor did not find the TUTOR system on the ADC module's RAM: disk; this is OK since we haven't created the system yet!

```
MBX Driver installed
ADS Shareable Image Driver installed
ADS User Image Driver installed
ADS device installation completed successfully
(c)1989-1992 GE FANUC AUTOMATION, NORTH AMERICA, INC.
ADS shareable images successfully installed
ADS FAULT TABLE shareable images successfully installed
(c)1989-1992 GE FANUC AUTOMATION, NORTH AMERICA, INC.

PLC is currently executing task 'ADS'
Privilege level set
DATA MANAGER Started
Error opening system configuration file RAM:TUTOR.CFG
(c)1989-1992 GE FANUC AUTOMATION, NORTH AMERICA, INC.
```

Your computer screen should now show the characters ”–>” on it, indicating that the ADC module has hard reset itself. If you don’t see these characters, either press the [Enter] key on your *target terminal’s keyboard* or alternatively hard reset the ADC module.

```
      TERMF terminal emulator, copyright 1988, 1989 GE Fanuc
        Press ALT-Z keys to return to programmer main menu
->
```

Section 2: The Development Tutorial

Overview of Product Operation

When producing an operator interface with the CIMPLICITY 90-ADS software for a particular application, you will typically go through the following steps (note that steps 2 through 6 may be performed in any order, one or more of those steps not performed at all, or one or more of them performed multiple times):

1. Run the ADS Builder
2. Use the system *Configuration Operations* to perform the following:
   - Name the system and set certain parameters;
   - Create data sources (Series 90 memory locations);
   - Create display formats (custom displays of Series 90 data);
   - Create translation tables (linear data scaling and offsetting);
   - Create lookup tables (non-linear data scaling and conversions);
   - Create engineering units conversion tables (linear data scaling);
   - Create command scripts (integral sequence of commands);
3. Use the *Screen Operations* to create screens and assign actions to the user-defined keys for each screen.
4. Use the *Alarm Operations* to create alarm sources and alarm pages.
5. Use the *Report Operations* to create printable reports.
6. Use the *Load/Save Operations* to save the system to disk and to the ADC; execute the system on the ADC.
7. *Exit* the ADS Builder.

Going Through the Tutorial

The tutorial is presented as a series of steps which represent the typical sequence you will follow in creating any system. You will build a non-trivial system and execute it on an ADC module using your target terminal. After you have completed the tutorial, you will have been introduced to the following product concepts and features:

- Use the ADS Builder to create and modify a system
- Use the ADS Builder to save a system to the ADC module
- Create screens
- Edit screen text
- Control video attributes and the size of the text

- draw rectangles
- Select regions on a screen
- Create dynamic objects
- Create bar charts
- Copy dynamic objects
- Create data sources
- Create linear translations
- Create display formats
- Create lookup tables
- Define function keys
- Create a custom location based on multiple PLC locations
- Create an alarm page
- Create an alarm source

- Use the Executor to execute a system
- View real-time data on multiple screens in multiple formats
- Edit a value on a screen
- Set a PLC location to a new value
- Display multiple screens simultaneously
- Look at PLC status information
- Access the Fault option module
- Display an alarm page
- Acknowledge alarms

For detailed information on what will be covered in general during the tutorial, refer to the later chapters in this manual and to GFK-0641, the ADS Reference Manual. The key assignments tables below should be used as a reference while using the Builder and Executor.

Table 6-1. Key Functions for System Building

Key Function	Key Sequence
GOLD	Insert
Help	Home
Quit	Esc or F10
Save	Alt-F10
Object list	Alt-S
Refresh screen	^W
Clear field	^X
Beginning of line	GOLD ←
End of line	GOLD →
Top of screen	GOLD ↑
Bottom of screen	GOLD ↓
Video select	F1
Video clear	Alt-F1
Color	F4
Character set	Alt-F4
Double wide	Alt-W
Double size	Alt-D
Draw toggle	Alt-F5
Draw area	F5
Delete line	End
Undelete line	GOLD End
Select toggle	F3
Cut area	F6
Paste area	Alt-F6
Startdynamic / predefinedobject	Alt-F7 or GOLD KP7
End dynamic object	F7
End predefined objects	Alt-F2
Delete dynamic object	Alt-F8
Modify dynamic object	F8
Copy dynamic object	F9
Paste dynamic object	Alt-F9
Touch screen grid	Delete
Touch screen assignments	GOLD Delete

† Num Lock must be set to OFF for 83-key keyboard; F11 and F12 keys on enhanced AT and PS / 2 style keyboards cannot be used (use SHIFT–F1 and SHIFT–F2).

‡ The MPC and CPC terminal tables are used for the PC-based Builder only.

1. Keys marked as Alt-x refer to the appropriate alternate key (Alt key held down while simultaneously pressing the appropriate key).

2. Keys marked as ^x refer to the appropriate control key (Ctrl key held down while simultaneously pressing the appropriate key).

4. Keys marked as GOLD xxx refer to the two key sequence of the GOLD key followed by the appropriate key.

Table 6-2. Key Functions for System Execution

Key Function	Terminal		
	MOIT/COIT TMOIT/TCOIT	VT100	MIBM/CIBM †
Exit system execution	^E	^E	^E
Clear field	^X or Home	^X	^X
Refresh screen	^W	^W	^W
User defined function key AK1	F1	KP1	F1 or KP1
User defined function key AK2	F2	KP2	F2 or KP2
User defined function key AK3	F3	KP3	F3 or KP3
User defined function key AK4	F4	KP4	F4 or KP4
User defined function key AK5	F5	KP5	F5 or KP5
User defined function key AK6	F6	KP6	F6 or KP6
User defined function key AK7	F7	KP7	F7 or KP7
User defined function key AK8	F8	KP8	F8 or KP8
User defined function key AK9	F9	KP9	F9 or KP9
User defined function key AK10	F10	KP0	F10 or KP0
User defined function key AK11	F11	PF1	F11 or Insert
User defined function key AK12	F12	PF2	F12 or Home
User defined function key AK13	F13	PF3	F13 or Delete
User defined function key AK14	F14	PF4	F14 or End
User defined function key AK15	F15	KPENTER	F15 or KP*

† Num Lock must be set to OFF for 83-key keyboard; F11 and F12 keys on enhanced AT and PS/2 style keyboards cannot be used (user SHIFT–F1 and SHIFT–F2).

1. For those keyboards which only support function keys F1 through F10, F11 through F15 may be generated by pressing SHIFT–F1 through SHIFT–F5.
2. Keys marked as ^x refer to a combination of the control key and a letter (Ctrl key held down while simultaneously pressing the appropriate key).
3. Keys marked as KPx refer to the appropriate numeric key on the numeric keypad (normally found on the righthand side of the keyboard).
4. F11, F12, and F13 are not available for use with the PC-based Builder.

If your **target** terminal is a GE Fanuc monochrome or color OIT, a GE Fanuc Mini OIT (non-touch version), a VT100 compatible, or a monochrome or color IBM PC compatible, you should proceed to Section 3.

If your **target terminal** is a GE Fanuc Mini OIT-Touch, a Nematron monochrome or color OptiTouch or a Lucas Deeco ST-2200, you should proceed to Section 4.

Section 3: Development Tutorial for Non-Touch Terminals

This section is a step-by-step tutorial for building and executing a system which will use a target terminal with an attached (or built–in) keyboard. You should use this section if you target terminal is one of the following:

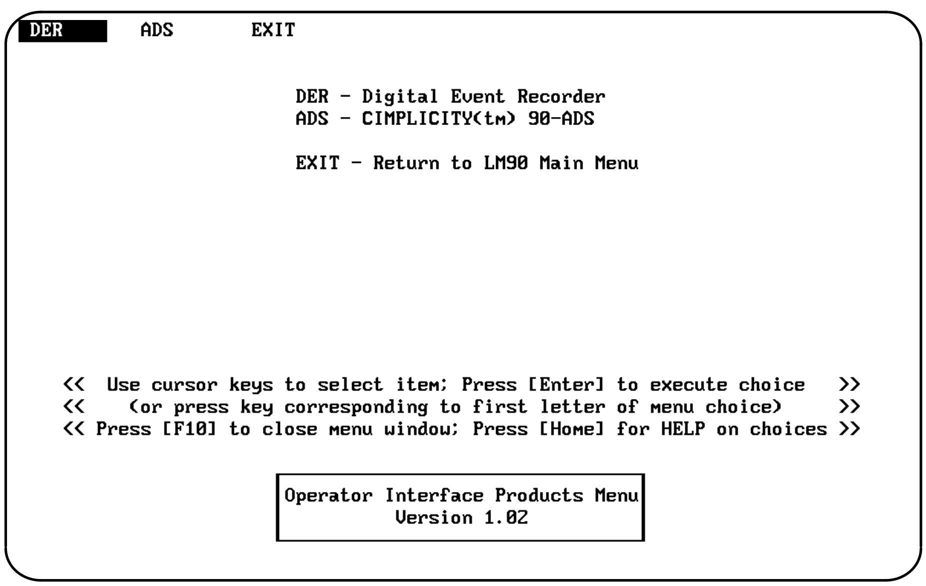
- GE Fanuc monochrome or color OIT
- GE Fanuc Mini OIT
- VT100 compatible
- Monochrome or color IBM PC compatible

A listing of the system you will be building may be found at the end of this section beginning on page 6-73.

STEP 1

Accessing the Builder

Type *OI_MENU* at the MS-DOS prompt to execute the Operator Interface products menu program, resulting in the initial screen shown below.



Press the [→] cursor key followed by the [Enter] key to select the ADS pull–down menu (alternatively, you may just press the [A] key).

```
DER        ADS        EXIT

           BUILD
           PCOP-ADS      DER - Digital Event Recorder
           ADSSETUP      ADS - CIMPLICITY(tm) 90-ADS
           TERMSET
           CREATHLP      EXIT - Return to LM90 Main Menu
           XREF
           TERMF


   <<  Use cursor keys to select item; Press [Enter] to execute choice   >>
   <<    (or press key corresponding to first letter of menu choice)     >>
   << Press [F10] to close menu window; Press [Home] for HELP on choices >>

                      Operator Interface Products Menu
                                Version 1.02
```

Press the [Enter] key to pop–up the Builder data entry window (alternatively, you may just press the [B] key).

```
DER        ADS        EXIT

           BUILD

             SYSTEM:

               PATH:

                            << Press [Home] for HELP >>


   <<  Use cursor keys to select item; Press [Enter] to execute choice   >>
   <<    (or press key corresponding to first letter of menu choice)     >>
   << Press [F10] to close menu window; Press [Home] for HELP on choices >>

                      Operator Interface Products Menu
                                Version 1.02
```

Fill out the ”System” name field with the text *TUTOR*.

```
DER          ADS         EXIT
             BUILD

               SYSTEM:  TUTOR

                 PATH:

                             << Press [Home] for HELP >>




    <<  Use cursor keys to select item; Press [Enter] to execute choice   >>
    <<    (or press key corresponding to first letter of menu choice)     >>
    << Press [F10] to close menu window; Press [Home] for HELP on choices >>

                         Operator Interface Products Menu
                                   Version 1.02
```

Press the [Enter] key twice to access the Builder’s copyright screen (alternatively, you can press the [Alt-F10] key). Pressing the [Enter] key while viewing the copyright screen will display the Builder’s main menu screen.

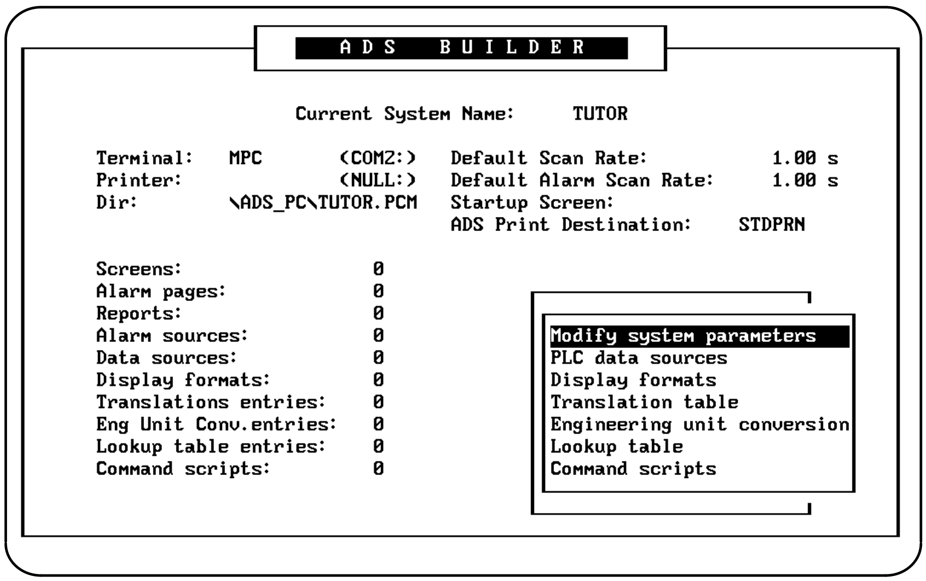
```
                         A D S   B U I L D E R

                       Current System Name:     TUTOR

     Terminal:   MPC       (COM2:)  Default Scan Rate:          1.00 s
     Printer:              (NULL:)  Default Alarm Scan Rate:    1.00 s
     Dir:        \ADS_PC\TUTOR.PCM  Startup Screen:
                                    ADS Print Destination:    STDPRN

     Screens:                 0
     Alarm pages:             0
     Reports:                 0             Configuration operations
     Alarm sources:           0             Screen operations
     Data sources:            0             Alarm operations
     Display formats:         0             Report operations
     Translations entries:    0             Load/Save operations
     Eng Unit Conv.entries:   0             Print system summary
     Lookup table entries:    0             Options PID
     Command scripts:         0             Terminal
                                            Exit
```

The Builder’s main screen provides current system information across the top of the screen. On the left-hand side of the screen are items that you will create along with the current quantities listed for each of these items. On the right-hand side of the screen is a window containing a menu listing a group of operations which are accessible from the main menu screen. You will interact with a number of these menu items throughout this tutorial.

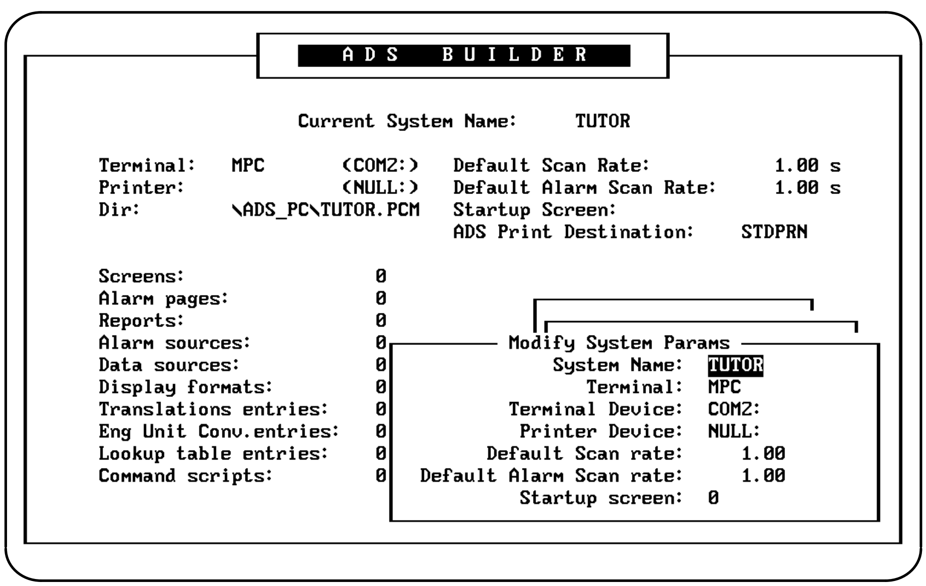
STEP 2

System Configuration

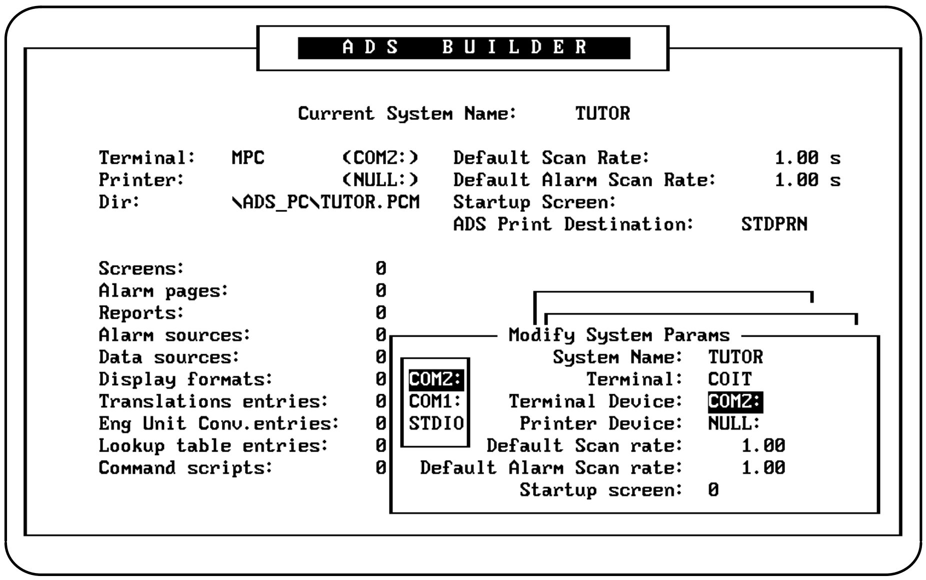
Press the [Enter] key to access the "Configuration Operations" submenu.



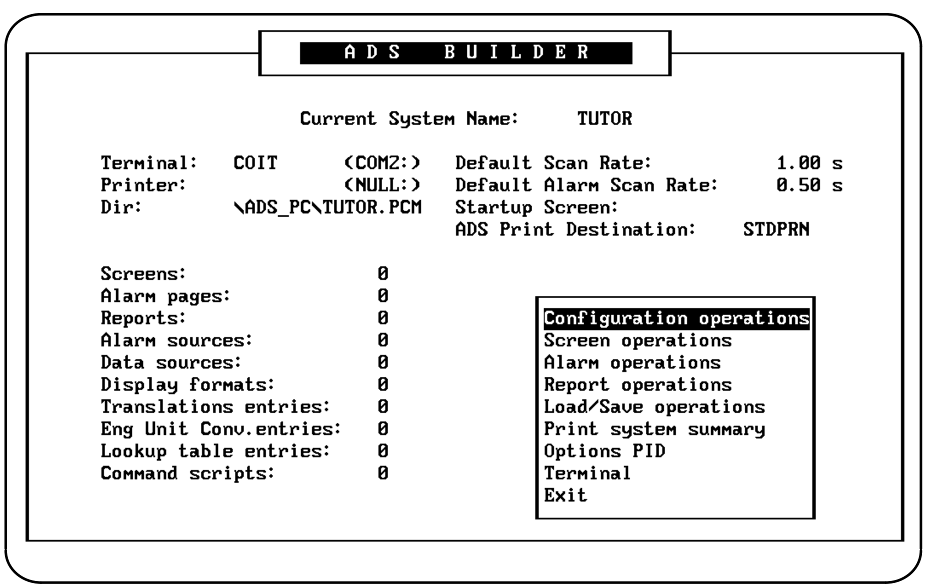
Press the [Enter] key to access the "Modify System Parameters" data entry form.



The [Enter] key is used to move from field to field within the data entry form; when on the last field of the form, pressing the [Enter] key will close the data entry form, saving its contents. Use the [Esc] key to cancel the entry of data into the form. The [Ctrl– X] key is used to clear the contents of a field. You should fill in the ”Terminal” and ”Terminal Device” fields of the form using information from Table 5– 2. It is suggested that you also change the ”Default Alarm Scan rate” field to 0.5. Note that some fields, such as the ”Terminal Device” field, present you with a menu of choices to pick from. The [↑] and [↓] cursor keys are used to highlight the desired choice; pressing the [Enter] key selects it.



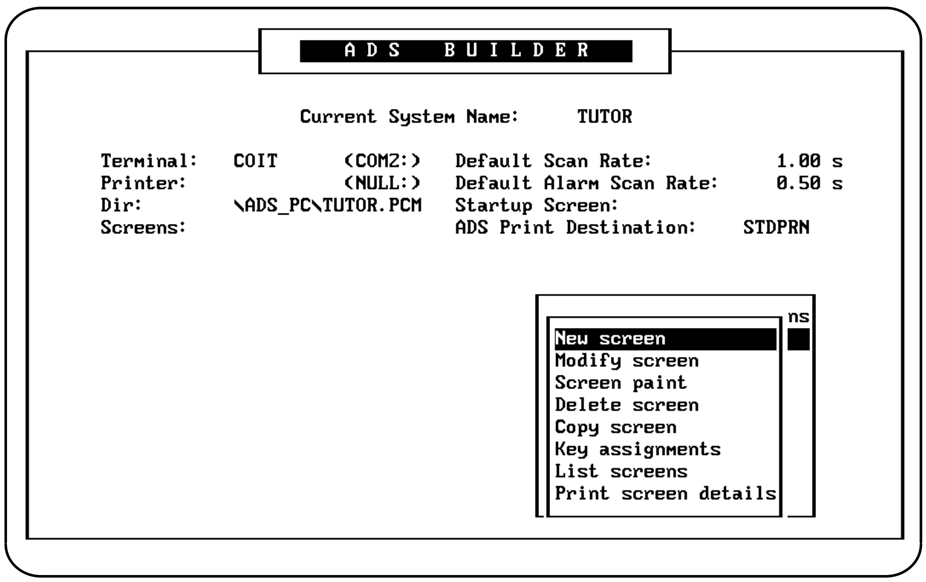
Once the ”Modify System Parameters” data entry form has been closed, press the [Esc] key to return to the Builder main menu. Note that the changes you made to the form are now reflected in the status information on the screen.



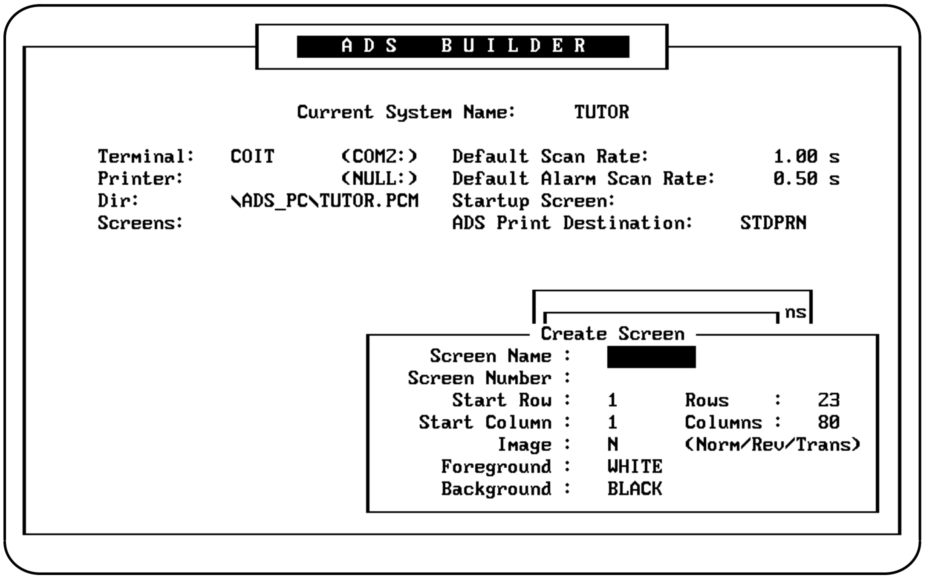
STEP 3

Creating the Main Screen

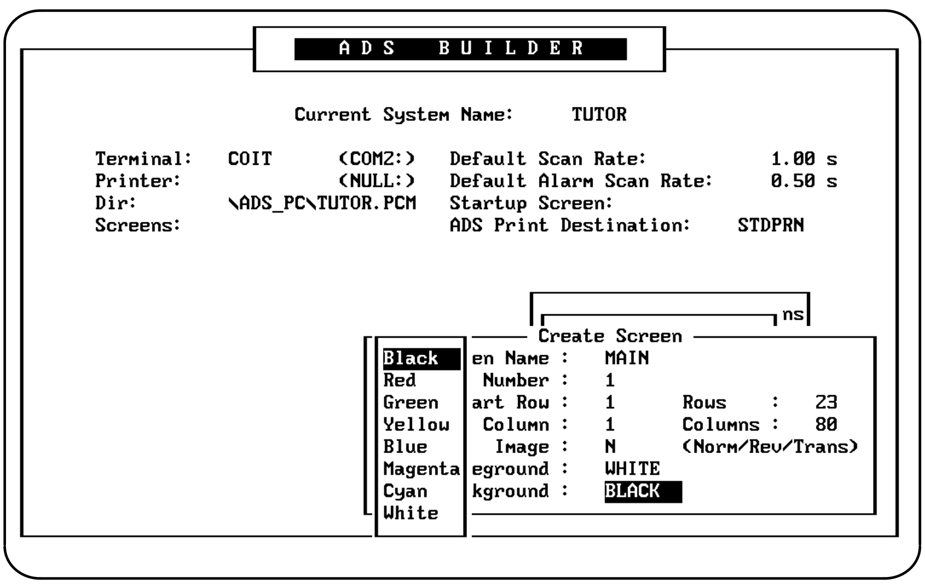
Now that you have selected the correct target terminal for your configuration, you may proceed to create your first screen. Select the "Screen Operations" submenu, either by pressing the [ ] or [–] cursor keys to select its menu entry and then pressing the [Enter] key to select it, or alternately by just pressing the [S] key. Throughout the remainder of this tutorial, when you are asked to select a menu item you should either cursor to that item and then press the enter key or alternatively you may just press the letter corresponding to the first letter of the menu item. Where more that one menu item begins with the same first character, the topmost item in the menu list would be selected by pressing its corresponding first letter.



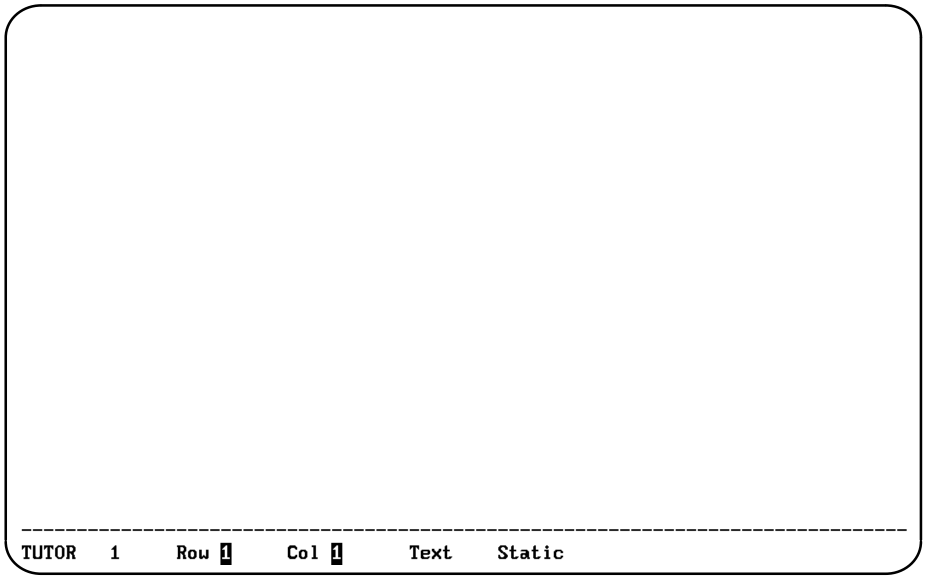
Select the ”New Screen” menu item to open up the create screen data entry form.



Enter a ”screen name” of *MAIN* and a ”screen number” of *1*. The ”start row”,”rows”, ”start column”, ”columns” and ”image” fields may all be left as their defaults. If you are using a color terminal, you may want to change the ”foreground” and ”background” colors to something other than the white on black default. Press the [Enter] key to complete or skip a field on the data entry form.



Upon completing the "create screen" data entry form you will automatically be placed into the **screen painter** for screen 1.

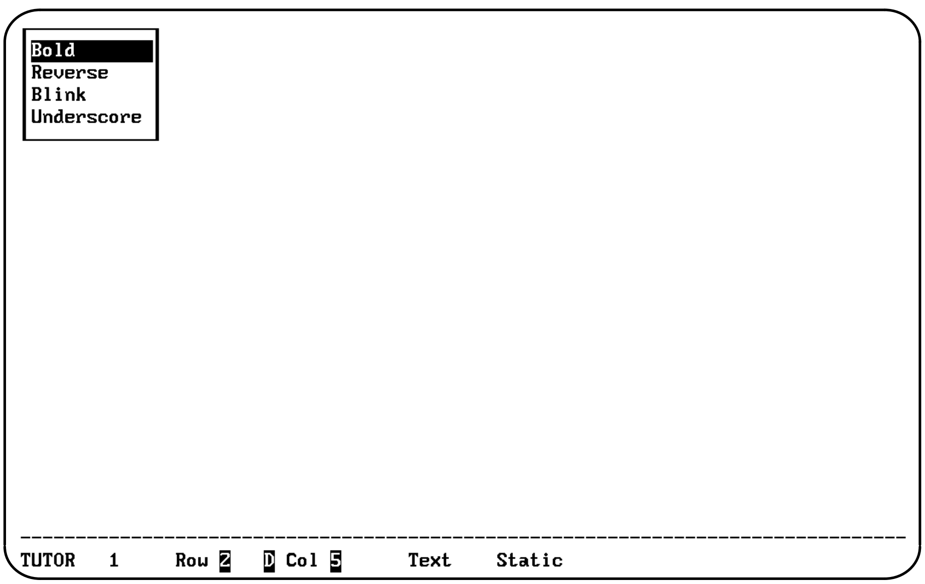


STEP 4

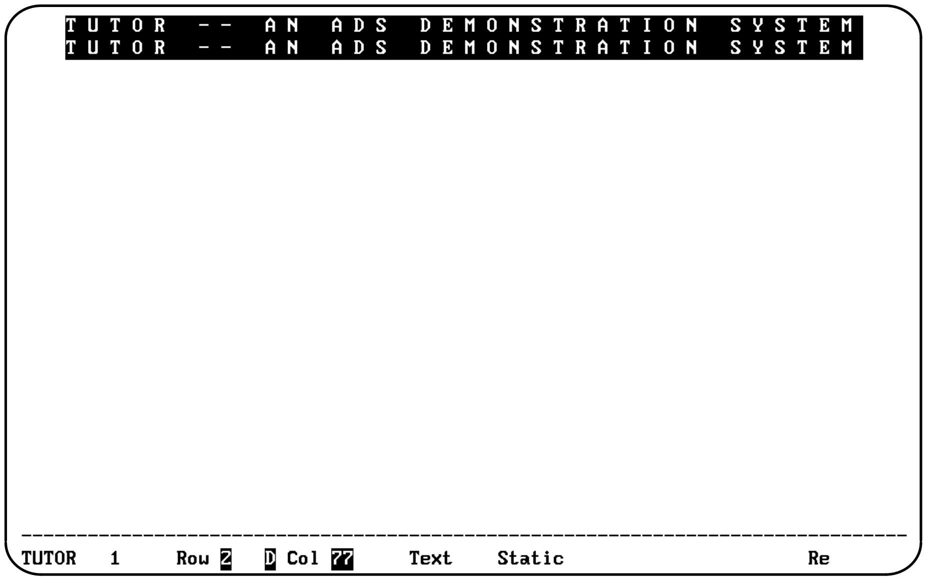
Video Attributes and Double Size Text

The dashed line towards the bottom of the screen indicates the lower bound of the screen area for your target terminal. The bottom line of the screen is reserved as the status area for the screen painter. It indicates the name of the system, the screen being painted, the <row, column> screen position of the cursor, that the painter is in text mode and that you are currently able to create static text. Initially we want to create a double–size text header for the screen.

Use the cursor keys to position the cursor at <row, column> position <2, 1>. Then press the [Alt–D] key to put the line into ”double size” mode; this will be denoted by the appearance of a reverse video ”D” in the status area. Now use the cursor keys to position the cursor at <row, column> position <2, 5>. Then press the [F1] key to select the video attributes menu.



Select the choice of "Reverse". The video attribute menu will be closed automatically; the activation of reverse video will be denoted by the "Re" designator in the right side of the status area. Now type in the desired text: *TUTOR — AN ADS DEMONSTRATION SYSTEM*. The double size text is displayed on your computer screen as two identical double spaced lines; these will appear as a single double size line on your terminal when the system is executed.



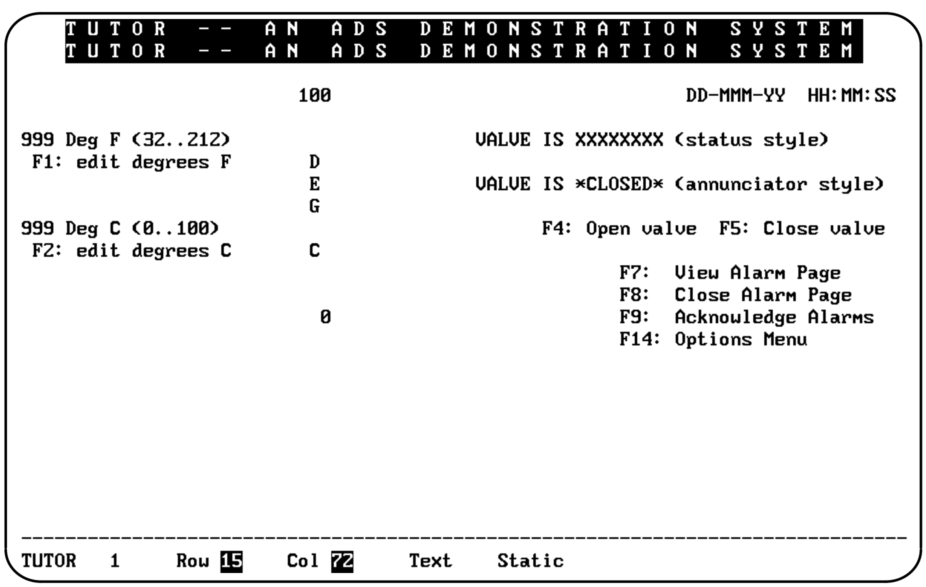
Since we have now entered all the text we want to with the reverse video attribute, press the [Alt–F1] key; note that the "Re" designator disappears from the status area. Alternatively, you can press the [F1] key to select the video attributes menu and then select the choice of "Reverse" again. This will also cause the reverse video choice to be "toggled off". The difference between the two approaches is that the [Alt–F1] key will remove ALL selected video attributes.

STEP 5

Editing Screen Text

Using the cursor keys to position the cursor at the appropriate <row, column> positions given in the table below, enter the specified text at the indicated screen positions. Note that the sequence of eight ”X’s” in the text ”VALVE IS XXXXXXXX” must be in upper case! Also, the text strings ”DD–MMM–YY” and ”HH:MM:SS” must be in upper case.

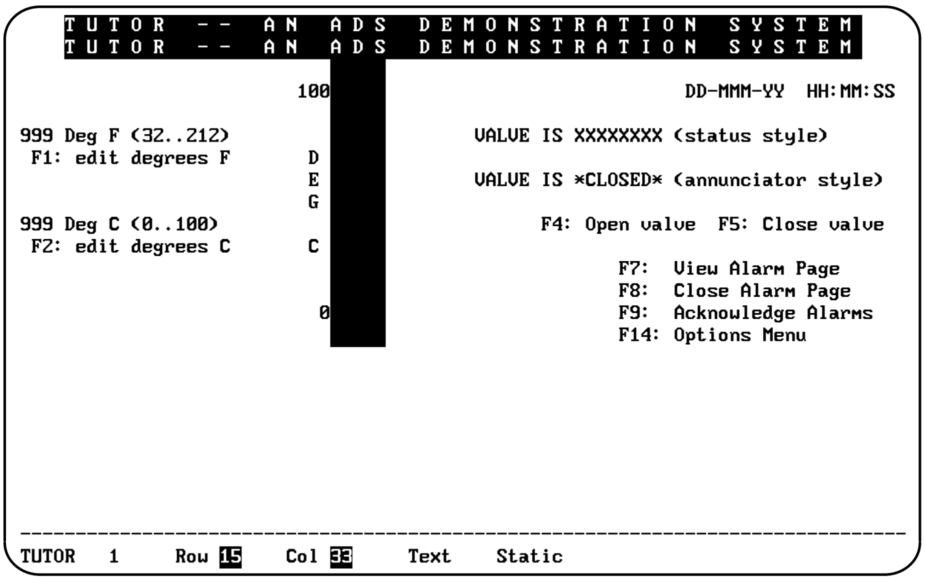
<Row Column>	Text to Type There
<4, 26>	100
<4, 61>	DD–MMM–YY
<4, 72>	HH:MM:SS
<6, 1>	999 Deg F (32..212)
<6, 42>	VALVE IS XXXXXXXX (status style)
<7, 2>	F1: edit degrees F
<7, 27>	D
<8, 27>	E
<8, 42>	VALVE IS *CLOSED* (annunciator style)
<9, 27>	G
<10, 1>	999 Deg C (0..100)
<10, 48>	F4: Open valve F5: Close valve
<11, 2>	F2: edit degrees C
<11, 27>	C
<12, 55>	F7: View Alarm Page
<13, 55>	F8: Close Alarm Page
<14, 28>	0
<14, 55>	F9: AcknowledgeAlarms
<15, 55>	F14: Options Menu



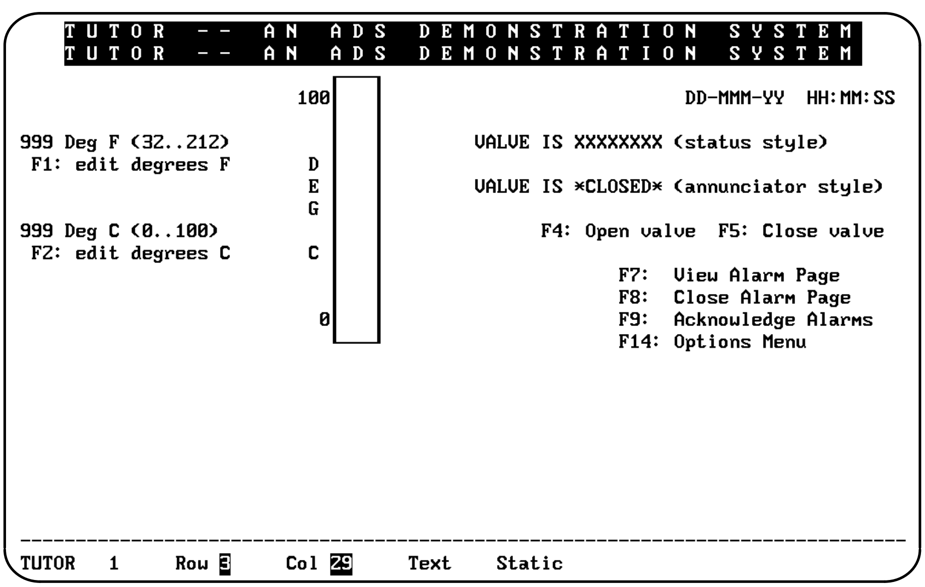
STEP 6

Drawing Rectangles

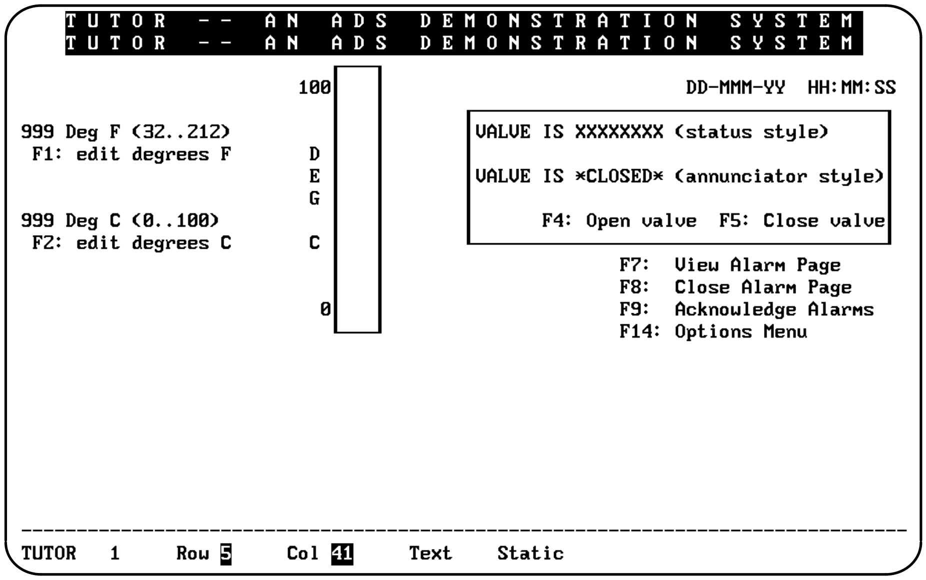
The next step is to draw a thermometer onto the screen which will be ”filled” when the system is executed. Position the cursor at the <3, 29> <row, column> position. Press the [F3] key to begin to select a region. Use the cursor keys to move over to column 33 in row 3, and then directly down in column 33 to row 15. Note that the entire region is displayed in reverse video.



Now press the [F5] key which causes a rectangle to be drawn along the *inside* of the selected region’s outer edges.



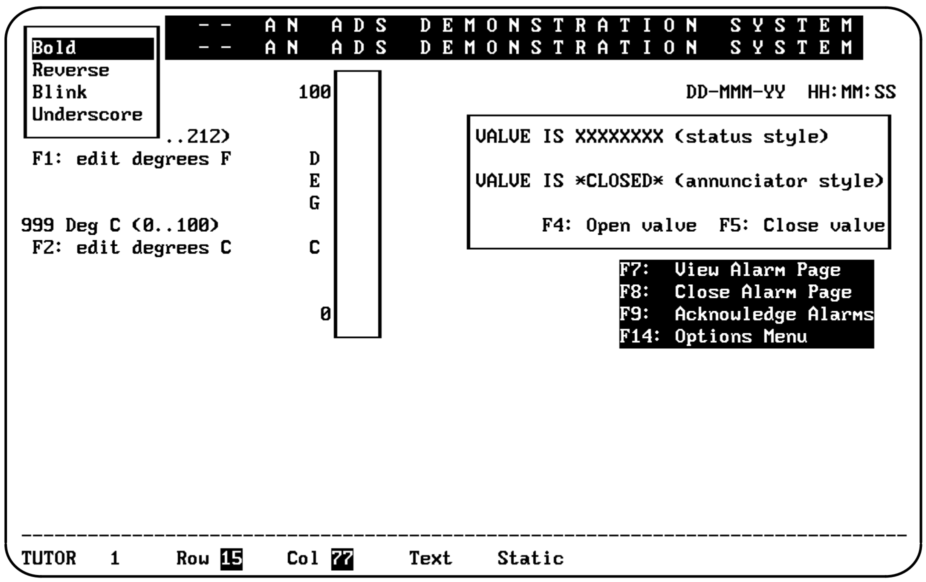
Use the same technique to draw a box around some text on the screen. Position the cursor at <row, column> position <5, 41>, press the [F3] key to begin the selection of the region, move the cursor first to <5, 79> and then to <11, 79>. Press the [F5] key to draw the desired rectangle.



STEP 7

Applying Video Attributes to a Region

You can use a similar technique to apply a video attribute to a region of text. Position the cursor at <row, column> position <12, 55>, press the [F3] key to begin the selection of the region, move the cursor first to <12, 77> and then to <15, 77>. Press the [F1] key to bring up the video attributes menu.

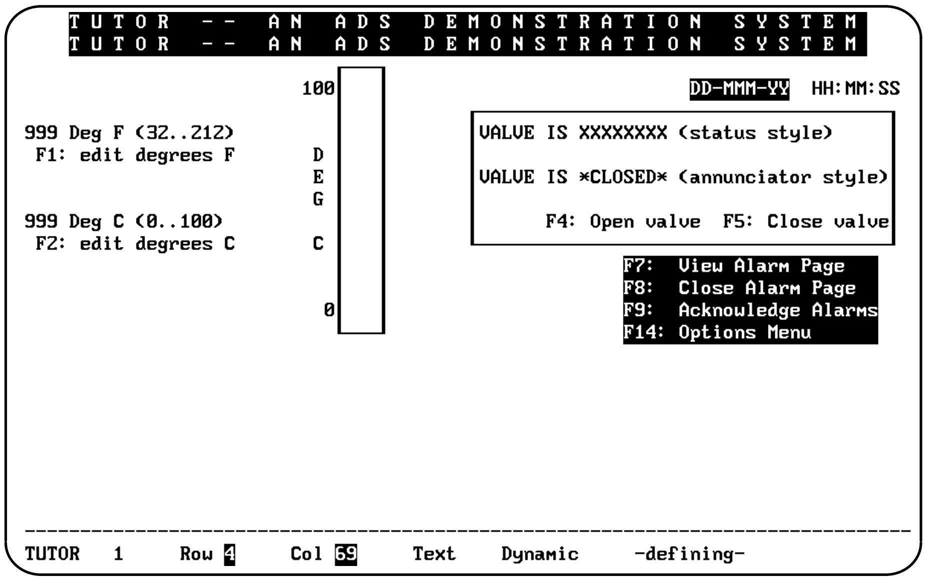


Select the "Reverse" option; the reverse video attribute will be applied to the entire selected region.

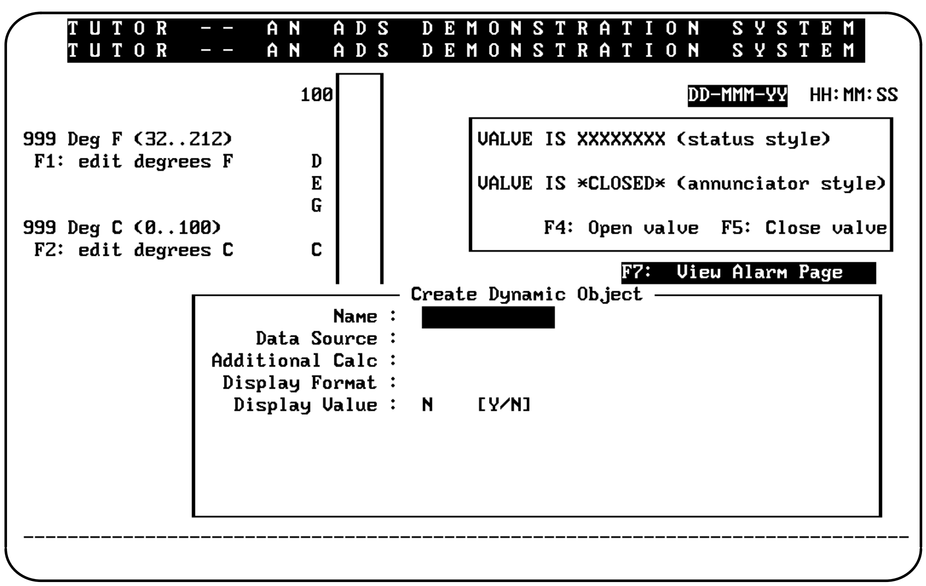
STEP 8

Creating Dynamic Objects; PLC Date and Time

Now its time to begin animating objects on the screen. First we'll animate the display of the PLC's date and time. The date and time fields are specified by the data format strings "DD–MMM–YY" and "HH:MM:SS", respectively. First, position the cursor at <row, column> position <4, 61>. Press the [Alt–F7] key to begin defining a "dynamic object" (one which will display data or status when the system is executed). The status area will confirm that you are defining a dynamic object. Move the cursor to <4, 69>; the date field will now be entirely in reverse video.



Press the [F7] key to complete the selection of the region which is to become a dynamic object. A dynamic object data entry form is automatically opened so that you can tell the ADS software some things about the object.



There are several commands in the ADS software which reference a dynamic object by screen number and the name of the object. Thus, dynamic object names only need to be unique from other objects on the same screen. Type in the name *DATE_DISPLAY* and press the [Enter] key. The "Data Source" field is selected next. A data source is what links a dynamic object to a location, or locations, in the PLC. Its name must be unique from all other data sources in a system, but may be referenced by multiple dynamic objects. Type in *PLC_DATE* and press the [Enter] key. Since data source PLC_DATE has not yet been defined, a data entry form for it is automatically opened up on the screen.

```
   T U T O R   - -   A N   A D S   D E M O N S T R A T I O N   S Y S T E M
   T U T O R   - -   A N   A D S   D E M O N S T R A T I O N   S Y S T E M

                           100                                DD-MMM-YY  HH:MM:SS

999 Deg F (32..212)                         VALUE IS XXXXXXXX (status style)
 F1: edit degrees F         D
                            E               VALUE IS *CLOSED* (annunciator style)
                            G
999 Deg C (0..100)                                F4: Open valve  F5: Close valve
 F2: edit degrees C         C
                                                           F7:  View Alarm Page
                                  Create Dynamic Object
                      Name :  DATE_DISPLAY
               Data Source :  PLC_DATE
           Additional Calc :
                                 Create a data source
                      Name:   PLC_DATE
          Source Data Type:   WORD
           Source Location:
                 Scan Rate:   *              (* or HH:MM:SS.CC)
          Additional Calc.:
--------------------------------------------------------------------------------
```

A reserved source location named "DATE" is referenced in order to retrieve the PLC date. It requires a data type of "LONGWORD". Regardless of the setting for the system scan rate, you will probably want to check on the PLC date once a second. The data source data entry form is filled out as follows:

```
   T U T O R   - -   A N   A D S   D E M O N S T R A T I O N   S Y S T E M
   T U T O R   - -   A N   A D S   D E M O N S T R A T I O N   S Y S T E M

                           100                                DD-MMM-YY  HH:MM:SS

999 Deg F (32..212)                         VALUE IS XXXXXXXX (status style)
 F1: edit degrees F         D
                            E               VALUE IS *CLOSED* (annunciator style)
                            G
999 Deg C (0..100)                                F4: Open valve  F5: Close valve
 F2: edit degrees C         C
                                                           F7:  View Alarm Page
                                  Create Dynamic Object
                      Name :  DATE_DISPLAY
               Data Source :  PLC_DATE
           Additional Calc :
                                 Create a data source
                      Name:   PLC_DATE
          Source Data Type:   LONGWORD
           Source Location:   DATE
                 Scan Rate:   00:00:01.00    (* or HH:MM:SS.CC)
          Additional Calc.:
--------------------------------------------------------------------------------
```

Pressing the [Enter] key completes the entry and closes the data source data entry form, returning you to the dynamic object data entry form. The dynamic object data entry form is completed as follows:

```
     T U T O R   - -   A N   A D S   D E M O N S T R A T I O N   S Y S T E M
     T U T O R   - -   A N   A D S   D E M O N S T R A T I O N   S Y S T E M

                         100|   |                             DD-MMM-YY  HH:MM:SS
                            |   |         ----------------------------------
999 Deg F (32..212)         |   |         |VALUE IS XXXXXXXX (status style)
 F1: edit degrees F       D |   |         |
                          E |   |         |VALUE IS *CLOSED* (annunciator style)
                          G |   |         |
999 Deg C (0..100)          |   |         |      F4: Open valve  F5: Close valve
 F2: edit degrees C       C |   |         ----------------------------------
                            |   |                      F7:  View Alarm Page
                 ------------------- Create Dynamic Object -----------------
                 |       Name :  DATE_DISPLAY
                 |Data Source :  PLC_DATE
                 |Additional Calc :
                 | Display Format :
                 |  Display Value :  Y    [Y/N]
                 |       Hex Notation:  N
                 |       Left Justify:  N
                 |          Zero Fill:  N
                 | Available for Edit:  N
                 -----------------------------------------------------------
--------------------------------------------------------------------------------
Data source added to system
```

Pressing the [Enter] key completes the entry and closes the dynamic object data entry form.

The "HH:MM:SS" is converted to a dynamic object which will display the PLCs time in the same manner as you just did for the date. Position the cursor on one end of the field designator, press the [Alt–F7] key to begin defining a dynamic object, then move to the opposite end of the field and press the [F7] key to complete the selection. The object is given the name *TIME_DISPLAY* and is tied to a data source to be named *PLC_TIME.* Data source PLC_TIME is defined very similarly to data source PLC_DATE.

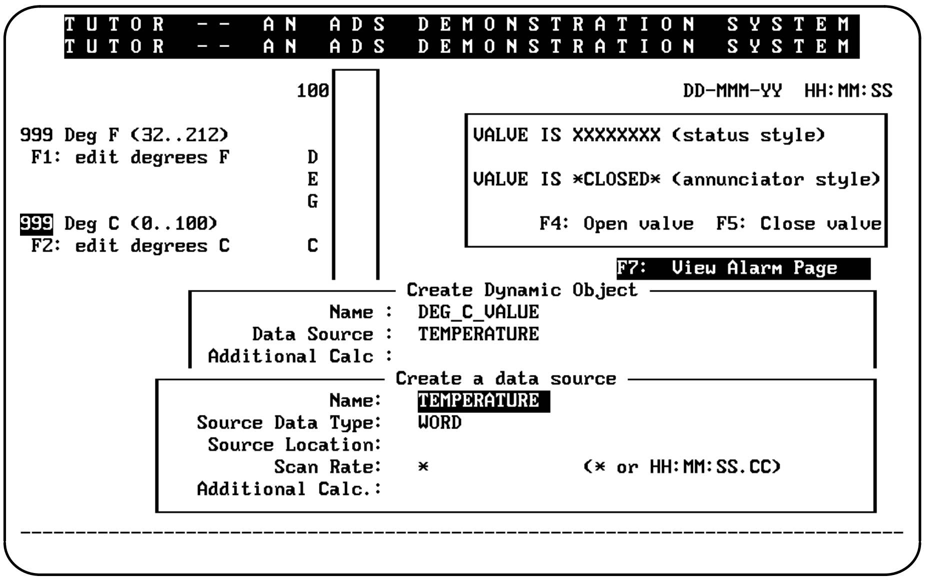
```
     T U T O R   - -   A N   A D S   D E M O N S T R A T I O N   S Y S T E M
     T U T O R   - -   A N   A D S   D E M O N S T R A T I O N   S Y S T E M

                         100|   |                             DD-MMM-YY  HH:MM:SS
                            |   |         ----------------------------------
999 Deg F (32..212)         |   |         |VALUE IS XXXXXXXX (status style)
 F1: edit degrees F       D |   |         |
                          E |   |         |VALUE IS *CLOSED* (annunciator style)
                          G |   |         |
999 Deg C (0..100)          |   |         |      F4: Open valve  F5: Close valve
 F2: edit degrees C       C |   |         ----------------------------------
                            |   |                      F7:  View Alarm Page
                 ------------------- Create Dynamic Object -----------------
                 |       Name :  TIME_DISPLAY
                 |Data Source :  PLC_TIME
                 |Additional Calc :
              ---------------------- Create a data source -------------------
              |            Name:   PLC_TIME
              |Source Data Type:   LONGWORD
              | Source Location:   TIME
              |       Scan Rate:   00:00:01.00    (* or HH:MM:SS.CC)
              |Additional Calc.:
              --------------------------------------------------------------
--------------------------------------------------------------------------------
```

The remainder of the dynamic object data entry form is filled out the same as for the DATE_DISPLAY dynamic object, with only the "Display Value" field needing to be changed to indicate "Y".

STEP 9

Creating Dynamic Objects Which Can Be Edited

The next step is to define a dynamic object for displaying temperature in degrees Celsius. Position the cursor on the ”9” located at <row, column> position <10, 1>; the sequence of three ”9’s” defines a numeric field three digits in width. Press the [Alt–F7] key to begin defining a dynamic object and move to the rightmost ”9”. Press the [F7] key to complete the selection of the dynamic object. Give the object the name *DEG_C_VALUE* and have it reference the data source *TEMPERATURE.*



In our example, the temperature will be stored in degrees Celsius; it will be treated as an unsigned word ranging between 0 and 100. Source location ”Z1” will be referenced. The Z memory is not true PLC memory as it is located on the ADC module; this makes the Z memory ideal for producing a tutorial as you will not need to be concerned with inadvertently changing data in your PLC. In a typical application you would reference such a value from a true PLC memory location, for example R100 or AI6.

```
      T U T O R   - -   A N   A D S   D E M O N S T R A T I O N   S Y S T E M
      T U T O R   - -   A N   A D S   D E M O N S T R A T I O N   S Y S T E M

                          100                            DD-MMM-YY  HH:MM:SS

999 Deg F (32..212)                       VALUE IS XXXXXXXX (status style)
 F1: edit degrees F        D
                           E              VALUE IS *CLOSED* (annunciator style)
                           G
999 Deg C (0..100)                             F4: Open value  F5: Close value
 F2: edit degrees C        C
                                                   F7:  View Alarm Page
                                 Create Dynamic Object
                       Name :  DEG_C_VALUE
                Data Source :  TEMPERATURE
            Additional Calc :
                                Create a data source
                       Name:   TEMPERATURE
           Source Data Type:   WORD
            Source Location:   Z1
                  Scan Rate:   *             (* or HH:MM:SS.CC)
           Additional Calc.:
--------------------------------------------------------------------------------
```

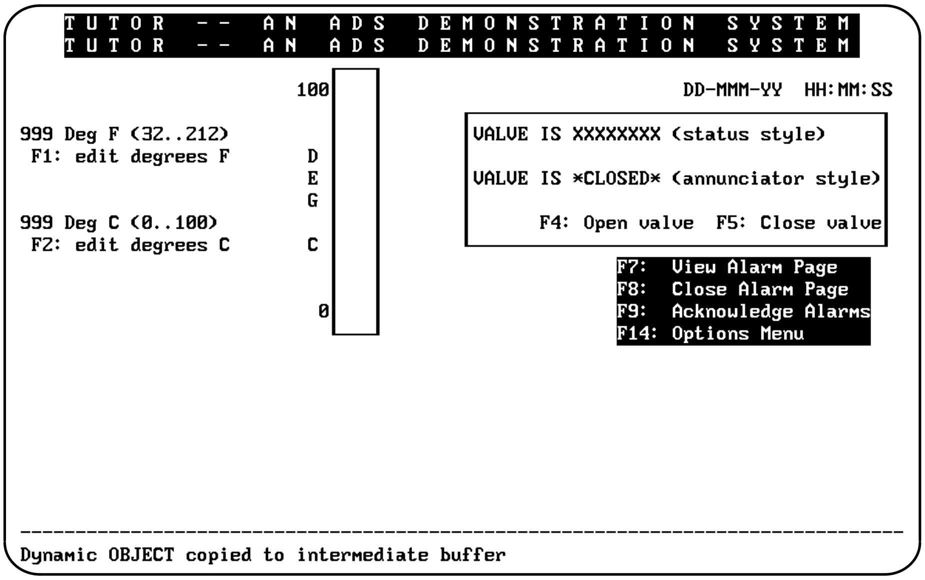
The dynamic object data entry form is completed to display a left–justified value, making it available to be edited within an allowable range of 0 to 100.

```
      T U T O R   - -   A N   A D S   D E M O N S T R A T I O N   S Y S T E M
      T U T O R   - -   A N   A D S   D E M O N S T R A T I O N   S Y S T E M

                          100                            DD-MMM-YY  HH:MM:SS

999 Deg F (32..212)                       VALUE IS XXXXXXXX (status style)
 F1: edit degrees F        D
                           E              VALUE IS *CLOSED* (annunciator style)
                           G
999 Deg C (0..100)                             F4: Open value  F5: Close value
 F2: edit degrees C        C
                                                   F7:  View Alarm Page
                                 Create Dynamic Object
                       Name :  DEG_C_VALUE
                Data Source :  TEMPERATURE
            Additional Calc :
             Display Format :
              Display Value :  Y    [Y/N]
                   Hex Notation:  N        Min:  0
                   Left Justify:  Y        Max:  100
                      Zero Fill:  N
             Available for Edit:  Y        Immediate write:   N
--------------------------------------------------------------------------------
Data source added to system
```

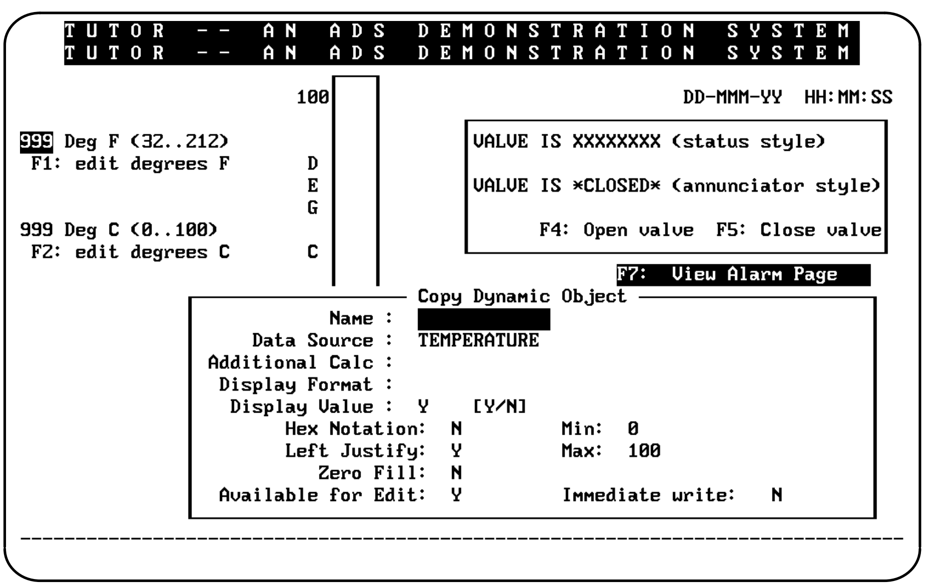
STEP 10

Copying a Dynamic Object

After completing the dynamic object which will display the temperature in degrees Celsius, we next want to define a very similar dynamic object which will display the temperature in degrees Fahrenheit. First we will make a copy of the just-defined dynamic object DEG_C_VALUE by pressing the [F9] key while the cursor is positioned somewhere on the dynamic object.



Now, move the cursor up to the ”9” located at <row, column> position <6, 1> and press the [Alt–F9] key. A copy of dynamic object DEG_C_VALUE is placed on the screen with its data entry form automatically opened up. All data on the form is identical to that for DEG_C_VALUE except that the name field is blank (remember that dynamic object names must be unique on a given screen).



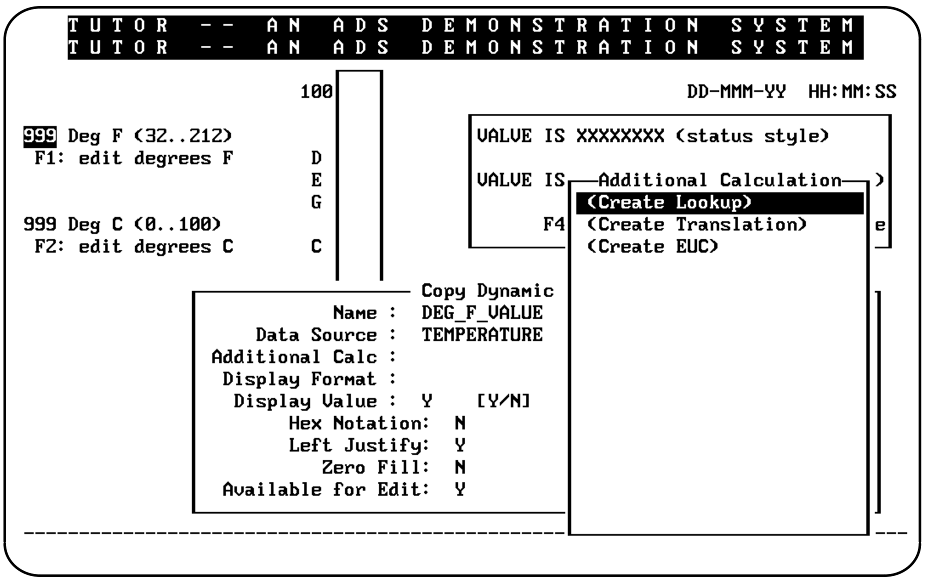
STEP 11

Using a Linear Translation

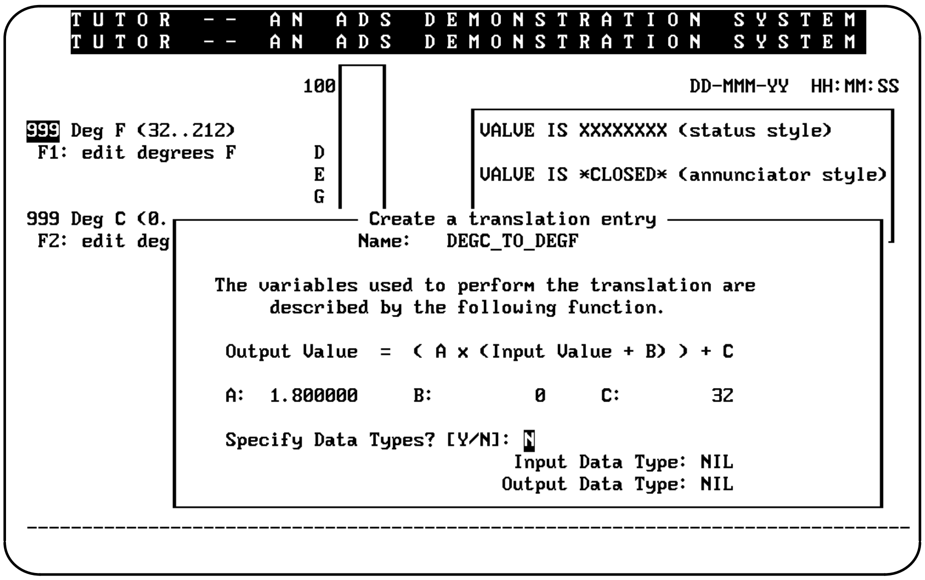
The dynamic object is given the name *DEG_F_VALUE*. The data source TEMPERATURE is already the correct one, so it is left as specified. However, TEMPERATURE yields a Celsius value, not the desired Fahrenheit value. Given a Celsius value, it may be converted to Fahrenheit by the equation

$$°\mathbf{F} = (1.8 \times °\mathbf{C}) + 32.$$

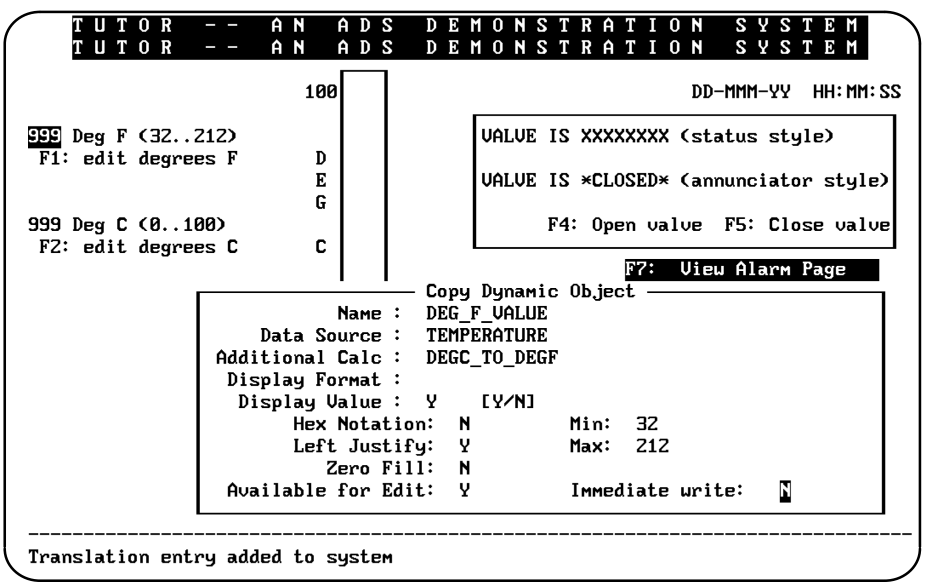
Thus we need to apply an "Additional Calculation" to the value supplied by data source TEMPERATURE. With the "Additional Calculation" field selected, press the [Alt–S] key to open up a window of available additional calculations.



Since no additional calculations exist at all, much less one we could use, we'll need to create one. In this case, we will want to create a new translation entry. Selecting the "Create Translation" entry opens up a data entry form for a new translation entry. The entry will be given the name DEGC_TO_DEGF, the "A" term will be 1.8, the "B" term 0 and the "C" term 32. "Specify Data Types?" will be left as "N".



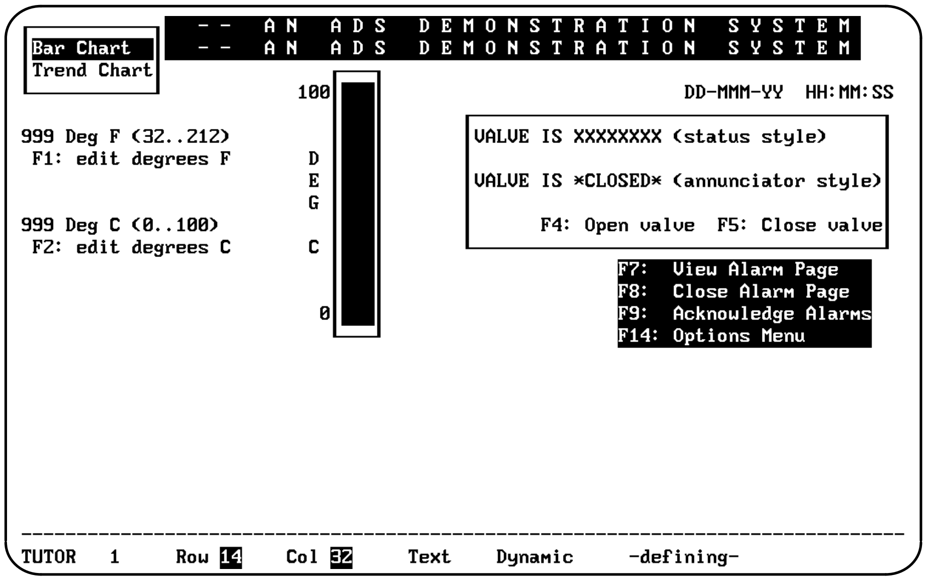
Completing the translation entry data entry form returns you to the dynamic object data entry form, with the newly created translation entry referenced as the additional calculation. The rest of the form is correct, except that the minimum and maximum value bounds need to be changed to Fahrenheit values 32 and 212.



STEP 12

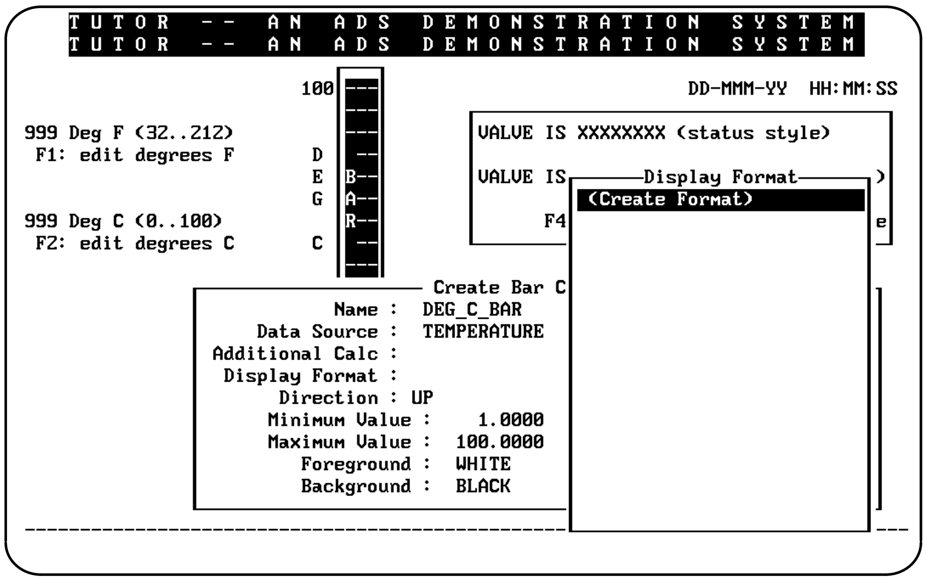
Creating a Bar Chart

Next we will want to create a bar chart which will represent mercury rising in our thermometer. Position the cursor at <row, column> position <4, 30>, press the [Alt-F7] key to begin defining a dynamic object, move the cursor first to <4, 32> and then to <14, 32>. This time you press the [Alt-F2] key to complete the dynamic object; a menu selection form is opened asking you what type of predefined object you want to create.



In this case we want a bar chart, so the ”Bar Chart” menu entry is selected. A data entry form for the bar chart is opened up on the screen. This form is very similar to that of a normal dynamic object. The bar chart is given the name *DEG_C_BAR* and is attached to existing data source TEMPERATURE; since TEMPERATURE already supplies a Celsius value, no additional calculation is required. We would like to make our thermometer a little more ”high tech”, however.

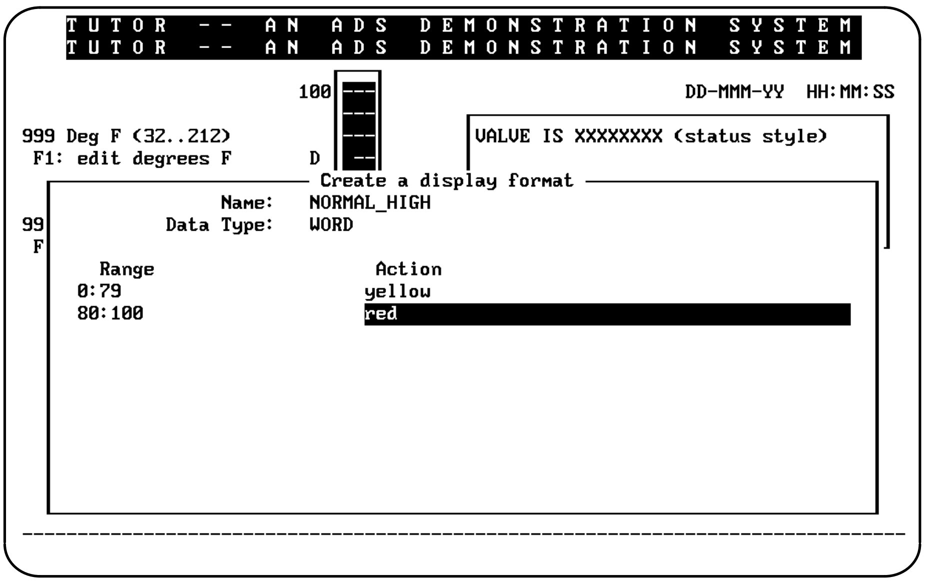
Whenever the temperature is in the range of 80 to 100 degrees Celsius, we want the bar chart to be displayed differently. This is accomplished through the use of a display format. With the cursor on the ”Display Format” field, press the [Alt-S] key to open up a window of available display formats.



STEP 13

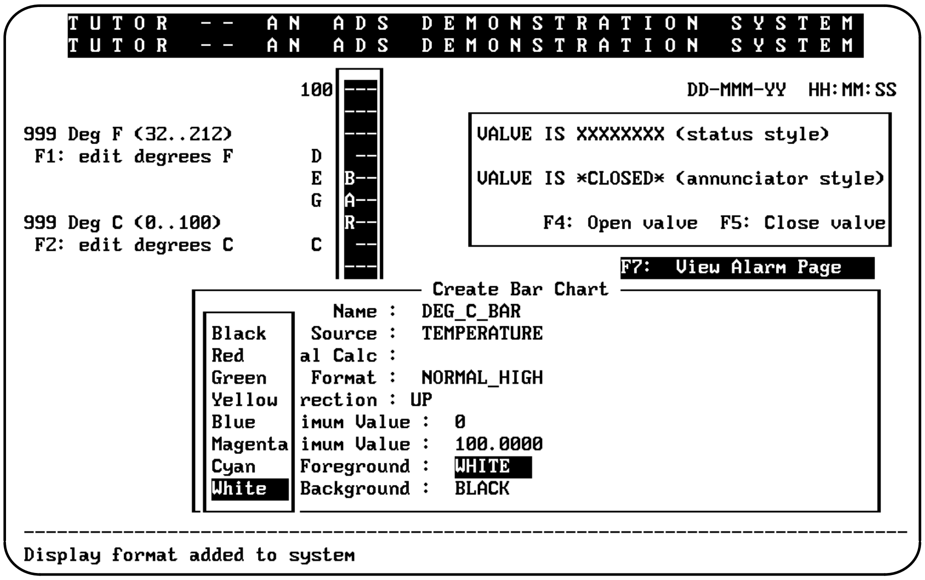
Using a Display Format

Again, no display format is available so you'll need to create one. Select the "Create Format" menu entry; this will open up a display format data entry form on the screen. Type in *NORMAL_HIGH* as the display format name. Since the value the display format will operate on is a WORD value, WORD is selected as the input data type. For a monochrome target terminal you will probably want to display the temperature with NORMAL video attributes for 0 to 79 and with the BOLD video attribute for 80 to 100. In the case of a color terminal, you might want to select a color such as YELLOW for 0 to 79 and RED for 80 to 100.



Completing the display format data entry form will return you to the bar chart data entry form. Note that rather than pressing the [Enter] key a number of times to complete the form, you can just press the [Alt–F10] key which will immediately complete and save the form.

The remainder of the bar chart data entry form is correct, except that the minimum value needs to be changed to 0. On color terminals the foreground and background color specifications give you the ability to affect the foreground and background colors of the bar chart differently than those of the screen it appears on.



STEP 14

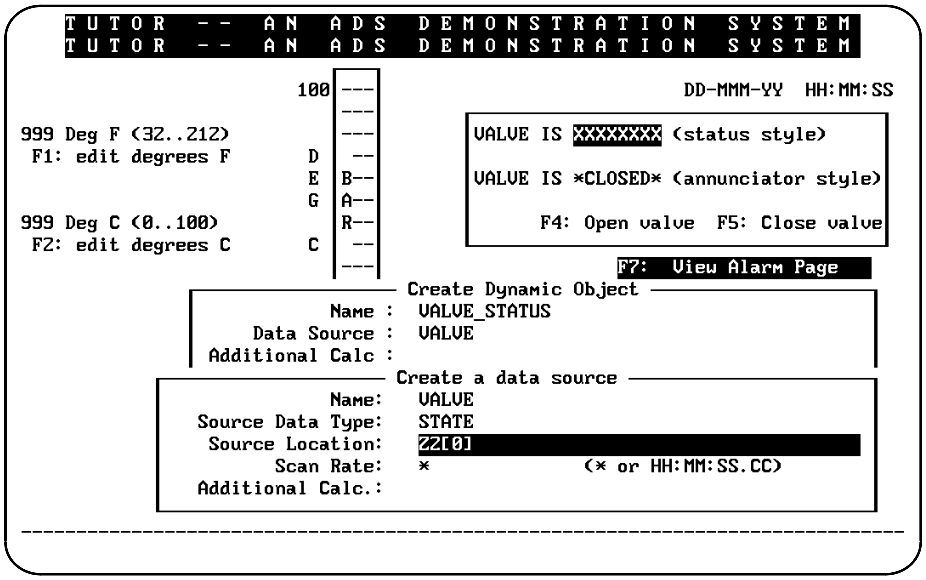
Using a Lookup Table

Having completed what we want to do in order to monitor temperature, we next need to set up our monitoring of our valve, which may be in either of two states: open (0) or closed (1). For one status indicator, we want to see either **OPEN** or **CLOSED** displayed on the screen. Position the cursor on the ”X” at <row, column> position <6, 51> and press the [Alt–F7] key to begin defining a dynamic object.

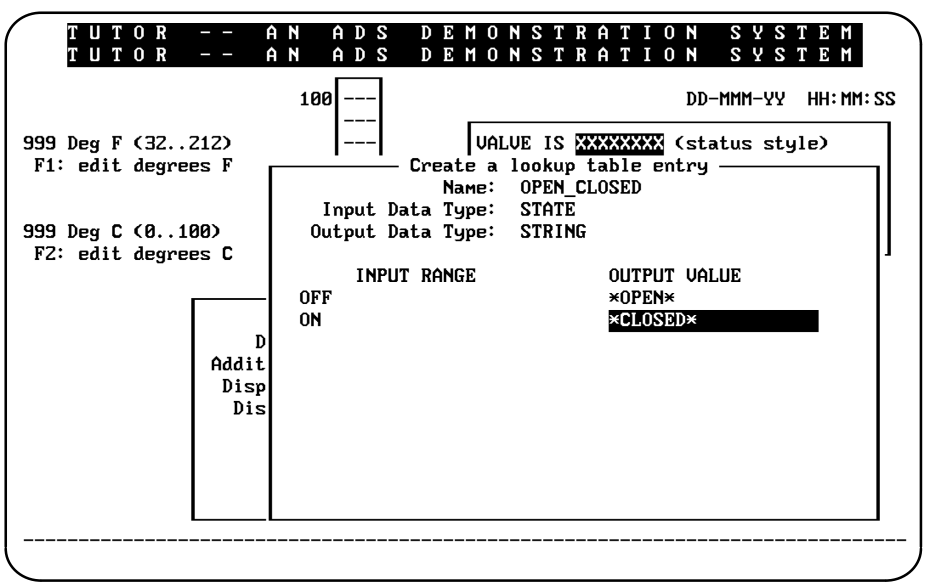
Move the cursor right to position it on the rightmost ”X” (column 58) and then press the [F7] key to complete the selection of the dynamic object. Give the dynamic object a name of *VALVE_STATUS*.

```
 T U T O R   - -   A N   A D S   D E M O N S T R A T I O N   S Y S T E M
 T U T O R   - -   A N   A D S   D E M O N S T R A T I O N   S Y S T E M
                         100|---|                         DD-MMM-YY  HH:MM:SS
                            |---|
999 Deg F (32..212)         |---|     VALUE IS XXXXXXXX (status style)
 F1: edit degrees F       D | --|
                          E |B--|     VALUE IS *CLOSED* (annunciator style)
                          G |A--|
999 Deg C (0..100)          |R--|           F4: Open valve  F5: Close valve
 F2: edit degrees C       C | --|
                            |---|                    F7:  View Alarm Page
                  ---------------- Create Dynamic Object ---------------
                               Name :  VALVE_STATUS
                        Data Source :
                    Additional Calc :
                     Display Format :
                      Display Value :  N    [Y/N]

--------------------------------------------------------------------------------
```

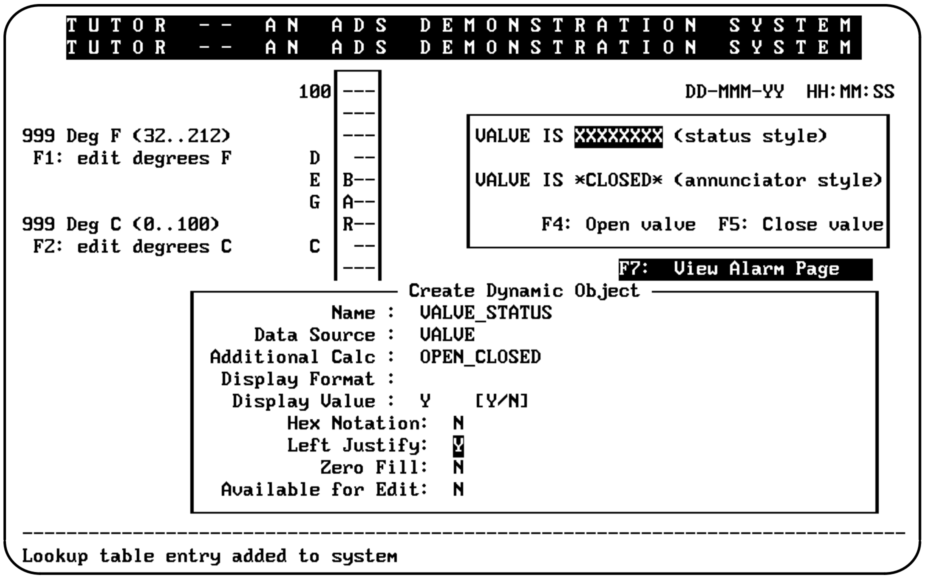
Now enter a data source name of *VALVE* and press the [Enter] key. Since the data source does not currently exist, a data entry form is opened up for its definition. It should be filled in as shown below. Note the source location is specified as *Z2[0]*. This specifies that a single bit of data should be extracted from bit b0 (the lowest order bit) in the word stored at Z2.



After completing the definition of data source VALVE, you will be returned to the dynamic object's data entry form. Note that a STATE data source always returns either the text string "OFF" for a 0 state or "ON" for a 1 state. However, we want to see either *OPEN* or *CLOSED* instead. This will require us to use a lookup table entry to make the conversion. Select the Additional Calculation field, press the [Alt– S] key for the Object List window and then select "Create Lookup". A data entry form for a lookup table entry is opened on the screen. Fill it out as shown below.



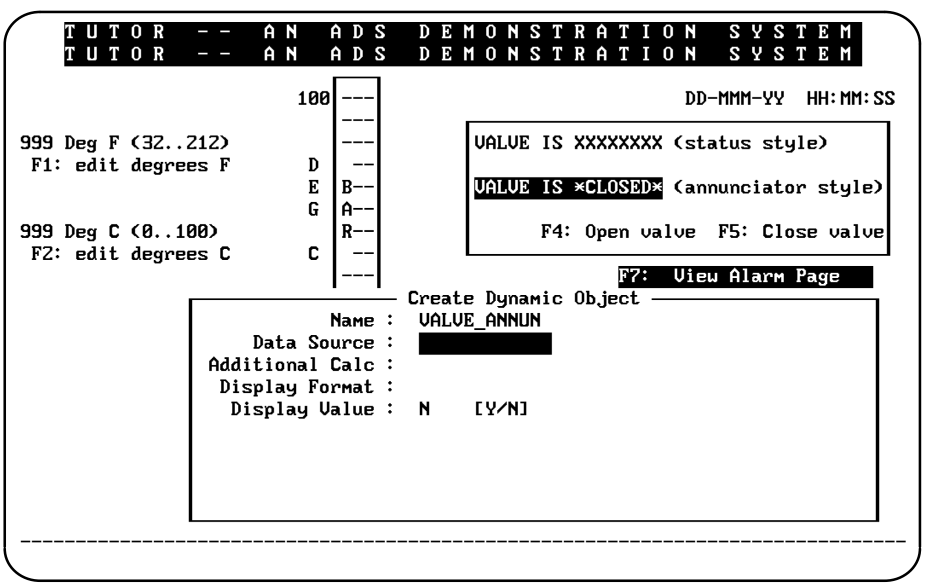
After completing the data entry form for the lookup table entry, you will be returned to the dynamic object's data entry form. It can now be completed as shown below.



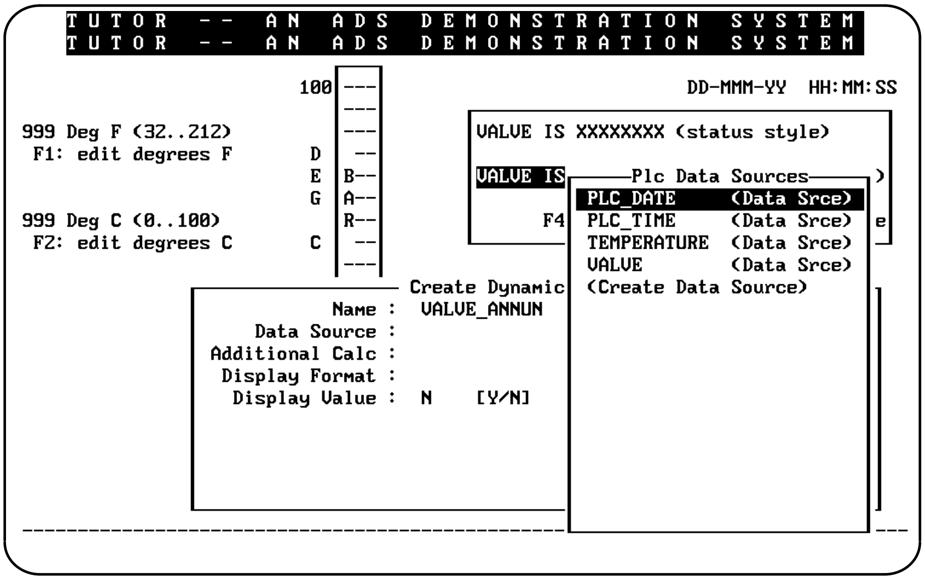
STEP 15

Dynamic Control of Video Attributes Assigned Static Text

We also want to view the valve's status in a second way. Whenever the valve is open we want to see the text *VALVE IS *CLOSED** displayed in normal video; when closed we want to see it displayed in reverse video. Position the cursor at <row, column> position <8, 42>, the leftmost character ("V") in the text string. Press the [Alt–F7] key to begin defining the dynamic object, move the cursor right until it is in column 58 of row 8 (rightmost character "*") and then press the [F7] key to complete the selection of the dynamic object. Give the dynamic object a name of *VALVE_ANNUN*.

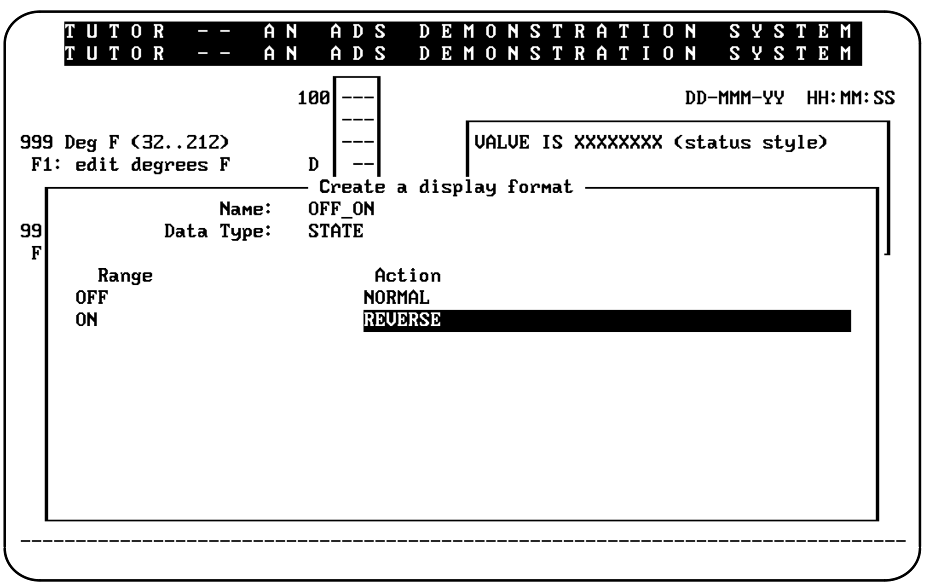


Though in this case we probably remember that the data source we need already exists and is named VALVE, let’s assume that we can’t remember. Press the [Alt–S] key to open up the object list, noting that VALVE is the fourth data source in the list.

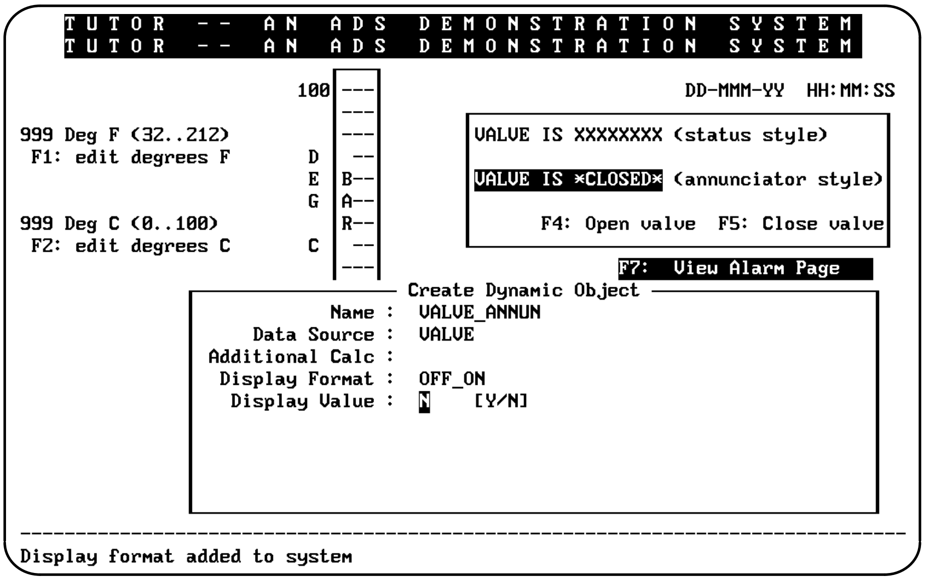


You can press the [↓] key to highlight it and then the [Enter] key to ”pick” it from the list.

Since we want to control the video attributes of the text string, we need to create a display format to do it. Select the Display Format field and then press the [Alt–S] key for the object list. Choose to create a new display format, filling out the resulting data entry form as shown below.



Pressing the [Alt–F10] key completes the definition of display format OFF_ON and returns you to the dynamic object's data entry form. This time we will leave the Display Value field in the form set to ”N” as we are not actually displaying a value; instead, we are only affecting video attributes. This situation where a display format is controlling the video attributes assigned to a static string of text on the screen is the only situation where the Display Value field is set to ”N”; otherwise, it should always be set to ”Y”.

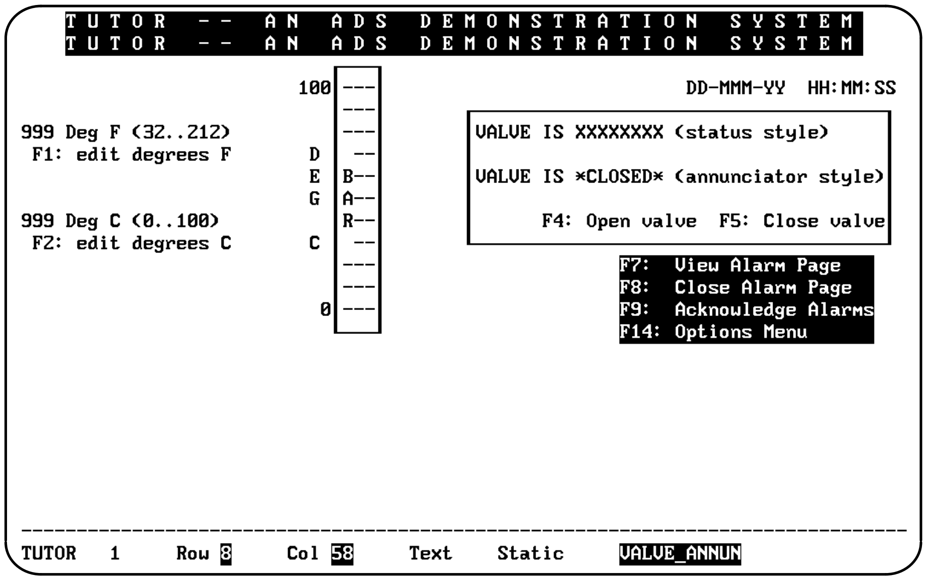


Pressing the [Enter] key completes the dynamic object data entry form.

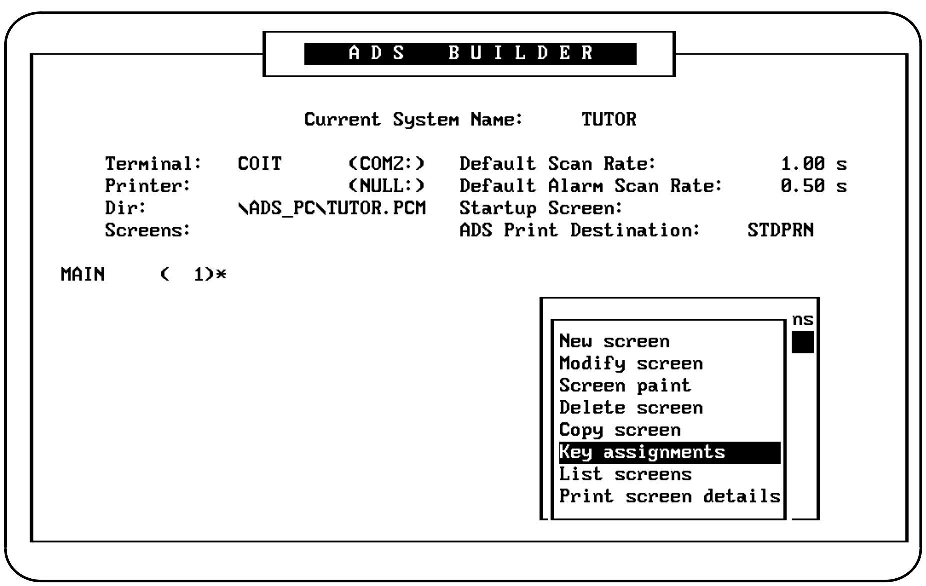
STEP 16

Defining the Function Keys

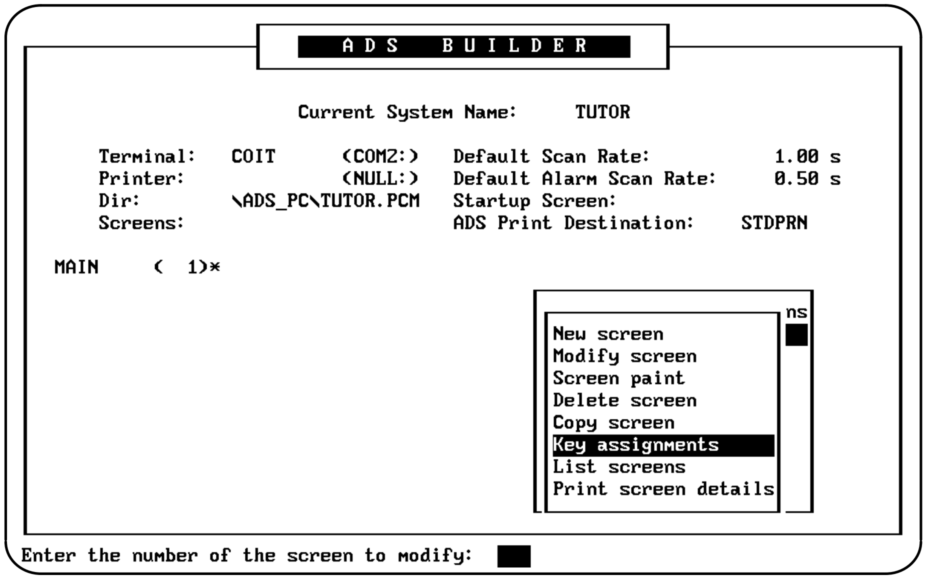
Though we haven't implemented anything for alarms or options yet, we have created all the functionality we need for our thermometer and valve monitoring. It might be a good idea to pause a moment to execute the system as it now exists before creating the rest. One task remains before executing the system: we must set up function key definitions for F1 and F2 for the thermometer and F4 and F5 for the valve.



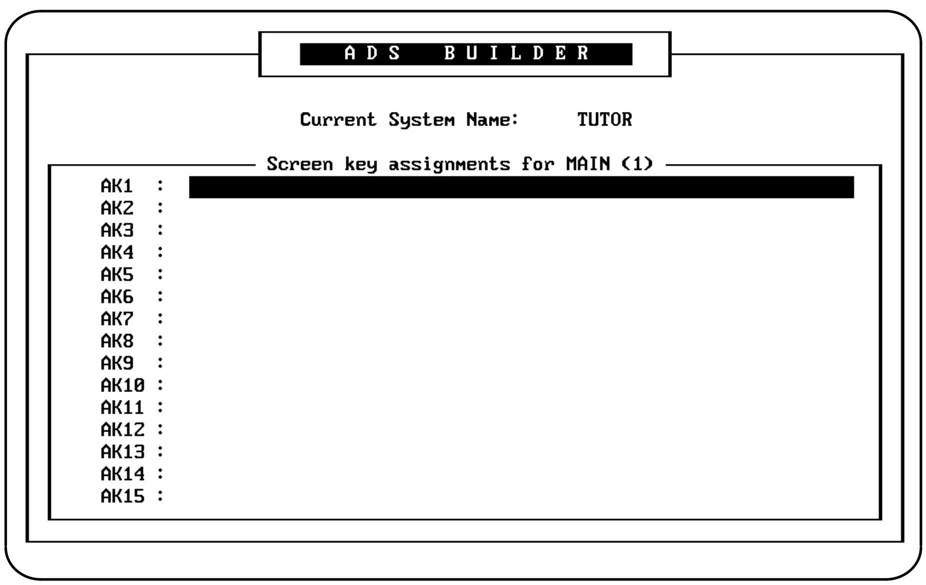
To exit the screen painter, saving the work that you've already done, press the [Alt–F10] key. Should you ever want to exit the screen painter and "throw away" the work you've done, pressing the [F10] key acts as a "Quit". You will be return to the screen menu options.



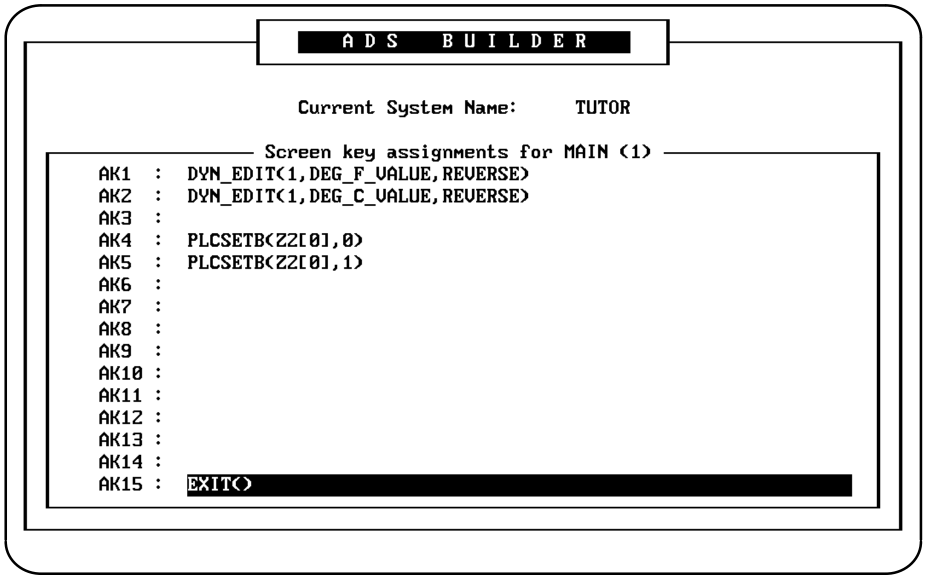
Select the *Key Assignments* menu option; you will be prompted for which screen you want to define keys.



Since we want to define keys for screen 1 (MAIN), enter ”1” in the field and press the [Enter] key. A data entry form for the screen 1 key assignments will be opened on the screen.



Enter the key assignments shown below.



Function key one is set up to begin a ”field edit” of dynamic object ”DEG_F_VALUE” on screen 1. DYN_EDIT is the command for beginning a field edit. You must enter a screen number along with the dynamic object’s name since dynamic object names need to be unique only within a single screen, not among different screens. The third item, or ”parameter” in the command list is ”REVERSE”. This item indicates the video attribute which should be applied to the field *while the edit is active.*

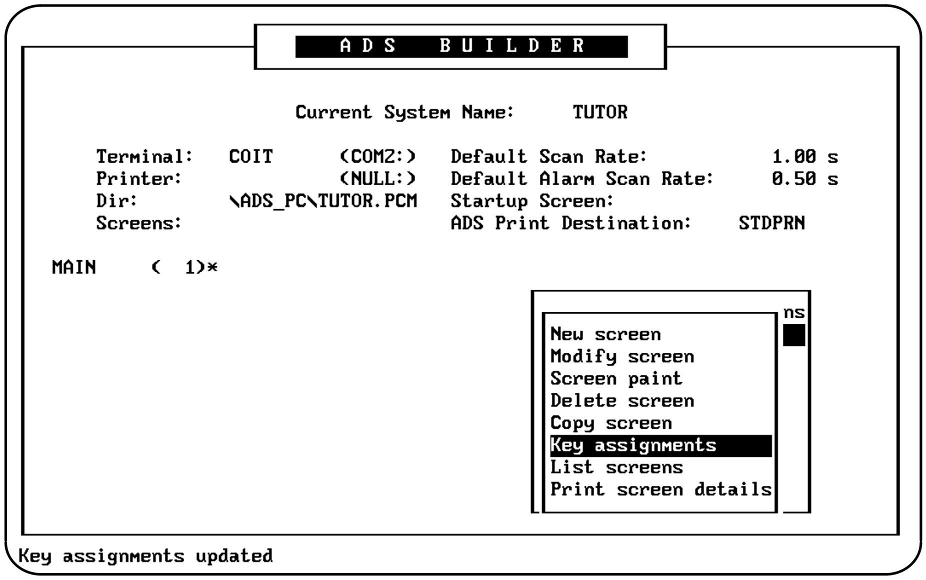
Function key two is another field edit command, this time for dynamic object ”DEG_C_VALUE” on screen 1.

Function key four is used to ”open” our valve by setting it to ”0”. The PLCSETB command is used to set a single bit to either a ”0” or a ”1”. The first parameter in the command is the memory location to be set; the second parameter indicates that memory location Z2[0] is to be set to ”0”.

Function key five is the same as that for function key four above except that the value ”1” is being stored.

Though no text on screen 1 specifies a key to be used for exiting the system, we will want to provide one - at least while we’re developing our system. In a ”real” production system we would probably want to remove this capability before giving operators access to the machine on the factory floor. The EXIT command (even though the command doesn’t require any parameters the empty parentheses are still required) accomplishes the system exit, and is assigned to function key fifteen.

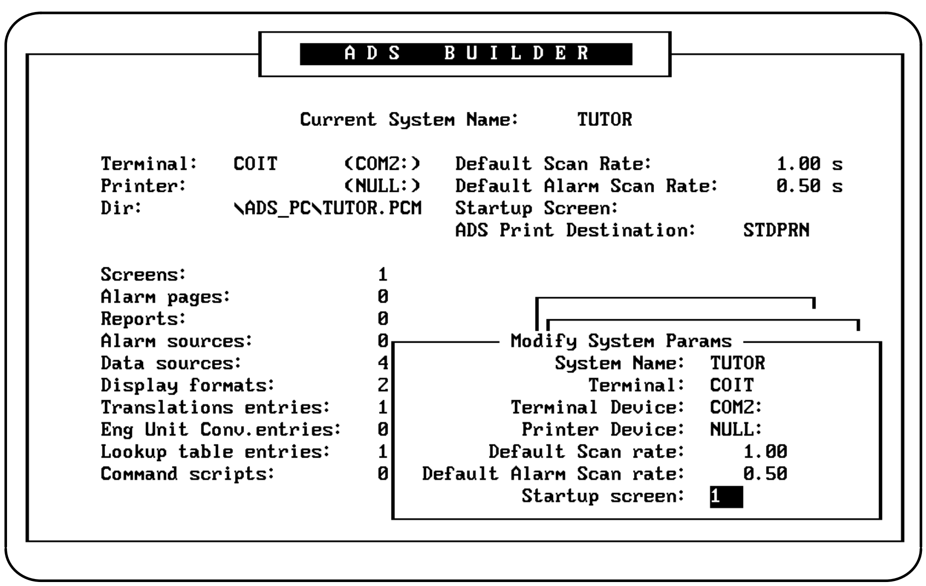
Pressing the [Enter] key completes the function key definitions and returns you to the screen operations menu.



STEP 17

Specifying the Starting Screen

In looking at the status area at the top of the screen, we see that we still haven't specified a startup screen (the screen which will initially be displayed whenever the ADC module is soft reset). To specify it we must again access the *Modify System Parameters* data entry form. Use the [Esc] key to return to the main menu, select *Configuration Operations* and then select *Modify System Parameters.* The startup screen should be set to "1" as shown below.

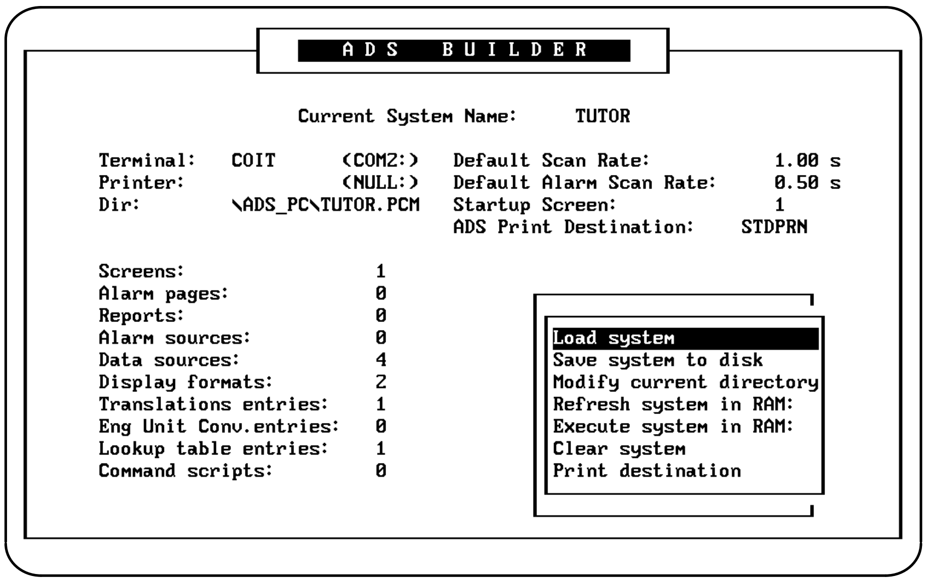


Pressing the [Enter] key completes the data entry form and returns you to the configuration operations menu.

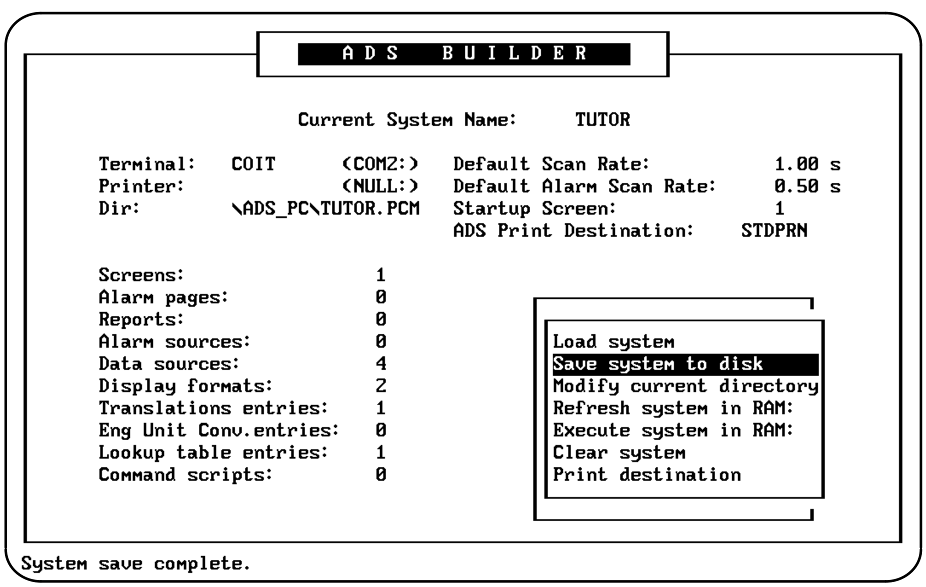
STEP 18

Saving the System to Disk

Now we are ready to save our system in preparation for actually copying the system to the ADC module. Press the [Esc] key to return to the main menu and then select *Load/Save Operations*.



Select the *Save System to Disk* menu item. Your system will be saved to your computer's hard disk, one file at a time. As each file is saved its name will be listed on the message line at the bottom of your computer screen. After all files are saved, a "System save complete" message will be displayed.



STEP 19

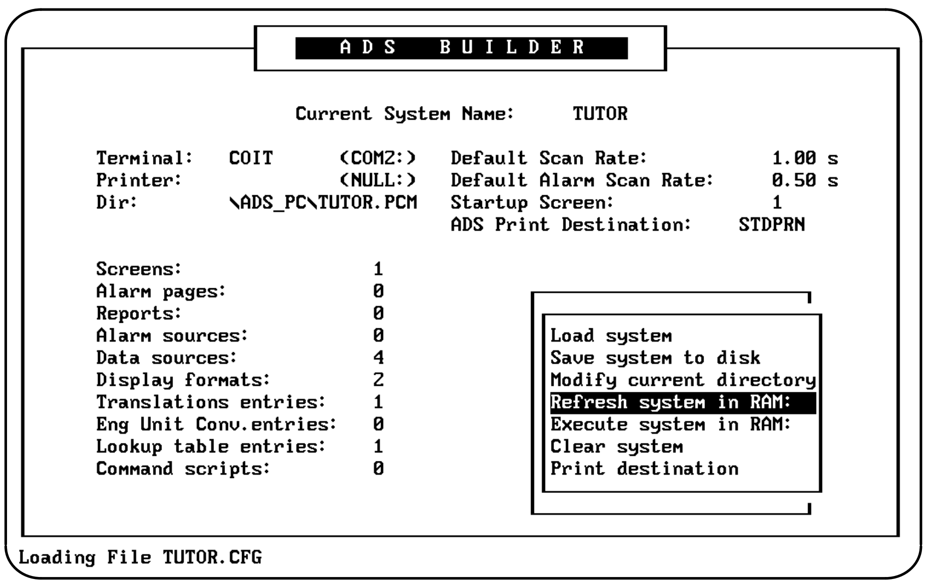
Copying the System to the ADC Module

Now that the system has been saved to disk it may be copied to the ADCs RAM disk. If you attempt to copy the system to the ADC module when it has not been saved to disk, you will be warned of this fact and prompted to confirm that the copy should continue. The copy is accomplished by selecting the *Refresh system in RAM:* menu option. The ADC module must be hard reset for this function to execute. The Builder will automatically check the ADCs status before attempting to copy the files. Should you see a message indicating that communications with the ADC module could not be established, you should check to make sure that

A. the appropriate cable from your computer is connected to your ADC module and

B. that the module is hard reset.

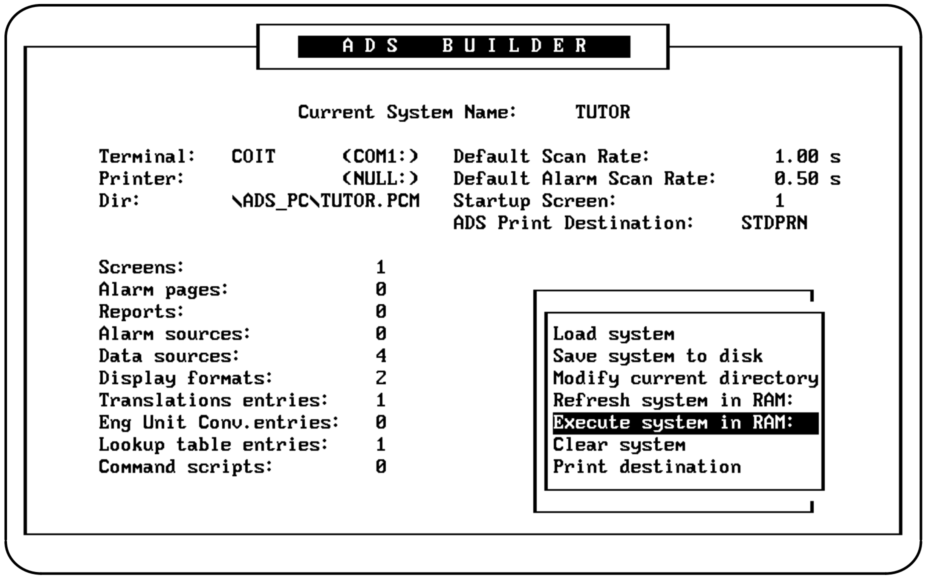
As each file is copied to the ADC module, a message is displayed on the message line so indicating that fact. At the completion of the copy a ”Refresh Complete” message will be displayed.



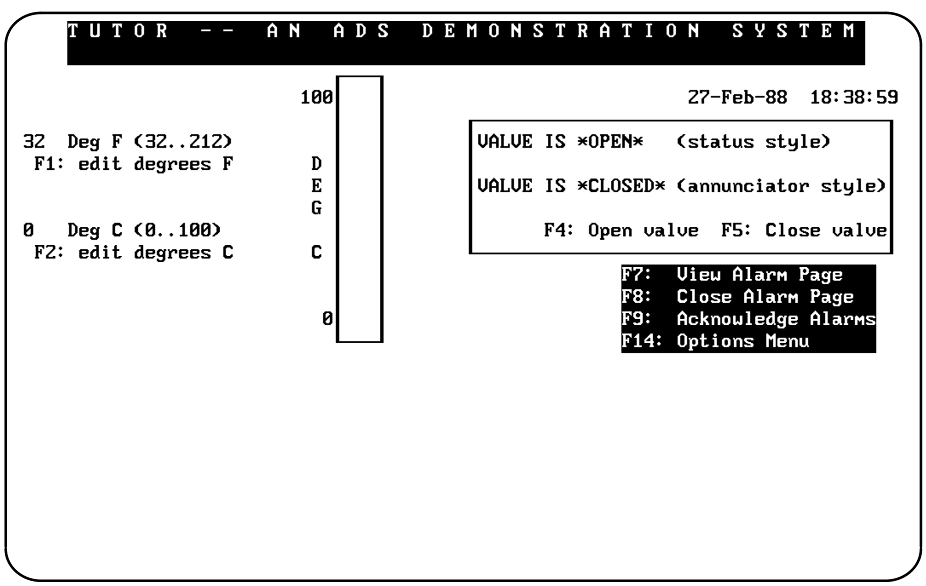
STEP 20

Executing the System

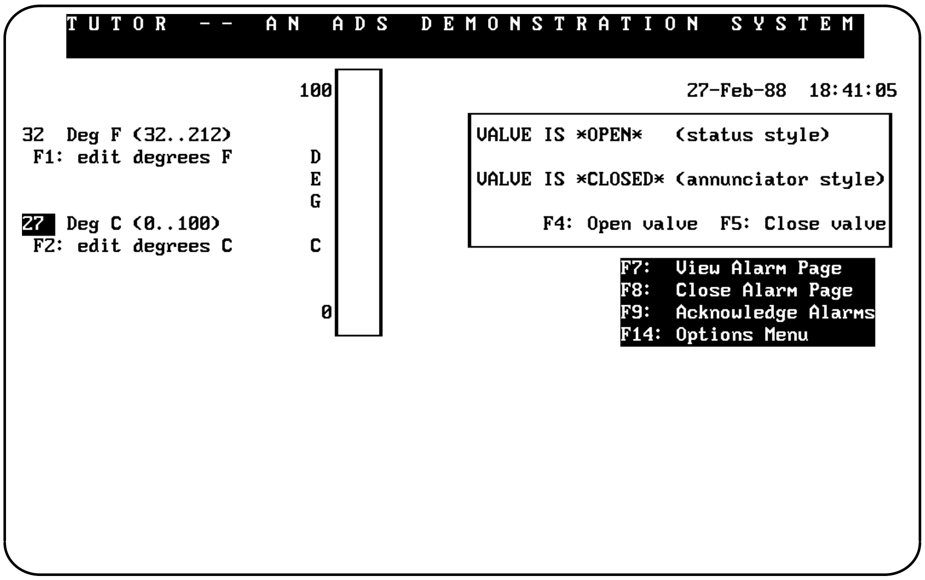
Now let's execute our system. Select the *Execute system in RAM:* menu option.



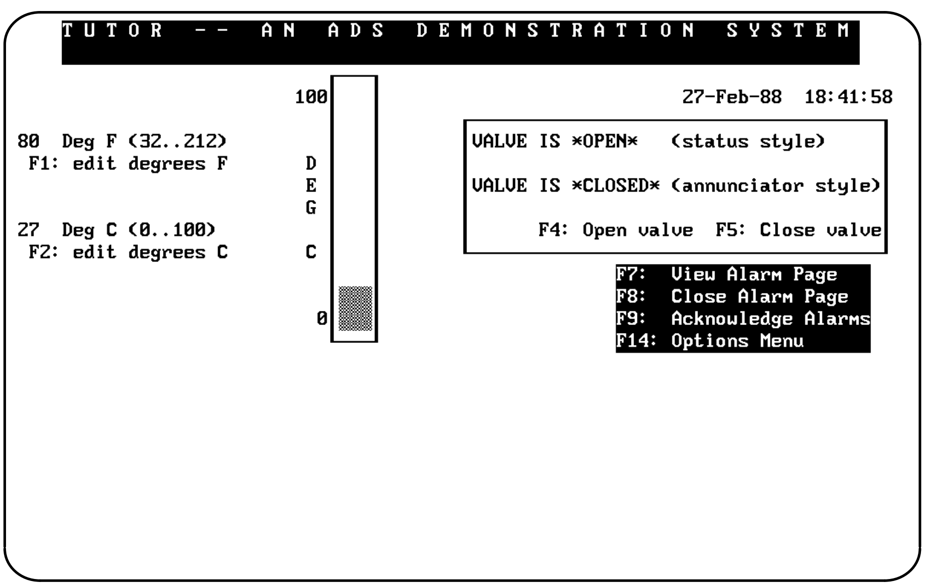
When you execute this menu option your computer screen will change to the "terminal emulation" screen and automatically soft reset the ADC module. Once on this screen you can reset the Builder by pressing the [Alt-Z] key. You should now begin to see text appearing on your target terminal's screen indicating that the various components of the ADS software have begun to execute and that the screens making up your system are being processed by the software. Following that your startup screen will be displayed on the module. The display should be similar to the screen below, with the time and date fields on the screen displaying the time and date per the PLC CPUs real-time clock.



First let’s see if we can get the ”mercury” to rise in our thermometer. Press the [F2] key to begin a field edit of the ”Degrees Celsius” value. After you press the [F2] key you should see the entire field displayed in reverse video and the ”0” value initially displayed in the field should be blinking. The [←] and [→] cursor keys can be used to move left and right within the field. The cursor position is indicated by the corresponding character blinking. Note that a reverse video blank will NOT blink if the cursor is on it. If you want to clear the contents of the field you can press the [Ctrk-X] key (you can also press the [Home] key on GE Fanuc OIT terminals). Typing characters into the field is accomplished in ”replace” or ”overwrite” mode. For our example, let’s type the value ”27” into the field.



The field edit is completed by pressing the [Enter] key. The field is displayed again in normal video, and we now see the value ”27” in the field. Also, note that our bar chart is now showing a non-zero reading corresponding to the value 27 and that our ”Degrees Fahrenheit” field is showing the equivalent temperature reading of ”80”.



Now let's turn our attention to our valve. At first glance the display seems to be contradictory in that the valve is shown to be both "open" and "closed". However, remember that the second valve display is a fixed string that will be shown in normal video when the valve is actually open and in reverse video when closed. Thus, both displays are really telling us the same thing.

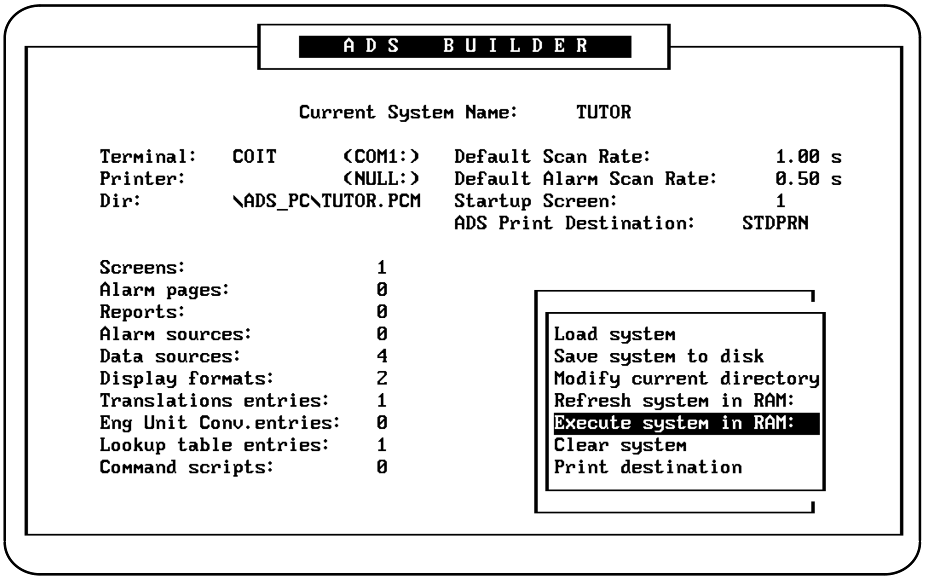
Press the [F5] key to close the valve, observing the changes made to the display on the screen.

```
T U T O R   - -   A N   A D S   D E M O N S T R A T I O N   S Y S T E M

                            100                      27-Feb-88  18:52:14
                                         VALUE IS *CLOSED* (status style)
80  Deg F (32..212)
 F1: edit degrees F           D
                              E          VALUE IS *CLOSED* (annunciator style)
                              G
27  Deg C (0..100)                            F4: Open valve  F5: Close valve
 F2: edit degrees C           C
                                                     F7:  View Alarm Page
                                                     F8:  Close Alarm Page
                              0                      F9:  Acknowledge Alarms
                                                     F14: Options Menu
```

Since we have now verified that the basic components of our system are functioning, let's go back and complete the remainder of our system. Press the [F15] key to exit the system. Depending on what target terminal you have selected, you may not see the "exiting" messages shown below. However, you should see the "–>" characters displayed on your computer screen. These characters indicate that the ADC module is now hard reset.

```
ADS EXECUTOR exiting ...

DATA MANAGER exiting ...
->
```

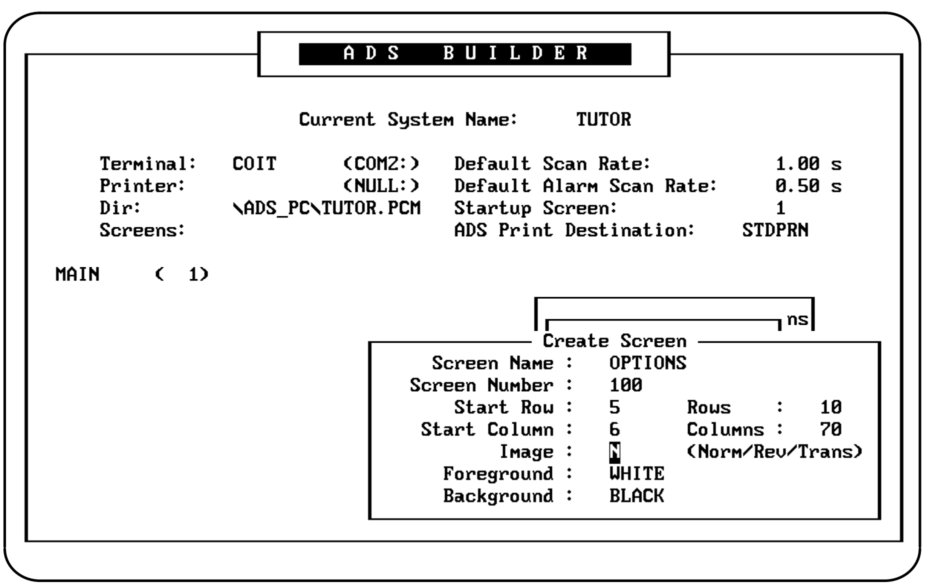
To return to the Builder's "Load / Save operations" menu, press the [Alt-Z] key.



STEP 21

Creating the Options Screen

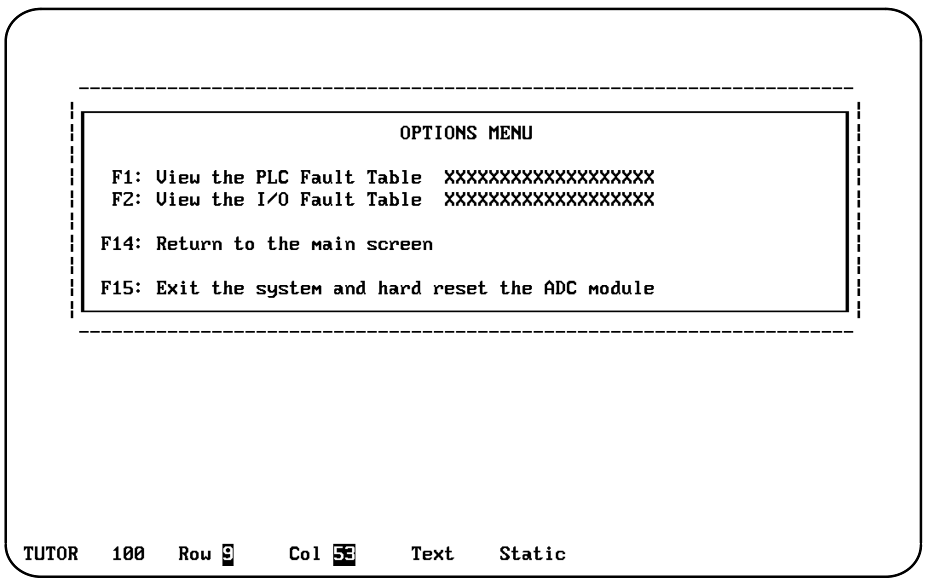
Use the [Esc] key to return to the Builder's main menu and from there select the *Screen Operations* menu. Execute the *New Screen* option and fill out the screen's data entry form per the following. Note that this new screen will not cover the full extent of the screen as did the main screen (screen 1).



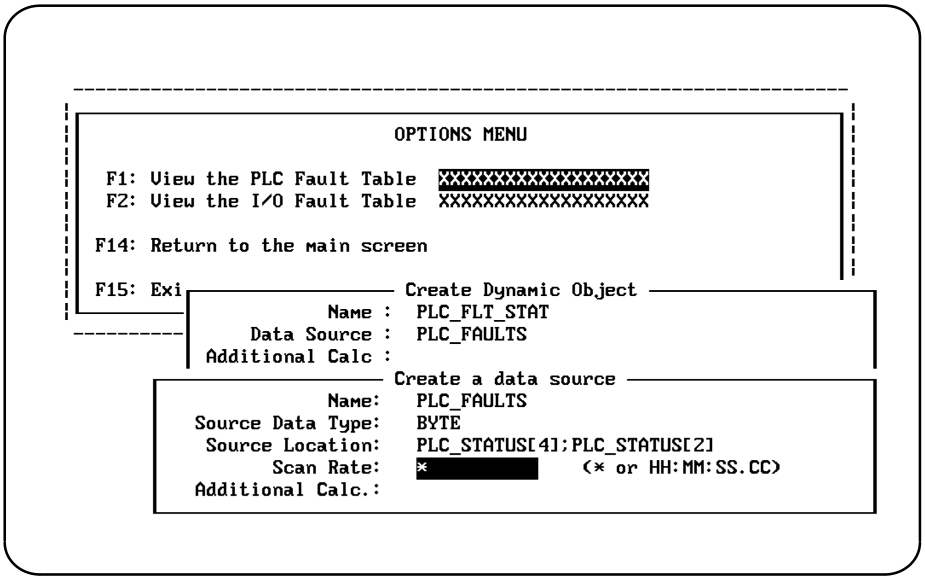
Press the [Enter] key to enter the screen painter.

Using the technique described in step 6 for drawing rectangles, draw a rectangle around the outer edges of the screen. Note that if you press the [Insert] key before pressing a cursor key the result is ”go to the end of” the line or column in the given direction. So, pressing the [F3] key to begin the select operation followed by the key sequences [Insert][→] and [Insert][↓] results in the entire screen being selected. Pressing the [F5] key then draws the desired rectangle. The following text should be typed onto the screen:

<Row, Column>	Text To Type There...
<2, 30>	OPTIONS MENU
<4, 4>	F1: View the PLC Fault Table
<4, 34>	XXXXXXXXXXXXXXXXXXX
<5, 4>	F2: View the I/O Fault Table
<5, 34>	XXXXXXXXXXXXXXXXXXX
<7, 3>	F14: Return to the main screen
<9, 3>	F15: Exit the system and hard reset the ADC module



Using the techniques learned beginning with step 8 regarding the creation of dynamic objects, position the cursor at <row, column> position <4, 34> and create a dynamic object spanning the sequence of 19 X's. The data entry form should be filled out as indicated below.

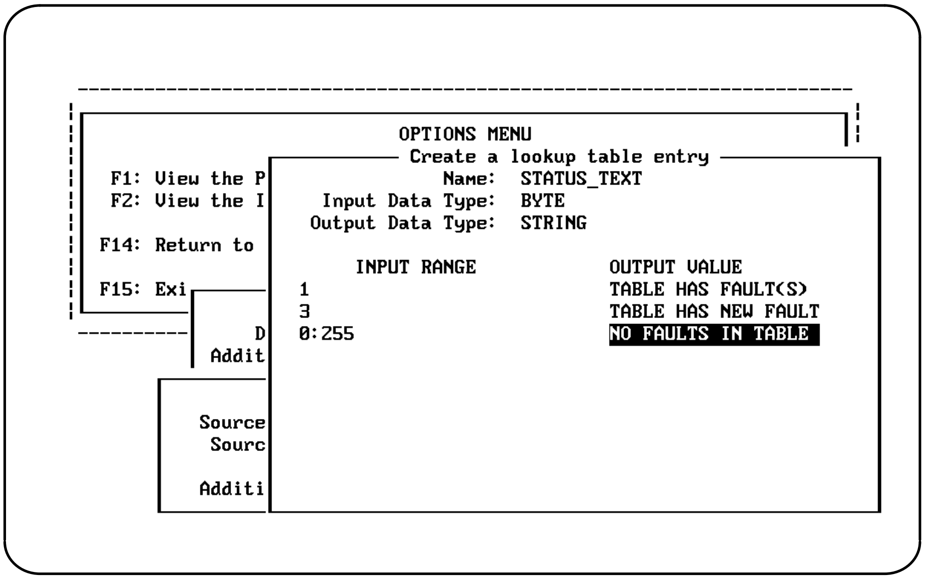


Note how data is entered in the *Source Location* field in the data source data entry form. PLC_STATUS is a special PLC status word which is actually a collection of 16 bit (STATE) flags of status information. The left portion of the definition, "PLC_STATUS[4] indicates that bit b4 (the fifth bit) of the status word should be accessed. Similarly, "PLC_STATUS[2] indicates that bit b2 (the third bit) of the status word should be accessed. Bit b4 indicates whether there are any faults in the PLC fault table and bit b2 indicates if there has been a change to the PLC fault table since the last time you looked at it.

Using the semicolon (;) character between the two single bit specifications serves to tie these two locations together to form a new "custom" value. Here a BYTE type has been chosen. The leftmost specification (PLC_STATUS[4]) becomes the least significant bit (bit b0) of the byte and the rightmost specification (PLC_STATUS[2]) becomes bit b1. Bits b2 through b7 are automatically set to 0 to fill out the remainder of the byte.

Select the *Additional Calculation* field for data source PLC_FAULTS, press the [Alt–S] key to open up the object list window and select ”Create Lookup”. Fill out the lookup table entry data entry form as shown below. Note that the custom value we have created will range between 0 and 3 as it consists of only two bits of information. These values have the following meanings:

b1	**b0**	**VALUE**	**MEANING**
0	0	0	No faults; Table hasn’t changed
0	1	1	Has faults; Table hasn’t changed
1	0	2	No faults; Table has changed
1	1	3	Has faults; Table has changed



In the case of values 1 and 3 there are unique strings we want to display indicating the status of a PLC fault table containing at least 1 fault. However, we want to display the same string for values 0 and 2 since in both cases the PLC fault table is empty. We could specify the same string twice, once for the value 0 and once for 2, but it can be accomplished as shown using only a single string. The ADS Executor will always process the lookup table entry from top to bottom looking for a match, stopping with the first match it encounters. Thus the range notation ”0:255” specifies that any byte value other than 1 or 3 should get the indicated output value (effectively an ”otherwise” clause).

Note that unlike what we did previously with the lookup table entry in step 14, the additional calculation was applied to the data source rather than to the dynamic object. In the previous case the data source was to be used in its ”raw” form with one dynamic object and in a scaled form with a second dynamic object. This meant that the scaling had to occur within the specific dynamic object that needed it. However, in this case data source PLC_FAULTS will only be used as a string so the scaling may be done directly in the data source if desired.

After completing the data source data entry form you are returned to the dynamic object data entry form. Select the *Display Format* field, press the [Alt–S] key to open up the object list window and select "Create Format". The resulting data entry form should be filled out as shown below.

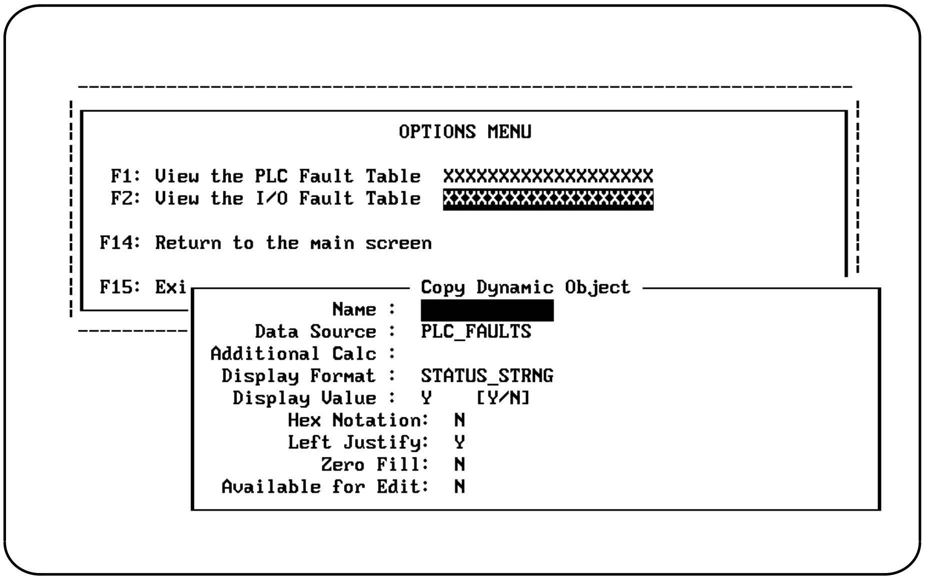
```
                                 OPTIONS MENU
                    Create a display format
             Name:    STATUS_STRNG
        Data Type:    STRING

  Range                      Action
TABLE HAS FAULT(S)          REVERSE
TABLE HAS NEW FAULT         REVERSE;BLINK
NO FAULTS IN TABLE          NORMAL
```

Note that the input range is specified as the converted strings, NOT the original BYTE values. The display format's data type MUST always match the "current" data type if an additional calculation has been applied, NOT the original input data type of the data source. The second action, "REVERSE;BLINK" indicates that *both* video attributes are to be applied.

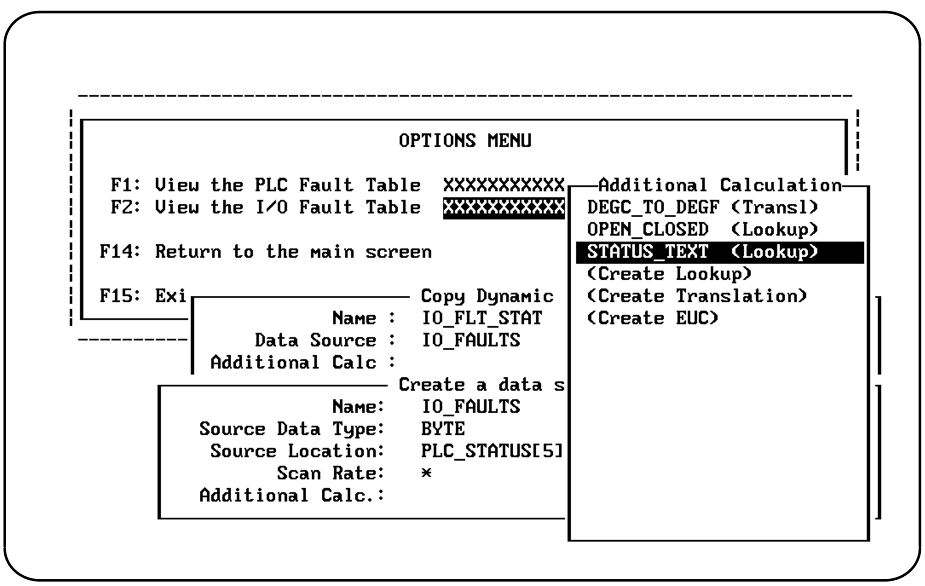
After completing the display format data entry form you are again returned to the dynamic object data entry form. It should be completed as shown below:

```
                                 OPTIONS MENU

   F1: View the PLC Fault Table  XXXXXXXXXXXXXXXXXXX
   F2: View the I/O Fault Table  XXXXXXXXXXXXXXXXXXX

  F14: Return to the main screen

  F15: Exi             Create Dynamic Object
                     Name :  PLC_FLT_STAT
              Data Source :  PLC_FAULTS
          Additional Calc :
           Display Format :  STATUS_STRNG
            Display Value :  Y    [Y/N]
                 Hex Notation:  N
                 Left Justify:  Y
                    Zero Fill:  N
           Available for Edit:  N

Display format added to system
```

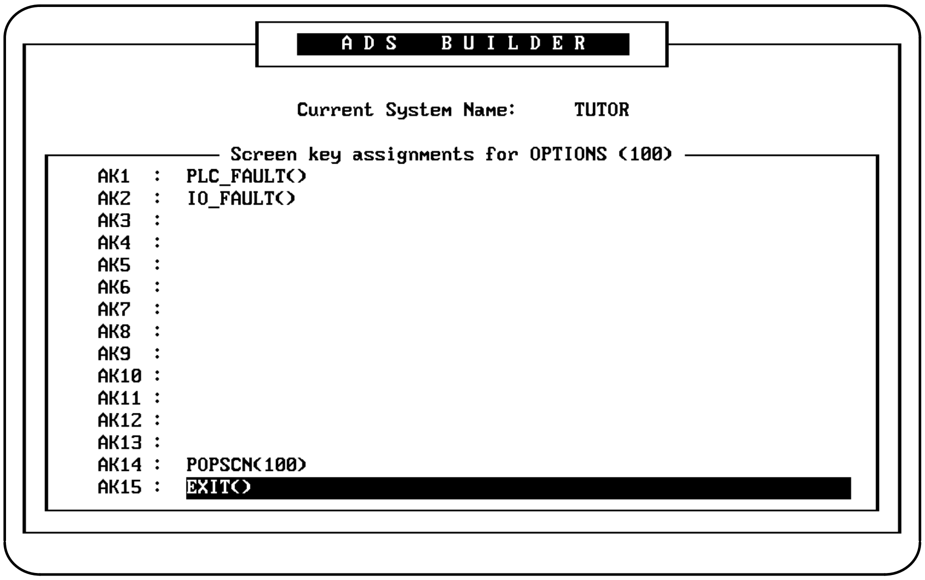
Using the techniques for copying a dynamic object originally learned in step 10, copy the just–created dynamic object PLC_FLT_STAT to the dynamic object paste buffer, position the cursor at <row, column> position <5, 34> and paste the dynamic object there.



Fill out the dynamic object data entry form as shown, creating data source IO_FAULTS as part of the effort (it is filled out identically to data source PLC_FAULTS except that the ”Source Location” field should be specified as ”PLC_STATUS[5];PLC_STATUS[3]”). Note that this time when you open up the object list window with the Additional Calculation field in the data source selected you find that the needed lookup table entry, STATUS_TEXT, already exists. Use the cursor keys to highlight it and then press the [Enter] key to pick it for inclusion in the data source.



After completing the data source and the dynamic object, the OPTIONS screen is now complete. Press the [Alt–F10] key to exit the screen painter while saving the work you have done. Select the *Key Assignments* menu option, specifying the newly created screen 100. Fill out the key assignments as shown below.



The key assignment for function key F1, *PLC_FAULT()*, indicates that the PLC fault table screen should be accessed. This will be possible at runtime only if you selected the Fault Module option with the ADSSETUP Utility and subsequently installed it on the ADC module using PCOP. An optional foreground and background color specification may be specified within the parentheses.

Function key F2 performs the same function as described for function key F1 above, except access is provided to the I/O fault table.

ADS supports the concept of multiple screens being displayed on the screen simultaneously. Each of these screens will have its own set of function key assignments. The last screen displayed on the target terminal will be the one whose function keys are active. Thus, we need to provide a mechanism for removing the OPTIONS screen from the terminal, while ”reactivating” the MAIN screen’s function keys. This is accomplished by the *POPSCN(100)* command assigned to function key F14.

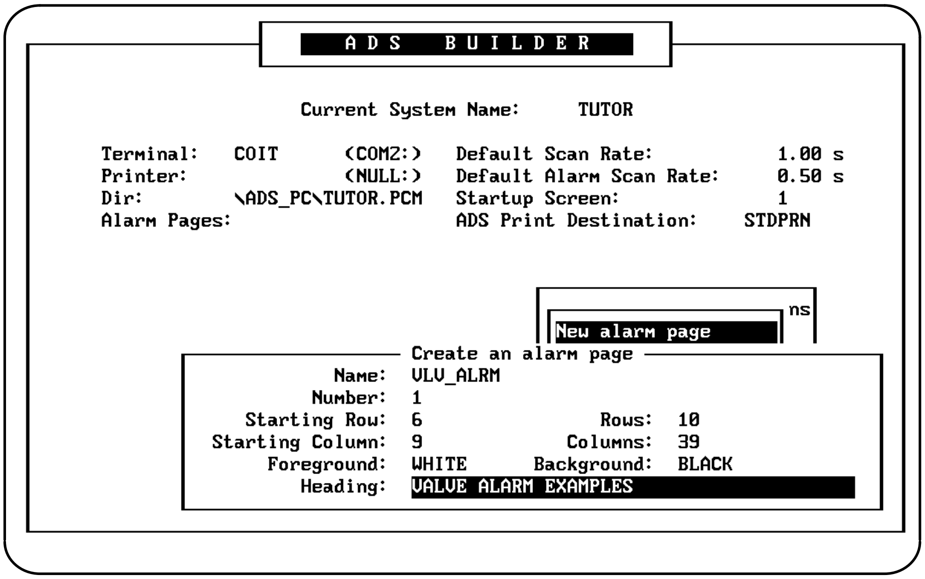
The *EXIT()* command assigned to function key F15 performs the same function as its assignment to function key F15 on the main screen.

The [Enter] key is used to complete the key assignments data entry form.

STEP 22

Creating an Alarm Page

Use the [Esc] key to return to the Builder's main menu and from there select the *Alarm Operations* menu. Execute the *New Alarm Page* option and fill out the alarm page's data entry form per the following.



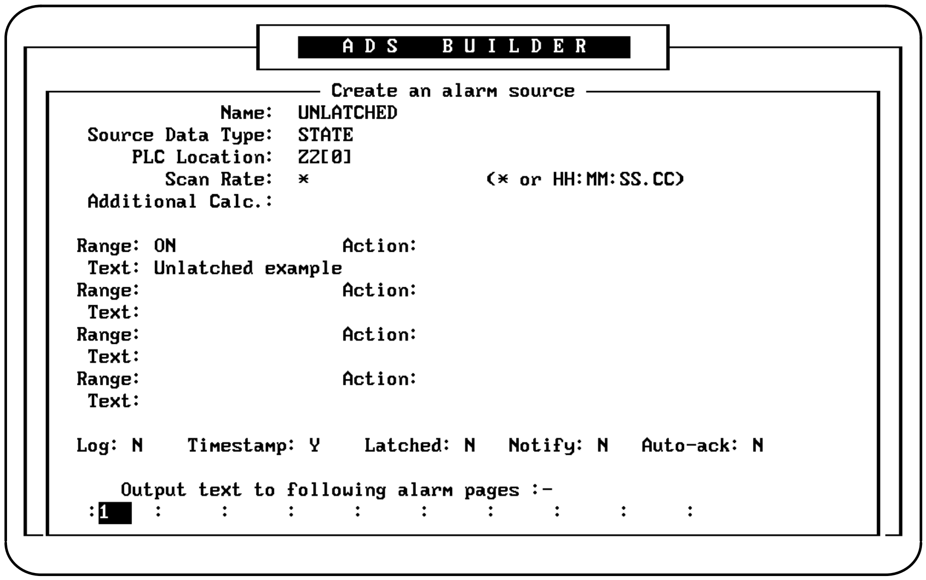
An alarm page is a special type of screen that is used to display alarm information and optionally allow the operator to interact with it to view and acknowledge particular alarms. It has no key assignments of its own; function key assignments providing for manipulation of the alarm page must be provided by the topmost screen on the display.

The actual alarms themselves are not specified here; they will be created next. Completing the alarm page data entry form will return you to the *Alarm Operations* menu.

STEP 23

Creating an Alarm Source

Select the *Alarm Sources* menu entry which displays an additional set of menu options. Execute the *New Alarm Source* option and fill out the alarm source's data entry form as shown in the following screen.



An alarm source defines a PLC location which is to be monitored at a user–specified rate regardless of the screen or screens currently displayed. In this example we are looking at a STATE (single bit) value located at location Z2[0]. Whenever the value is found to be ON (set to "1") the text string "Unlatched example" is to be displayed on alarm page 1. With the *Timestamp* field set to "Y", the entry in the alarm page will show the PLC time and date when the alarm condition was seen by the ADC module. By leaving the *Latched* field set to "N", each time the location is found to transition from OFF to ON a new entry will be logged in the alarm page. Thus it is possible that multiple occurrences of the same alarm may appear in the alarm page. Such an alarm is said to be "unlatched".

STEP 24

Copying an Alarm Source

Often many of your alarm sources will be very similar in their definition, differing only in PLC location and perhaps in the setting of certain flags. In such cases it is easier to start with an existing alarm source and then modify it rather than creating it completely from scratch. In our case the remaining two alarm sources will be very similar to alarm source UNLATCHED which we just finished creating. In order to use it as our ”template” we must make a copy of it. Select the *Copy an alarm source* menu option and specify *UNLATCHED* as the alarm source to be copied.

```
                         A D S   B U I L D E R

                     Current System Name:     TUTOR

   Terminal:   COIT      (COM2:)  Default Scan Rate:          1.00 s
   Printer:              (NULL:)  Default Alarm Scan Rate:    0.50 s
   Dir:        \ADS_PC\TUTOR.PCM  Startup Screen:             1
   Alarm Sources:                 ADS Print Destination:    STDPRN

UNLATCHED
                                                              ns
                                            New alarm source
                                            Modify an alarm source
                                            Delete an alarm source
                                            Copy an alarm source
                                            View current sources
                                            List sources
                                            Print sources

Enter the name of the Alarm source to copy:  UNLATCHED
```

Pressing the [Enter] enter key opens up an alarm source data entry form with all fields filled out identically to those of alarm source UNLATCHED.

```
                         A D S   B U I L D E R
                       Create an alarm source
               Name:
   Source Data Type:  STATE
       PLC Location:  Z2[0]
          Scan Rate:  *                 (* or HH:MM:SS.CC)
   Additional Calc.:

  Range:  ON              Action:
   Text:  Unlatched example
  Range:                  Action:
   Text:
  Range:                  Action:
   Text:
  Range:                  Action:
   Text:

  Log: N    Timestamp: Y    Latched: N    Notify: N    Auto-ack: N

      Output text to following alarm pages :-
   :1    :    :    :    :    :    :    :    :    :
```

We will name this new alarm source AUTO_ACK. For the purposes of this tutorial we will leave the PLC location specified the same as for the UNLATCHED alarm. Typically you will always need to change the PLC Location field following an alarm source copy. The *Text* field is changed to read ”Auto–ack example” and the *Auto–ack* flag is changed to ”Y”. By default an entry in an alarm page will be shown blinking when it occurs. When an operator acknowledges the alarm it will be shown steady. In addition, if the alarm source is no longer in alarm, the entry will be removed from the alarm page following its acknowledgement. You should set the *Auto–ack* flag to ”Y” for any alarms that you do not want an operator to have to explicitly acknowledge.

```
                         A D S   B U I L D E R

                       Create an alarm source
              Name:  AUTO_ACK
  Source Data Type:  STATE
      PLC Location:  ZZ[0]
         Scan Rate:  *                (* or HH:MM:SS.CC)
  Additional Calc.:

 Range: ON                 Action:
  Text: Auto-ack example
 Range:                    Action:
  Text:
 Range:                    Action:
  Text:
 Range:                    Action:
  Text:

 Log: N    Timestamp: Y    Latched: N   Notify: N   Auto-ack: Y

     Output text to following alarm pages :-
  :1    :     :     :     :     :     :     :     :     :
```

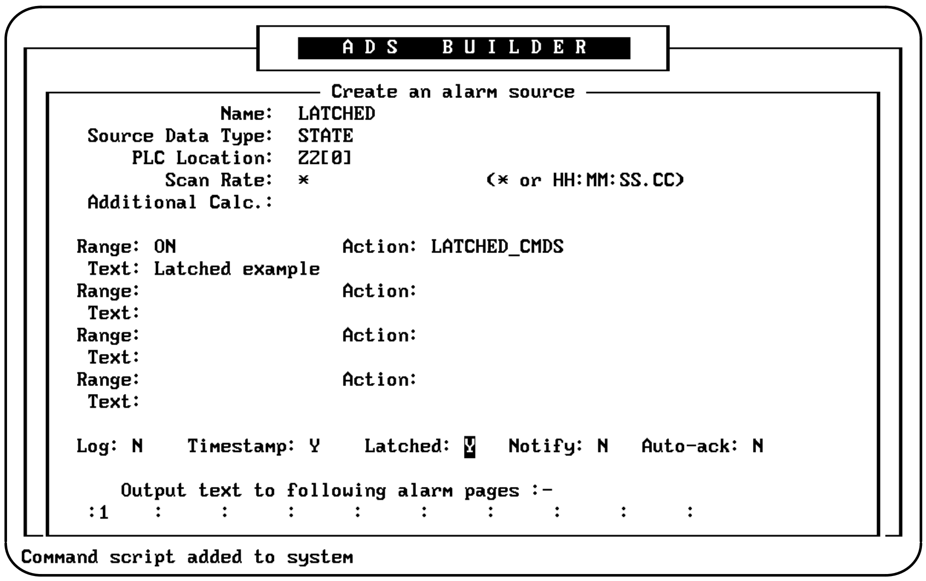
Make another copy of alarm source UNLATCHED, this time giving it a name of LATCHED. Select the first *Action* field and press the [Alt–S] key to open up the object list for command scripts. Choose to create a new script, resulting in a command script data entry form being opened up on the screen. Fill it out as shown below.

```
                         A D S   B U I L D E R

                       Create an alarm source
              Name:  LATCHED
  Source Data Type:  STATE
      PLC Location:  ZZ[0]
                        Create a command script
      Name:  LATCHED_CMDS

  PLCSETW(Z1,100)
  LOGTTM(Look at bar chart!)




                  Enter ONE valid command per line
```

A command script is used to specify a sequence of commands which will be executed when an alarm range evaluates true or by a particular function key being pressed to which the script is attached. One command script can call another, meaning that a very long sequence of commands triggered by a single event is possible.

In this example, the first command will write the word value ”100” to location Z1, which just happens to be the location we are using to monitor our temperature reading. The second command will display the text string ”Look at bar chart!” at the bottom of the target terminal’s display.

After completing the command script, you are returned to the alarm source data entry form. Change the *Text* field to read ”Latched example” and set the *Latched* flag to ”Y”.

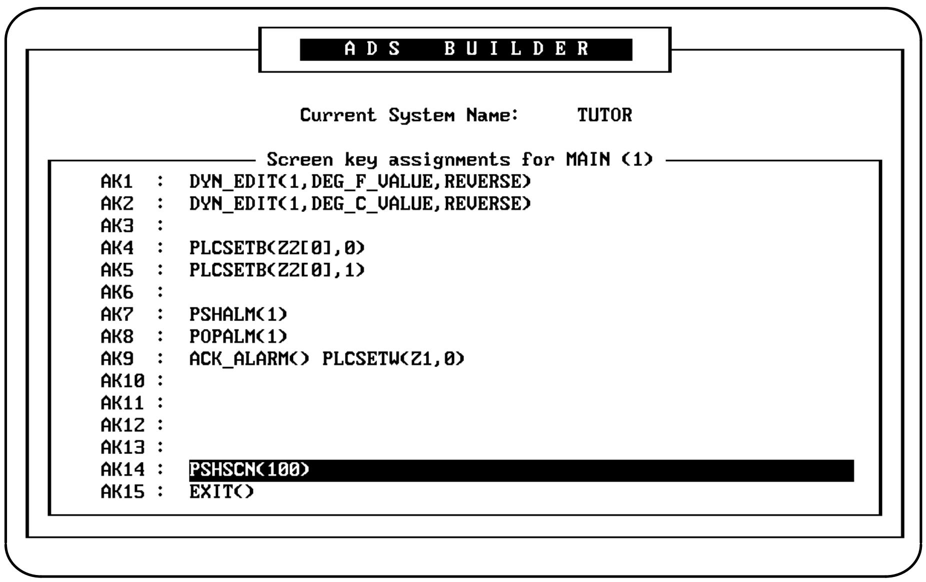


A ”latched” alarm differs from an ”unlatched” one in that only a single entry may appear in the alarm page at any one time. Once a latched alarm is logged in an alarm page, the entry must be acknowledged by the operator before any new instances of it are logged.

STEP 25

Updating the Main Screen’s Key Assignments

Now that we have finished creating our options screen and our alarm handling we need to modify our main screen’s key assignments accordingly. Use the [Esc] key to return to the Builder’s main menu and then choose *Screen Operations*. Choose the *Key Assignments* menu option and select the MAIN screen, screen 1. Add key assignments for function keys 7, 8, 9 and 14, as shown below.



The PSHALM(1) and POPALM(1) commands will provide for the displaying or removing from display, respectively, alarm page 1.

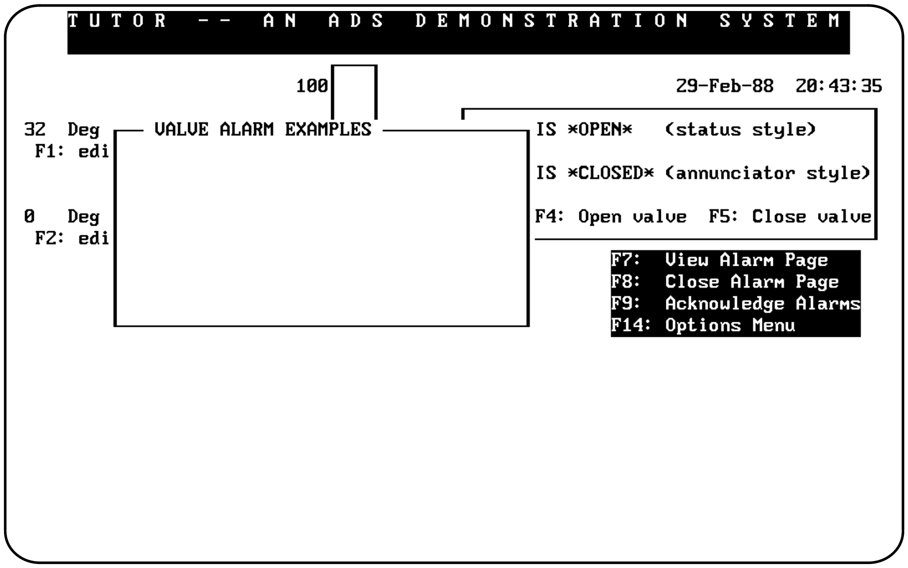
Two commands, separated by a space (” ”), are assigned to function key 9. The first of these, ACK_ALARM(), is used to acknowledge all currently unacknowledged alarms. The second command, PLCSETW(Z1,0), sets our temperature reading to 0. Note that a command script containing these two commands could also have been used here rather than defining both commands in the key assignments field itself.

The PSHSCN(100) command assigned to function key 14 is used to display the OPTIONS screen (100) on the target terminal display.

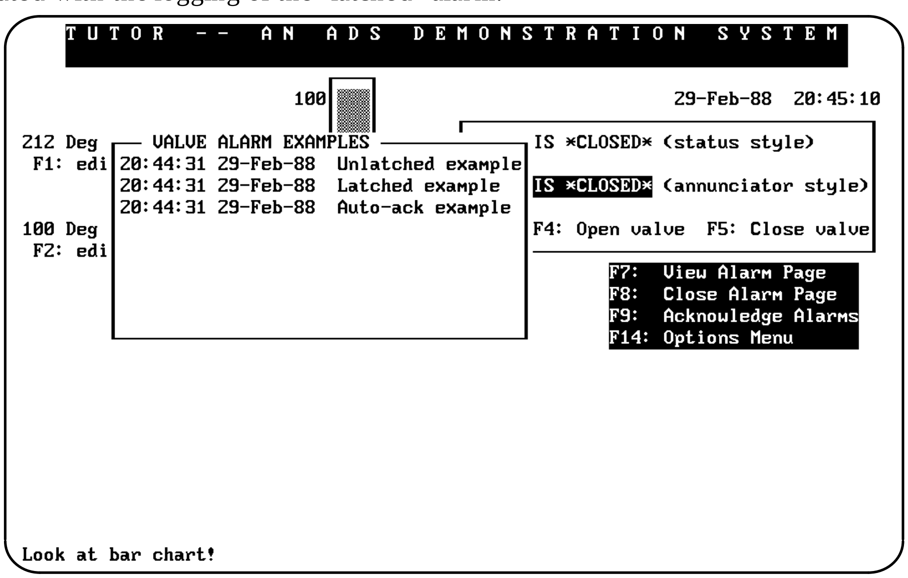
STEP 26

Interacting With an Alarm Page

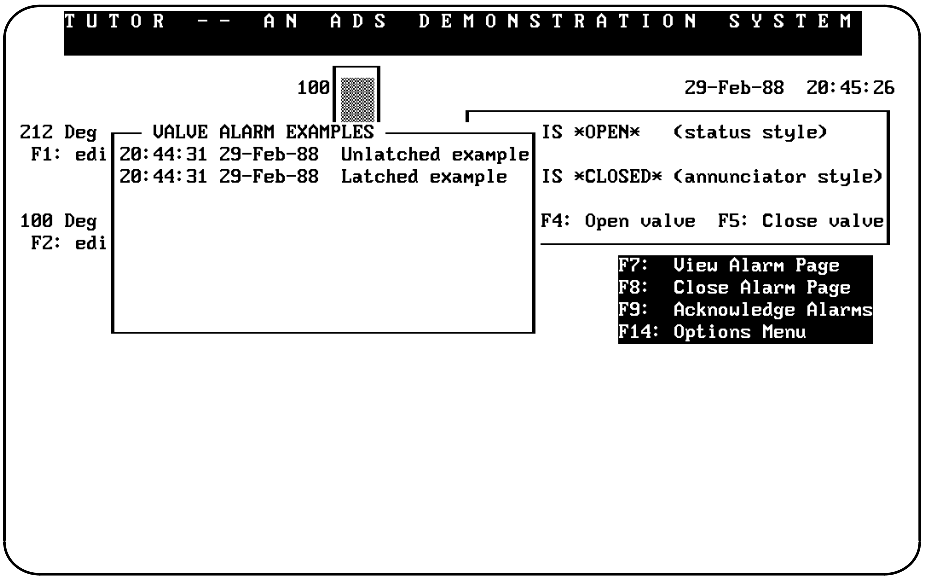
Now that we have completed our system, we need to save it both to disk and to the ADC module, then execute it, as we originally did back in steps 18 through 20. Use the [Esc] key to return to the Builder's main menu and select *Load/Save Operations*. Then consecutively execute menu items *Save system to disk*, *Refresh system in RAM:* and *Execute system in RAM:*. Once the startup screen is displayed, press the [F7] key to view alarm page 1.



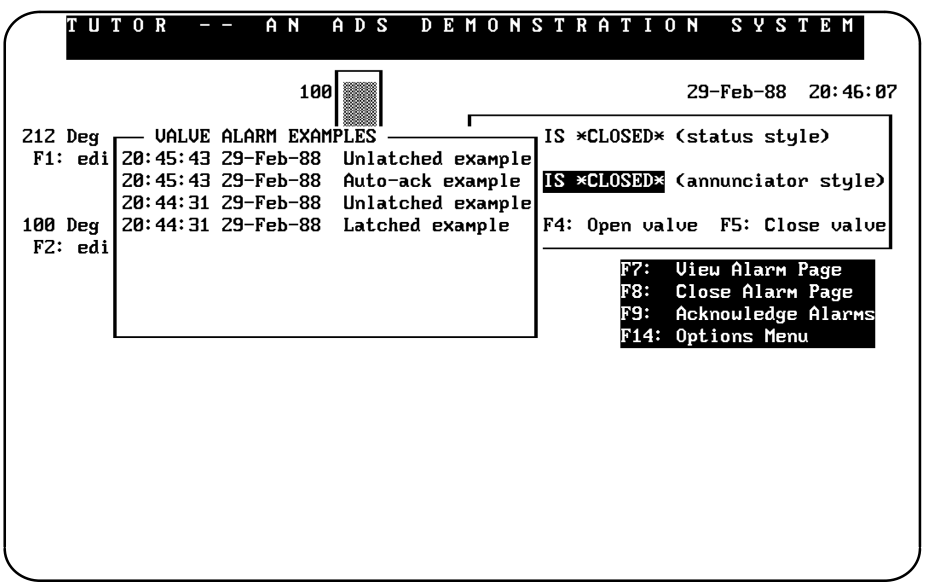
Now press the [F5] key to close the valve. Note that all three of our alarms are logged in alarm page 1, along with the time and date of their occurrence. The entries corresponding to both the latched and unlatched alarms are shown blinking; the entry corresponding to the auto acknowledged entry is displayed steady. Also, note that our thermometer now shows a temperature of 100C and that the message "Look at bar chart!" is displayed at the bottom of your terminal's display. These two items are a consequence of the action associated with the logging of the "latched" alarm.



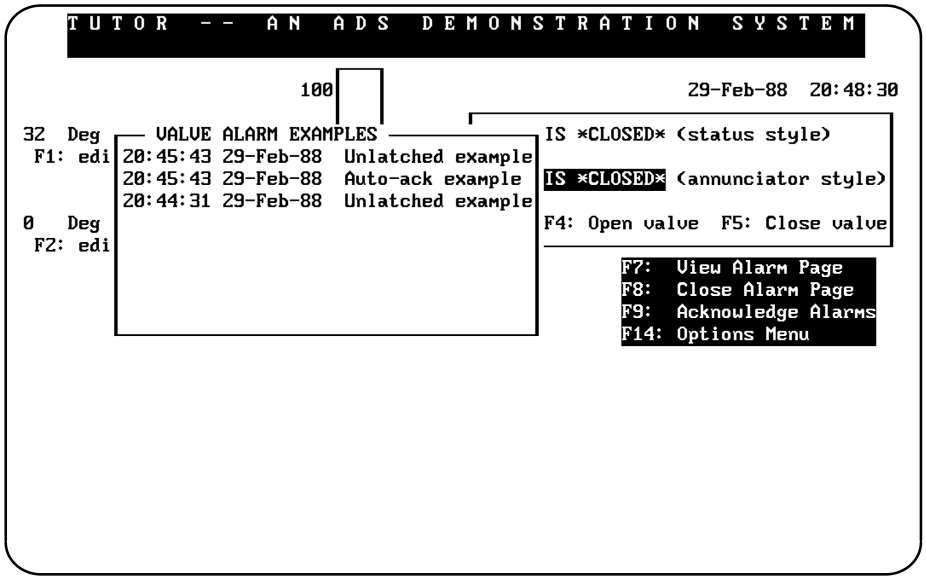
Now press the [F4] key to open the valve. Note that the entry corresponding to the auto acknowledge alarm has been removed from the alarm page. This is because when an acknowledged alarm transitions out of its alarm state it is automatically removed from all alarm pages it is logged to.



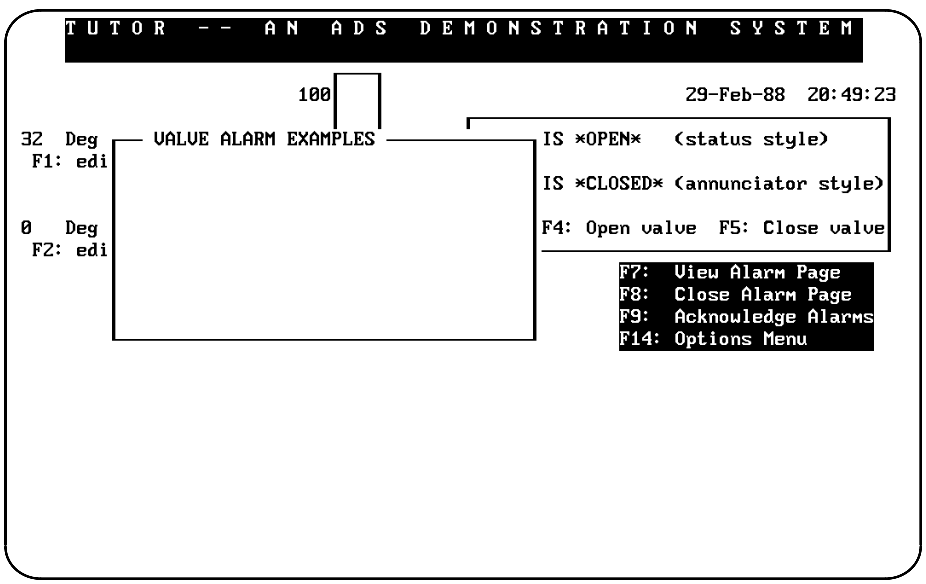
Pressing the [F5] key to again close the valve triggers the alarm condition again. Note that a second entry corresponding to the unlatched alarm is now in the table, that a new entry for the auto acknowledge alarm is logged in the table and that the *original* latched alarm entry is still in the table.



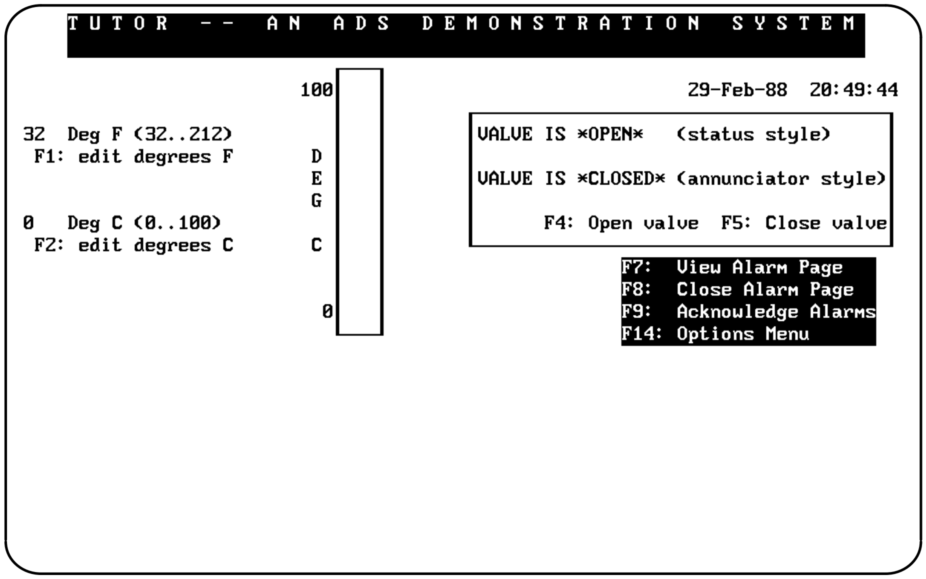
If you now press the [F9] key to acknowledge the alarms, notice that all the alarms are now shown with a steady display indicating that they have been acknowledged. Also, the second command attached to that key has caused our temperature to be reset to 0°C.



Now press the [F4] key to open the valve; this also resets our alarm condition. As a consequence, all our acknowledged alarms are automatically removed from the alarm page.



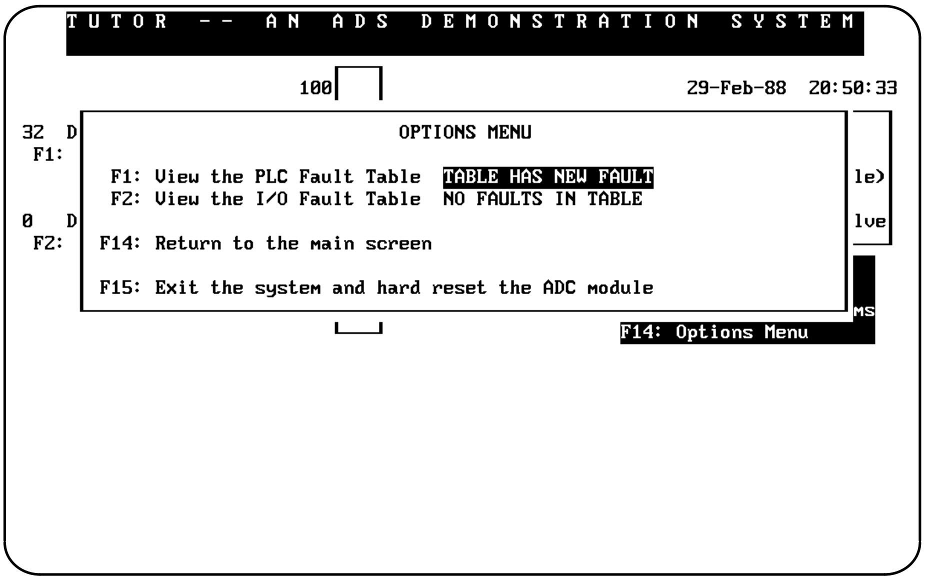
To remove the alarm page from the display, press the [F8] key.



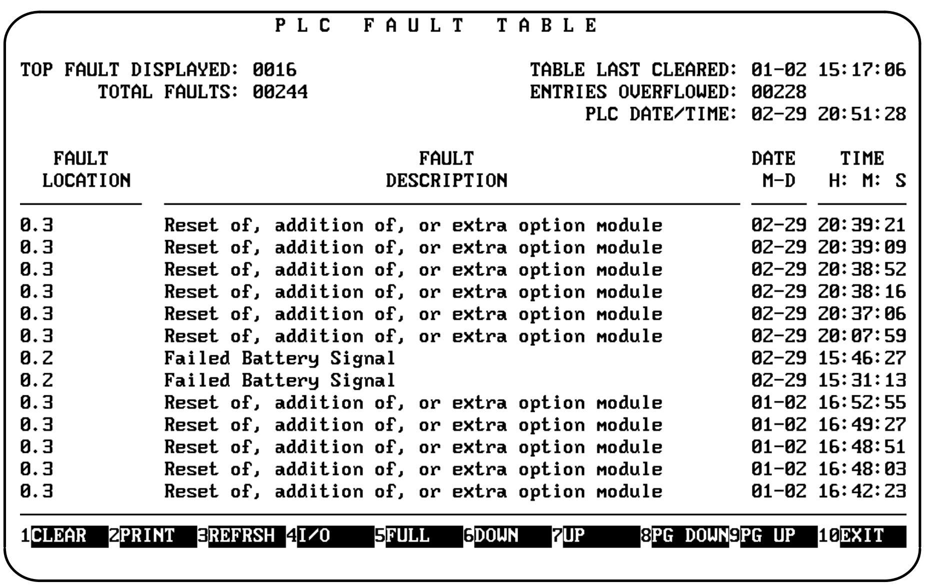
STEP 27

Accessing the Options Screen and the PLC Fault Table

Now let’s look at our new options screen by pressing the [F14] key. Note that in this example the PLC fault table is described as having new faults and the I/O fault table is described as having no faults at all. Depending on the status of your PLC you may or may not have any new faults in the I/O fault table; however, your PLC fault table should have one or more faults in it relating to the resetting of the ADC module during this tutorial.



Press the [F1] key to gain access to the display of the PLC fault table. Note that this display is the same as the one which can be accessed from within the Logicmaster 90 programming and configuration software packages.

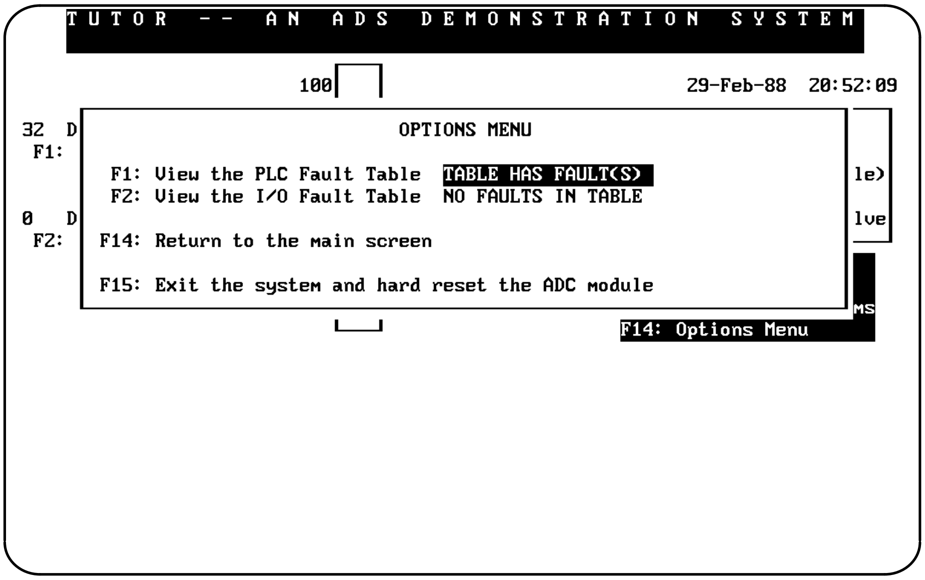

P L C F A U L T T A B L E

TOP FAULT DISPLAYED: 0016
TOTAL FAULTS: 00244
TABLE LAST CLEARED: 01-02 15:17:06
ENTRIES OVERFLOWED: 00228
PLC DATE/TIME: 02-29 20:51:28

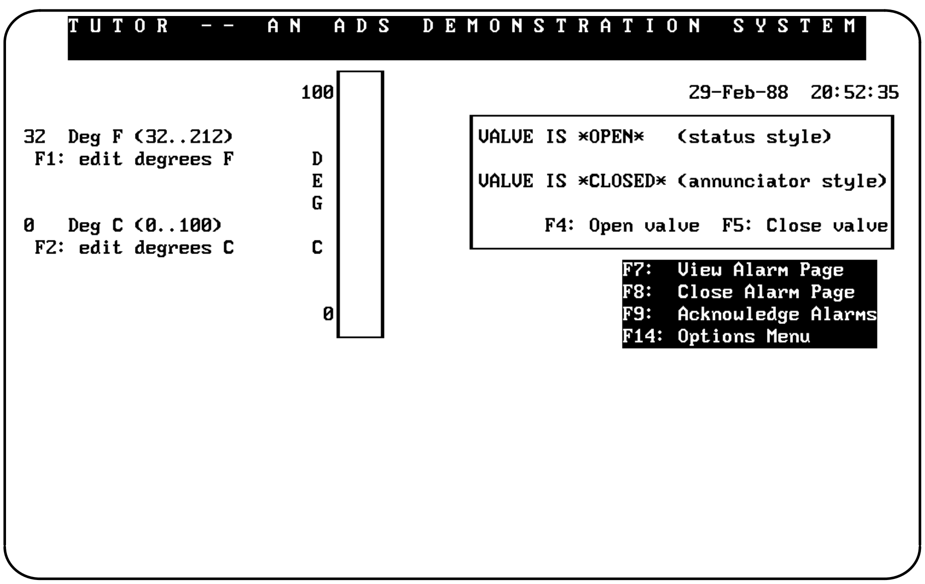
FAULT LOCATION	FAULT DESCRIPTION	DATE M-D	TIME H: M: S
0.3	Reset of, addition of, or extra option module	02-29	20:39:21
0.3	Reset of, addition of, or extra option module	02-29	20:39:09
0.3	Reset of, addition of, or extra option module	02-29	20:38:52
0.3	Reset of, addition of, or extra option module	02-29	20:38:16
0.3	Reset of, addition of, or extra option module	02-29	20:37:06
0.3	Reset of, addition of, or extra option module	02-29	20:07:59
0.2	Failed Battery Signal	02-29	15:46:27
0.2	Failed Battery Signal	02-29	15:31:13
0.3	Reset of, addition of, or extra option module	01-02	16:52:55
0.3	Reset of, addition of, or extra option module	01-02	16:49:27
0.3	Reset of, addition of, or extra option module	01-02	16:48:51
0.3	Reset of, addition of, or extra option module	01-02	16:48:03
0.3	Reset of, addition of, or extra option module	01-02	16:42:23

1CLEAR 2PRINT 3REFRSH 4I/O 5FULL 6DOWN 7UP 8PG DOWN 9PG UP 10EXIT

Pressing the [F10] key returns you to the options screen. Note that the description for the PLC fault table has changed from ”Table has new fault” to ”Table has fault(s)”; this change is due to you viewing the PLC fault table.



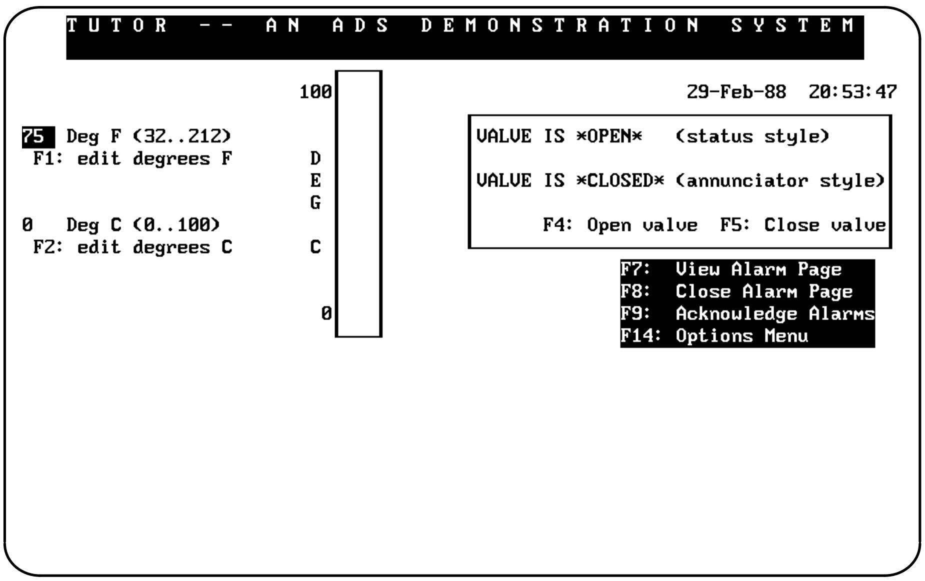
Pressing the [F14] returns you to the main screen.



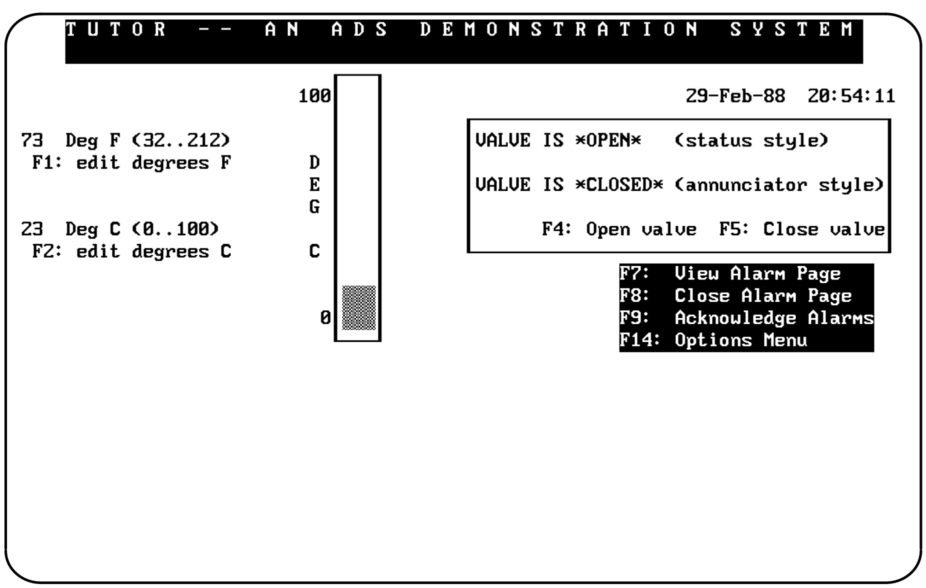
STEP 28

Beware of Rounding Errors

When you are using scaling with a dynamic object which you then edit, the scaling is applied in reverse such that the value is sent to the PLC with the proper units. This conversion can lead to rounding errors which can result in a display being slightly different than what you expected. For example, our temperature value was defined to be in units of degrees Celsius. In one case we display the equivalent temperature value in degrees Fahrenheit, and also allow you to edit that value. Assume that the operator edits the degrees Fahrenheit temperature, entering a value of 75.



After pressing the [Enter] key, the value is converted to degrees Celsius before being stored in the defined memory area. Following that, the screen values are again scanned and the screen refreshed with the new values. Considering that some roundoff error occurred in the conversion, the just– entered temperature of 75°F changes to read 73!



SCREEN DETAILS LISTING

```
Screen Number : 1     MAIN
    Start Row : 1        End Row :  23
    Start Column : 1      End Column :  80
   Image : NORMAL
   Background : BLACK  Foreground : WHITE
Dynamic Object : DATE_DISPLAY
  Start Row : 4       End Row :  4
  Start Column : 61   End Column :  69
  Data Source : PLC_DATE
  Additional Calc. :
  Display Format :
  Display Value : Yes  ( )
  Avail for Edit: No
Dynamic Object : DEG_C_BAR
  Start Row : 4       End Row :  14
  Start Column : 30   End Column :  32
  Data Source : TEMPERATURE
  Additional Calc. :
  Display Format : NORMAL_HIGH
  Display Value : No
  Avail for Edit: No
Dynamic Object : DEG_C_VALUE

  Start Row : 10      End Row :  10
  Start Column : 2    End Column :  4

  Data Source : TEMPERATURE
  Additional Calc. :
  Display Format :
  Display Value : Yes  ( Left_justify )
  Avail for Edit: Yes
     Min: 0
     Max: 100
Dynamic Object : DEG_F_VALUE

  Start Row : 6       End Row :  6
  Start Column : 2    End Column :  4

  Data Source : TEMPERATURE
  Additional Calc. : DEGC_TO_DEGF
  Display Format :
  Display Value : Yes  ( Left_justify )
  Avail for Edit: Yes
     Min: 32
     Max: 212

Dynamic Object : TIME_DISPLAY

  Start Row : 4       End Row :  4
  Start Column : 72   End Column :  79

  Data Source : PLC_TIME
  Additional Calc. :
  Display Format :
  Display Value : Yes  ( )
  Avail for Edit: No
Dynamic Object : VALVE_ANNUN

  Start Row : 8       End Row :  8
  Start Column : 42   End Column :  58

  Data Source : VALVE
  Additional Calc. :
  Display Format : OFF_ON
  Display Value : No
  Avail for Edit: No

Dynamic Object : VALVE_STATUS

  Start Row : 6       End Row :  6
  Start Column : 51   End Column :  58

  Data Source : VALVE
  Additional Calc. : OPEN_CLOSED
  Display Format :
  Display Value : Yes ( Left_justify )
  Avail for Edit: No
```

```
      10       20       30       40       50       60       70       80
.........+.........+.........+.........+.........+.........+.........+.........+
   T U T O R  – –  A N  A D S  D E M O N S T R A T I O N  S Y S T E M   .
   T U T O R  – –  A N  A D S  D E M O N S T R A T I O N  S Y S T E M   .
                            +–––+                                         .
                        100|–––|                      DD–MMM–YY  HH:MM:SS .
                          |–––|    +–––––––––––––––––––––––––––––––––––––+ .
999 Deg F (32..212)         |–––|    |VALVE IS XXXXXXXX (status style)   | .
 F1: edit degrees F     D | ––|      |                                   | .
                      E |B––|     |VALVE IS *CLOSED* (annunciator style)| .
                         G |A––|      |                                  | .
999 Deg C (0..100)          |R––|     |    F4: Open valve  F5: Close valve| +10
F2: edit degrees C    C | ––|    +–––––––––––––––––––––––––––––––––––––+ .
                           |–––|               F7:  View Alarm Page       .
                           |–––|               F8:  Close Alarm Page      .
                          0|–––|               F9:  Acknowledge Alarms    .
                           +–––+               F14: Options Menu          .
                                                                          .
                                                                          .
                                                                          .
                                                                          .
                                                                          +20
                                                                          .
                                                                          .
                                                                          .
```

```
Key definitions
 AK1 : DYN_EDIT(1,DEG_F_VALUE,REVERSE)   AK9 : ACK_ALARM() PLCSETW(Z1,0)
 AK2 : DYN_EDIT(1,DEG_C_VALUE,REVERSE)   AK10 :
 AK3  :                                  AK11 :
 AK4  : PLCSETB(Z2[0],0)                 AK12 :
 AK5  : PLCSETB(Z2[0],1)                 AK13
 AK6  :                                  AK14 : PSHSCN(100)
 AK7  : PSHALM(1)                        AK15 : EXIT()
 AK8  : POPALM(1)

Screen Number : 100   OPTIONS

  Start Row : 5        End Row :  14
  Start Column : 6     End Column :  75

  Image : NORMAL

  Background : BLACK   Foreground : WHITE

Dynamic Object : IO_FLT_STAT              Dynamic Object : PLC_FLT_STAT

  Start Row : 5        End Row :  5          Start Row : 4        End Row :  4
  Start Column : 34    End Column :  52      Start Column : 34    End Column :  52

     Data Source : IO_FAULTS                 Data Source : PLC_FAULTS
     Additional Calc. :                      Additional Calc. :
     Display Format : STATUS_STRNG           Display Format : STATUS_STRNG
     Display Value : Yes ( Left_justify )    Display Value : Yes ( Left_justify )
     Avail for Edit: No                      Avail for Edit: No
```

```
      10       20       30       40       50       60       70
.........+.........+.........+.........+.........+.........+.........+
+---------------------------------------------------------------------+.
|                       OPTIONS MENU                          |.
|                                                             |.
| F1: View the PLC Fault Table  XXXXXXXXXXXXXXXXXXX           |.
| F2: View the I/O Fault Table  XXXXXXXXXXXXXXXXXXX           |.
|                                                             |.
| F14: Return to the main screen                              |.
|                                                             |.
| F15: Exit the system and hard reset the ADC module          |.
+---------------------------------------------------------------------++10

Key definitions–
  AK1  : PLC_FAULT()                      AK9  :
  AK2  : IO_FAULT()                       AK10 :
  AK3  :                                  AK11 :
  AK4  :                                  AK12 :
  AK5  :                                  AK13 :
  AK6  :                                  AK14 : POPSCN(100)
  AK7  :                                  AK15 : EXIT()
  AK8  :

      ALARM PAGE LISTING

Alarm Page :   1     VLV_ALRM

  Start Row : 6         End Row :  15
  Start Column : 9      End Column :  47
  Foreground : BLACK  Background : WHITE
  Heading : VALVE ALARM EXAMPLES

      ALARM SOURCE LISTING

Alarm Source : AUTO_ACK                   Alarm Source : LATCHED

  Data Type : STATE                          Data Type : STATE
  Location : Z2[0]                           Location : Z2[0]
  Scan Rate : *                              Scan Rate : *
  Additional Calc. :                         Additional Calc. :

  Alarm Pages : 1                            Alarm Pages : 1

  Flags : Timestamp Auto–ack                 Flags : Timestamp Latched

  Range : ON                                 Range : ON
    Text : Auto–ack example                    Text : Latched example
    Action :                                   Action : LATCHED_CMDS

Alarm Source : UNLATCHED

  Data Type : STATE
  Location : Z2[0]
  Scan Rate : *
  Additional Calc. :

  Alarm Pages : 1

  Flags : Timestamp

  Range : ON
    Text : Unlatched example
    Action :
```

DATA SOURCE LISTING

```
DataSource : IO_FAULTS

  Data Type : BYTE
 Location : PLC_STATUS[5];PLC_STATUS[3]
  Scan Rate : *
 Additional Calc. : STATUS_TEXT

Data Source : PLC_FAULTS

  Data Type : BYTE
 Location : PLC_STATUS[4];PLC_STATUS[2]
  Scan Rate : *
 Additional Calc. : STATUS_TEXT

Data Source : TEMPERATURE

  Data Type : WORD
  Location : Z1
  Scan Rate : *
  Additional Calc. :

Data Source : PLC_DATE

  Data Type : LONGWORD
  Location : DATE
 Scan Rate : 00:00:01.00
 Additional Calc. :

Data Source : PLC_TIME

  Data Type : LONGWORD
  Location : TIME
 Scan Rate : 00:00:01.00
 Additional Calc. :

Data Source : VALVE

  Data Type : STATE
  Location : Z2[0]
  Scan Rate : *
  Additional Calc. :
```

DISPLAY FORMAT LISTING

```
DisplayFormat : NORMAL_HIGH

  Data Type : WORD

      Range          Action
  0:79                YELLOW
  80:100              RED

Display Format : OFF_ON

  Data Type : STATE

      Range          Action
  OFF                 NORMAL
  ON                  REVERSE

DisplayFormat:STATUS_STRNG

 Data Type : STRING

      Range             Action
 TABLE HAS FAULT(S)   REVERSE
 TABLE HAS NEW FAULT  REVERSE;BLINK
 NO FAULTS IN TABLE   NORMAL
```

TRANSLATION LISTING

```
TranslationDEGC_TO_DEGF

 Variables A :  1.800000
           B :         0
           C :        32
 Input Data Type  : NIL
 Output Data Type :  NIL
```

LOOKUP TABLE LISTING

```
LookupTable : OPEN_CLOSED

  Input Data Type : STATE
  Output Data Type : STRING

  Input Range        Output Range
  OFF                *OPEN*
  ON                 *CLOSED*

Lookup Table : STATUS_TEXT

  Input Data Type : BYTE
  Output Data Type : STRING

  Input Range      Output Range
  1                TABLE HAS FAULT(S)
  3                TABLE HAS NEW FAULT
  0:255            NO FAULTS IN TABLE
```

COMMAND SCRIPT LISTING

```
CommandScript:LATCHED_CMDS

PLCSETW(Z1,100)
 LOGTTM(Look at bar chart!)
```

Section 4: Development Tutorial for Touch Terminals

This section is a step-by-step tutorial for building and executing a system which will use a target terminal with a touch screen interface as opposed to an attached (or built-in) keyboard. You should use this section if your target terminal is one of the following:

- GE Fanuc Mini OIT-Touch
- Nematron monochrome or color OptiTOUCH
- Lucas Deeco ST-2200

A listing of the system you will be building may be found at the end of this section beginning on page 6-148.

STEP 1

Accessing the Builder

Type *OI_MENU* at the MS-DOS prompt to execute the Operator Interface products menu program, resulting in the initial screen shown below.

```
 DER          ADS        EXIT

                               DER - Digital Event Recorder
                               ADS - CIMPLICITY(tm) 90-ADS

                               EXIT - Return to LM90 Main Menu





     <<  Use cursor keys to select item; Press [Enter] to execute choice   >>
     <<    (or press key corresponding to first letter of menu choice)     >>
     << Press [F10] to close menu window; Press [Home] for HELP on choices >>

                              Operator Interface Products Menu
                                        Version 1.02
```

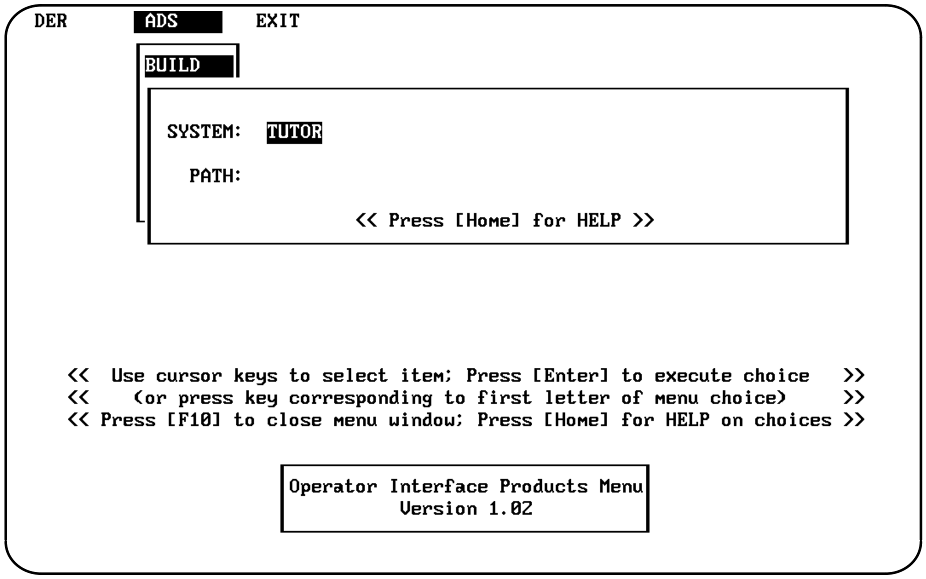
Press the [→] cursor key followed by the [Enter] key to select the ADS pull–down menu (alternatively, you may just press the [A] key).

```
DER       ADS       EXIT

          BUILD
          PCOP-ADS      DER - Digital Event Recorder
          ADSSETUP      ADS - CIMPLICITY(tm) 90-ADS
          TERMSET
          CREATHLP      EXIT - Return to LM90 Main Menu
          XREF
          TERMF



<<  Use cursor keys to select item; Press [Enter] to execute choice   >>
<<    (or press key corresponding to first letter of menu choice)     >>
<< Press [F10] to close menu window; Press [Home] for HELP on choices >>

                 Operator Interface Products Menu
                           Version 1.02
```

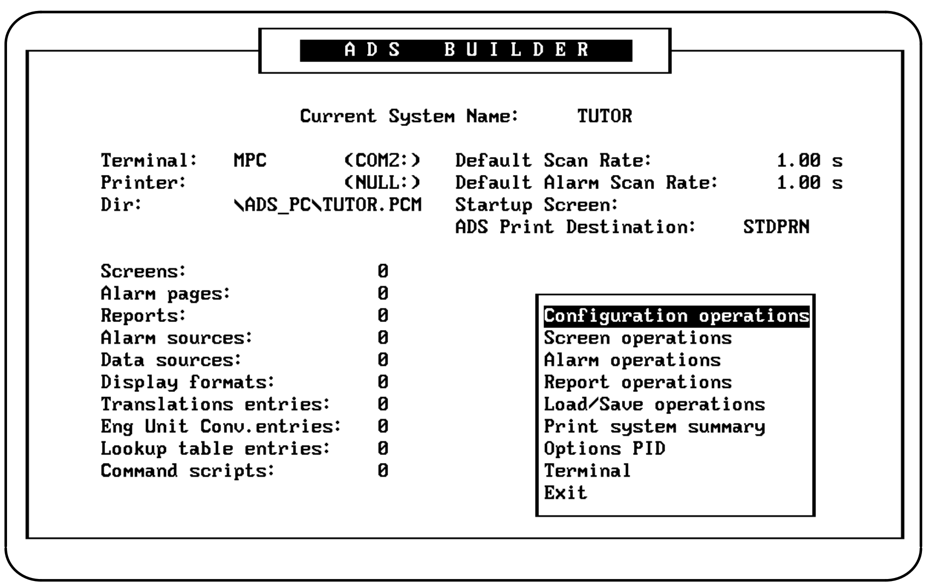
Press the [Enter] key to pop–up the Builder data entry window (alternatively, you may just press the [B] key).

```
DER       ADS       EXIT

          BUILD

            SYSTEM:

              PATH:

                          << Press [Home] for HELP >>



<<  Use cursor keys to select item; Press [Enter] to execute choice   >>
<<    (or press key corresponding to first letter of menu choice)     >>
<< Press [F10] to close menu window; Press [Home] for HELP on choices >>

                 Operator Interface Products Menu
                           Version 1.02
```

Fill out the ”System” name field with the text *TUTOR*.



Press the [Enter] key twice to access the Builder's copyright screen (alternatively, you can press the [Alt-F10] key). Pressing the [Enter] key while viewing the copyright screen will display the Builder's main menu screen.

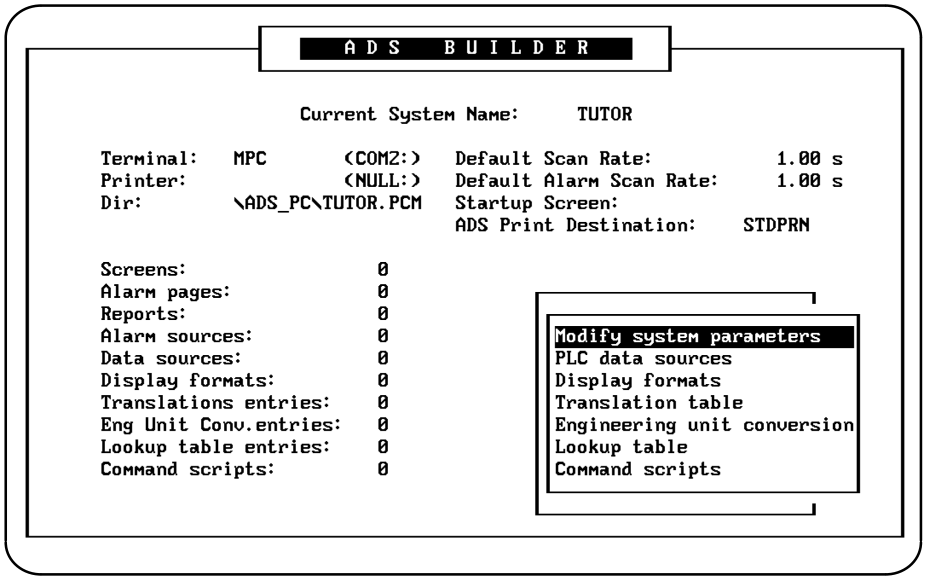


The Builder's main screen provides current system information across the top of the screen. On the left-hand side of the screen are items that you will create along with the current quantities listed for each of these items. On the right-hand side of the screen is a window containing a menu listing a group of operations which are accessible from the main menu screen. You will interact with a number of these menu items throughout this tutorial.

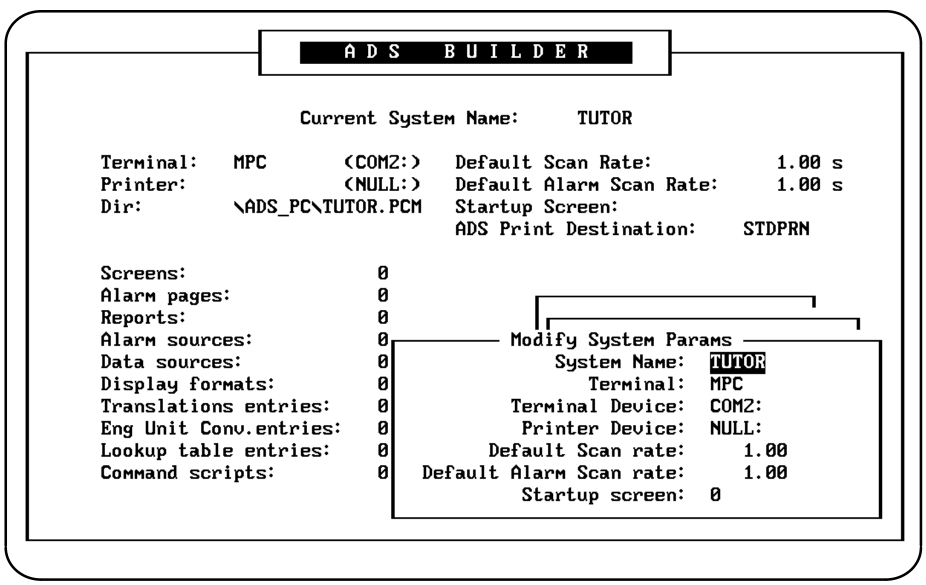
STEP 2

System Configuration

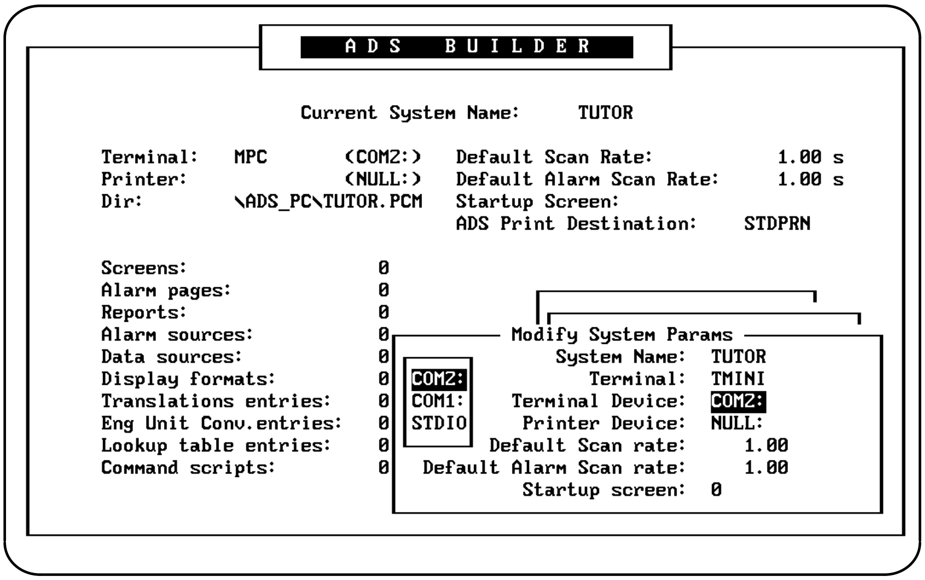
Press the [Enter] key to access the ”Configuration Operations” submenu.



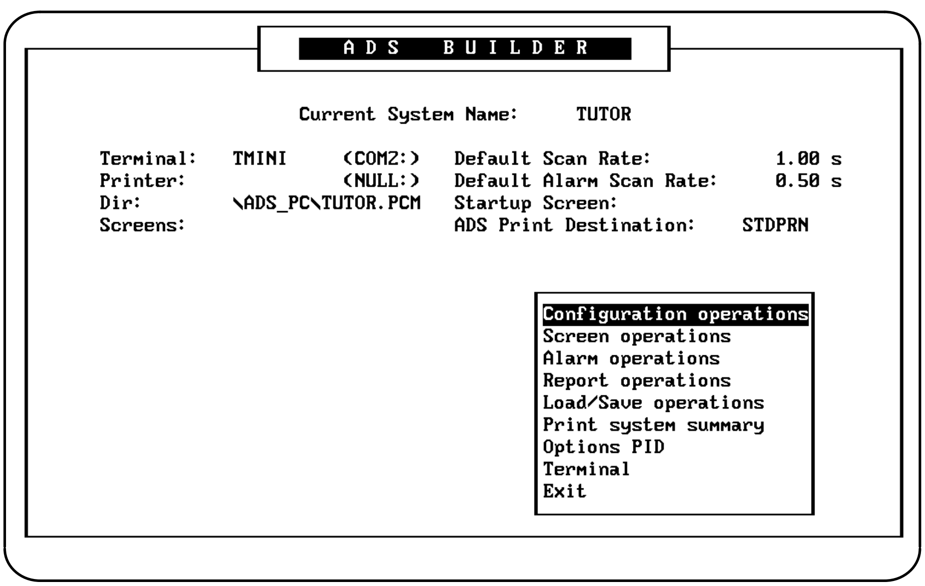
Press the [Enter] key to access the ”Modify System Parameters” data entry form.



The [Enter] key is used to move from field to field within the data entry form; when on the last field of the form, pressing the [Enter] key will close the data entry form, saving its contents. Use the [Esc] key to cancel the entry of data into the form. The [Ctrl-X] key is used to clear the contents of a field. You should fill in the ”Terminal” and ”Terminal Device” fields of the form per table 5-2. It is suggested that you also change the ”Default Alarm Scan rate” field to 0.5. Note that some fields, such as the ”Terminal Device” field, present you with a menu of choices to pick from. The [↑] and [↓] cursor keys are used to highlight the desired choice; pressing the [Enter] key selects it.



Once the ”Modify System Parameters” data entry form has been closed, press the [Esc] key to return to the Builder main menu. Note that the changes you made to the form are now reflected in the status information on the screen.



STEP 3

Creating the Main Screen

Now that you have selected the correct target terminal for your configuration, you may proceed to create your first screen. Select the "Screen Operations" submenu, either by pressing the [↑] or [↓] cursor keys to select its menu entry and then pressing the [Enter] key to select it, or alternately by just pressing the [S] key. Throughout the remainder of this tutorial, when you are asked to select a menu item you should either cursor to that item and then press the [Enter] key or alternatively you may just press the letter corresponding to the first letter of the menu item. Where more that one menu item begins with the same first character, the topmost item in the menu list would be selected by pressing its corresponding first letter.

```
                         A D S   B U I L D E R

                   Current System Name:     TUTOR

   Terminal:   TMINI     (COM2:)  Default Scan Rate:           1.00 s
   Printer:              (NULL:)  Default Alarm Scan Rate:     0.50 s
   Dir:        \ADS_PC\TUTOR.PCM  Startup Screen:
   Screens:                       ADS Print Destination:    STDPRN

                                          New screen
                                          Modify screen
                                          Screen paint
                                          Delete screen
                                          Copy screen
                                          Key assignments
                                          List screens
                                          Print screen details
                                          Touch screen assignments
```

Select the "New Screens" menu item to open up the create screen data entry form.

```
                         A D S   B U I L D E R

                   Current System Name:     TUTOR

   Terminal:   TMINI     (COM2:)  Default Scan Rate:           1.00 s
   Printer:              (NULL:)  Default Alarm Scan Rate:     0.50 s
   Dir:        \ADS_PC\TUTOR.PCM  Startup Screen:
   Screens:                       ADS Print Destination:    STDPRN

                               Create Screen
                  Screen Name :
                Screen Number :
                    Start Row :   1      Rows    :   15
                 Start Column :   1      Columns :   80
                        Image :   N      (Norm/Rev/Trans)
                   Foreground :   WHITE
                   Background :   BLACK
```

Enter a ”screen name” of *MAIN* and a ”screen number” of *1*. The ”start row”,”rows”, ”start column”, ”columns” and ”image” fields may all be left as their defaults. If you are using a color terminal, you may want to change the ”foreground” and ”background” colors to something other than the white on black default. Press the [Enter] key to complete or skip a field on the data entry form.

```
                         A D S   B U I L D E R

                     Current System Name:     TUTOR

  Terminal:   TMINI     (COM2:)   Default Scan Rate:         1.00 s
  Printer:              (NULL:)   Default Alarm Scan Rate:   0.50 s
  Dir:        \ADS_PC\TUTOR.PCM   Startup Screen:
  Screens:                        ADS Print Destination:    STDPRN

                                  Create Screen
                          Screen Name :   MAIN
                        Screen Number :   1
                            Start Row :   1      Rows    :   15
                         Start Column :   1      Columns :   80
                                Image :   N      (Norm/Rev/Trans)
                           Foreground :   WHITE
                           Background :   BLACK
```

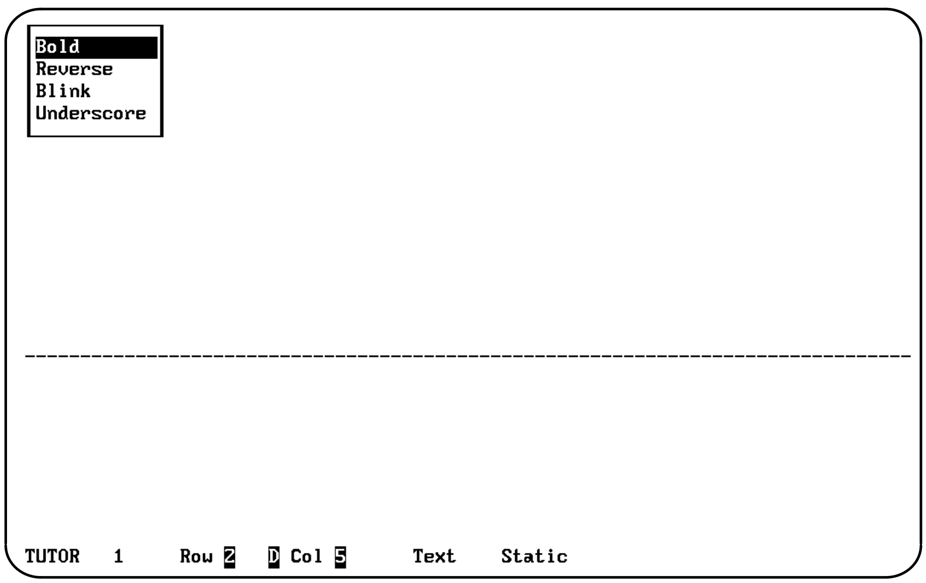
Upon completing the ”create screen” data entry form you will automatically be placed into the **screen painter** for screen 1.

```
--------------------------------------------------------------------------------

TUTOR   1     Row 1     Col 1      Text    Static
```

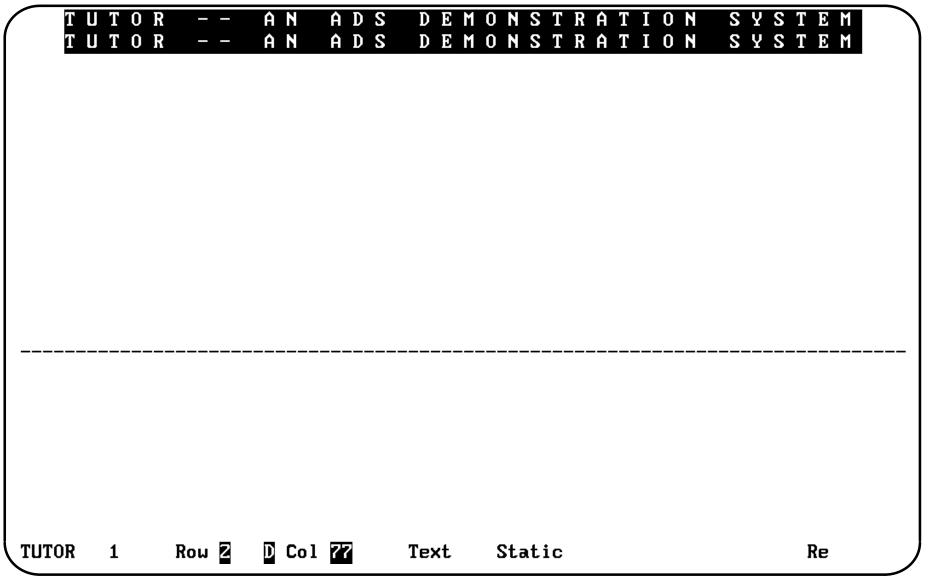
STEP 4

Video Attributes and Double Size Text

The dashed line towards the bottom of the screen indicates the lower bound of the screen area for your target terminal. The bottom line of the screen is reserved as the status area for the screen painter. It indicates the name of the system, the screen being painted, the <row, column> screen position of the cursor, that the painter is in text mode and that you are currently able to create static text. Initially we want to create a double–size text header for the screen. Use the cursor keys to position the cursor at <row , column> position <2, 1>. Then press the [Alt–D] key to put the line into ”double size” mode; this will be indicated by the appearance of a reverse video ”D” in the status area. Now use the cursor keys to position the cursor at <row, column> position <2, 5>. Then press the [F1] key to select the video attributes menu.



Select the choice of ”Reverse”. The video attribute menu will be closed automatically; the activation of reverse video will be indicated in the status area by the ”Re” designator. Now type in the desired text: *TUTOR — AN ADS DEMONSTRATION SYSTEM*. The double size text is displayed on your computer screen as two identical double spaced lines; these will appear as a single double size line on your terminal when the system is executed.

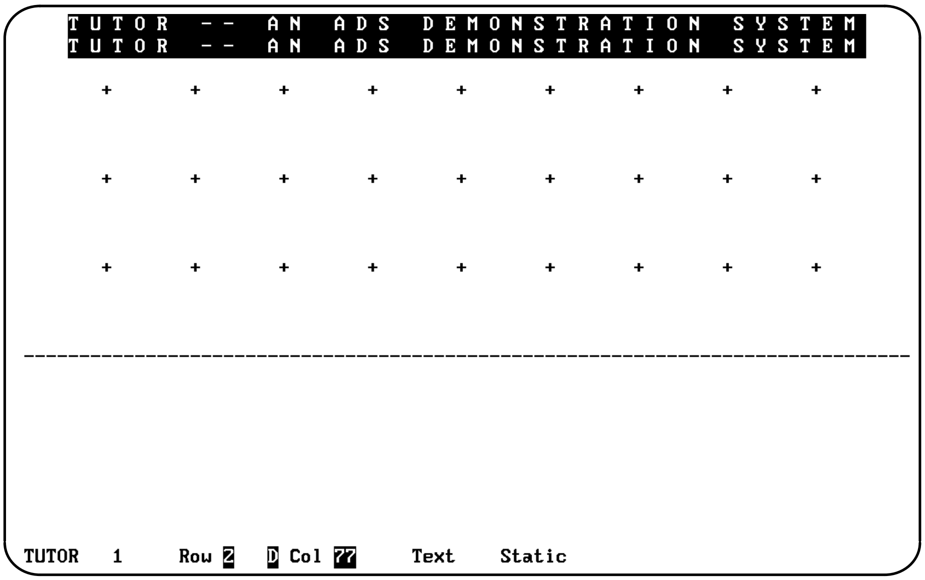


Since we have now entered all the text that we want to with the reverse video attribute, press the [Alt-F1] key; note that the ”Re” designator disappears from the status area. Alternatively, you can press the [F1] key to select the video attributes menu and then select the choice of ”Reverse” again. This will also cause the reverse video choice to be ”toggled off”. The difference between the two approaches is that the [Alt-F1] key will remove ALL selected video attributes.

STEP 5

Editing Screen Text

Whenever you edit text onto screens that will be displayed on a touch terminal, you will nearly always want to display the touch point grid to help you align your text in relation to the touch points you will be creating. Pressing the [Delete] key toggles on the display of the touch point grid.

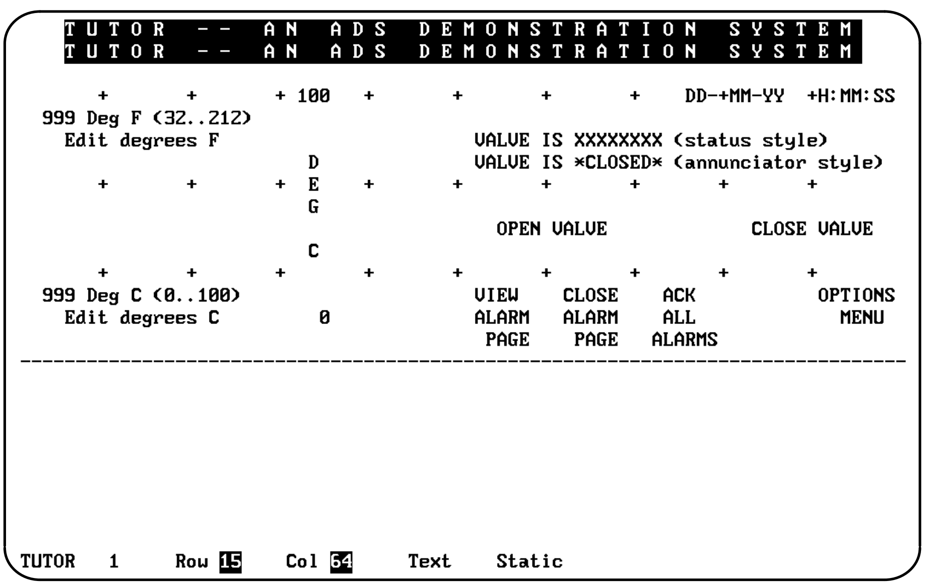


The rows of ”+ ’s” indicate the lower righthand corner of each touch point that the terminal supports (except the bottommost line of touch points where the dashed line covers up the “+ ’s”). In this example, four rows with ten touch points in each row are supported.

If you type a character directly on top of one of the ”+’s”, that character will not be visible since the ”+’s” are always displayed ”on top”. Pressing the [Delete] key to toggle off the display of the touch point grid will show you the characters which appear beneath each ”+” character.

Using the cursor keys to position the cursor at the appropriate <row, column> positions shown in the table below, enter the specified text at the indicated screen positions. Note that the sequence of eight ”X”s in the text ”VALVE IS XXXXXXXX” must be in upper case. Also, the text strings ”DD-MMM-YY” and ”HH:MM:SS” must be in upper case.

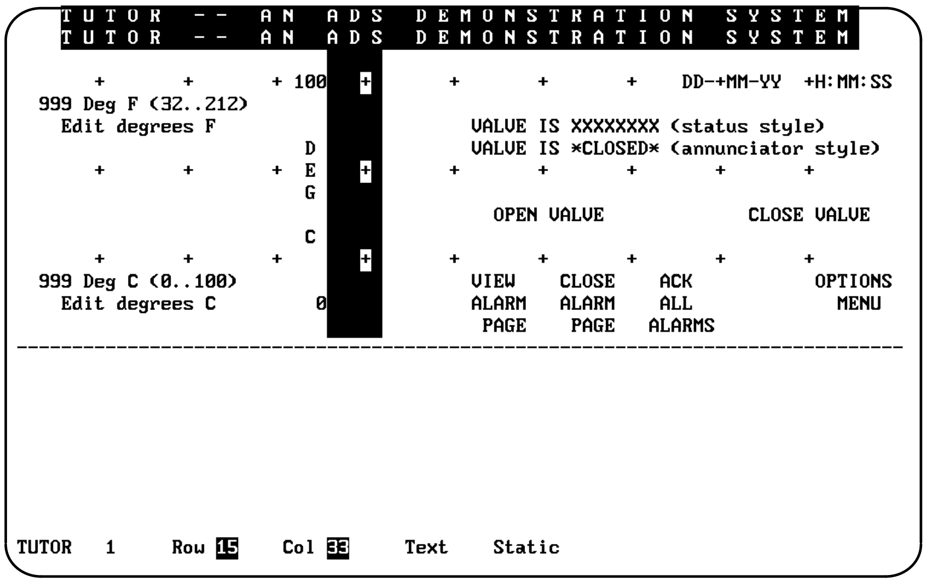
<Row, Column>	**Text to Type There**
<4, 26>	100
<4,61>	DD-MMM-YY
<4, 72>	HH:MM:SS
<5, 3>	999 Deg F (32..212)
<6,5>	Edit Degrees F
<6, 42>	VALVE IS XXXXXXXX (status style)
<7, 27>	D
<7, 42>	VALVE IS *CLOSED* (annunciator style)
<8, 27>	E
<9,27>	G
<10, 44>	OPEN VALVE
<10, 67>	CLOSE VALVE
<11, 27>	C
<13, 3>	999 Deg C (0..100)
<13, 42>	VIEW
<13, 50>	CLOSE
<13, 59>	ACK
<13, 73>	OPTIONS
<14, 5>	Edit Degrees C
<14, 28>	0
<14, 42>	ALARM
<14, 50>	ALARM
<14, 59>	ALL
<14, 75>	MENU
<15, 43>	PAGE
<15, 51>	PAGE
<15, 58>	ALARMS



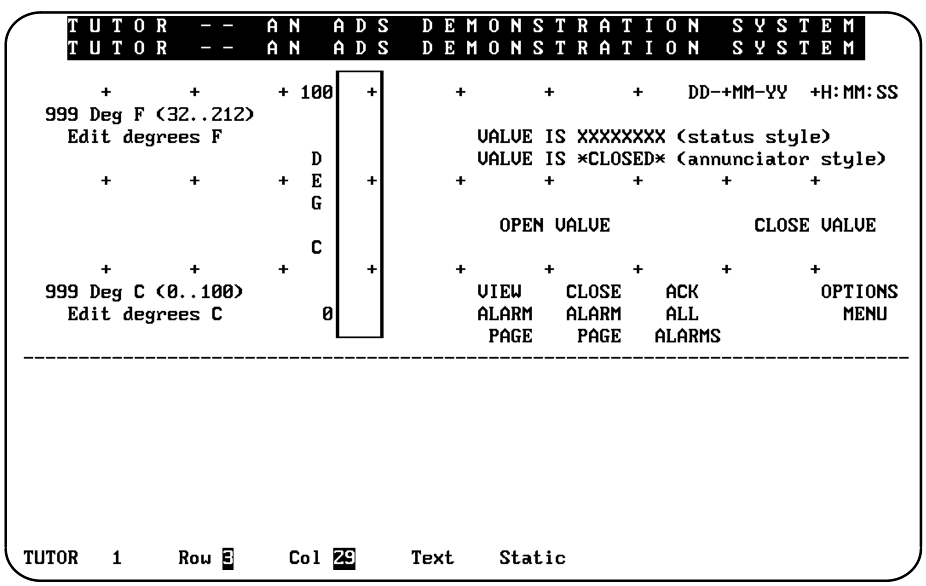
STEP 6

Drawing Rectangles

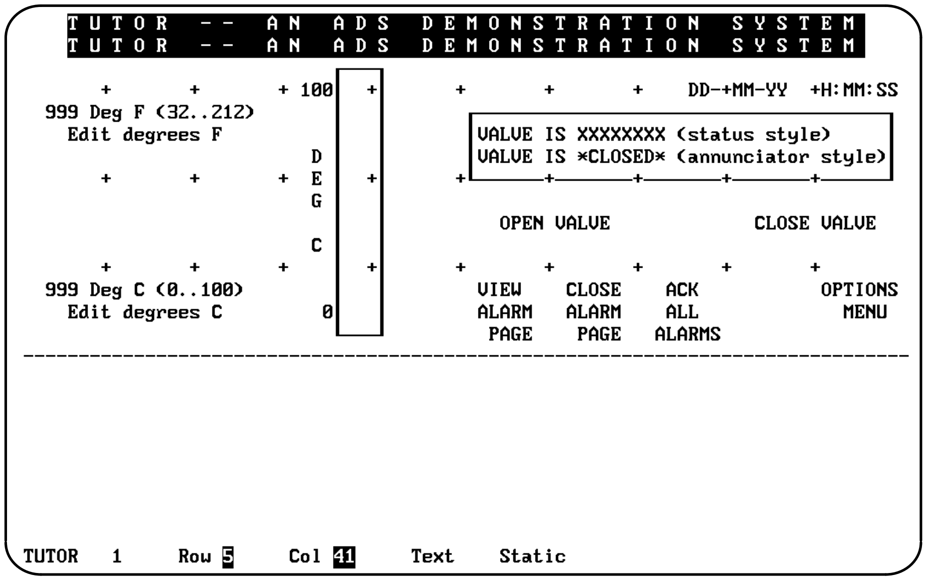
The next step is to draw a thermometer onto the screen which will be "filled" when the system is executed. Position the cursor at the <3, 29> <row, column> position. Press the [F3] key to begin to select a region. Use the cursor keys to move over to column 33 in row 3, and then directly down in column 33 to row 15. Note that the entire region is displayed in reverse video.



Now press the [F5] key which causes a rectangle to be drawn along the *inside* of the selected region's outer edges.



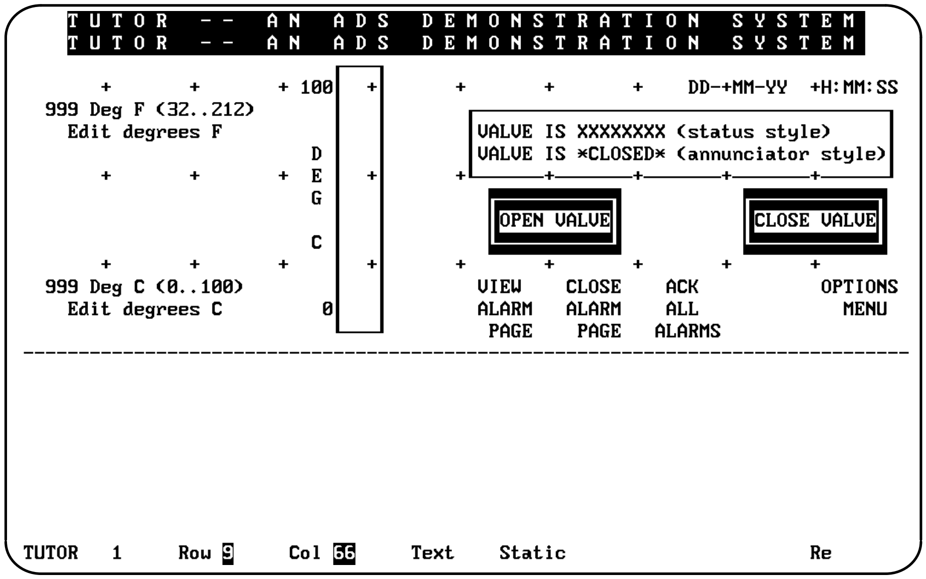
Use the same technique to draw a box around some text on the screen. Position the cursor at <row, column> position <5, 14>, and press the [F3] key to begin the selection of the region; move the cursor first to position <5, 79> and then to position <8, 79>. Press the [F5] key to draw the desired rectangle.



A video attribute, or attributes, may be applied during the process of drawing a rectangle. When we have completed our system, we will want to use the ”OPEN VALVE” and ”CLOSE VALVE” areas as touch points, so we want to make them appear to stand out as buttons. One effective way to do this is to place a reverse video rectangle around the text, giving it the illusion of a raised labeled button.

Using the techniques learned from previous steps, we first need to activate the reverse video attribute. Press the [F1] key for the video attributes menu and select ”Reverse”. You should see the ”Re” designation in the status area of the screen. Now position the cursor at <row, column> position <9, 43>, and press the [F3] key to begin selection of the region, then move the cursor first to position <9, 54> and then down to position <11, 54>. Press the [F5] key to draw the desired reverse video rectangle. Next move the cursor to position <9, 66>, and press the [F3] key to begin selection of the region, move the cursor to position <9, 78> and then down to position <11, 78>. Again press the [F5] key to draw the rectangle.

The screen will then appear as shown below.



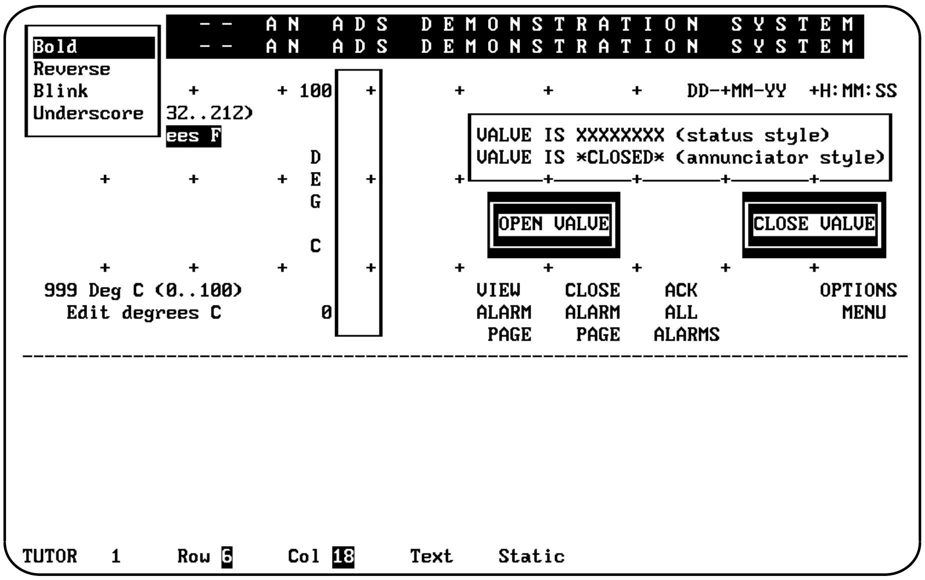
Note that the buttons have been placed so that they fall totally within adjacent touch areas. *This was not done by accident!* Whenever placing text on a screen for a touch terminal, you must be aware of where your touch regions will be placed.

Since we have completed drawing our reverse video rectangles, we need to reset the video attributes back to normal. Press the [Alt-F1] key to accomplish this.

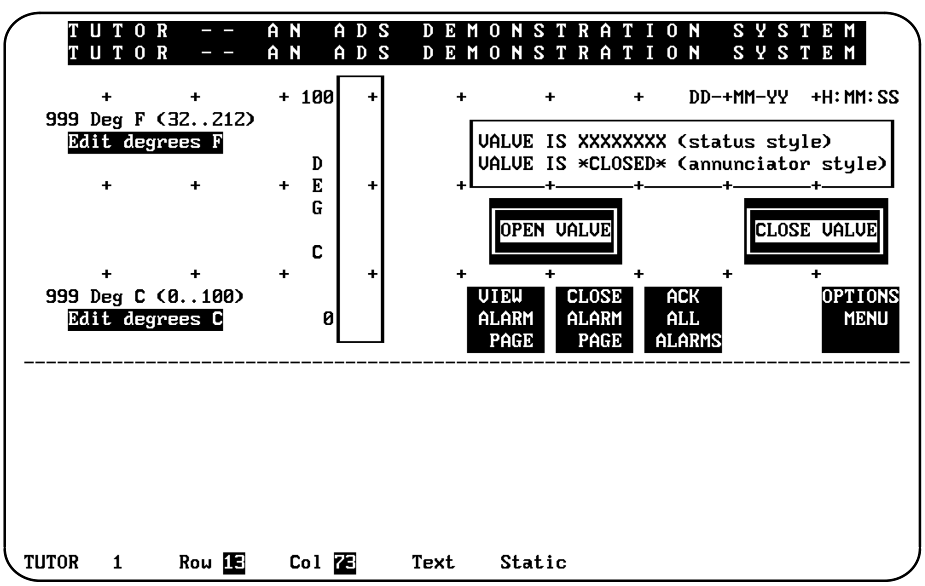
STEP 7

Applying Video Attributes to a Region

You can use a similar technique to apply a video attribute to a region of text. Position the cursor at <row, column> position <6, 5>, press the [F3] key to begin the selection of the region and move the cursor to postition <6, 18>. Press the [F1] key to bring up the video attribute menu.



Select the ”Reverse” option; the reverse video attribute will be applied to the entire selected region. Use the same techniques as in the previous step to reverse video the text ”Edit degrees C”, ”VIEW ALARM PAGE”, ”CLOSE ALARM PAGE”,”ACK ALL ALARMS” and ”OPTIONS MENU”. Again note that all these areas are to be touch areas, and are thus laid out appropriately with regards to the touch point grid.

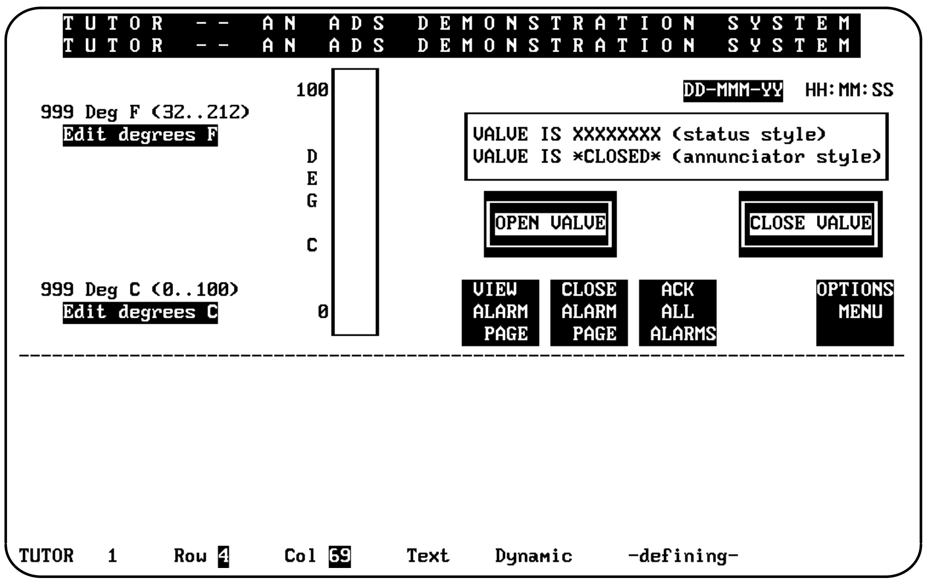


STEP 8

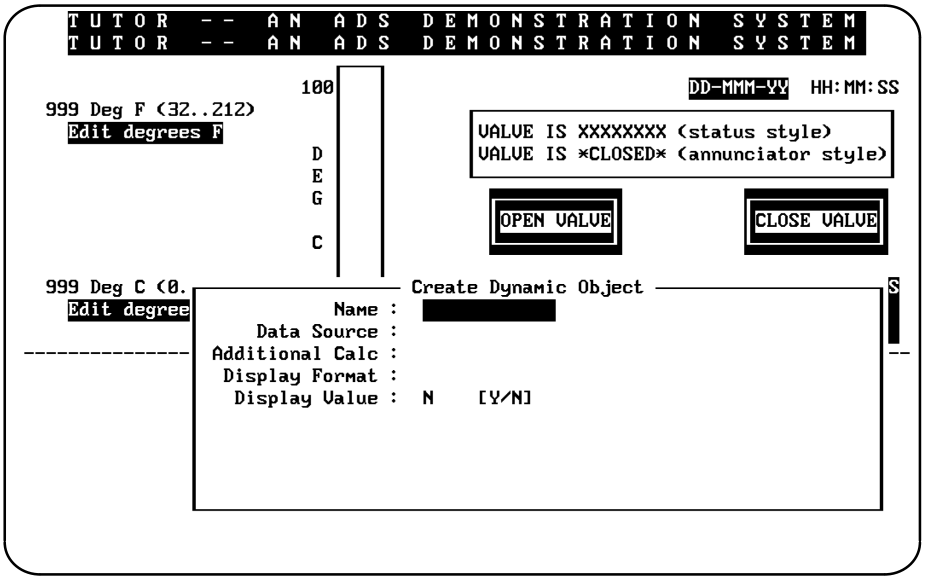
Creating Dynamic Objects; PLC Date and Time

Now its time to begin animating objects on the screen. Since we've already set up our touch point areas we won't be needing the touch point grid for awhile; press the [Delete] key to toggle it off of the display.

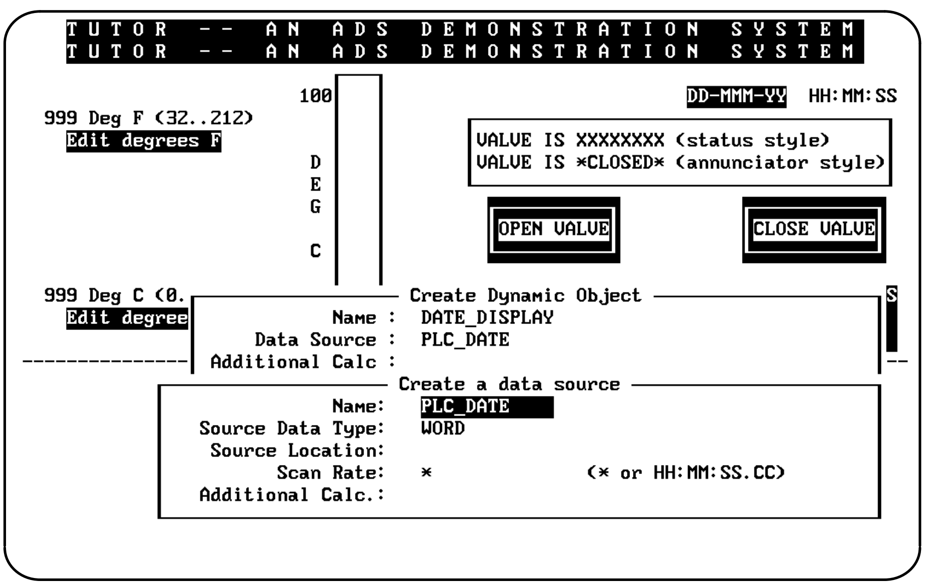
First we'll animate the display of the PLCs date and time. The date and time fields are specified by the data format strings "DD-MMM-YY" and "HH:MM:SS", respectively. First, position the cursor at <row, column> position <4, 61>. Press the [Alt–F7] key to begin defining a "dynamic object" (one which will display data or status when the system is executed). The status area will confirm that you are defining a dynamic object. Move the cursor to <4, 69>; the date field will now be entirely in reverse video.



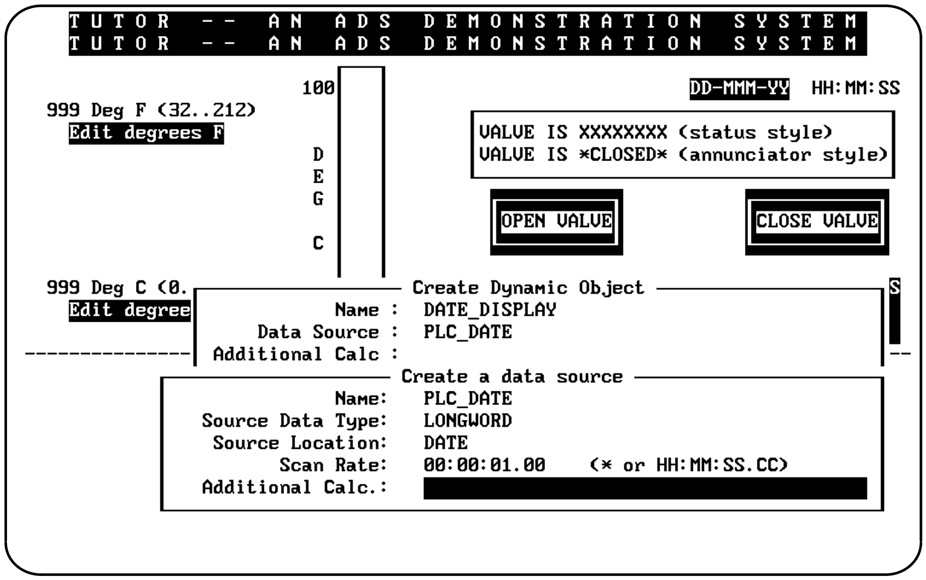
Press the [F7] key to complete the selection of the region which is to become a dynamic object. A dynamic object data entry form is automatically opened so that you can tell the ADS software some things about the object.



There are several commands in the ADS software which reference a dynamic object by screen number and the name of the object. Thus, dynamic object names only need be unique from other objects on the same screen. Type in the name *DATE_DISPLAY* and press the [Enter] key. The "Data Source" field is selected next. A data source is what links a dynamic object to a location, or locations, in the PLC. Its name must be unique from all other data sources in a system, but may be referenced by multiple dynamic objects. Type in *PLC_DATE* and press the [Enter] key. Since data source PLC_DATE has not yet been defined, a data entry form for it is automatically opened up on the screen.

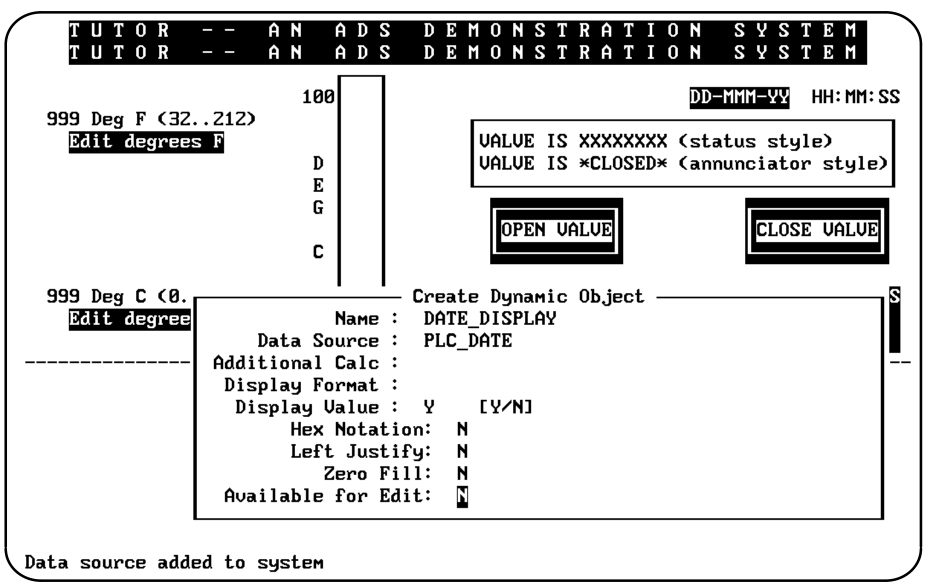


A reserved source location named ”DATE” is referenced in order to retrieve the PLC date. It requires a data type of ”LONGWORD”. Regardless of the setting for the system scan rate, you will probably want to check on the PLC date once a second. The data source data entry form is filled out as follows:



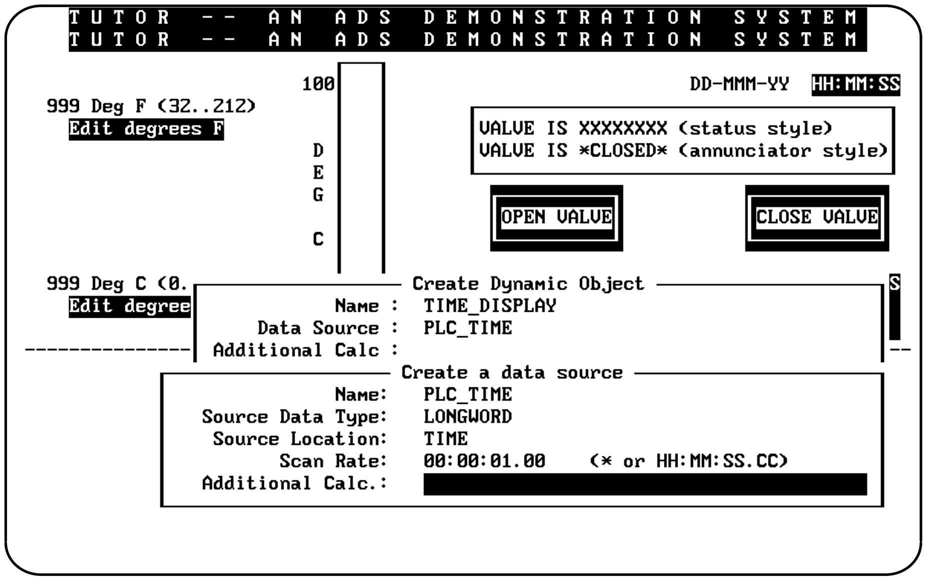
Pressing the [Enter] key completes the entry and closes the data source data entry form, returning you to the dynamic object data entry form.

The dynamic object data entry form is completed as follows:



Press the [Enter] key to complete the entry and close the dynamic object data entry form.

The "HH:MM:SS" is converted to a dynamic object which will display the PLCs time in the same manner as you just did for the date. Position the cursor on one end of the field designator, press the [Alt-F7] key to begin defining a dynamic object, then move to the opposite end of the field and press the [F7] key to complete the selection. The object is given the name *TIME_DISPLAY* and is tied to a data source to be named *PLC_TIME*. Data source PLC_TIME is defined similarly to data source PLC_DATE.

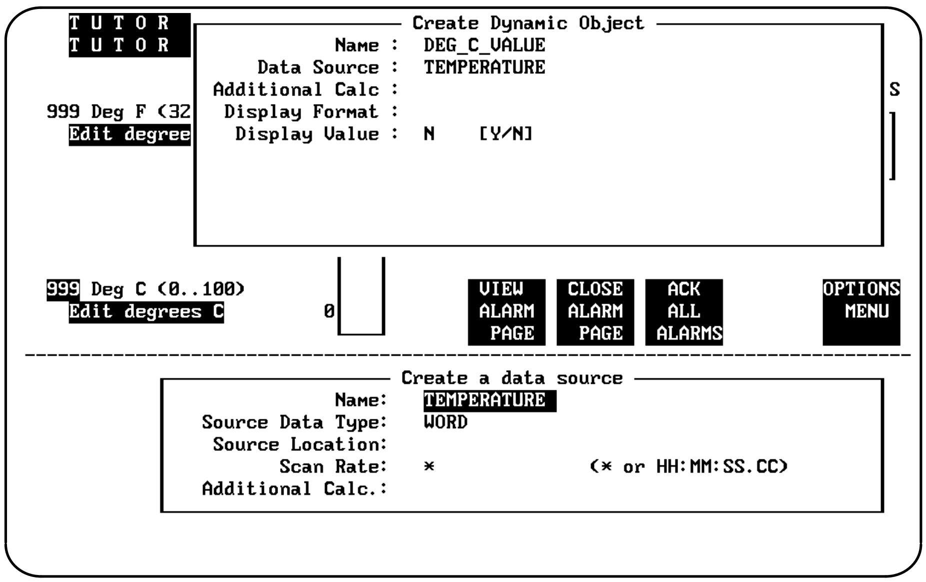


The remainder of the dynamic object data entry form is filled out the same as for the DATE_DISPLAY dynamic object, with only the "Display Value" field needing to be changed to indicate "Y".

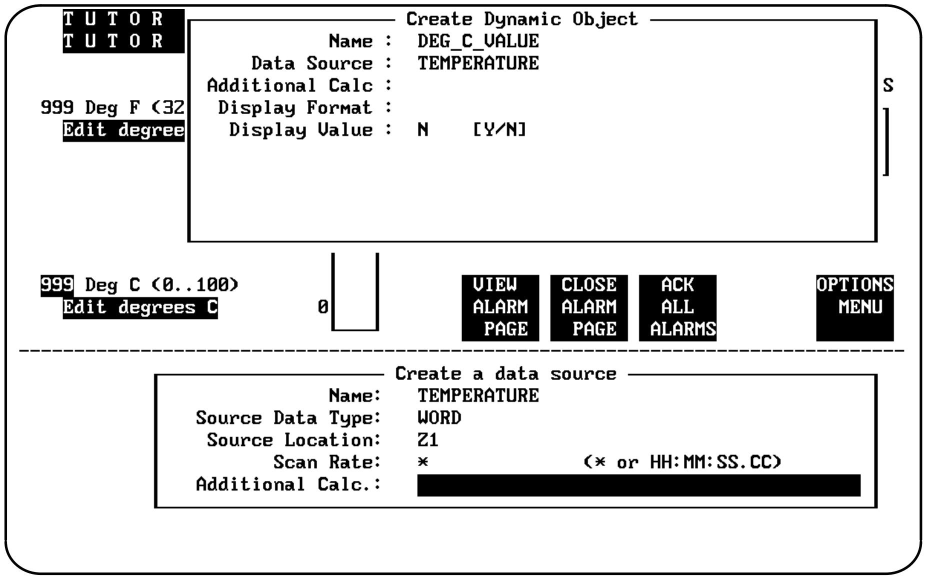
STEP 9

Creating Dynamic Objects Which Can Be Edited

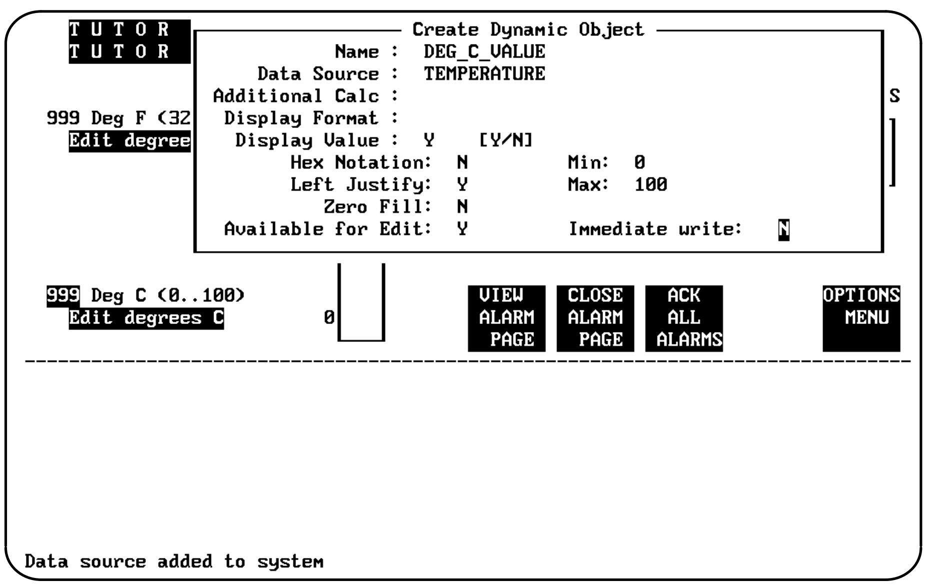
The next step is to define a dynamic object for displaying temperature in degrees Celsius. Position the cursor on the ”9” located at <row, column> position <13, 3>; the sequence of three ”9’s” defines a numeric field three digits in width. Press the [Alt-F7] key to begin defining a dynamic object and move to the rightmost ”9”. Press the [F7] key to complete the selection of the dynamic object. Give the object the name *DEG_C_VALUE* and have it reference the data source *TEMPERATURE.*



In our example, the temperature will be stored in degrees Celsius; it will be treated as an unsigned word which ranges between 0 and 100. Source location ”Z1” will be referenced. The Z memory is not true PLC memory as it is located on the ADC module. This makes the Z memory ideal for producing a tutorial as you will not need to be concerned with inadvertently changing data in your PLC. In a typical application you would reference such a value from a true PLC memory location, for example, R100 or AI6.



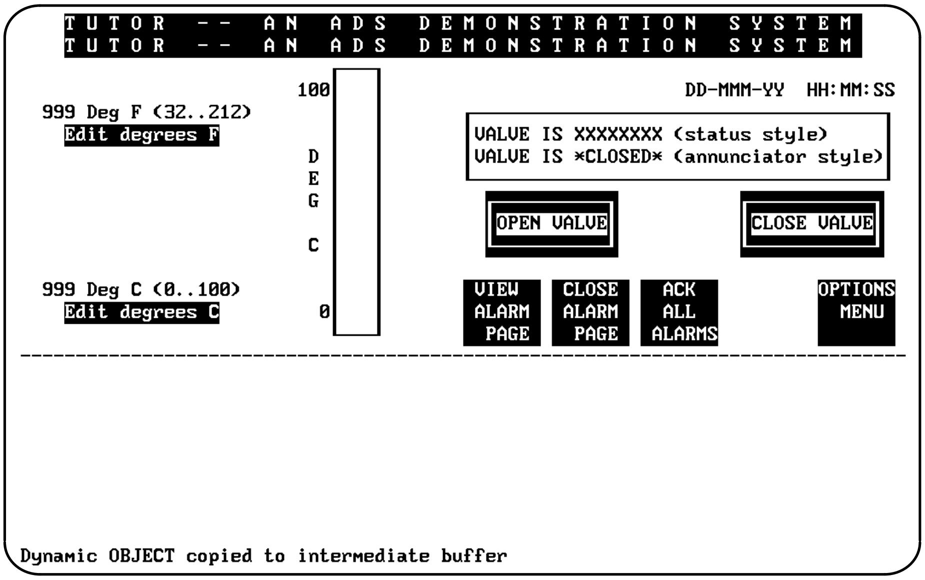
The dynamic object data entry form is completed to display a left–justified value, making it available to be edited within an allowable range of 0 to 100.



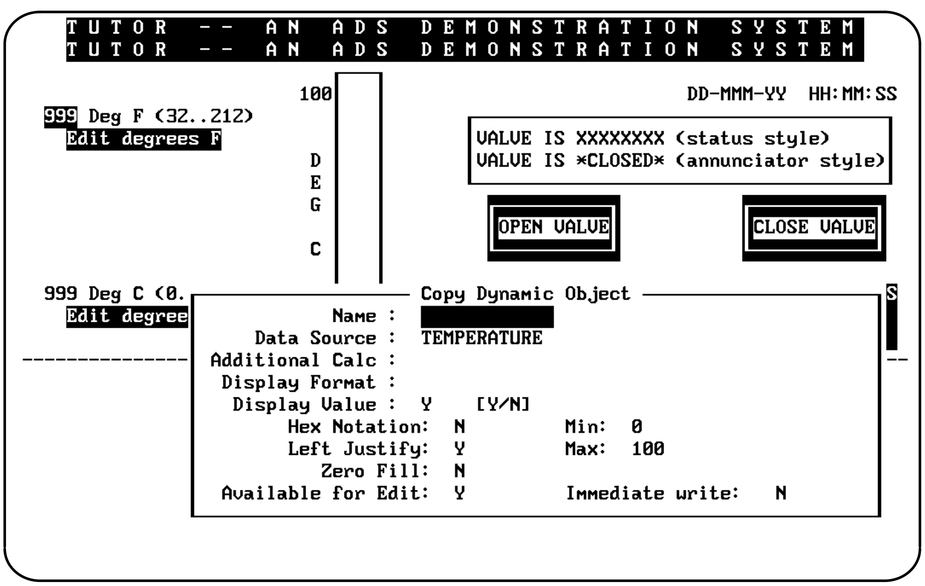
STEP 10

Copying a Dynamic Object

After completing the dynamic object which will display the temperature in degrees Celsius, we next want to define a very similar dynamic object which will display the temperature in degrees Fahrenheit. First we will make a copy of the just-defined dynamic object DEG_C_VALUE by pressing the [F9] key while the cursor is positioned somewhere on the dynamic object.



Now, move the cursor up to the ”9” located at <row, column> position <5, 3> and press the [Alt-F9] key. A copy of dynamic object DEG_C_VALUE is placed on the screen with its data entry form automatically opened up. All data on the form is identical to that for DEG_C_VALUE except that the name field is blank (remember that dynamic object names must be unique on a given screen).



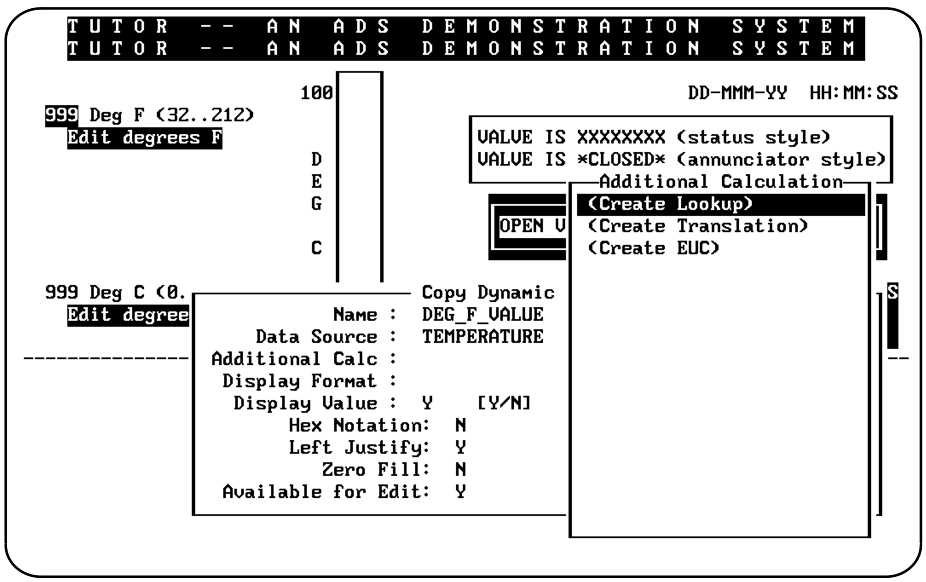
STEP 11

Using a Linear Translation

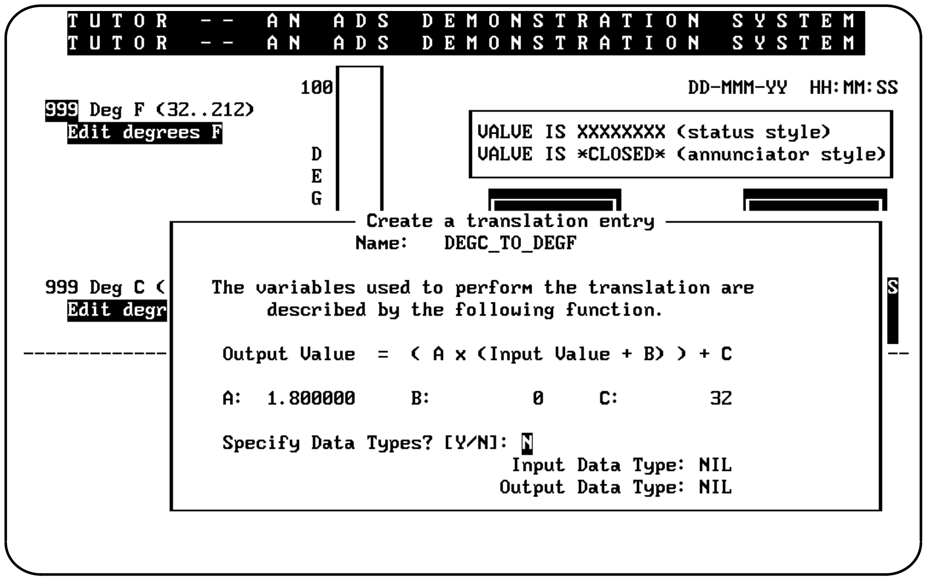
The dynamic object is given the name *DEG_F_VALUE*. The data source TEMPERATURE is already the correct one, so it is left as specified. However, TEMPERATURE yields a Celsius value, not the desired Fahrenheit value. Given a Celsius value, it may be converted to Fahrenheit by the equation

$$°F = (1.8 \times °C) + 32.$$

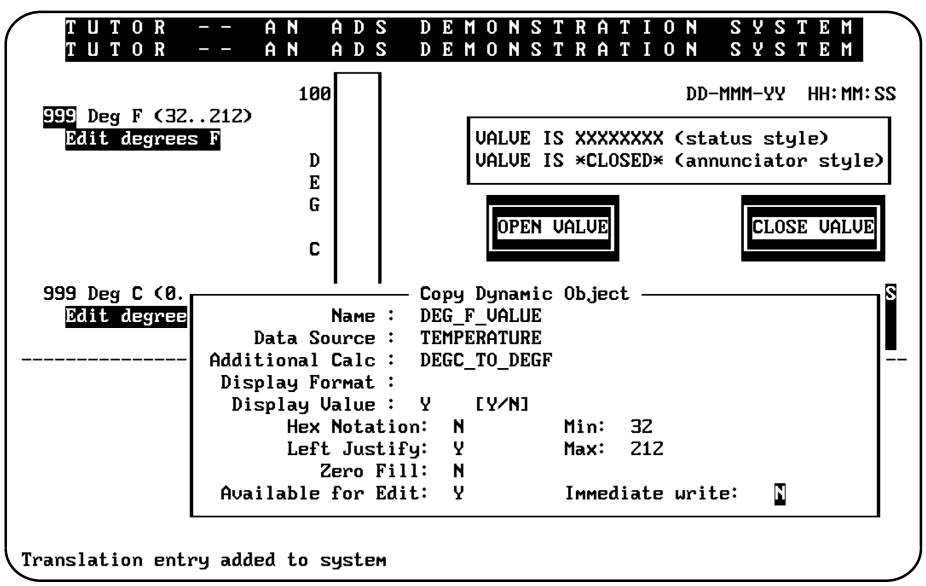
Thus we need to apply an "Additional Calculation" to the value supplied by data source TEMPERATURE. With the "Additional Calculation" field selected, press the [Alt-S] key to open up a window of available additional calculations.



Since no additional calculations exist at all, much less one we could use, we'll need to create one. In this case, we want to create a new translation entry. Selecting the "Create Translation" entry opens up a data entry form for a new translation entry. The entry will be given the name DEGC_TO_DEGF, the "A" term will be 1.8, the "B" term 0 and the "C" term 32. "Specify Data Types?" will be left as "N".



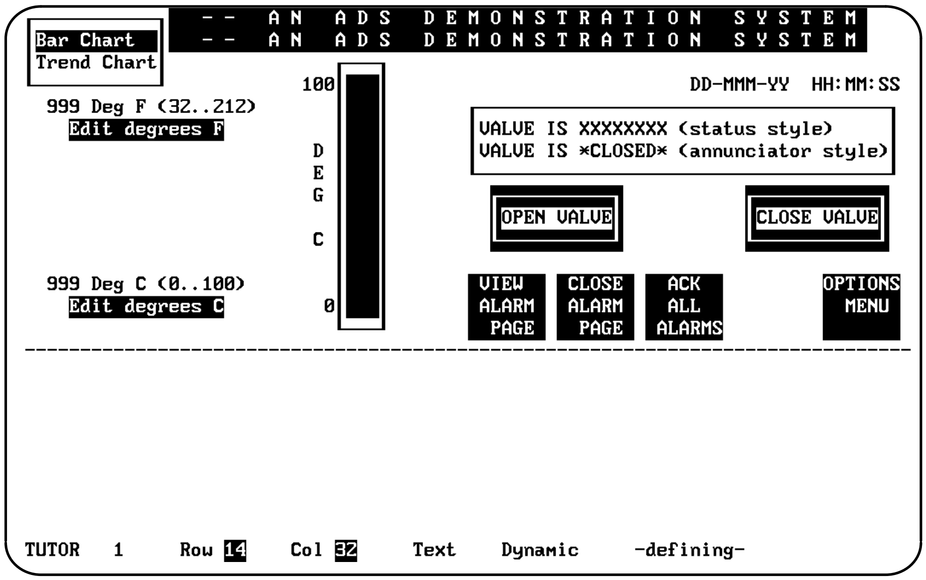
Completing the translation entry data entry form returns you to the dynamic object data entry form, with the newly created translation entry referenced as the additional calculation. The rest of the form is correct, except that the minimum and maximum value bounds need to be changed to Fahrenheit values 32 and 212.



STEP 12

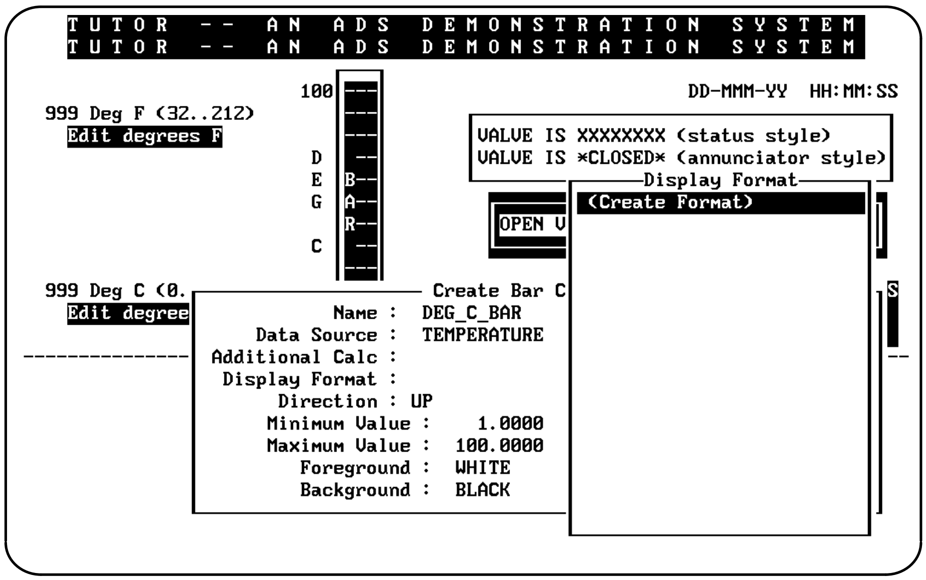
Creating a Bar Chart

Next we want to create a bar chart that will represent mercury rising in the thermometer. Position the cursor at <row, column> position <4, 30>, press the [Alt-F7] key to begin defining a dynamic object, move the cursor first to <4, 32> and then to <14, 32>. This time you press the [Alt-F2] key to complete the dynamic object; a menu selection form is opened asking you what type of predefined object you want to create.



In this case we want a bar chart, so we select the "Bar Chart" menu entry. A data entry form for the bar chart is opened up on the screen. This form is similar to that of a normal dynamic object. The bar chart is given the name *DEG_C_BAR* and is attached to existing data source TEMPERATURE; since TEMPERATURE already supplies a Celsius value, no additional calculation is required.

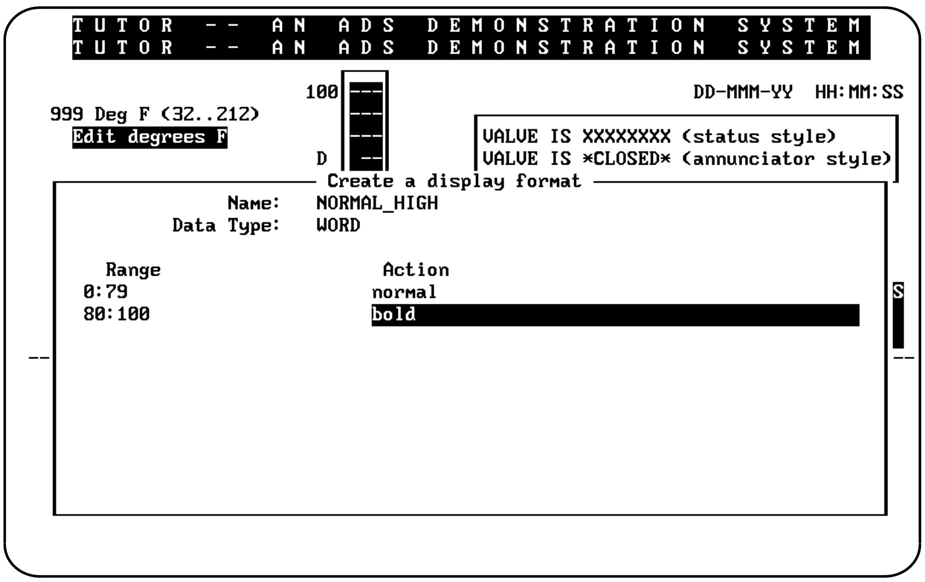
We would like to make our thermometer a little more "high tech", however. Whenever the temperature is in the range of 80 to 100 degrees Celsius, we want the bar chart to be displayed differently. This is accomplished through the use of a display format. With the cursor on the "Display Format" field, press the [Alt-S] key to open up a window of available display formats.



STEP 13

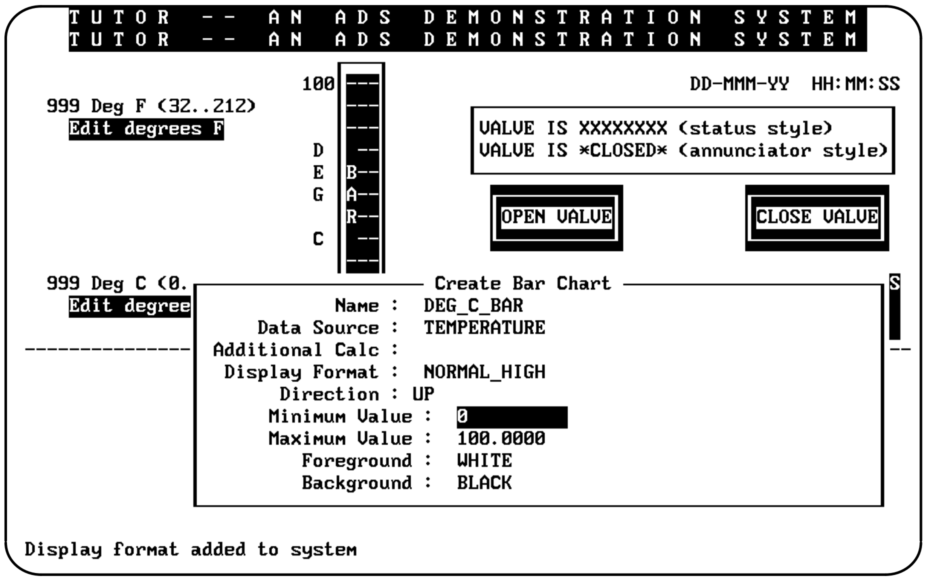
Using a Display Format

Again, no display format is available so you'll need to create one. Select the "Create Format" menu entry; this will open up a display format data entry form on the screen. Type in *NORMAL_HIGH* as the display format name. Since the value the display format will operate on is a WORD value, select WORD as the input data type. For a monochrome target terminal you will probably want to display the temperature with NORMAL video attributes for 0 to 79 and with the BOLD video attribute for 80 to 100. In the case of a color terminal, you may want to select a color such as YELLOW for 0 to 79 and RED for 80 to 100.



Completing the display format data entry form returns you to the bar chart data entry form. Note that rather than pressing the [Enter] key several times to complete the form, you can just press the [Alt-F10] key which will immediately complete and save the form.

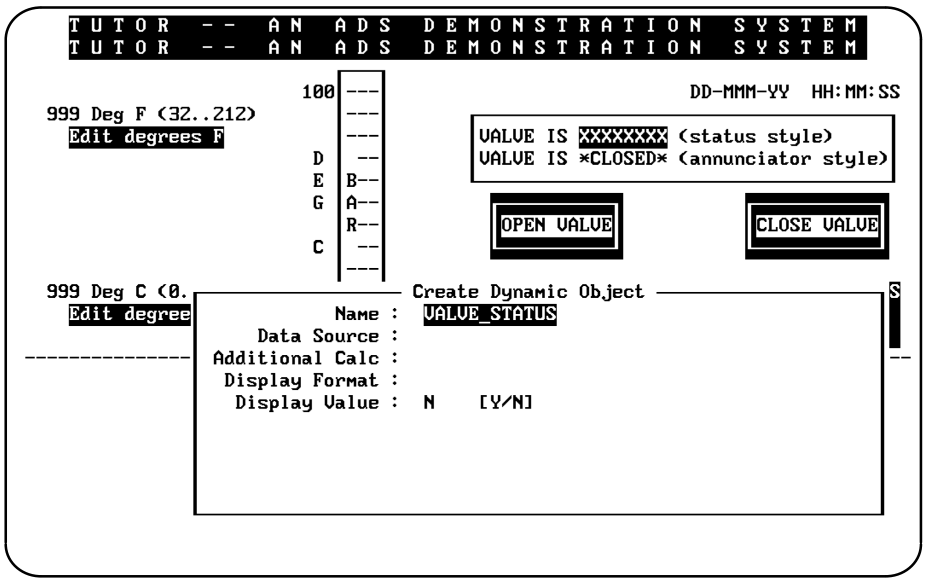
The remainder of the bar chart data entry form is correct, except that the minimum value needs to be changed to 0. On color terminals the foreground and background color specifications give you the ability to affect the foreground and background colors of the bar chart differently than those of the screen it appears on.



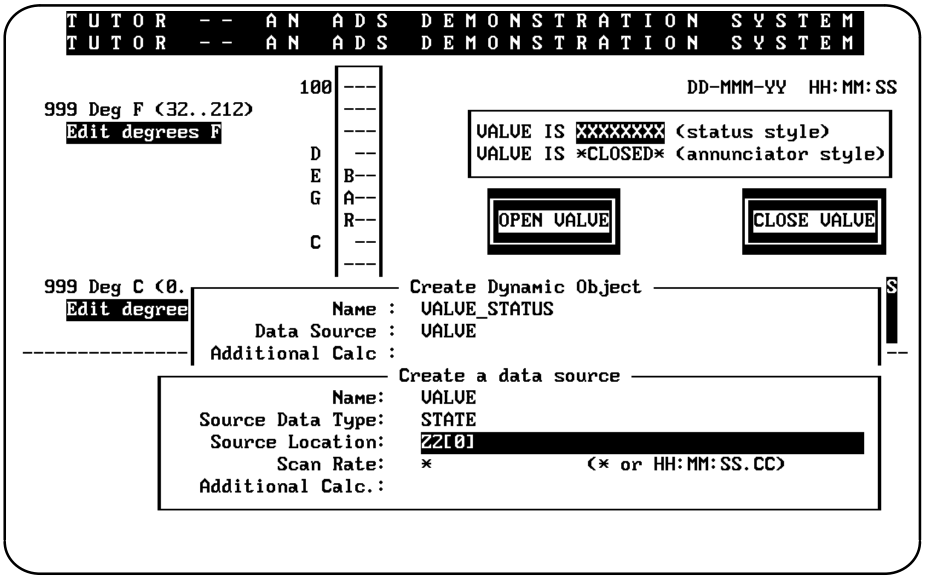
STEP 14

Using a Lookup Table

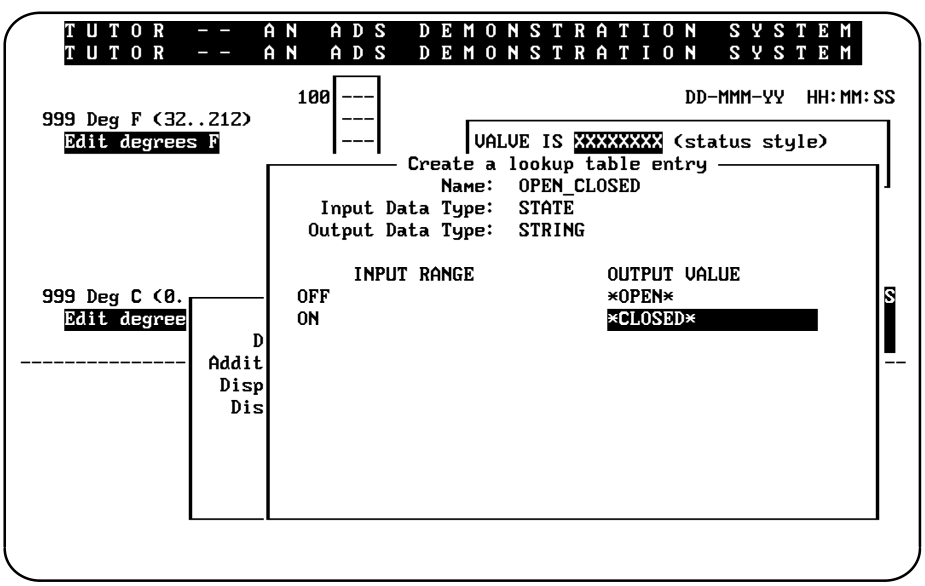
Having completed what we want to do in order to monitor temperature, we next need to set up monitoring of the valve, which may be in either of two states: open (0) or closed (1). For one status indicator, we want to see either **OPEN** or **CLOSED** displayed on the screen. Position the cursor on the "X" at <row, column> position <6, 51> and press the [Alt-F7] key to begin defining a dynamic object. Move the cursor right to position it on the rightmost "X" (column 58) and then press the [F7] key to complete the selection of the dynamic object. Give the dynamic object a name of *VALVE_STATUS*.



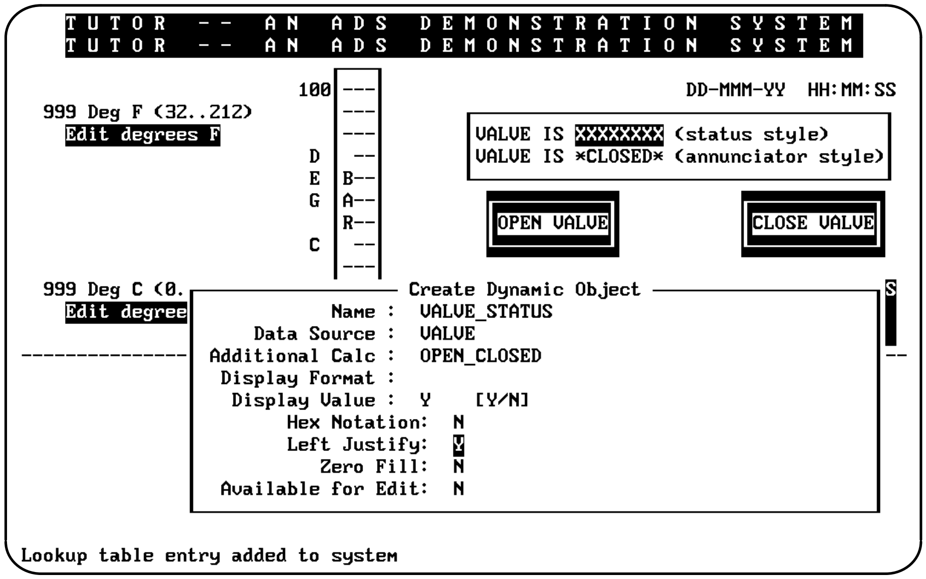
Now enter a data source name of *VALVE* and press the [Enter] key. Since the data source does not currently exist, a data entry form is opened up for its definition. It should be filled in as shown below. Note the source location is specified as *Z2[0]*. This specifies that a single bit of data should be extracted from bit b0 (the lowest order bit) in the word stored at Z2.



After completing the definition of data source VALVE, you will be returned to the dynamic object's data entry form. Note that a STATE data source always returns either the text string "OFF" for a 0 state or "ON" for a 1 state. However, we want to see either *OPEN* or *CLOSED* instead. This will require us to use a lookup table entry to make the conversion. Select the Additional Calculation field, press the [Alt-S] key for the Object List window and then select "Create Lookup". A data entry form for a lookup table entry is opened on the screen. Fill it out as shown below.



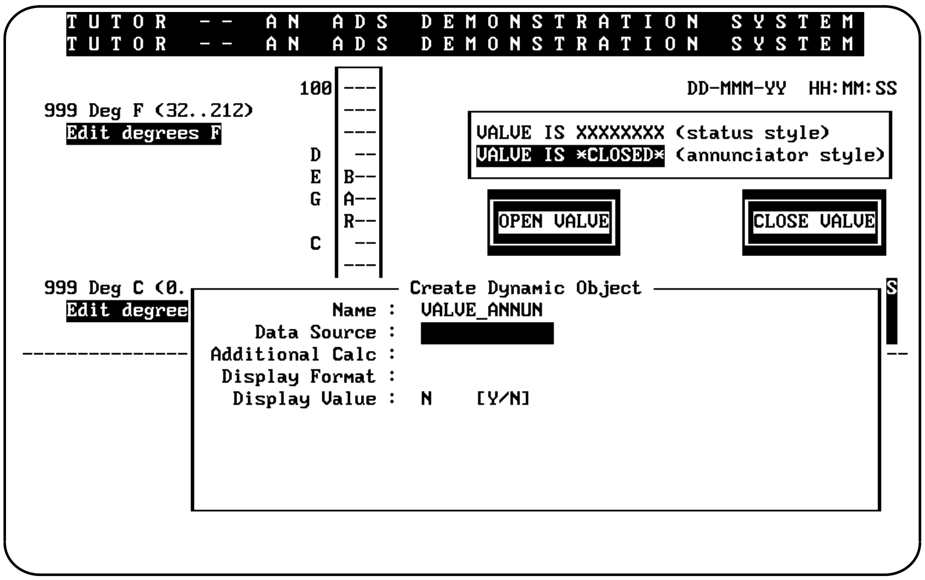
Upon completing the data entry form for the lookup table entry, you will be returned to the dynamic object's data entry form. It can now be completed as shown below.



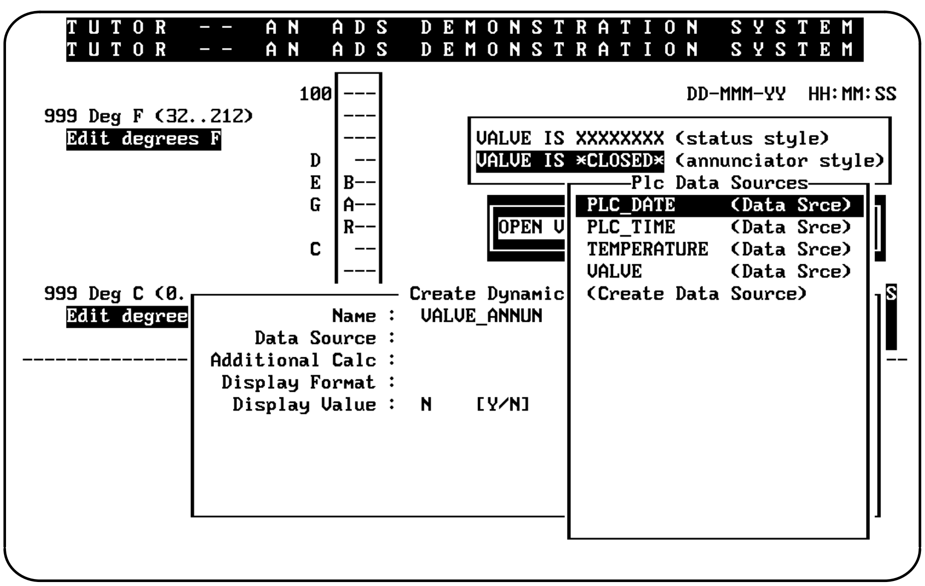
STEP 15

Dynamic Control of Video Attributes Assigned Static Text

We also want to view the valve's status in a second way. Whenever the valve is open we want to see the text *VALVE IS *CLOSED** displayed in normal video; when closed we want to see it displayed in reverse video. Position the cursor at <row, column> position <7, 42>, the leftmost character ("V") in the text string. Press the [Alt-F7] key to begin defining the dynamic object, move the cursor right until it is in column 58 of row 7 (rightmost character "*") and then press the [F7] key to complete the selection of the dynamic object. Give the dynamic object a name of *VALVE_ANNUN*.

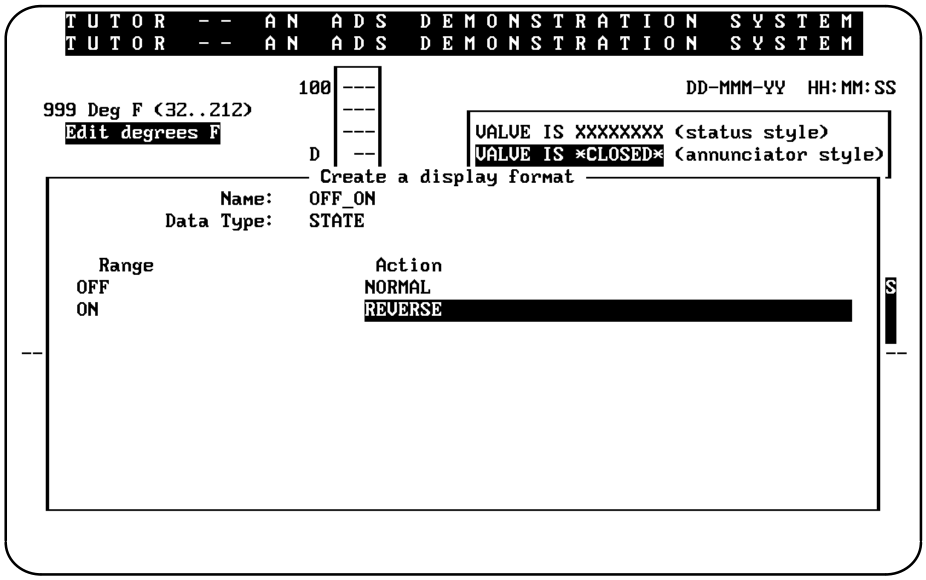


Although in this case we probably remember that the data source we need already exists and is named VALVE, let's assume that we can't remember. Press the [Alt-S] key to open up the object list, noting that VALVE is the fourth data source in the list.

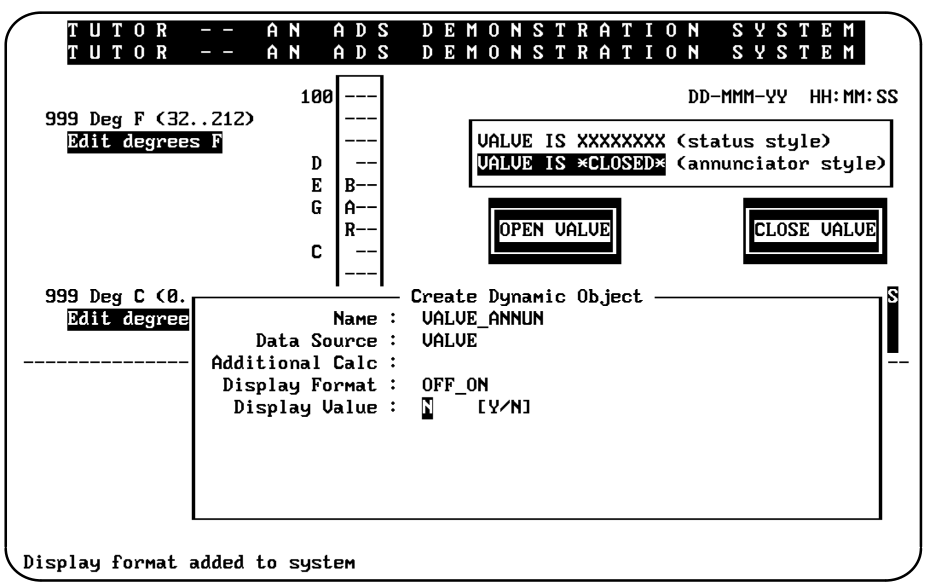


You can press the [↓] key to highlight it and then the [Enter] key to ”pick” it from the list.

Since we want to control the video attributes of the text string, we need to create a display format to do it. Select the Display Format field and then press the [Alt-S] key for the object list. Choose to create a new display format, filling out the resulting data entry form as shown below.



Pressing the [Alt-F10] key completes the definition of display format OFF_ON and returns you to the dynamic object’s data entry form. This time we will leave the Display Value field in the form set to ”N” as we are not actually displaying a value; instead, we are only affecting video attributes. This situation where a display format is controlling the video attributes assigned to a static string of text on the screen is the only situation where the Display Value field is set to ”N”; otherwise, it should always be set to ”Y”.



Pressing the [Enter] key completes the dynamic object data entry form.

STEP 16

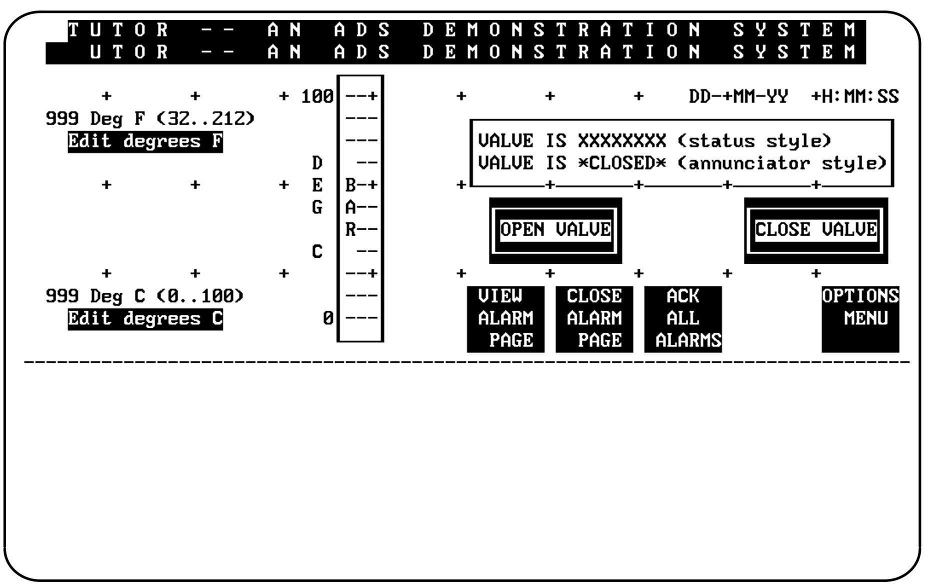
Defining the Touch Points

Now that we have completed animating the main screen, we now need to activate the touch point areas previously laid out on the screen. Basically we will be simulating part of a real keyboard in activating the touch points; thus these touch areas will send a ”key code” very similar to the one sent by a real keyboard when a key is depressed. Appendix B in this manual presents all the character codes you will need to use in activating your touch points.

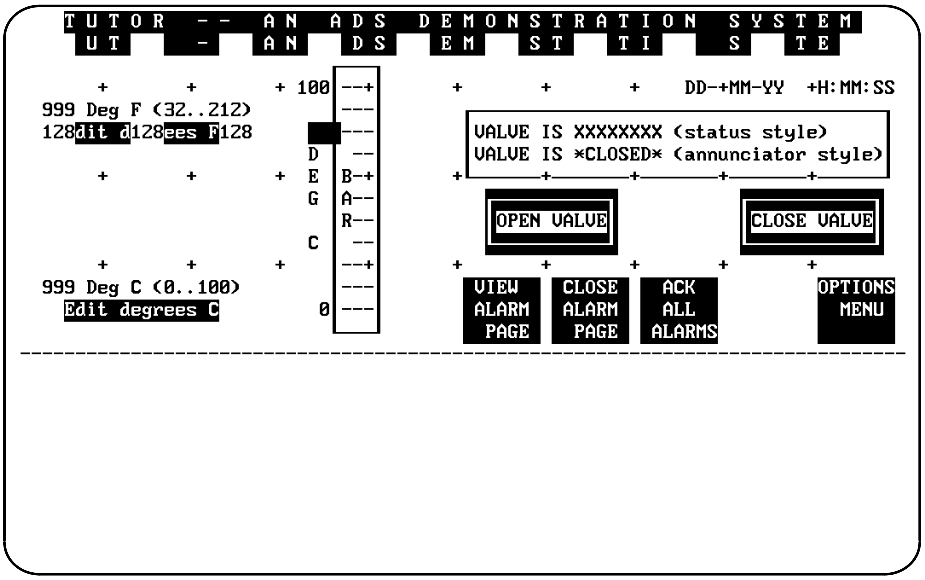
The key sequence [Insert][Delete] will display the touch point grid, if it is not already displayed, and begin prompting you for the key code to be assigned to each touch point supported by the target terminal. An edit field is initially opened up in the top left touch point area. This field will be overlaid on top of the screen, making it look like some of your screen characters have been deleted. Don’t worry though, as the characters are still there underneath the field. In fact, you will notice that as you successively enter values for touch point areas, causing more edit fields to be opened, that more and more of your screen will be overlaid in this manner.

If you don’t want a particular touch area to return a key code value just leave it blank. You can move to the next touch point area by pressing the [Enter] key; the [↑] cursor key will take you back to the previous touch point area. If you want to erase the value in the current touch point area, press the [Ctrl-X] key.

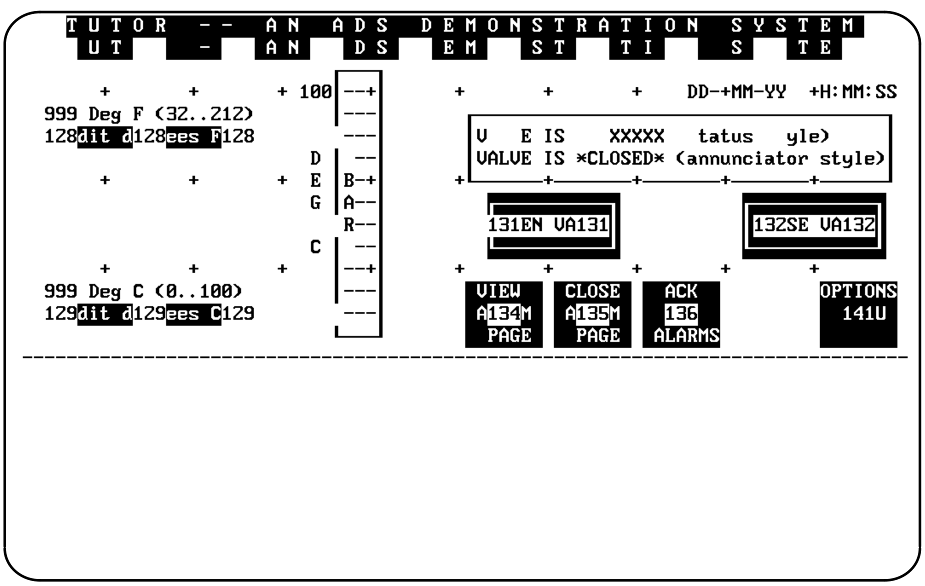
You cannot make a touch point area smaller than the minimum size supported for your target terminal (the size supported by the touch point grid) but you can in effect create larger touch point areas. This can be done by assigning the same key code value to adjacent touch point areas.



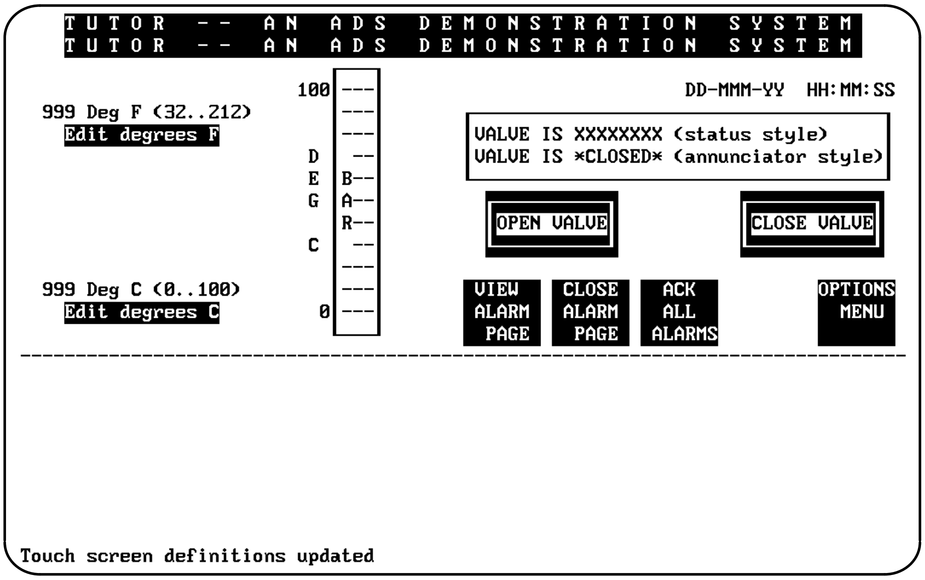
The first touch point area you want to activate is the three consecutive touch point areas in which the text ”Edit degrees F” appears. Press the [Enter] key until you reach the leftmost touch area in the second row of touch points. To cause an action to occur you will need the touch point area to return the key code of a function key. In looking at appendix B we see that function keys F1 through F15 are designated by the decimal key codes 128 through 142. We choose to use function key F1 in this case, so we enter the (same) key code value ”128” into the three consecutive touch point areas.



In a similar manner we choose to use function key F2 (129) for ”Edit degrees C”, F4 (131) for ”Open Valve”, F5 (132) for ”Close Valve”, F7 (134) for ”View Alarm Page”, F8 (135) for ”Close Alarm Page”, F9 (136) for ”Ack All Alarms” and F14 (141) for ”Options Menu”. Enter the appropriate decimal key code values into the related touch point areas as shown below.



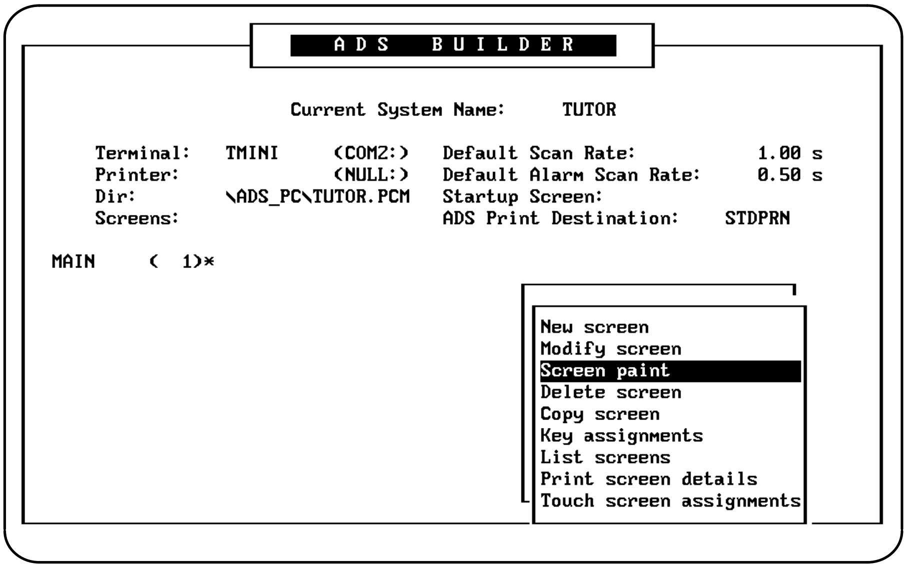
Pressing the [Enter] key when positioned on the last touch point area, or the [Alt-F10] key from any touch point area, completes the definition of the touch point areas for the current screen.



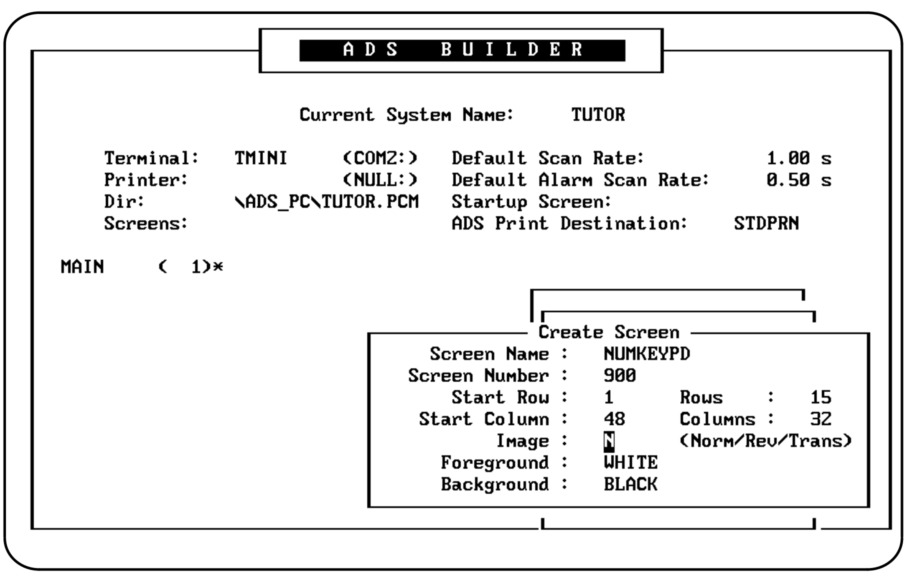
STEP 17

Creating a Numeric Keypad

In order to edit new temperature values on our main screen we need access to a numeric keypad. Since we (probably) won't have a keyboard attached to the target touch terminal, we'll need to create a screen to provide the numeric keypad functionality. First, press the [Alt-F10] key to save the main screen; you'll be returned to the screen operations menu.

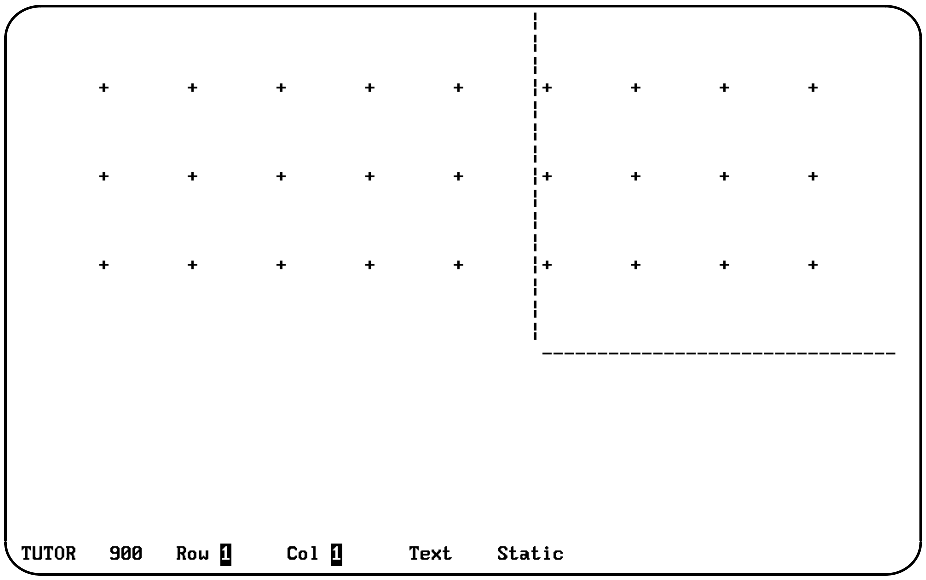


We now need to create a new screen to serve as the numeric keypad. This screen will need to provide access to at least 15 unique functions (*0– 9, decimal point, minus, clear, cancel* and *enter*) so a minimum of 15 touch points will be required. Since many people are familiar with a computer keyboard's numeric keypad we will design our screen with that "look and feel". Also, since the values we need to edit are on the left-hand side of the main screen we'll want our numeric keypad to appear on the right-hand side of the screen. The "Create Screen" dialog box should be filled out as shown below (any unused screen number could have been specified).

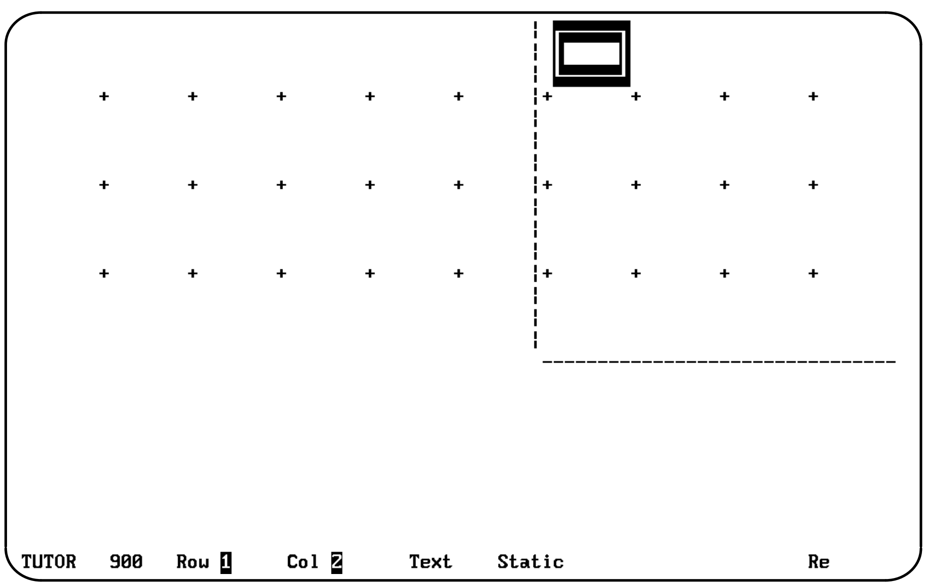


Upon completing the "Create Screen" dialog box you will enter the screen painter for the numeric keypad screen (number 900). The dashed vertical and horizontal lines about the upper right corner of the display indicates where the new screen would be displayed on the target terminal screen.

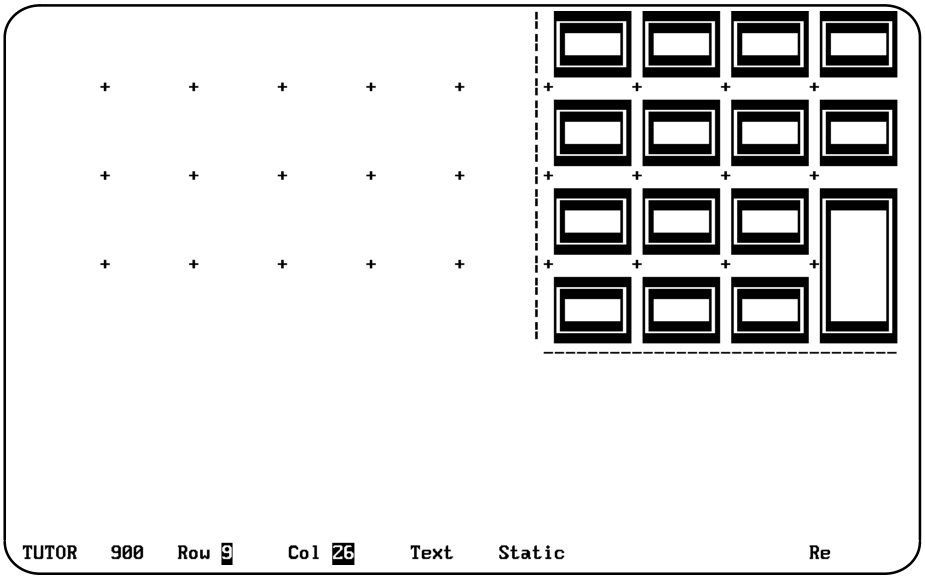
Press the [Delete] key to toggle on the touch point grid.



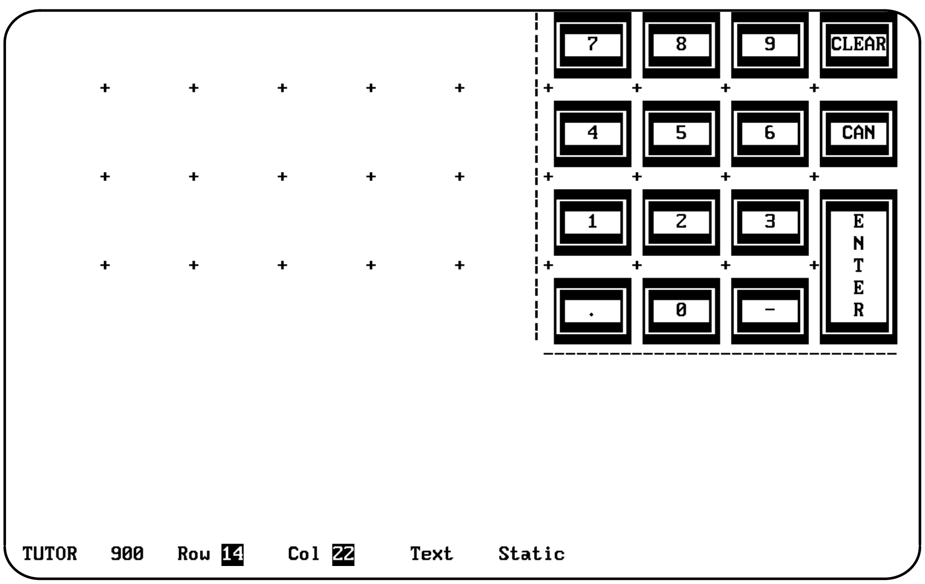
We now need to draw the "buttons" we need for our numeric keypad. First press the [F1] key to pull down the video attributes menu and select "Reverse"; "Re" should be displayed in the status line. Use the [F3] (select) key and the cursor keys to select the region between <row, column> position <1, 2> and <3, 8>, and then press the [F5] key to draw a reverse video line. Note that the button resides within a touch point area.



Use the same technique to create the remainder of the buttons we will need for the numeric keypad.

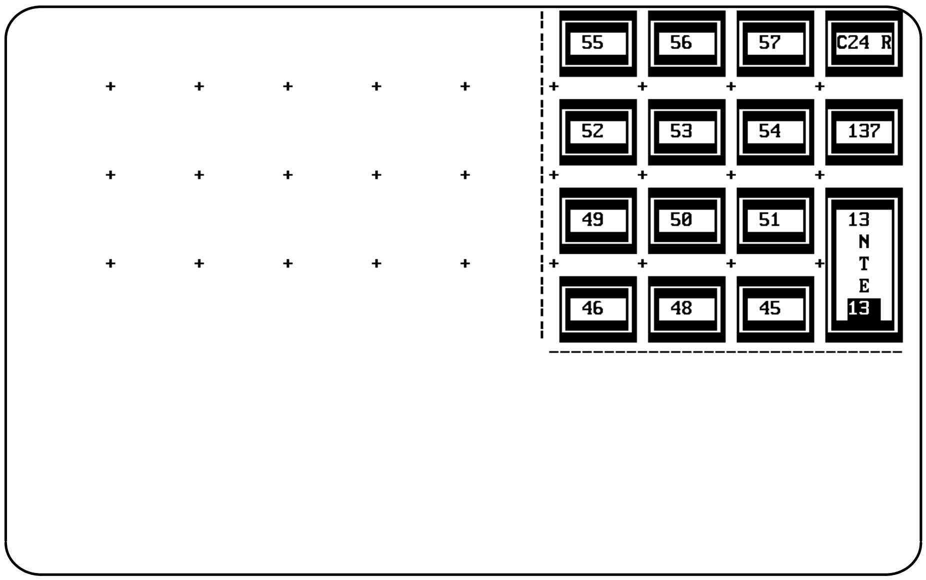


Press the [Alt-F1] key to turn off the reverse video attribute, returning to normal video. Then type in the indicated text as the button ”labels”.



Press the key sequence [Insert] [Delete] to begin defining the touch point key codes (refer to Appendix B). Note that the entire touch point matrix may be defined, not just those touch points which will be covered by the numeric keypad. This is done so that defined touch point areas on other screens will be disabled while the current screen is displayed.

Type in the decimal key code values as shown below. Numeric keys 0 through 9 are specified by key codes 48 through 57. [Ctrl-X] functions to clear a field; it is associated with keycode 24. When editing, the [F10] key is temporarily redefined to indicate that field input should be canceled; it is associated with keycode 137. Likewise, the decimal point is associated with keycode 46, the minus sign with 45 and the [Enter] key with 13.



After completing the touch point definitions, press the [Alt-F10] key to save the screen, you will then be returned to the screen operations menu.

STEP 18

Defining the Function Keys

Although we haven’t implemented anything for alarms or options yet, we have created all the functionality we need for our thermometer and valve monitoring. It might be a good idea to pause a moment to execute the system as it now exists before creating the rest. One task remains before executing the system: we must set up function key definitions for F1 and F2 for the thermometer and F4 and F5 for the valve.

Select the *Key Assignments* menu option; you will be prompted for which screen you want to define the keys.

```
                        A D S   B U I L D E R

                    Current System Name:     TUTOR

    Terminal:   TMINI     (COM2:)  Default Scan Rate:          1.00 s
    Printer:              (NULL:)  Default Alarm Scan Rate:    0.50 s
    Dir:        \ADS_PC\TUTOR.PCM  Startup Screen:
    Screens:                       ADS Print Destination:    STDPRN

MAIN     (  1)*
NUMKEYPD (900)*
                                             New screen
                                             Modify screen
                                             Screen paint
                                             Delete screen
                                             Copy screen
                                             Key assignments
                                             List screens
                                             Print screen details
                                             Touch screen assignments
Enter the number of the screen to modify:
```

Since we want to first define keys for screen 900 (NUMKEYPD), enter ”900” in the field and press the [Enter] key. A data entry form for screen 900’s key assignments will be opened on the screen.

```
                        A D S   B U I L D E R

                    Current System Name:     TUTOR

          Screen key assignments for NUMKEYPD (900)
    AK1  :
    AK2  :
    AK3  :
    AK4  :
    AK5  :
    AK6  :
    AK7  :
    AK8  :
    AK9  :
    AK10 :
    AK11 :
    AK12 :
    AK13 :
    AK14 :
    AK15 :
```

As you will see, ordinarily we will be able to display and remove the numeric keypad screen without any ”special” operator intervention. The one exception to this will be if the operator presses the ”Cancel” button to cancel data entry for the current field. In this case the numeric keypad will remain displayed and will require a second press of the cancel button to remove it from the display. The command used to remove a screen from the display is POPSCN, with the screen number to be removed placed in parentheses. Screen number ”0” refers to the screen at the ”top” of the display, which in this case will be screen 900 (900 could have been explicitly entered as the screen number instead of 0 for this case).

```
                     A D S   B U I L D E R

              Current System Name:     TUTOR

     Screen key assignments for NUMKEYPD (900)
   AK1  :
   AK2  :
   AK3  :
   AK4  :
   AK5  :
   AK6  :
   AK7  :
   AK8  :
   AK9  :
   AK10 :  POPSCN(0)
   AK11 :
   AK12 :
   AK13 :
   AK14 :
   AK15 :
```

Pressing the [Alt-F10] key completes the key definitions for screen 900, and returns you to the screen operations menu.

```
                     A D S   B U I L D E R

              Current System Name:     TUTOR

   Terminal:   TMINI     (COM2:)  Default Scan Rate:          1.00 s
   Printer:              (NULL:)  Default Alarm Scan Rate:    0.50 s
   Dir:       \ADS_PC\TUTOR.PCM   Startup Screen:
   Screens:                       ADS Print Destination:    STDPRN

MAIN     (  1)*
NUMKEYPD (900)*
                                              New screen
                                              Modify screen
                                              Screen paint
                                              Delete screen
                                              Copy screen
                                              Key assignments
                                              List screens
                                              Print screen details
                                              Touch screen assignments
Key assignments updated
```

Select the *Key Assignments* menu option again, and this time select screen 1, the main screen. Enter the key assignments shown below.

```
                         A D S   B U I L D E R

              Current System Name:     TUTOR

 ---------- Screen key assignments for MAIN (1) ----------
   AK1  :  PSHSCN(900) DYN_EDIT(1,DEG_F_VALUE,REVERSE) POPSCN(900)
   AK2  :  PSHSCN(900) DYN_EDIT(1,DEG_C_VALUE,REVERSE) POPSCN(900)
   AK3  :
   AK4  :  PLCSETB(Z2[0],0)
   AK5  :  PLCSETB(Z2[0],1)
   AK6  :
   AK7  :
   AK8  :
   AK9  :
   AK10 :
   AK11 :
   AK12 :
   AK13 :
   AK14 :  EXIT()
   AK15 :
```

Function key one is set up to begin a "field edit" of dynamic object "DEG_F_VALUE" on screen 1. First, the numeric keypad, screen 900, must be displayed on the screen. This is accomplished via the PSHSCN(900) command, where the number of the screen to "push" is place in parentheses. A screen which is pushed onto the display overlays, as opposed to replaces, the current screen(s) on the display. DYN_EDIT is the command for beginning a field edit. You must enter a screen number along with the dynamic object's name since dynamic object names need be unique only within a single screen, not among different screens. The third item, or "parameter" in the command list is "REVERSE". This item indicates the video attribute which should be applied to the field *while the edit is active*. Upon successfully completing the edit (by pressing the ENTER button) the numeric keypad screen will automatically be removed from the display via the POPSCN command.

Function key two is another field edit command, this time for dynamic object "DEG_C_VALUE" on screen 1.

Function key four is used to "open" our valve by setting it to "0". The PLCSETB command is used to set a single bit to either a "0" or a "1". The first parameter in the command is the memory location to be set; the second parameter indicates that memory location Z2[0] is to be set to "0".

Function key five is the same as that for function key four above except that the value "1" is being stored.

Although no text on screen 1 specifies a button to be used for exiting the system, we will want to provide one at least while we're developing our system. In a "real" production system we would probably want to remove this capability before giving operators access to the machine on the factory floor. The EXIT command (even though the command doesn't require any parameters the empty parentheses are still required) accomplishes the system exit, and is assigned to function key fourteen.

Press the [Alt-F10] key to complete the key assignments form.

STEP 19

Specifying the Starting Screen

In looking at the status area at the top of the screen, we see that we still haven't specified a startup screen (the screen which will initially be displayed whenever the ADC module is soft reset). To specify it we must again access the *Modify System Parameters* data entry form. Use the [Esc] key to return to the main menu, select *Configuration Operations* and then select *Modify System Parameters*. The startup screen should be set to "1" as shown below.

```
                          A D S   B U I L D E R

                    Current System Name:     TUTOR

   Terminal:   TMINI     (COM2:)   Default Scan Rate:            1.00 s
   Printer:              (NULL:)   Default Alarm Scan Rate:      0.50 s
   Dir:        \ADS_PC\TUTOR.PCM   Startup Screen:
                                   ADS Print Destination:     STDPRN

   Screens:                  2
   Alarm pages:              0
   Reports:                  0
   Alarm sources:            0 ─────── Modify System Params ───────
   Data sources:             4            System Name:  TUTOR
   Display formats:          2               Terminal:  TMINI
   Translations entries:     1        Terminal Device:  COM2:
   Eng Unit Conv.entries:    0         Printer Device:  NULL:
   Lookup table entries:     1      Default Scan rate:     1.00
   Command scripts:          0 Default Alarm Scan rate:    0.50
                                       Startup screen:  1
```

Pressing the [Enter] key completes the data entry form and returns you to the configuration operations menu.

STEP 20

Saving the System to Disk

Now we are ready to save our system in preparation for actually copying the system to the ADC module. Press the [Esc] key to return to the main menu and then select *Load/Save Operations.*

```
                        A D S   B U I L D E R

                 Current System Name:     TUTOR

  Terminal:   TMINI     (COM2:)   Default Scan Rate:          1.00 s
  Printer:              (NULL:)   Default Alarm Scan Rate:    0.50 s
  Dir:        \ADS_PC\TUTOR.PCM   Startup Screen:             1
                                  ADS Print Destination:    STDPRN

  Screens:                  2
  Alarm pages:              0
  Reports:                  0
  Alarm sources:            0              Load system
  Data sources:             4              Save system to disk
  Display formats:          2              Modify current directory
  Translations entries:     1              Refresh system in RAM:
  Eng Unit Conv.entries:    0              Execute system in RAM:
  Lookup table entries:     1              Clear system
  Command scripts:          0              Print destination
```

Select the *Save System to Disk* menu item. Your system will be saved to your computer's hard disk, one file at a time. As each file is saved its name will be listed on the message line at the bottom of your computer screen. After all files are saved, a "System save complete" message will be displayed.

```
                        A D S   B U I L D E R

                 Current System Name:     TUTOR

  Terminal:   TMINI     (COM2:)   Default Scan Rate:          1.00 s
  Printer:              (NULL:)   Default Alarm Scan Rate:    0.50 s
  Dir:        \ADS_PC\TUTOR.PCM   Startup Screen:             1
                                  ADS Print Destination:    STDPRN

  Screens:                  2
  Alarm pages:              0
  Reports:                  0
  Alarm sources:            0              Load system
  Data sources:             4              Save system to disk
  Display formats:          2              Modify current directory
  Translations entries:     1              Refresh system in RAM:
  Eng Unit Conv.entries:    0              Execute system in RAM:
  Lookup table entries:     1              Clear system
  Command scripts:          0              Print destination

System save complete.
```

STEP 21

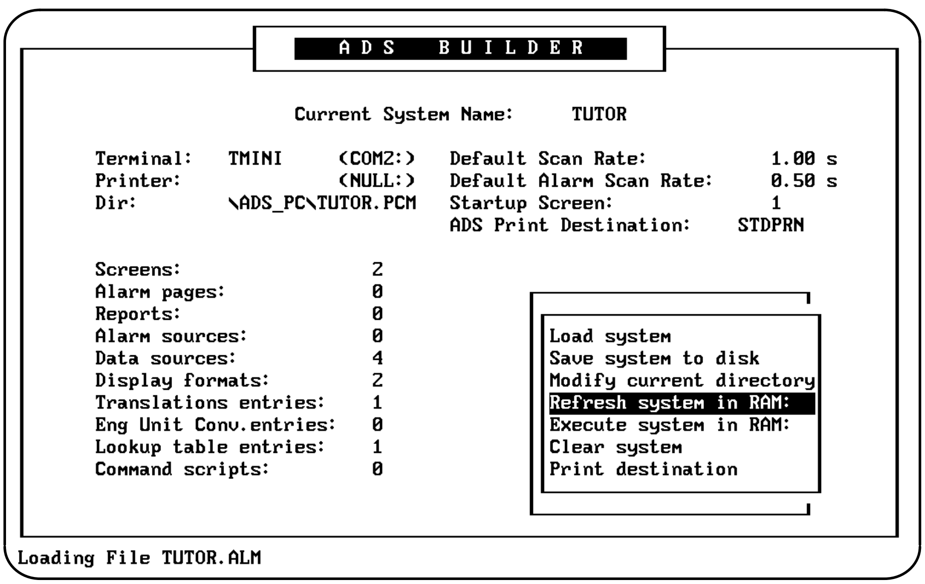
Copying the System to the ADC Module

Now that the system has been saved to disk it may be copied to the ADCs RAM disk. If you attempt to copy the system to the ADC module when it has not been saved to disk, you will be warned of this fact and prompted to confirm that the copy should continue. The copy is accomplished by selecting the *Refresh system in RAM:* menu option. The ADC module must be hard reset for this function to execute. The Builder will automatically check the ADCs status before attempting to copy the files. Should you see a message indicating that communications with the ADC module could not be established, you should check to make sure that

A. the appropriate cable from your computer is connected to your ADC module and that

B. the module is hard reset.

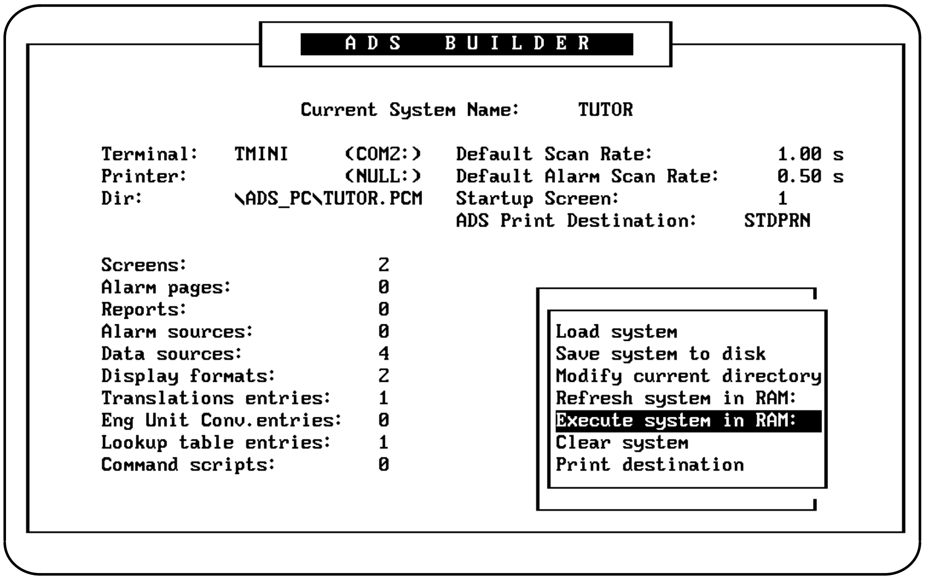
As each file is copied to the ADC module, a message is displayed on the message line indicating that fact. At the completion of the copy a ”Refresh Complete” message will be displayed.



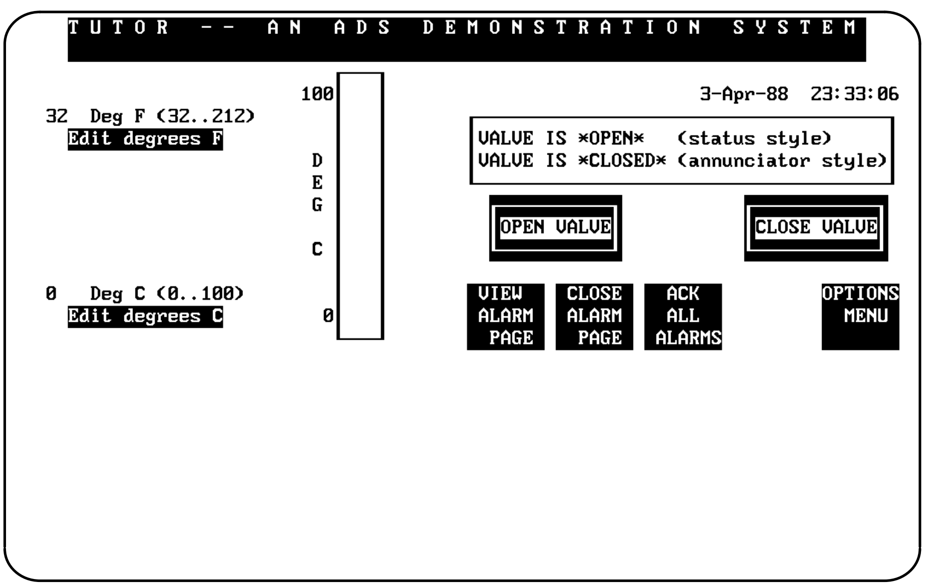
STEP 22

Executing the System

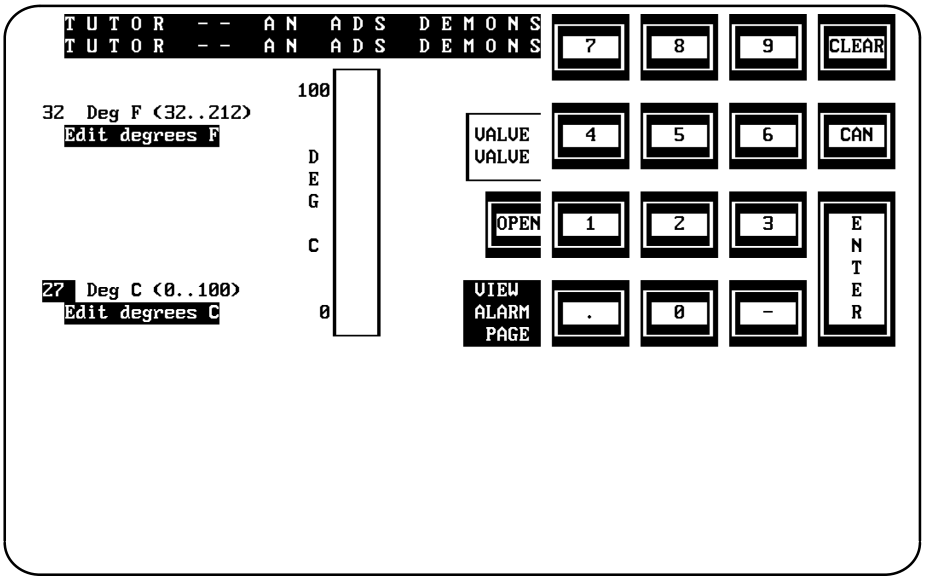
Now let’s execute our system! Select the *Execute system in RAM:* menu option.



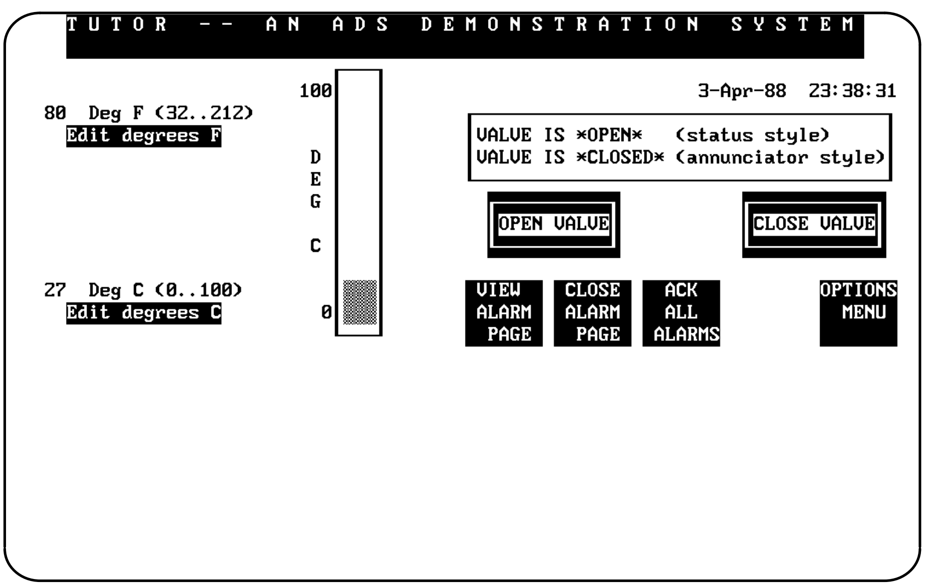
When you execute this menu option your computer screen will change to the ”terminal emulation” screen. and automatically soft reset the ADC module. Once on this screen you can return to the Builder by pressing the [Alt-Z] key. You should now begin to see text appearing on your target terminal’s screen indicating that the various components of the ADS software have begun to execute and that the screens making up your system are being processed by the software. Following that your startup screen will be displayed on the module. The display should be similar to the following screen, with the time and date fields on the screen displaying the time and date per the PLC CPUs real– time clock.



First let's see if we can get the "mercury" to rise in our thermometer. Press the "Edit degrees C" touch area to begin a field edit of the "Degrees Celsius" value. After you press the touch area you should see a numeric keypad displayed on the right-hand side of the display and the entire field displayed in reverse video and the "0" initially displayed in the field should be blinking. If you want to clear the contents of the field you may press the "CLEAR" button on the numeric keypad. If you want to cancel the operation, you will need to press the "CAN" button *twice*. Inputting characters into the field is accomplished in "replace" or "overwrite" mode. For our example, let's input the value "27" into the field by pressing the appropriate buttons on the keypad..

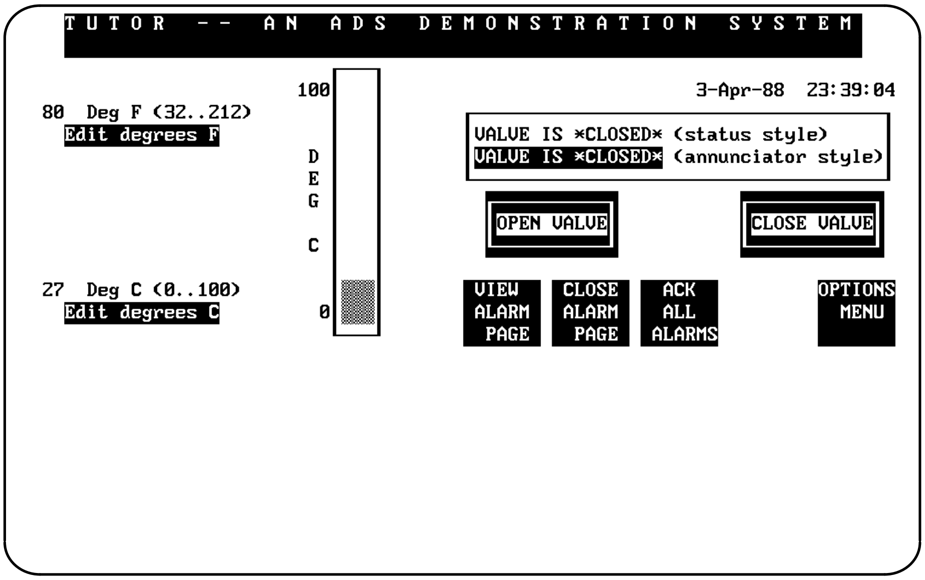


The field edit is completed by pressing the "ENTER" button on the keypad. The numeric keypad will be removed from the display; the field is displayed again in normal video, and we now see the value "27" in the field. Also, note that our bar chart is now showing a non–zero reading corresponding to the value 27 and that our "Degrees Fahrenheit" field is showing the equivalent temperature reading of "80"!

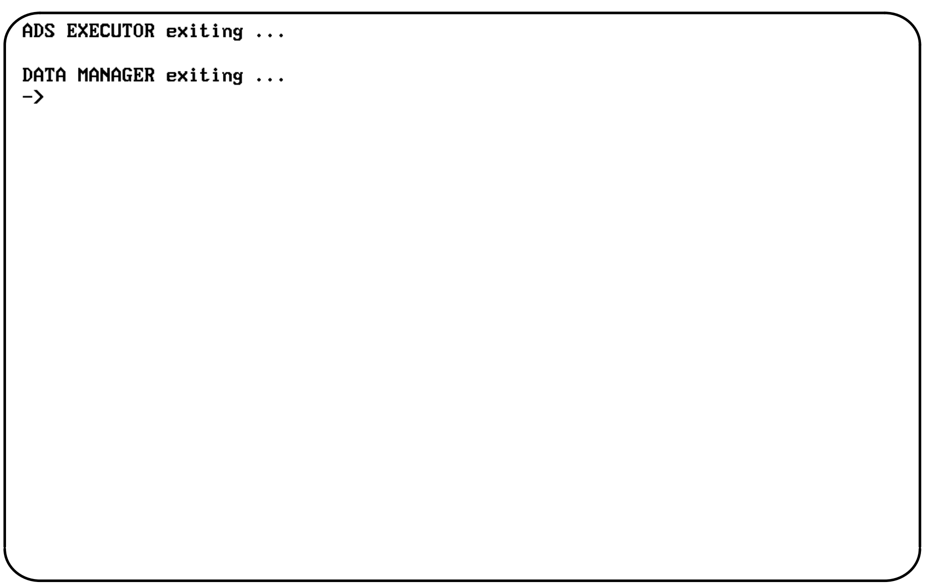


Now let's turn our attention to our valve. At first glance the display seems to be quite contradictory in that the valve is shown to be both "open" and "closed". However, remember that the second valve display is a fixed text string which is shown in normal video when the valve is actually open and in reverse video when closed. Thus, both displays are really telling us the same thing.

Press the "CLOSE VALVE" touch area to close the valve, observing the changes made to the display on the screen.



Since we've now verified that the basic components of our system are functioning, let's go back and complete the remainder of our system. Press the "OPTIONS MENU" touch area to exit the system. Depending on what target terminal you have selected, you may or may not see the "exiting" messages shown below. However, you should see the "–>" characters displayed on your computer's screen. These characters indicate that the ADC module is now hard reset.



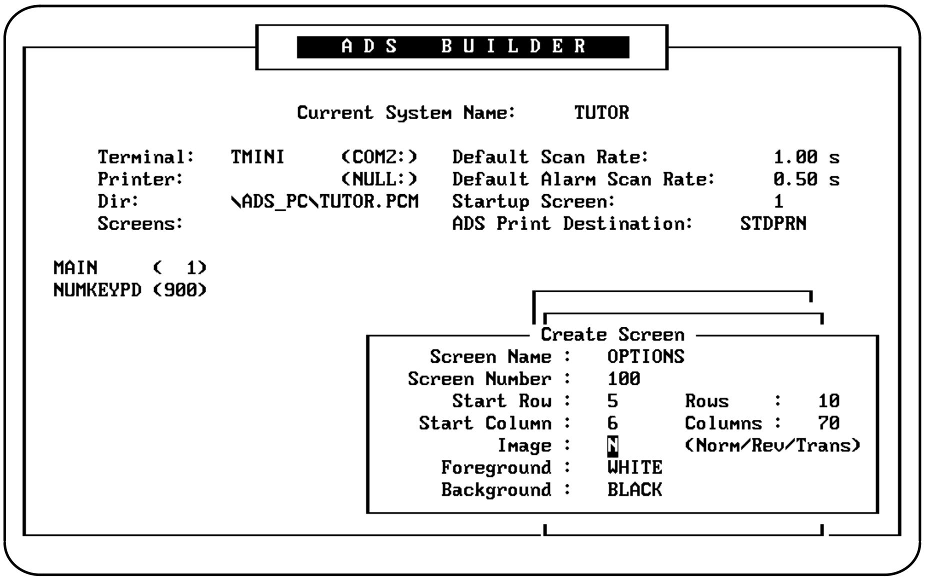
To return to the Builder's "Load / Save operations" menu, press the [Alt-Z] key.

```
                              A D S   B U I L D E R

                     Current System Name:      TUTOR

Terminal:   TMINI      (COM2:)  Default Scan Rate:          1.00 s
Printer:               (NULL:)  Default Alarm Scan Rate:    0.50 s
Dir:        \ADS_PC\TUTOR.PCM   Startup Screen:             1
                                ADS Print Destination:    STDPRN

Screens:                 2
Alarm pages:             0
Reports:                 0
Alarm sources:           0            Load system
Data sources:            4            Save system to disk
Display formats:         2            Modify current directory
Translations entries:    1            Refresh system in RAM:
Eng Unit Conv.entries:   0            Execute system in RAM:
Lookup table entries:    1            Clear system
Command scripts:         0            Print destination
```

STEP 23

Creating the Options Screen

Use the [Esc] key to return to the Builder's main menu and from there select the *Screen Operations* menu. Execute the *New Screen* option and fill out the screen's data entry form as shown below. Note that this new screen will not cover the full area of the screen as did the main screen (screen 1).

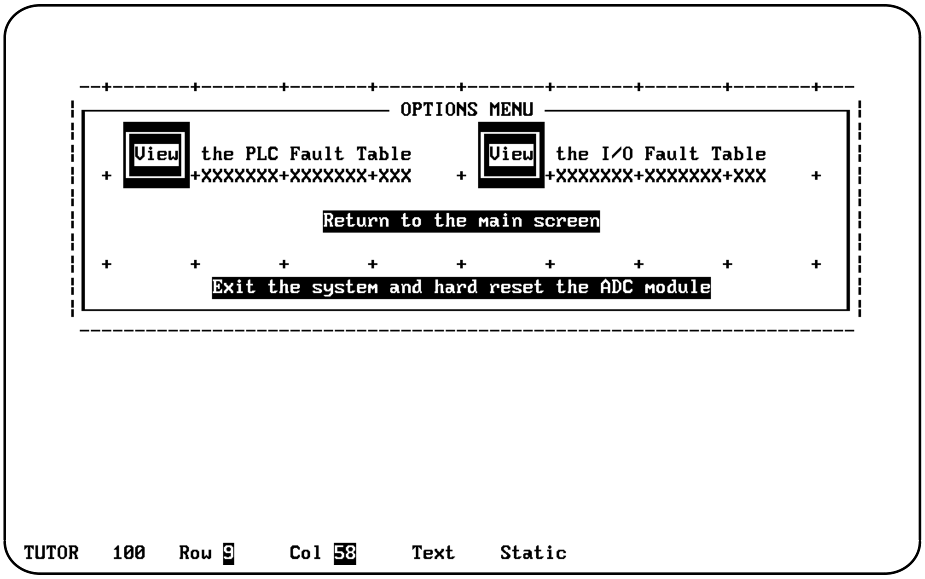


Press the [Enter] key to enter the screen painter.

Press the [Delete] key to toggle on the touch point grid. Using the technique employed in step 6 for drawing rectangles, draw a rectangle around the outer edges of the screen. Note that if you press the [Insert] key before pressing a cursor key the result is "go to the end of" the line or column in the given direction. So, pressing the [F3] key to begin the select operation followed by the key sequences [Insert][→] and [Insert][↓] results in the entire screen being selected. Pressing the [F5] key then draws the desired rectangle. The following text should be typed onto the screen:

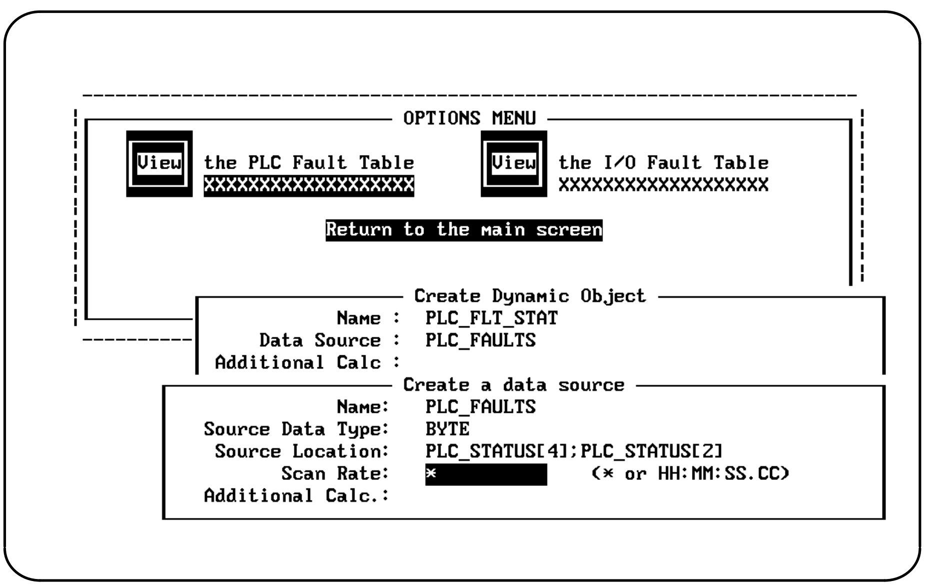
<**Row, Column**>	**Text to Type There**
<1, 30>	OPTIONS MENU
<3, 6>	View
<3, 12>	the PLC Fault Table
<3, 38>	View
<3, 44>	the I/O Fault Table
<4, 12>	XXXXXXXXXXXXXXXXXXX
<4, 44>	XXXXXXXXXXXXXXXXXXX
<6, 23>	Return to the main screen
<9, 13>	Exit the system and hard reset the ADC module

Using the techniques learned in steps 6 and 7, place reverse video boxes around the ”View” text and reverse video the ”Return to the main screen” and the ”Exit the system and hard reset the ADC module” text.



Press the [Delete] key to toggle off the touch point grid, as all the needed text has been properly positioned on the screen.

Using the techniques learned beginning with step 8 regarding the creation of dynamic objects, position the cursor at <row, column> position <4, 12> and create a dynamic object spanning the sequence of 19 X’s. The data entry form should be filled out as indicated below.

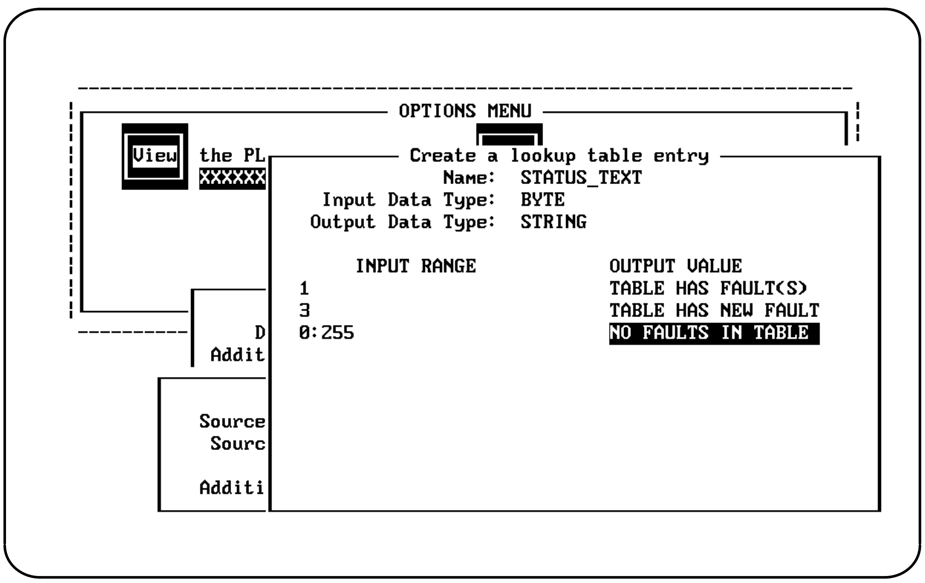


Note the syntax of the *Source Location* field in the data source data entry form. PLC_STATUS is a special PLC status word which is actually a collection of 16 bit (STATE) flags of status information. The left portion of the definition, “PLC_STATUS[4]” indicates that bit b4 (the fifth bit) of the status word should be accessed. Similarly, “PLC_STATUS[2]” indicates that bit b2 (the third bit) of the status word should be accessed. Bit b4 indicates whether there are any faults in the PLC fault table and bit b2 indicates if there has been a change to the PLC fault table since the last time you looked at it.

Using the semicolon (;) character between the two single bit specifications serves to tie these two locations together to form a new ”custom” value. Here a BYTE type has been chosen. The leftmost specification (PLC_STATUS[4]) becomes the least significant bit (bit b0) of the byte and the rightmost specification (PLC_STATUS[2]) becomes bit b1. Bits b2 through b7 are automatically set to 0 to fill out the remainder of the byte.

Select the *Additional Calculation* field for data source PLC_FAULTS, press the [Alt-S] key to open up the object list window and select ”Create Lookup”. Fill out the lookup table entry data entry form as shown below. Note that the custom value we have created will range between 0 and 3 as it consists of only two bits of information. These values have the following meanings:

b1	b0	VALUE	MEANING
0	0	0	No faults; Table hasn’t changed
0	1	1	Has faults; Table hasn’t changed
1	0	2	No faults; Table has changed
1	1	3	Has faults; Table has changed

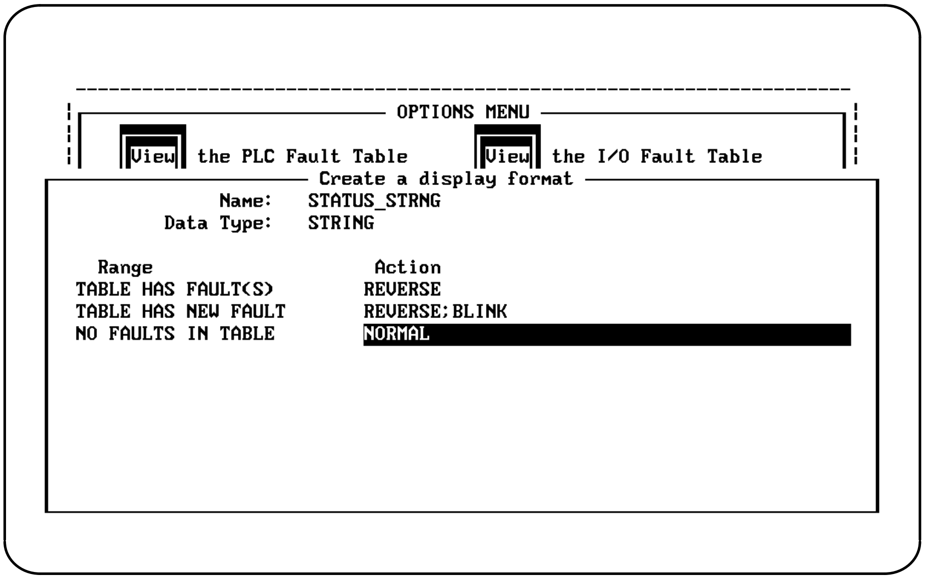


In the case of values 1 and 3 there are unique strings we want to display indicating the status of a PLC fault table containing at least one fault. However, we want to display the same string for values 0 and 2 since in both cases the PLC fault table is empty. We could specify the same string twice, once for the value 0 and once for 2, but it can be accomplished as shown using only a single string. The ADS Executor will always process the lookup table entry from top to bottom looking for a match, stopping with the first match it encounters. Thus the range notation ”0:255” specifies that any byte value other than 1 or 3 should get the indicated output value (effectively an ”otherwise” clause).

Note that unlike what we did previously with the lookup table entry in step 14, the additional calculation was applied to the data source rather than to the dynamic object. In the previous case the data source was to be used in its ”raw” form with one dynamic object and in a scaled form with a second dynamic object. This meant that the scaling had to occur within the specific dynamic object that needed it. However, in this case data source

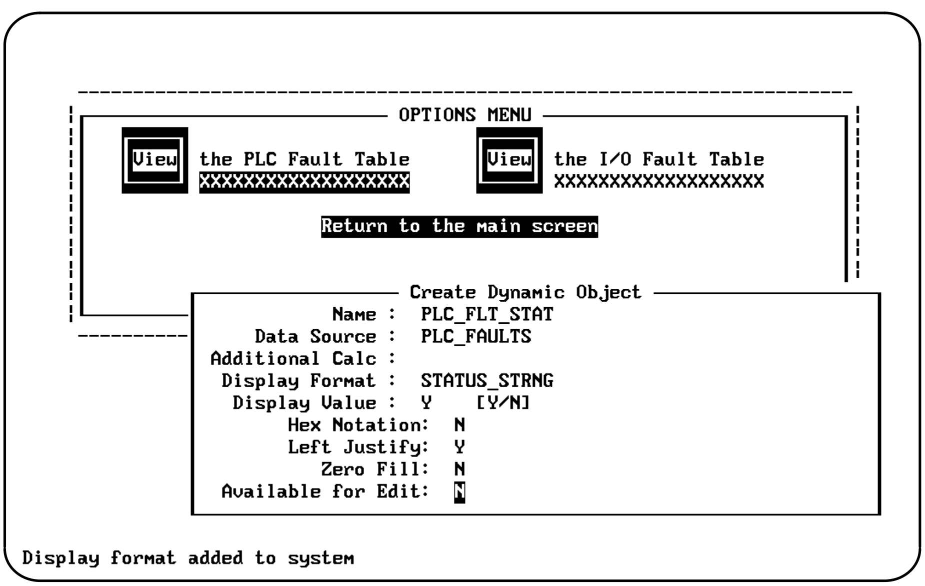
PLC_FAULTS will only be used as a string so the scaling may be done directly in the data source if desired.

After completing the data source data entry form you are returned to the dynamic object data entry form. Select the *Display Format* field, press the [Alt-S] key to open up the object list window and select "Create Format". The resulting data entry form should be filled out as shown below.

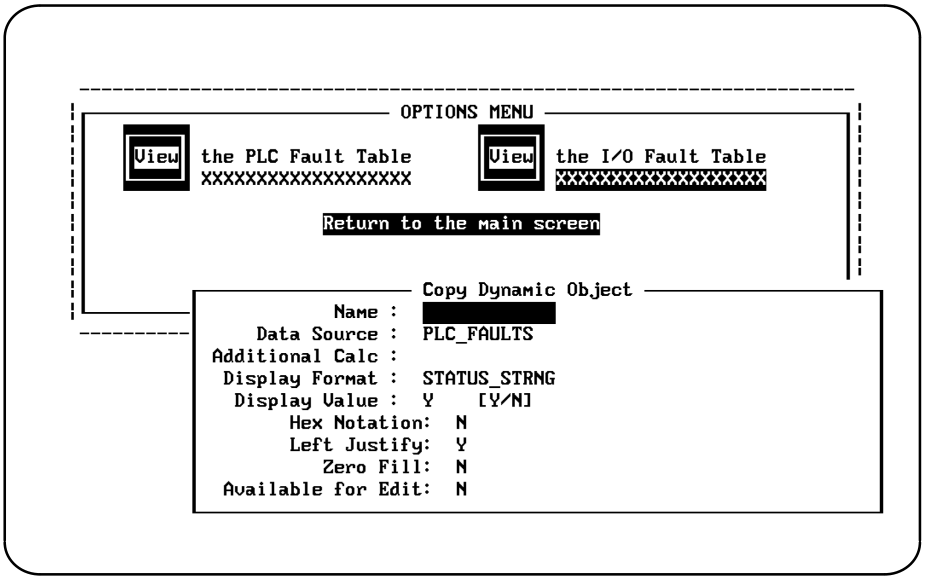


Note that the input range is specified as the converted strings, NOT the original BYTE values. The display format's data type MUST always match the "current" data type if an additional calculation has been applied, NOT the original input data type of the data source. The second action, "REVERSE;BLINK" indicates that *both* video attributes are to be applied.

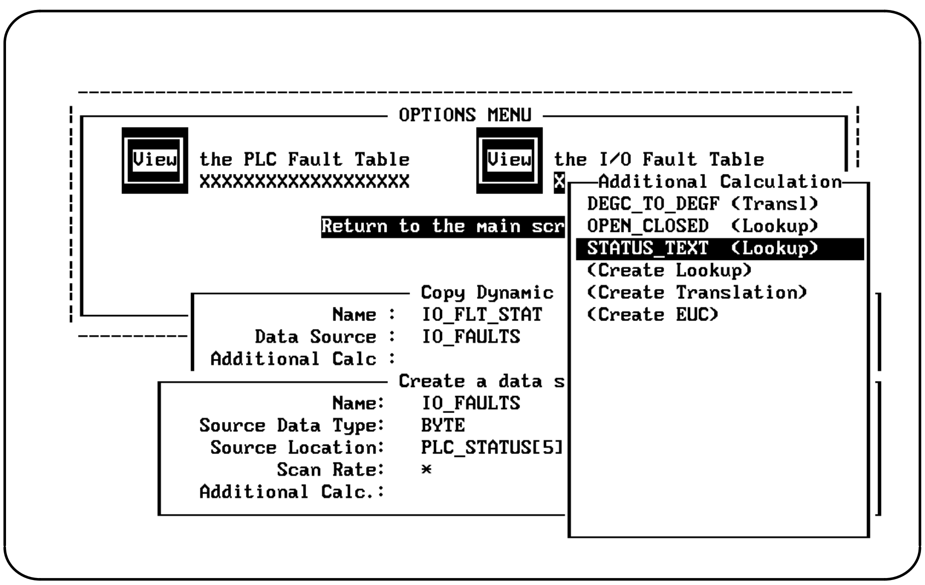
After completing the display format data entry form you are again returned to the dynamic object data entry form. It should be completed as shown below:



Using the techniques for copying a dynamic object originally learned in step 10, copy the just-created dynamic object PLC_FLT_STAT to the dynamic object paste buffer, position the cursor at <row, column> position <4, 44> and paste the dynamic object there.

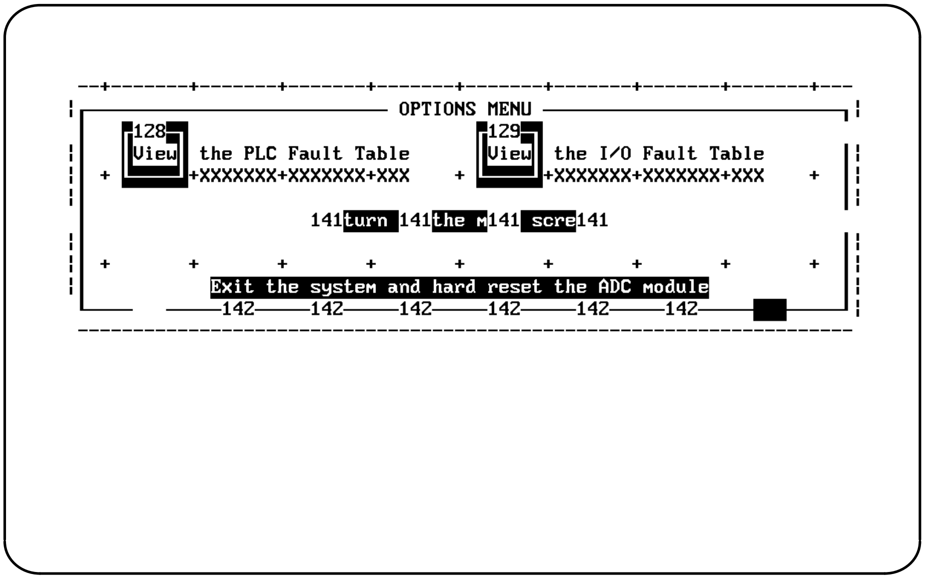


Fill out the dynamic object data entry form as shown on the screen below, creating data source IO_FAULTS as part of the effort (note that it is filled out identically to data source PLC_FAULTS except that the ”Source Location” field should be specified as ”PLC_STATUS[5];PLC_STATUS[3]”). Note that this time when you open up the object list window with the Additional Calculation field in the data source selected you find that the needed lookup table entry, STATUS_TEXT, already exists. Use the cursor keys to highlight it and then press the [Enter] key to pick it for inclusion in the data source.

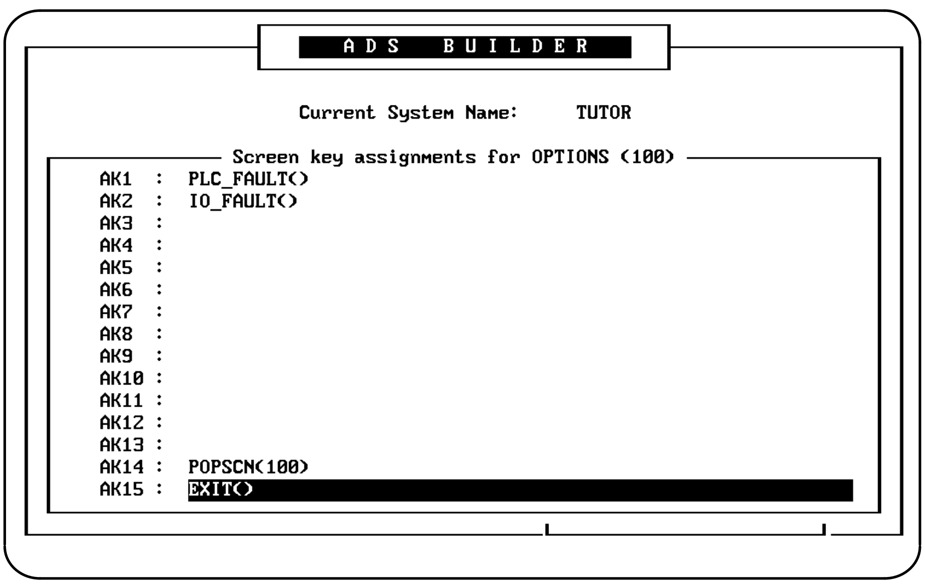


Press the key sequence [Insert] [Delete] to begin defining the touch point areas. ”View the PLC fault table” will be assigned the keycode 128 (F1), ”View the I/O fault table” 129

(F2), ”Return to the main screen” 141 (F14) and ”Exit the system and hard reset the ADC module” 142 (F15).



After completing the touch point definitions, the OPTIONS screen is now complete. Press the [Alt-F10] key to exit the screen painter while saving the work you have done. Select the *Key Assignments* menu option, specifying the newly created screen 100. Fill out the key assignments as shown below.



The key assignment for function key F1, *PLC_FAULT()*, indicates that the PLC fault table screen should be accessed. This will be possible at runtime only if you selected the Fault Module option with the ADSSETUP Utility and subsequently installed it on the ADC module utilizing PCOP. An optional foreground and background color specification may be specified within the parentheses.

Function key F2 performs the same function as described for function key F1 above, except access is provided to the I/O fault table.

ADS supports the concept of multiple screens being displayed on the screen simultaneously. Each of these screens will have its own set of function key assignments. The last screen displayed on the target terminal will be the one whose function keys are active. Because of this we need to provide a mechanism for removing the OPTIONS screen from the terminal, "reactivating" the MAIN screen's function keys. This is accomplished by the *POPSCN(100)* command assigned to function key F14.

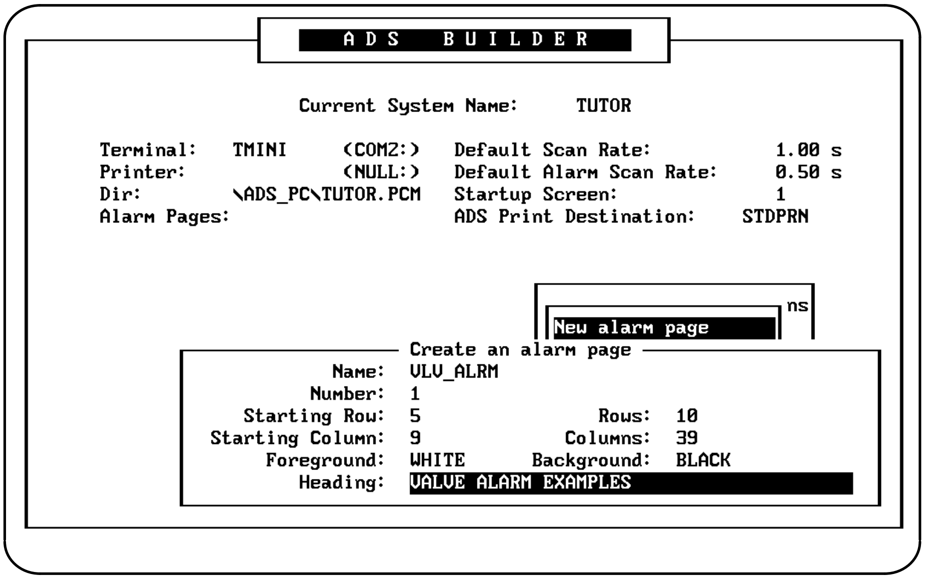
The *EXIT()* command assigned to function key F15 performs the same function as did its assignment to function key F14 on the main screen.

The [Enter] key is used to complete the key assignments data entry form.

STEP 24

Creating an Alarm Page

Use the [Esc] key to return to the Builder's main menu and from there select the *Alarm Operations* menu. Execute the *New Alarm Page* option and fill out the alarm page's data entry form as shown in the following screen.



An alarm page is a special type of screen that is used to display alarm information and optionally allow the operator to interact with it to view and acknowledge particular alarms. It has no key assignments of its own; function key assignments providing for manipulation of the alarm page must be provided by the topmost screen on the display.

The actual alarms themselves are not specified here; they will be created next. Completing the alarm page data entry form will return you to the *Alarm Operations* menu.

STEP 25

Creating an Alarm Source

Select the *Alarm Sources* menu entry which displays an additional set of menu options. Execute the *New Alarm Source* option and fill out the alarm source's data entry form per the following.

```
                         A D S   B U I L D E R

                  Create an alarm source
           Name:  UNLATCHED
 Source Data Type:  STATE
     PLC Location:  Z2[0]
        Scan Rate:  *                (* or HH:MM:SS.CC)
 Additional Calc.:

Range: ON              Action:
 Text: Unlatched example
Range:                 Action:
 Text:
Range:                 Action:
 Text:
Range:                 Action:
 Text:

Log: N    Timestamp: Y    Latched: N   Notify: N   Auto-ack: N

    Output text to following alarm pages :-
 :1  :    :    :    :    :    :    :    :    :
```

An alarm source defines a PLC location which is to be monitored at a user-specified rate regardless of the screen or screens currently displayed. In this example we are looking at a STATE (single bit) value located at location Z2[0]. Whenever the value is found to be ON (set to "1") the text string "Unlatched example" is to be displayed on alarm page 1.

With the *Timestamp* field set to "Y", the entry in the alarm page will show the PLC time and date when the alarm condition was seen by the ADC module. By leaving the *Latched* field set to "N", each time the location is found to transition from OFF to ON a new entry will be logged in the alarm page. Because of this it is possible that multiple occurrences of the same alarm may appear in the alarm page. Such an alarm is said to be "unlatched".

STEP 26

Copying an Alarm Source

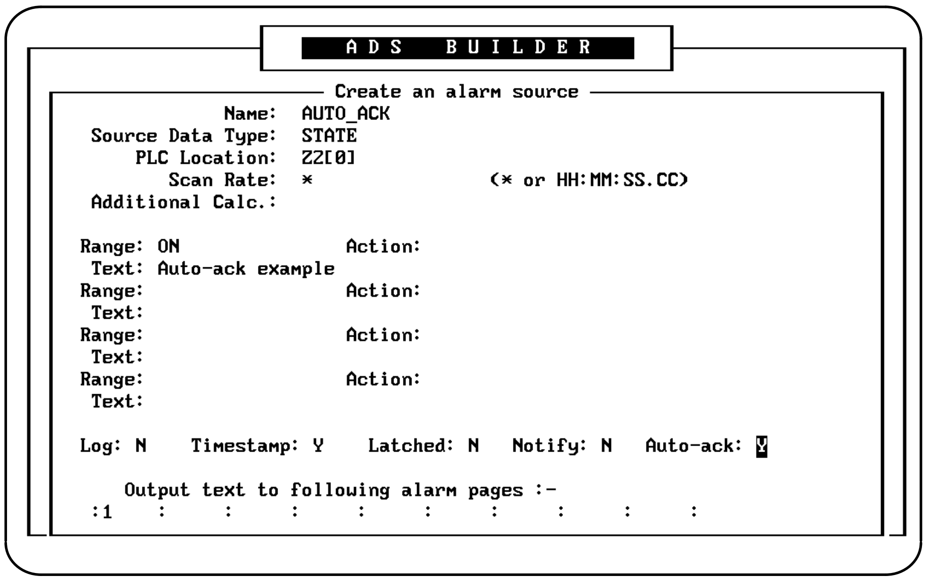
Often many of your alarm sources will be very similar in their definition, differing only in PLC location and perhaps in the setting of certain flags. In such cases it is easier to start with an existing alarm source and then modify it rather than creating it completely from scratch. In our case our remaining two alarm sources will be very similar to alarm source UNLATCHED which we just finished creating. In order to use it as our ”template” we must make a copy of it. Select the *Copy an alarm source* menu option and specify *UNLATCHED* as the alarm source to be copied.

```
                         A D S   B U I L D E R

                    Current System Name:     TUTOR

     Terminal:   TMINI     (COM2:)  Default Scan Rate:          1.00 s
     Printer:              (NULL:)  Default Alarm Scan Rate:    0.50 s
     Dir:       \ADS_PC\TUTOR.PCM   Startup Screen:             1
     Alarm Sources:                 ADS Print Destination:    STDPRN

 UNLATCHED
                                                                   ns
                                                 New alarm source
                                                 Modify an alarm source
                                                 Delete an alarm source
                                                 Copy an alarm source
                                                 View current sources
                                                 List sources
                                                 Print sources

Enter the name of the Alarm source to copy:  UNLATCHED
```

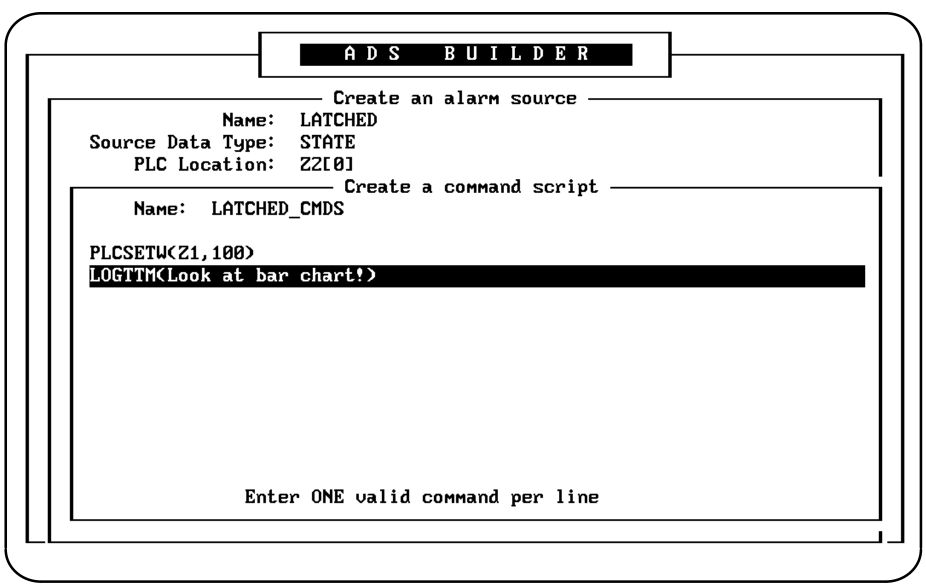
Pressing the [Enter] key opens up an alarm source data entry form with all fields filled out identically to those of alarm source UNLATCHED.

```
                         A D S   B U I L D E R
                       Create an alarm source
              Name:
   Source Data Type:  STATE
       PLC Location:  Z2[0]
          Scan Rate:  *                 (* or HH:MM:SS.CC)
   Additional Calc.:

  Range: ON             Action:
   Text: Unlatched example
  Range:                Action:
   Text:
  Range:                Action:
   Text:
  Range:                Action:
   Text:

  Log: N    Timestamp: Y    Latched: N    Notify: N    Auto-ack: N

      Output text to following alarm pages :-
   :1    :    :    :    :    :    :    :    :    :
```

Name this new alarm source AUTO_ACK. For the purposes of this tutorial we will leave the PLC location specified the same as for the UNLATCHED alarm. Typically you will always need to change the PLC Location field following an alarm source copy. The *Text* field is changed to read ”Auto-ack example” and the *Auto-ack* flag is changed to ”Y”. By default an entry in an alarm page will be shown blinking when it occurs. When an operator acknowledges the alarm it will be shown steady. In addition, if the alarm source is no longer in alarm, the entry will be removed from the alarm page following its acknowledgment. You should set the *Auto-ack* flag to ”Y” for any alarms you do not want an operator to have to explicitly acknowledge.



Make another copy of alarm source UNLATCHED, this time giving it a name of LATCHED. Select the first *Action* field and press the [Alt-S] key to open up the object list for command scripts. Choose to create a new script, resulting in a command script data entry form being opened up on the screen. Fill it out as shown below.



A command script is used to specify a sequence of commands which will be executed when an alarm range evaluates true or by a particular function key being pressed to which the script is attached. One command script can call another, meaning that a very long sequence of commands triggered by a single event is possible.

In this example, the first command will write the word value ”100” to location Z1, which just happens to be the location we are using to monitor our temperature reading. The second command will display the text string ”Look at bar chart!” at the bottom of the target terminal’s display.

After completing the command script, you are returned to the alarm source data entry form. Change the *Text* field to read ”Latched example” and set the *Latched* flag to ”Y”.

```
                         A D S   B U I L D E R

                      Create an alarm source
            Name:  LATCHED
Source Data Type:  STATE
    PLC Location:  Z2[0]
       Scan Rate:  *                 (* or HH:MM:SS.CC)
Additional Calc.:

Range:  ON               Action:  LATCHED_CMDS
 Text:  Latched example
Range:                   Action:
 Text:
Range:                   Action:
 Text:
Range:                   Action:
 Text:

Log:  N    Timestamp:  Y    Latched:  Y   Notify:  N   Auto-ack:  N

    Output text to following alarm pages :-
 :1    :     :     :     :     :     :     :     :     :
Command script added to system
```

A ”latched” alarm differs from an ”unlatched” one in that only a single entry may appear in the alarm page at any one time. Once a latched alarm is logged in an alarm page, the entry must be acknowledged by the operator before any new instances of it are logged.

STEP 27

Updating the Main Screen's Key Assignments

Now that we have finished creating our options screen and our alarm handling we need to modify the main screen's key assignments accordingly. Use the [Esc] key to return to the Builder's main menu and then choose *Screen Operations*. Choose the *Key Assignments* menu option and select the MAIN screen, screen 1. Add key assignments for function keys 7, 8, and 9 and change the key assignment for function key 14, as shown below.

```
                         A D S   B U I L D E R

              Current System Name:     TUTOR

              Screen key assignments for MAIN (1)
   AK1  :  PSHSCN(900) DYN_EDIT(1,DEG_F_VALUE,REVERSE) POPSCN(900)
   AK2  :  PSHSCN(900) DYN_EDIT(1,DEG_C_VALUE,REVERSE) POPSCN(900)
   AK3  :
   AK4  :  PLCSETB(Z2[0],0)
   AK5  :  PLCSETB(Z2[0],1)
   AK6  :
   AK7  :  PSHALM(1)
   AK8  :  POPALM(1)
   AK9  :  ACK_ALARM() PLCSETW(Z1,0)
   AK10 :
   AK11 :
   AK12 :
   AK13 :
   AK14 :  PSHSCN(100)
   AK15 :
```

The PSHALM(1) and POPALM(1) commands will provide for the displaying or removing from display, respectively, alarm page 1.

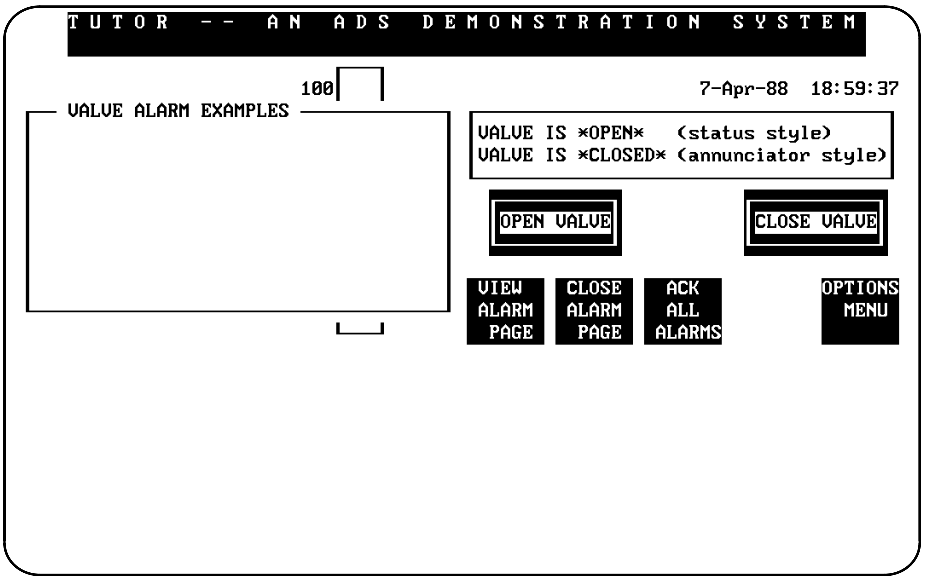
Two commands, separated by a space (" "), are assigned to function key 9. The first of these, ACK_ALARM(), is used to acknowledge all currently unacknowledged alarms. The second command, PLCSETW(Z1,0), sets our temperature reading to 0. Note that a command script containing these two commands could also have been used here rather than defining both commands in the key assignments field.

The PSHSCN(100) command assigned to function key 14 is used to display the OPTIONS screen (100) on the target terminal display.

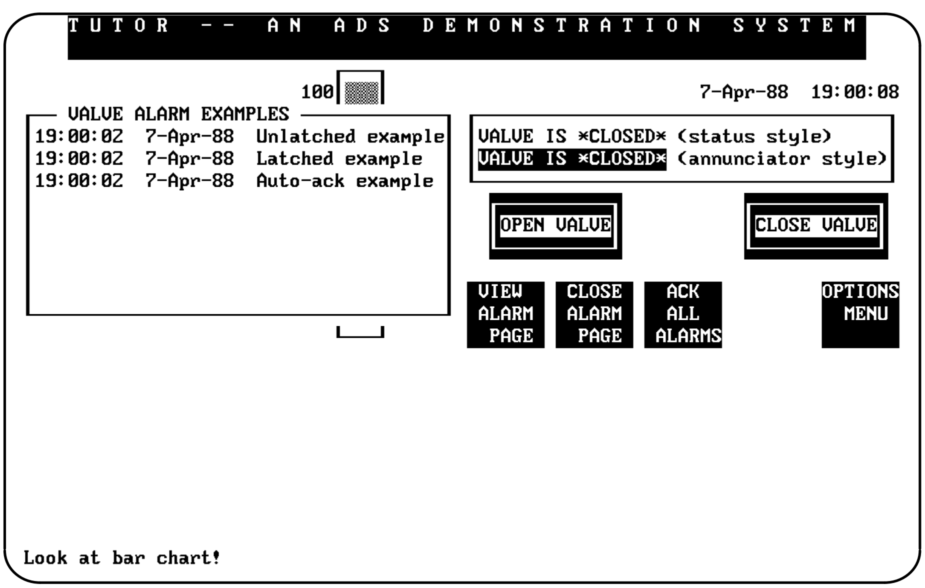
STEP 28

Interacting With an Alarm Page

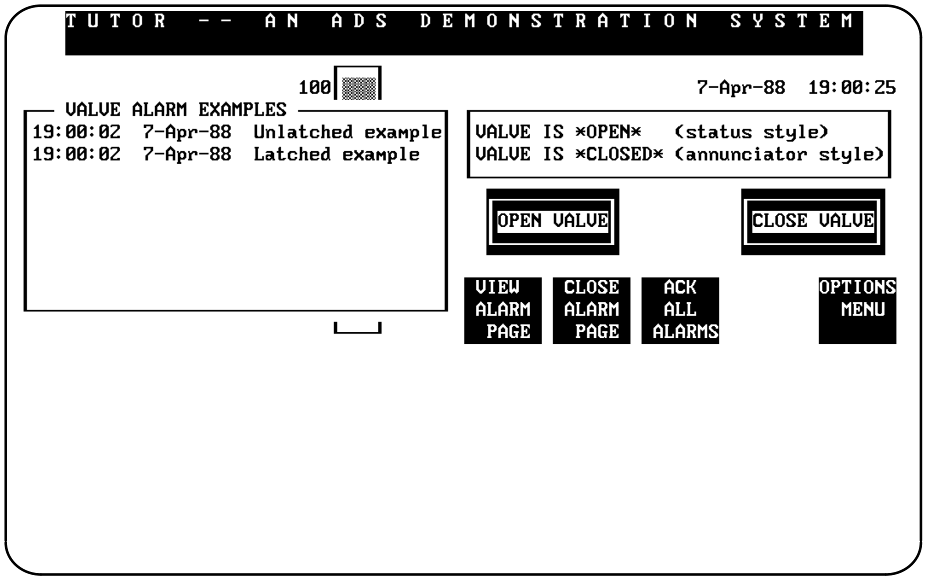
Now that we have completed our system, we need to save it both to disk and to the ADC module, then execute it, as we originally did back in steps 20 through 22. Use the [Esc] key to return to the Builder's main menu and select *Load/Save Operations*. Then consecutively execute menu items *Save system to disk*, *Refresh system in RAM:* and *Execute system in RAM:*. Once the startup screen is displayed, press the "VIEW ALARM PAGE" touch area to view alarm page 1.



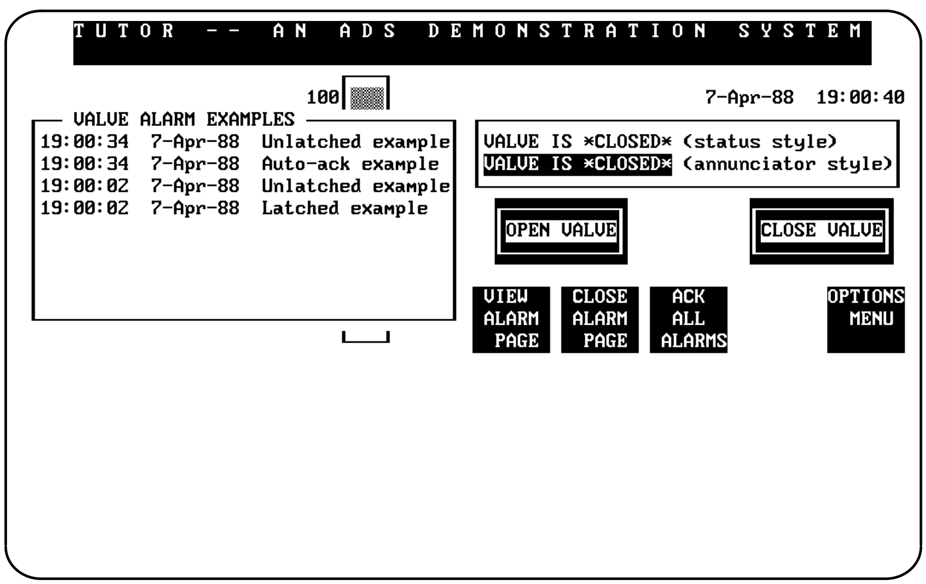
Now press the "CLOSE VALVE" touch area to close the valve. Note that all three of our alarms are logged in alarm page 1, along with the time and date of their occurrence. The entries corresponding to both the latched and unlatched alarms are shown blinking; the entry corresponding to the auto acknowledged entry is displayed steady. Also, note that our thermometer now shows a temperature of 100C and that the message "Look at bar chart!" is displayed at the bottom of your terminal's display. These two items are a result of the action associated with the logging of the "latched" alarm.



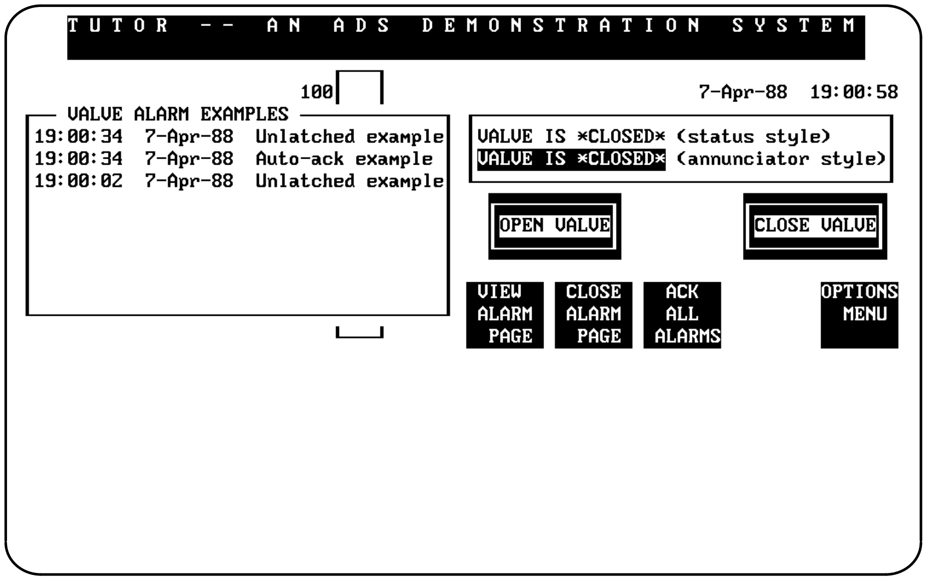
Now press the "OPEN VALVE" touch area to open the valve. Note that the entry corresponding to the auto acknowledge alarm has been removed from the alarm page. This is because when an acknowledged alarm transitions out of its alarm state it is automatically removed from all alarm pages to which it is logged.



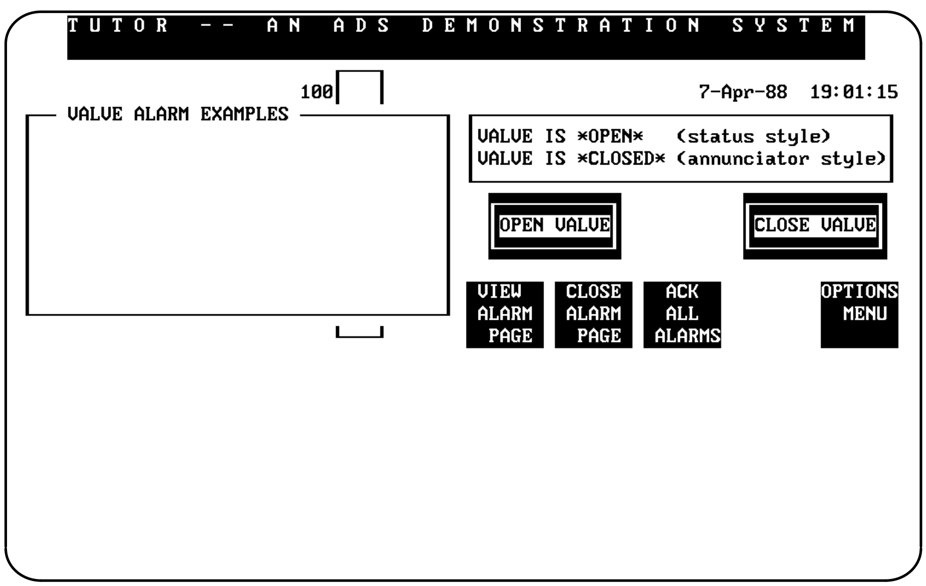
Pressing the "CLOSE VALVE" touch area to again close the valve triggers the alarm condition again. Note that a second entry corresponding to the unlatched alarm is now in the table, that a new entry for the auto acknowledge alarm is logged in the table and that the *original* latched alarm entry is still in the table.



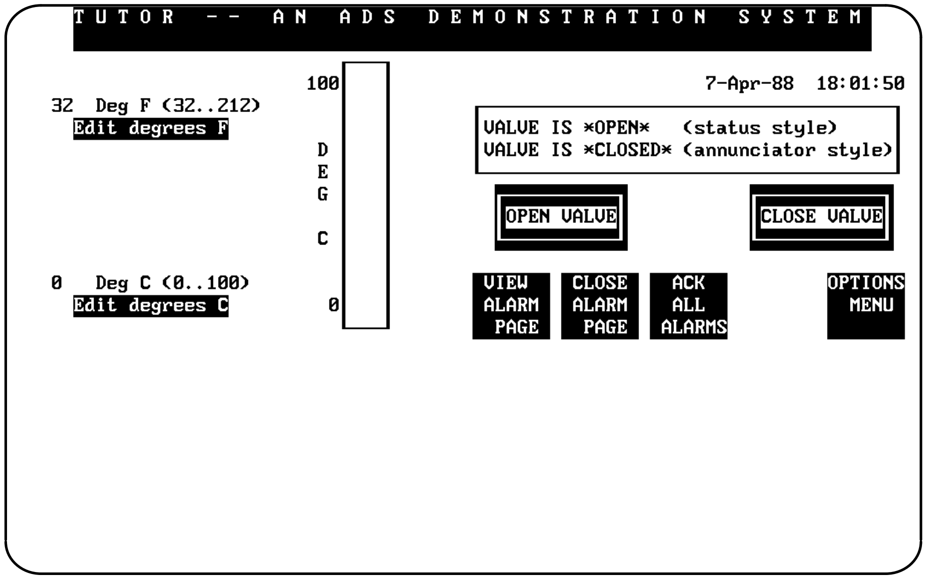
If you now press the "ACK ALL ALARMS" touch area to acknowledge the alarms, all the alarms are now shown with a steady display indicating that they have been acknowledged. Also, the second command attached to that touch area has caused our temperature to be reset to 0°C .



Now press the "OPEN VALVE" touch area to open the valve; this also resets our alarm condition. As a consequence, all our acknowledged alarms are automatically removed from the alarm page.



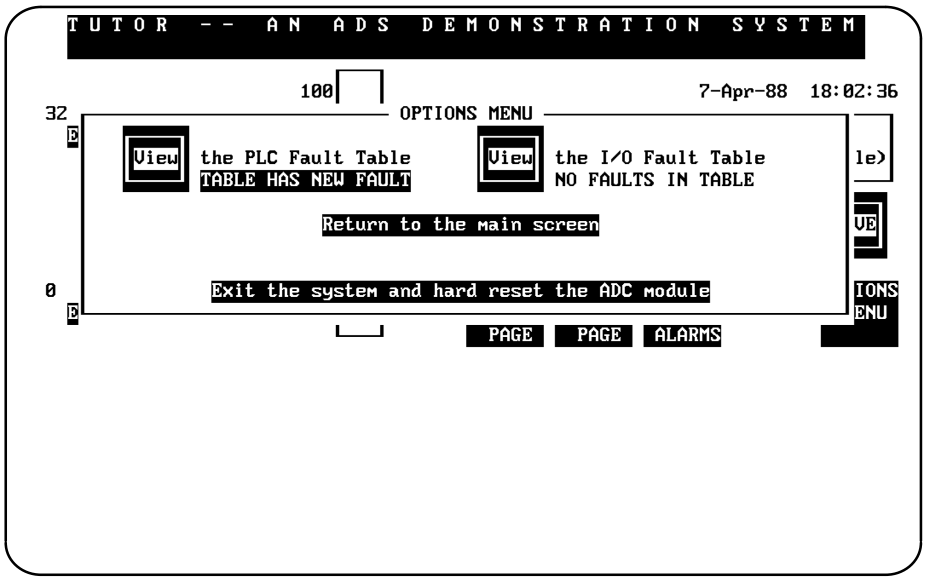
To remove the alarm page from the display, press the "CLOSE ALARM PAGE" touch area.



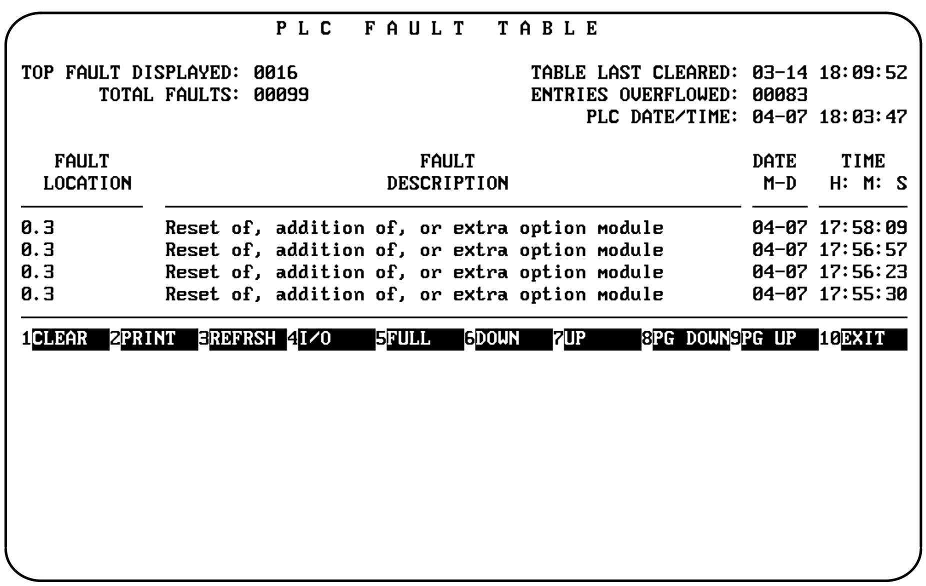
STEP 29

Accessing the Options Screen and the PLC Fault Table

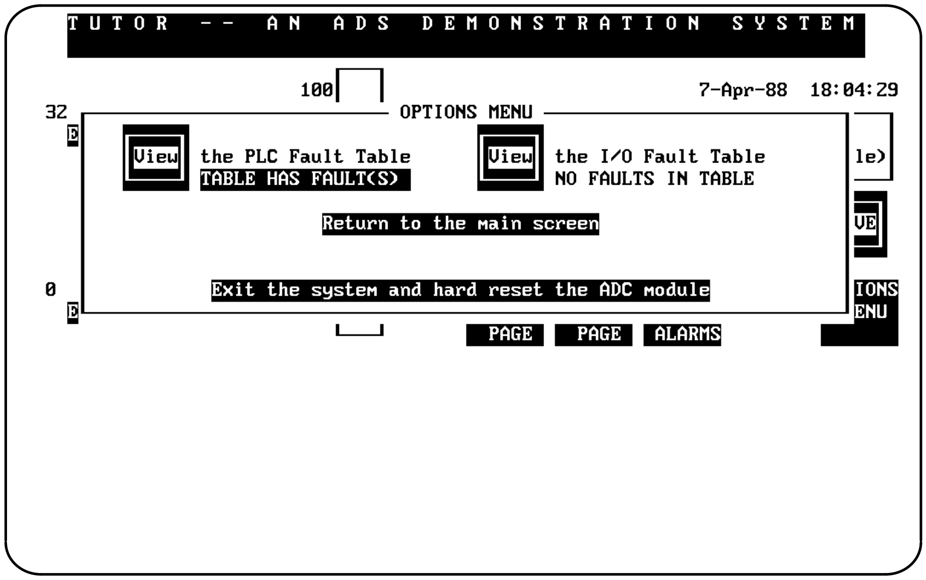
Now let's look at our new options screen by pressing the "OPTIONS MENU" touch area. Note that in this example the PLC fault table is described as having new faults and the I/O fault table is described as having no faults at all. Depending on the status of your PLC you may or may not have any new faults in the I/O fault table; however, your PLC fault table should have one or more faults in it relating to the resetting of the ADC module during this tutorial.



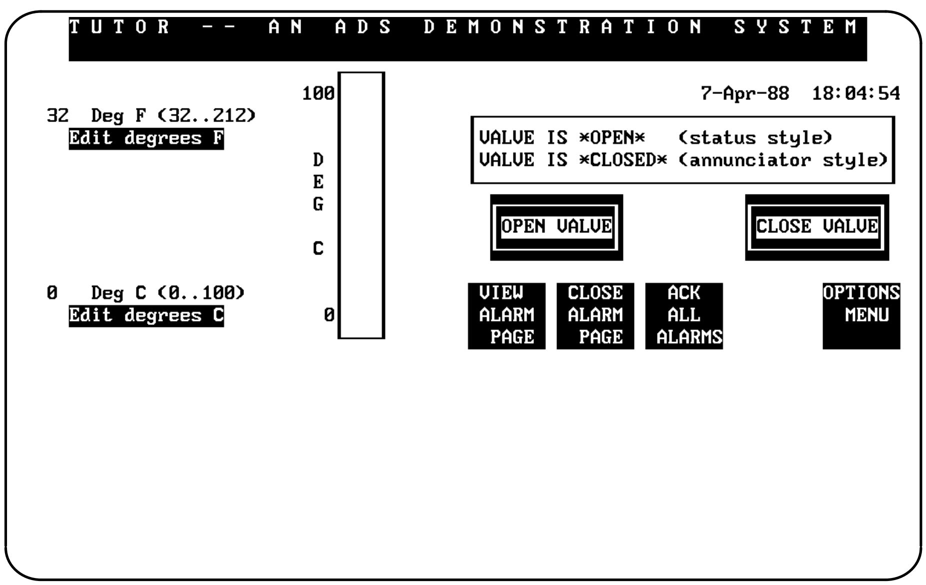
Press the "VIEW" the PLC Fault Table touch area to gain access to the display of the PLC fault table. Note that this display is the same as the one which can be accessed from within the Logicmaster 90 programming and configuration software packages.



Pressing the ”EXIT” touch area returns you to the options screen. Note that the description for the PLC fault table has changed from ”Table has new fault” to ”Table has fault(s)”; this change is due to you viewing the PLC fault table.



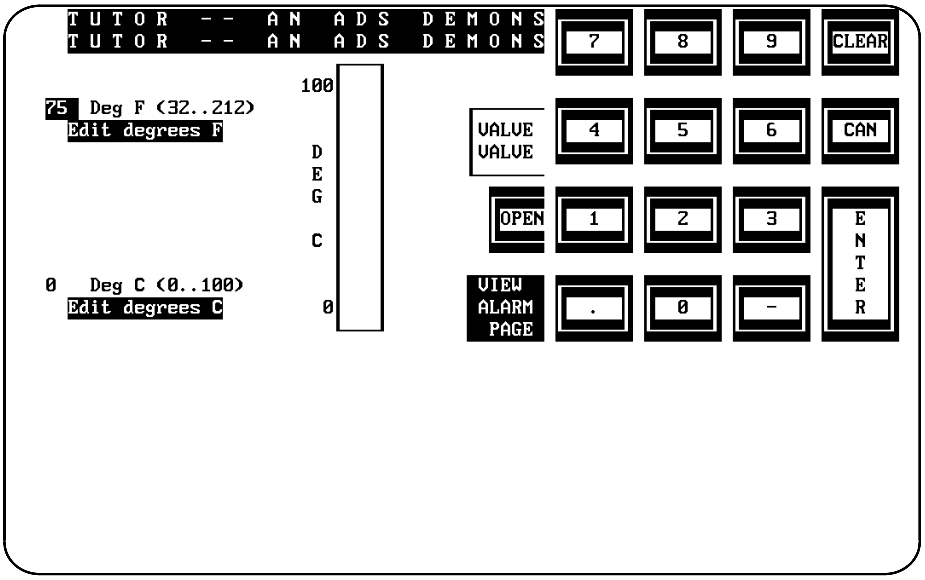
Pressing the ”Return to the main screen” touch area returns you to the main screen.



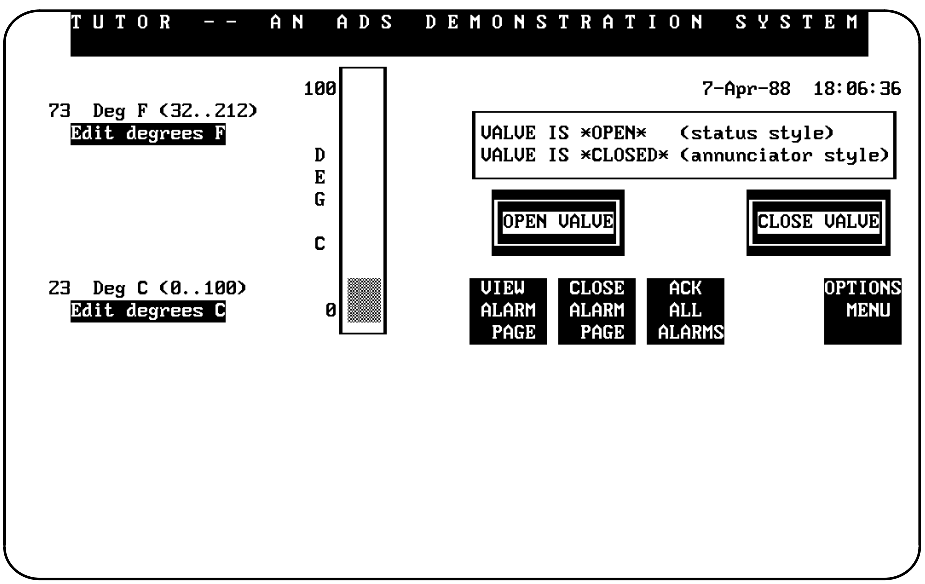
STEP 30

Beware of Rounding Errors

When you are using scaling with a dynamic object which you then edit, the scaling is applied in reverse so that the value is sent to the PLC with the proper units. This conversion can lead to rounding errors which can result in a display being slightly different than what you expected. For example, our temperature value was defined to be in units of degrees Celsius. In one case we display the equivalent temperature value in degrees Fahrenheit, and also allow you to edit that value. Assume that the operator edits the degrees Fahrenheit temperature, entering a value of 75.



After pressing the ”ENTER” touch area, the value is converted to degrees Celsius before being stored in the defined memory area. Following that, the screen values are again scanned and the screen refreshed with the new values. Since some roundoff error occurred in the conversion, the just-entered temperature of 75°F changes to read 73.



SCREEN DETAILS LISTING

```
ScreenNumber : 1     MAIN

    Start Row : 1        End Row :  15
    Start Column : 1     End Column :  80

    Image : NORMAL

    Background : BLACK   Foreground : WHITE

Dynamic Object : DATE_DISPLAY

    Start Row : 4        End Row :  4
    Start Column : 61    End Column :  69

    Data Source : PLC_DATE
    Additional Calc. :
    Display Format :
    Display Value : Yes  ( )
    Avail for Edit: No

Dynamic Object : DEG_C_BAR

    Start Row : 4        End Row :  14
    Start Column : 30    End Column :  32

    Data Source : TEMPERATURE
    Additional Calc. :
    Display Format : NORMAL_HIGH
    Display Value : No
    Avail for Edit: No

Dynamic Object : DEG_C_VALUE

    Start Row : 13       End Row :  13
    Start Column : 3     End Column :  5

    Data Source : TEMPERATURE
    Additional Calc. :
    Display Format :
    Display Value : Yes  ( Left_justify )
    Avail for Edit: Yes
      Min: 0
      Max: 100

Dynamic Object : DEG_F_VALUE

    Start Row : 5        End Row :  5
    Start Column : 3     End Column :  5

    Data Source : TEMPERATURE
    Additional Calc. : DEGC_TO_DEGF
    Display Format :
    Display Value : Yes  ( Left_justify )
    Avail for Edit: Yes
      Min: 32
      Max: 212

Dynamic Object : TIME_DISPLAY

    Start Row : 4        End Row :  4
    Start Column : 72    End Column :  79

    Data Source : PLC_TIME
    Additional Calc. :
    Display Format :
    Display Value : Yes  ( )
    Avail for Edit: No

Dynamic Object : VALVE_ANNUN

    Start Row : 7        End Row :  7
    Start Column : 42    End Column :  58

    Data Source : VALVE
    Additional Calc. :
    Display Format : OFF_ON
    Display Value : No
    Avail for Edit: No

DynamicObject:VALVE_STATUS

    Start Row : 6        End Row :  6
    Start Column : 51    End Column :  58

    Data Source : VALVE
    AdditionalCalc.:OPEN_CLOSED
    Display Format :
    Display Value : Yes ( Left_justify )
    Avail for Edit: No
```

```
        10        20        30        40        50        60        70        80
.........+.........+.........+.........+.........+.........+.........+.........+
   T U T O R  – –  A N  A D S  D E M O N S T R A T I O N  S Y S T E M    .
   T U T O R  – –  A N  A D S  D E M O N S T R A T I O N  S Y S T E M    .
                          +–––+                                         .
                      100|–––|                    DD–MMM–YY  HH:MM:SS .
 999 Deg F (32..212)   |–––|   +–––––––––––––––––––––––––––––––––––––+ .
   Edit degrees F       |–––|     |VALVE IS XXXXXXXX (status style)    | .
                     D | ––|     |VALVE IS *CLOSED* (annunciator style)| .
                    E |B––|     +–––––––––––––––––––––––––––––––––––––+ .
                      G |A––|       +–––––––––––+        +––––––––––––+  .
                        |R––|       |OPEN VALVE|         |CLOSE VALVE|  +10
                      C | ––|       +–––––––––––+        +––––––––––––+  .
                          |–––|                                        .
 999 Deg C (0..100)      |–––|      VIEW   CLOSE   ACK        OPTIONS .
   Edit degrees C        0|–––|      ALARM  ALARM   ALL          MENU  .
                         +–––+       PAGE   PAGE   ALARMS              .
```

```
Key definitions
AK1:PSHSCN(900)DYN_EDIT(1,DEG_F_VALUE,REVERSE)POPSCN(900)
AK2:PSHSCN(900)DYN_EDIT(1,DEG_C_VALUE,REVERSE)POPSCN(900)
AK3 :
AK4 : PLCSETB(Z2[0],0)
AK5 : PLCSETB(Z2[0],1)
AK6 :
AK7 : PSHALM(1)
AK8 : POPALM(1)
AK9 : ACK_ALARM() PLCSETW(Z1,0)
AK10 :
AK11 :
AK12 :
AK13 :
AK14 : PSHSCN(100)
AK15 :
```

```
Touchpoint Definitions



     +      +      +      +      +      +      +      +      +

  128    128    128

     +      +      +      +      +      +      +      +      +

                               131     131           132     132

     +      +      +      +      +      +      +      +      +

  129    129    129                134     135     136           141
```

```
ScreenNumber : 100   OPTIONS

   Start Row : 5     End Row :  15
   Start Column : 6  End Column :  75
   Image : NORMAL
   Background : BLACK  Foreground : WHITE

Dynamic Object : IO_FLT_STAT            Dynamic Object : PLC_FLT_STAT

  Start Row : 4         End Row :  4          Start Row : 4         End Row :  4
  Start Column : 44     End Column :  62      Start Column : 12     End Column :  30

  Data Source : IO_FAULTS                     Data Source : PLC_FAULTS
  Additional Calc. :                          Additional Calc. :
  Display Format : STATUS_STRNG               Display Format : STATUS_STRNG
  Display Value : Yes ( Left_justify )        Display Value : Yes ( Left_justify )
  Avail for Edit: No                          Avail for Edit: No

      10       20       30       40       50       60       70
.........+.........+.........+.........+.........+.........+.........+
+-------------------------OPTIONS MENU-------------------------+.
|   +----+                    +----+                           |.
|  |View| the PLC Fault Table    |View| the I/O Fault Table    |.
|  +----+ XXXXXXXXXXXXXXXXXXX   +----+ XXXXXXXXXXXXXXXXXXX     |.
|                                                              |.
|                Return to the main screen                     |.
|                                                              |.
|       Exit the system and hard reset the ADC module          |.
+--------------------------------------------------------------------++10

Key definitions
 AK1 : PLC_FAULT()
 AK2 : IO_FAULT()
 AK3  :
 AK4  :
 AK5  :
 AK6  :
 AK7  :
 AK8  :
 AK9  :
 AK10 :
 AK11 :
 AK12 :
 AK13 :
 AK14 : POPSCN(100)
 AK15 : EXIT()

Touch point Definitions

     +      +      +      +      +      +      +      +      +

       128                       129

     +      +      +      +      +      +      +      +      +

                  141    141    141    141

     +      +      +      +      +      +      +      +      +

            142    142    142    142    142    142
```

```
ScreenNumber : 900   NUMKEYPD

    Start Row : 1        End Row :  15
    Start Column : 48     End Column :  79
    Image : NORMAL
   Background : BLACK  Foreground : WHITE

       10        20        30
.........+.........+.........+..
+-----++-----++-----++-----+.
 |  7  | |  8  | |  9  | |CLEAR|.
+-----++-----++-----++-----+.
                            .
+-----++-----++-----++-----+.
 |  4  | |  5  | |  6  | | CAN |.
+-----++-----++-----++-----+.
                            .
+-----++-----++-----++-----+.
 |  1  | |  2  | |  3  | |  E  |+10
 +-----+ +-----+ +-----+ | N |.
                         |  T  |.
 +-----+ +-----+ +-----+ | E |.
 |  .  | |  0  | |  -  | |  R  |.
+-----++-----++-----++-----+.
Keydefinitions
  AK1  :
  AK2  :
  AK3  :
  AK4  :
  AK5  :
  AK6  :
  AK7  :
  AK8  :
  AK9  :
 AK10 : POPSCN(0)
  AK11 :
  AK12 :
  AK13 :
  AK14 :
  AK15 :

Touchpoint Definitions
                                          55      56      57      24

      +       +       +       +       +       +       +       +       +

                                          52      53      54      137

      +       +       +       +       +       +       +       +       +

                                          49      50      51      13

      +       +       +       +       +       +       +       +       +

                                          46      48      45      13
```

ALARM PAGE LISTING

```
AlarmPage :   1     VLV_ALRM

   Start Row : 5        End Row :  14
   Start Column : 1     End Column :  39
  Foreground : WHITE  Background : BLACK
 Heading : VALVE ALARM EXAMPLES
```

ALARM SOURCE LISTING

```
AlarmSource : AUTO_ACK

   Data Type : STATE
   Location : Z2[0]
   Scan Rate : *
   Additional Calc. :

   Alarm Pages : 1

   Flags : Timestamp Auto-ack

   Range : ON
     Text : Auto-ack example
     Action :
```

```
Alarm Source : LATCHED

    Data Type : STATE
    Location : Z2[0]
    Scan Rate : *
    Additional Calc. :

    Alarm Pages : 1

   Flags : Timestamp Latched

    Range : ON
      Text : Latched example
     Action : LATCHED_CMDS
```

```
AlarmSource:UNLATCHED
  Data Type : STATE
  Location : Z2[0]
   Scan Rate : *
  Additional Calc. :

  Alarm Pages : 1

  Flags : Timestamp

   Range : ON
    Text : Unlatched example
     Action :
```

DATA SOURCE LISTING

```
DataSource : IO_FAULTS                    Data Source : PLC_DATE

  Data Type : BYTE                           Data Type : LONGWORD
 Location : PLC_STATUS[5];PLC_STATUS[3]      Location : DATE
  Scan Rate : *                             Scan Rate : 00:00:01.00
 Additional Calc. : STATUS_TEXT              Additional Calc. :


Data Source : PLC_FAULTS                  Data Source : PLC_TIME

  Data Type : BYTE                           Data Type : LONGWORD
 Location : PLC_STATUS[4];PLC_STATUS[2]      Location : TIME
  Scan Rate : *                             Scan Rate : 00:00:01.00
 Additional Calc. : STATUS_TEXT              Additional Calc. :


Data Source : TEMPERATURE                  Data Source : VALVE

  Data Type : WORD                           Data Type : STATE
  Location : Z1                              Location : Z2[0]
  Scan Rate : *                              Scan Rate : *
  Additional Calc. :                         Additional Calc. :
```

DISPLAY FORMAT LISTING

```
DisplayFormat : NORMAL_HIGH               Display Format : OFF_ON

  Data Type : WORD                           Data Type : STATE

      Range          Action                      Range          Action
  0:79                  NORMAL                OFF                  NORMAL
  80:100                BOLD                  ON                   REVERSE


DisplayFormat:STATUS_STRNG
 Data Type : STRING

      Range          Action
 TABLE HAS FAULT(S)    REVERSE
 TABLE HAS NEW FAULT   REVERSE;BLINK
 NO FAULTS IN TABLE    NORMAL
```

TRANSLATION LISTING

```
TranslationDEGC_TO_DEGF

 Variables A :  1.800000
           B :         0
           C :        32
 Input Data Type  : NIL
 Output Data Type :  NIL
```

LOOKUP TABLE LISTING

```
Lookup Table : OPEN_CLOSED

  Input Data Type : STATE
  Output Data Type : STRING

  Input Range        Output Range
  OFF                *OPEN*
  ON                 *CLOSED*
```

```
Lookup Table : STATUS_TEXT

  Input Data Type : BYTE
  Output Data Type : STRING

  Input Range        Output Range
  1                  TABLE HAS FAULT(S)
  3                  TABLE HAS NEW FAULT
  0:255              NO FAULTS IN TABLE
```

COMMAND SCRIPT LISTING

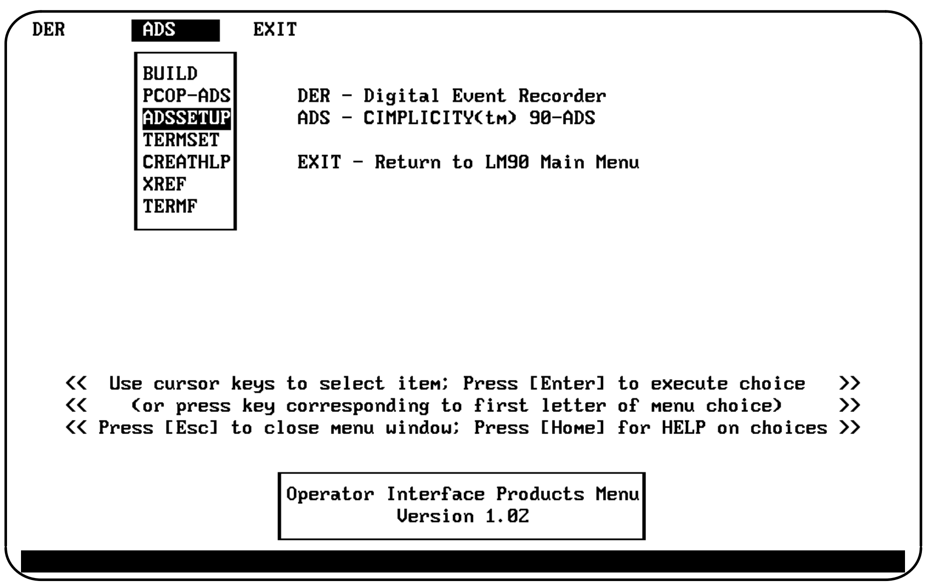
```
Command Script:LATCHED_CMDS

PLCSETW(Z1,100)
  LOGTTM(Look at bar chart!)
```

Chapter 7 ADS Setup Utility

The ADS software can be run in a number of different configurations on a number of different terminals. The ADS Setup Utility provides you a method for customizing the ADS software to fit your particular application. During the ADS software installation process, the ADS Setup Utility was copied to the hard disk of your computer. It will be executed on your computer, not the ADC module.

Section 1: Entering the ADS Setup Utility

There are two methods for entering the ADS Setup Utility. The preferred method is to use the Operator Interface Products Menu, as shown in the screen below. Refer to Chapter 11 of this manual for details on using the Operator Interface Products menu.



To enter the ADS Setup Utility from the MS-DOS prompt, type the following command:

ADSSETUP

By default, the ADS Setup Utility assumes that you will be using a computer with a monochrome display as the host computer. If your computer has a color display, and you want to view the Setup Utility in color the first time you enter it, type the following command at the MS-DOS prompt:

ADSSETUP COLOR

The following screen will be displayed on your computer's display:

```
                 CIMPLICITY (tm) 90-ADS Setup Utility
                            Version 4.01

DEVELOPMENT VERSION SELECTIONS:       EXECUTE-ONLY VERSION SELECTIONS:
  Menu                      78672       Executor               246144
  Builder                  257040       Fault Table Module      93136
  Executor                 199248         Max System (bytes):  293312
    Max System (bytes):     97632

                                      Development Version Selections
                                      Execute-Only Version Selections
                                      Page 2 Selections
                                      Leave Setup

                            PAGE 1 OF 2
```

You will see five different categories of setup information on the screen organized on two screen pages: *development version selections*, *execute-only version selections*, *host computer selections*, *target terminal selections*, and *target printer selections*. A selection menu is displayed in the lower right hand corner of the screen. Each of the selections are explained in detail below.

Section 2: Using the Setup Utility

The ADS Setup Utility is organized as a simple “pick and choose” menu system. The current menu selection is shown in reverse video. You may select a different menu selection by using the [ ] and [–] keys. Pressing the [Enter] key will execute the currently selected menu entry. Note that the [Enter] key may be labeled [Return] on some keyboards; if your keyboard has a second [Enter] key located in the numeric keypad area, only the [Enter] key located with the QWERTY keys should be used. Executing the menu entry will result in either a field value being entered, or in a dialog box being overlaid on the screen. Alternatively, you can press the key that corresponds to the first character of the menu selection you want to execute, and that selection will immediately be executed.

Entering field values in a dialog box (see following sections) are accomplished in the same manner as described above for executing a menu selection. An additional key, the [Esc] key, may be used to Quit the dialog box, without saving any of the changes you may have made in that dialog box. A dialog box is automatically closed when you press the [Enter] key on the last field in the box.

Section 3: The ADS Environments

When the ADS software is installed onto the ADC module, one of two **environments** is installed: **development** or **execute-only**. As their names imply, the development environment is used primarily when developing a new ADS operator interface system and the execute-only environment is used primarily to execute an existing ADS system automatically when you power-up the PLC or soft reset the ADC module. In addition, the execute-only environment is selected when using the PC-based Builder to develop an ADS system.

The ADS Setup Utility allows you to select which major ADS components, or options, are to be installed onto the ADC module as part of the development or execute-only environment. As each component and option will occupy memory that would otherwise be available to store the operator interface system that you will create, the selections should be made with care. If you aren’t going to use a particular feature, don’t include it. The ADS Setup Utility does NOT actually install the software on the ADC module; it only catalogs your selections. The PCOP software is used to install your new selections on the ADC module, as explained below and in Chapter 5.

Section 4: Customizing the ADS Development Environment

Note

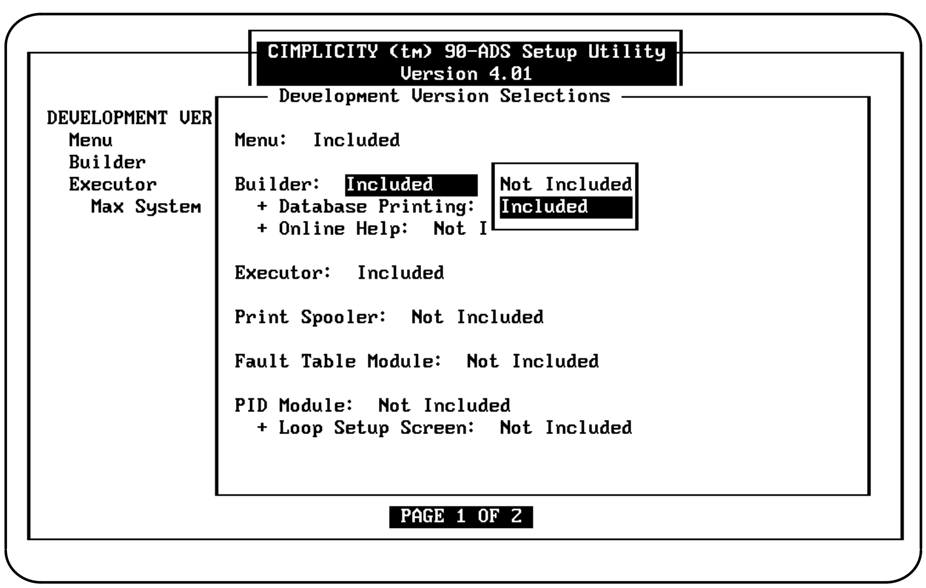
Beginning with ADS software release 4.01, the development environment no longer needs to be used in developing or executing a system. Instead, the PC-based Builder should now be used for all your development needs. Support for the development environment is maintained primarily for those customers currently experienced with it.

The ADS development environment is used primarily when you are developing a new ADS operator interface system. It has a *Menu Program*, and may optionally consist of a *Builder*, a *Database Printout* utility for the Builder, an *Online Help* facility for the Builder, an *Executor*, a *Print Spooler*, a *Fault Table Module* and/or a *PID Module* (including a loop setup screen).

Using the development environment is particularly effective when first learning about how the CIMPLICITY 90-ADS software works, or for using the Fault or PID option modules without needing to create a system first. However, because of memory limitations the development environment is not very effective in producing typical sized systems. For the actual production of your system you are encouraged to use the PC-based Builder (see Chapter 8) in conjunction with the execute-only environment (see Section 5 in this chapter).

In the upper lefthand corner of the ADS Setup Utility's page 1 screen you will see the currently selected options for the development environment. The numbers to the right of each selection indicate how much memory they will occupy which could otherwise be used for additional database space for your ADS system. The memory remaining for the database is also displayed. When the ADS software is first installed on your computer, the default selections are Menu, Builder, Online Help and Executor, which is all that most users should initially need.

It's possible to choose more options than will fit in memory. If this happens, the available database space will be shown as a negative number, and an Error indicator will be blinking next to it. To change the development version selections, execute the **Development Version Selections** menu option. The following screen will be displayed on your computer's screen:



In this dialog box you have the option of **Including** or **Not Including** each of the optional components. In some cases, the selection of one option requires the selection of another; this will be done for you automatically. All components, with the exception of the Menu program, are optional for the development environment. See Chapter 1 of the CIMPLICITY 90-ADS Reference manual, GFK-0641, for details on the operation of the Menu.

The **Builder** option is used to create and modify ADS operator interface systems. Except in the case of the Mini OIT and the Touch Mini OIT terminals, the Builder is typically executed on the target terminal. See Chapters 2 through 12 of the CIMPLICITY 90-ADS Reference manual, GFK-0641, for more details on the operation of the Builder.

The **Database Printing** option provides a method for obtaining a listing of your ADS operator interface system. It can only be selected if the Builder option is also selected. Selecting the database printing option automatically selects the print spooler option. See Chapters 3 through 10 of the CIMPLICITY 90-ADS Reference manual, GFK-0641, for more details on the operation of Database Printing.

The **Online Help** option enables an extensive help facility for the Builder. It can only be selected if the Builder option is selected. See Chapter 2 of the CIMPLICITY 90-ADS Reference manual, GFK-0641, for more details on the operation of Online Help.

The **Executor** option is used to execute an existing ADS operator interface system on the target terminal. See Chapter 13 of the CIMPLICITY 90-ADS Reference manual, GFK-0641, for more details on the operation of the Executor.

The **Print Spooler** option is used to output text to a printer. It is automatically selected if you have also selected the Database Printing option (see above). You will also want to select it if you intend to log alarms or print reports to a printer when your ADS operator interface system is executed via the Executor (see above). See Chapter 13 of the CIMPLICITY 90-ADS Reference manual, GFK-0641, for more details on the operation of the Print Spooler.

The **Fault Table Module** provides you with two screens for displaying the PLC and I/O fault tables maintained by the Series 90 CPU. These screens are almost identical to those supported by the Logicmaster 90 Programming and Configuration software packages. The fault table module can be accessed either from the Menu Program or from within your ADS operator interface system. See Chapter 14 of the CIMPLICITY 90-ADS Reference manual, GFK-0641, for more details on the operation of the Fault Table Module.

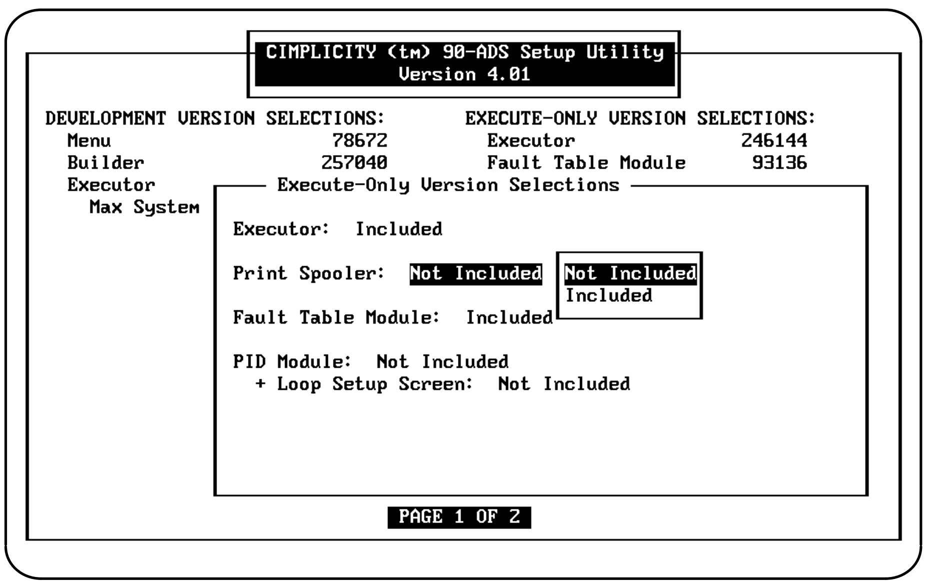
The **PID Module** provides you with four screens (including the loop setup screen) for viewing and manipulating PID loop data resident in the Series 90 CPU. These screens include a setup screen, a configuration screen, a monitor screen and a tuning screen. The PID module may be accessed either from the Menu Program or from within your ADS operator interface system. See Chapter 15 of the CIMPLICITY 90-ADS Reference manual, GFK-0641, for more details on the operation of the PID Module.

Section 5: Customizing the ADS Execute-Only Environment

The ADS execute-only environment is used in two main ways. First, it is used in conjunction with developing a system using the PC-based Builder (see chapter 8). Second, it is used when the building of your ADS operator interface system is (nearly) complete, and you want the system to automatically begin executing when you power cycle the PLC or do a soft reset of the ADC module. It always consists of an *Executor*, and may optionally consist of a *Print Spooler*, or *Fault Table Module* and / or a *PID Module* (with or without a loop Setup Screen).

In the upper righthand corner of the ADS Setup Utility's page 1 screen you will see the currently selected options for the execute-only environment. The numbers to the right of each selection indicate how much memory they will occupy which could otherwise be used for additional database space for your ADS system. The memory remaining for the database is also displayed. When the ADS software is first installed on your computer, the default selections are Executor and Fault Table Module, which is all that most users should initially need (in fact, many users will not need the Fault Tables module).

To change the execute-only version selections, execute the **Execute-Only Version Selections** menu option. The following screen will be displayed on your computer's display:



In this dialog box you will have the option of **Including** or **Not Including** each of the optional components. All components, with the exception of the Executor, are optional for the execute-only environment.

The **Print Spooler** option is used to output text to a printer. You will want to select it if you intend to log alarms or print reports to a printer when your ADS operator interface system is executed via the Executor (see above). See Chapter 13 of the CIMPLICITY 90-ADS Reference manual, GFK-0641, for more details on the operation of the Print Spooler.

The **Fault Table Module** provides you with two screens for displaying the PLC and I/O fault tables maintained by the Series 90 CPU. These screens are virtually identical to those supported by the Logicmaster 90 Programming and Configuration software packages. The fault table module may be accessed from within your ADS operator interface system. See Chapter 14 of the CIMPLICITY 90-ADS Reference manual, GFK-0641, for more details on the operation of the Fault Table Module.

The basic **PID Module** provides you with three screens for viewing and manipulating PID loop data resident in the Series 90 CPU. These screens include a configuration screen, a monitor screen and a tuning screen. Optionally, you may include a loop setup screen (typically only needed for initially setting-up the loop definitions). The PID module may be accessed from within your ADS operator interface system. See Chapter 15 of the CIMPLICITY 90-ADS Reference manual, GFK-0641, for more details on the operation of the PID Module.

Section 6: Specifying the Host Computer

The host computer selections indicate whether your computer has a color display or a monochrome display, whether or not the computer should emulate the GE Fanuc OIT terminal character set when running the PC-based Builder and what type of printer (if any) is attached to the computer. The current selections may be viewed in the upper third of the ADS Setup Utility page 2 screen.

To change the host computer selections, execute the **Host Computer Selections** menu option. The following screen will be displayed on your computer's display:

```
                 CIMPLICITY (tm) 90-ADS Setup Utility
                             Version 4.01

HOST COMPUTER SELECTIONS:
  Monochrome                             Generic ASCII Printer
  Normal IBM Character Set

TARGET TERMINAL SELECTIONS:
  COM2:
  Terminals Supported:  COIT   MOIT   TMINI  CIBM

TAR     Host Computer Selections
  P
     Host Computer Monitor:  Monochrome   MONOCHROME
                                          COLOR
     Host Computer Character Set:  Normal

     Host Printer Type:  Generic ASCII Printer

                              PAGE 2 OF 2
```

In this dialog box you will have the opportunity to configure the information concerning your host computer. The host computer selections are utilized to properly initialize the PC-based Builder (see Chapter 8).

You should specify either **color** or **monochrome** for your computer's monitor, as appropriate. Monochrome is the default choice, and will function properly on color monitors as well. Note that your selection should be based on your computer's actual monitor, or screen, and not based on which video adapter board is installed in the computer. This selection is used by the ADS Setup utility itself, in addition to being used by the PC-based Builder.

The host computer character set defaults to **normal IBM**, which means that the computer's character set will be used in the PC-based Builder. This setting will work properly for all target terminals, and is the setting of choice for use with the CIBM, MIBM, VT100 and LUDCO terminal tables. You may want to use one of the other two settings, **OIT - EGA resolution** or **OIT - VGA resolution** if the following set of conditions are ALL true:

- You are using one of the terminal tables COIT, MOIT, MINI, TMINI, TCOIT, TMOIT
- You are planning on using the graphic character set capabilities of the terminal
- Your computer has either an EGA or VGA video graphics adapter installed

Using one of the "OIT" character sets allows your computer to properly display the target terminal's graphic characters. The normal IBM character set allows for graphic character specification, but you cannot view the graphic characters as they would appear on the target terminal.

There are three disadvantages to using one of the "OIT" character sets, as summarized below.

1. When you create screens in the PC-based Builder the display will be somewhat compressed into the upper part of the computer's monitor. This is because the OITs characters do not use as many pixels in the vertical plane as does your computer's character set. As the characters will be somewhat smaller on the monitor, they will be somewhat more difficult to see.
2. A number of the OIT graphic characters, when grouped together, form pictures of objects like valves and circles. When using one of the OIT character sets in the PC-based Builder, you may see very thin vertical breaks separating some of the individual characters which affects the display of these pictures. This effect is due to your computer's video graphics adapter and will have no affect on what is actually displayed on the target terminal.
3. The OIT character set emulation redefines the meaning of the BOLD attribute bit. This means that characters viewed in the PC-based Builder which were / are created with the BOLD attribute enabled will appear on your computer monitor as graphics characters; they will appear on the target terminal properly, however.

You can use the ADS Setup utility to switch the character set between invocations of the PC-based Builder to reduce the impact of the problems listed above, as appropriate, to the screens of your system you are working on in the PC-based Builder at any point in time.

By default the printer attached to your computer is treated as a **generic ASCII** printer. All output to such a printer is done with standard ASCII characters. Any line drawing or other graphic characters are printed out with a standard ASCII character representing it. If you are using one of the terminal tables COIT, MOIT, MINI, TMINI, TCOIT or TMOIT, and you are using the graphic character capabilities of that terminal, the **Epson** and **HP HPGL Laser** choices are attractive alternatives. The Epson selection supports any of the standard Epson-compatible printers (e.g., Epson FX-100) and the HP selection supports any of the HP-compatible laser printers which supports HPGL (e.g., HP LaserJet IIISi). With the Epson and HP type of printers you can obtain a true printout of your screens which contain graphic characters on them.

Section 7: Specifying the Target Terminal

The target terminal selection tells ADS where it should expect to find your target display terminal and lets you select which terminal types are to be supported. Your target terminal's location will depend on the type of terminal you are using, and will be either **COM1:** or **COM2:**. The current selections may be viewed in the middle third of the ADS Setup Utility page 2 screen.

Refer to the table below to determine the selection which is right for the terminal that you are using.

Table 7-1. Target Terminal Port Selection

Terminal	Target Table	Terminal Port Selection
GE Fanuc color OIT	COIT	COM2:
GE Fanuc monochrome OIT	MOIT	COM2:
Nematron OptiTOUCH color OIT	TCOIT	COM2:
Nematron OptiTOUCH monochrome OIT	TMOIT	COM2:
GE Fanuc Mini OIT	MINI	COM2:
GE Fanuc Touch Mini OIT	TMINI	COM2:
VT100	VT100	COM2:
Lucas Deeco ST-2200	LUDCO	COM2:
IBM PC with color display	CIBM	COM1:
IBM PC with monochrome display	MIBM	COM1:

The ADS Setup Utility screen lists which target terminals have been included for support. You will notice that the **COIT MOIT**, **TMINI**, and **CIBM** terminal tables are always included, since they are resident in the firmware on the ADC module. The **MIBM**, **MINI**, **TCOIT**, **TMOIT, VT100** and / or **LUDCO** terminal tables may also be included, at a small cost of available memory on the ADC module. Do not include any of these terminals that you do not need.

To change the target terminal selections, execute the **Target Terminal Selections** menu option. The following screen will be displayed on your computer's display:

```
                 CIMPLICITY (tm) 90-ADS Setup Utility
                             Version 4.01

HOST COMPUTER SELECTIONS:
  Monochrome                              Generic ASCII Printer
  Normal IBM Character Set
                 Target Terminal Selections
TARGET TERMINAL
  COM2:          Terminal Connected To:  COM2:    COM1:
  Terminals Sup                                   COM2:
                 MIBM.TBL:  Not Included

TARGET PRINTER   MINI.TBL:  Not Included
  Printers Supp
                 TCOIT.TBL: Not Included

                 TMOIT.TBL: Not Included

                 VT100.TBL: Not Included

                 LUDCO.TBL: Not Included
```

In this dialog box you will have the option of defining your target terminal as either **COM1:** or **COM2:**, and whether or not to include the **MIBM**, **MINI**, **TCOIT**, **TMOIT**, **VT100** and / or **LUDCO** terminal tables.

Section 8: Specifying the Target Printer

The target printer selection tells ADS what type of printers are to be supported that are attached to the ADC module (NOT attached to your computer). In the bottom third of the ADS Setup Utility page 2 screen you can view the current target printer selections.

The **ASCII** and **TTY** printer tables are always included, since they are resident in the firmware on the ADC module, and will work with any printer you attach to the ADC module. The only difference between the ASCII and the TTY printer tables is that use of the ASCII table will automatically activate form feed generation every 63 lines while the TTY table will never generate any form feeds. The **PCNEC** (NEC printer), **LA100** (DEC LA100 printer) and **EPSON** (Epson compatible printer, e.g., Epson FX-100) printer tables may also be included at a small cost of available memory on the ADC module. If you do not need one of these additional tables, you should not include them.

Note that only the EPSON printer table supports the printing of OIT terminal graphic characters; all other selections will print out an ASCII character substitution instead. The EPSON printer table not only supports database printing from within the Builder when the ADC-based Builder is being used, but it also supports screen prints triggered by the TTDUMP command from within the Executor.

To change the target printer selections, execute the **Select Target Printer** menu option. The following screen will be displayed on your computer's display:

```
                 CIMPLICITY (tm) 90-ADS Setup Utility
                            Version 4.01

HOST COMPUTER SELECTIONS:
  Monochrome                                 Generic ASCII Printer
  Normal IBM Character Set

TARGET TERMINAL SELECTIONS:
  COM2:
  Terminals Supported:  COIT   MOIT   TMINI  CIBM

TARGET PRINTER  ────── Target Printer Selections ──────
  Printers Supp
                 PCNEC.TBL:  Not Included   Not Included
                                            Included
                 LA100.TBL:  Not Included

                 EPSON.TBL:  Not Included

                           PAGE 2 OF 2
```

In this dialog box you will have the option of including the **PCNEC**, **LA100** and / or **EPSON** printer tables.

Section 9: Leaving the Setup Utility

After making any changes that you want to make, execute the **Leave Setup** menu option. If you have made any changes, the ADS Setup Utility will prompt you to confirm that the changes should be saved. Any changes saved will be stored and used the next time the ADS Setup Utility is run.

Section 10: Installing the New Selections on the ADC Module

The ADS Setup Utility **does not automatically install your selections** on the ADC module; you must use the PCOP communications software for that. The same ADS installation process you followed to initially install the ADS software will need to be followed again to install the changes. Refer to Chapter 5 for details on using PCOP to install the ADS software onto the ADC module.

Note that when installing the ADS software subsequent to a previous installation that only the changes you have made are updated to the module. Therefore, subsequent installations normally take much less time to accomplish than the initial installation. Also note that any user system resident on the ADC module's RAM: disk will be unaffected by the software installation process.

Chapter 8

ADS Off-Line, PC-Based Builder

A version of the ADS Builder is hosted on an IBM-PC or compatible computer, allowing you to build systems for any of the supported target terminal types. Based on your computer equipment and the target terminal you are building the system for, you may need to change the default settings in effect for the PC-based Builder. See chapter 7, Section 6, "Specifying the Host Computer", for how to properly specify host computer settings which impact the operation of the PC-based Builder.

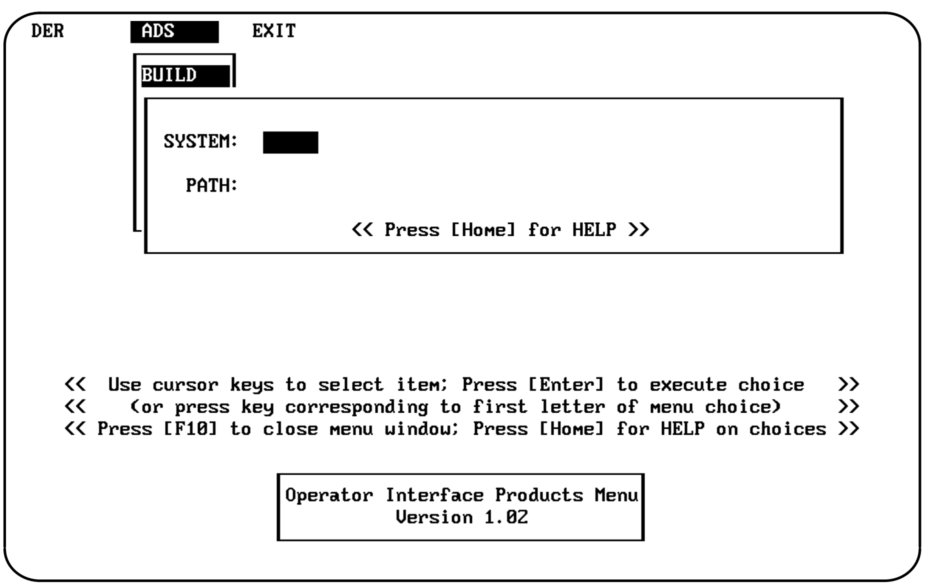
Note that a version of the ADS Builder may be loaded onto the ADC module when the "development mode" is installed on the ADC module. The ADC-based version of the builder is useful *ONLY* for tutorials and the creation of very small systems. The PC-based Builder should be used for all serious system creation and editing. Systems created with either Builder are completely compatible between both Builders.

Section 1: Accessing The Builder

The ADS PC-based Builder may be accessed either by directly calling it or alternatively it may be accessed via the OI Menu program. Most users will find the OI Menu program the most convenient as it also gives easy access to other ADS software utilities. The OI Menu program may be accessed either by pressing the "OI" key on the Logicmaster 90 main menu or by specifying

OI_MENU

at the MS-DOS prompt. In either case, the initial OI Menu screen will be displayed. From the initial screen the ADS menu is selected and then the Builder option is chosen.



The SYSTEM name field is filled out with the name of a new or existing ADS system. The name may consist of from 1 to 5 alphanumeric or underscore (_) characters. If no PATH to a "source folder" is specified, the system will be created in / accessed from the "folder" (MS-DOS sub directory)

\ADS_PC\<systemname>.PCM

If the optional PATH field is filled in, it must be filled in with the complete MS-DOS directory path where the system is to be created or located. A discussion of folders is given below.

Alternatively, you may create / access a system by specifying

ADSBUILD <system name> {<source folder path>}

at the MS-DOS prompt, where <system name> and the optional <source folder path> are as described above. For example, to create the system NEW in the "standard folder" \ADS_PC\NEW.PCM you would specify

ADSBUILD NEW

In either case, the ADS Builder will be executed. After pressing the [Enter] key when viewing the copyright screen, the following will be displayed on the computer screen.

```
                      A D S   B U I L D E R

                  Current System Name:     NEW

Terminal:   MPC       (COM2:)   Default Scan Rate:          1.00 s
Printer:              (NULL:)   Default Alarm Scan Rate:    1.00 s
Dir:         \ADS_PC\NEW.PCM    Startup Screen:
                                ADS Print Destination:    STDPRN

Screens:                 0
Alarm pages:             0
Reports:                 0                Configuration operations
Alarm sources:           0                Screen operations
Data sources:            0                Alarm operations
Display formats:         0                Report operations
Translations entries:    0                Load/Save operations
Eng Unit Conv.entries:   0                Print system summary
Lookup table entries:    0                Options PID
Command scripts:         0                Terminal
                                          Exit
```

Note that the folder \ADS_PC\NEW.PCM was created automatically; also note that the base folder name is the same as the system name.

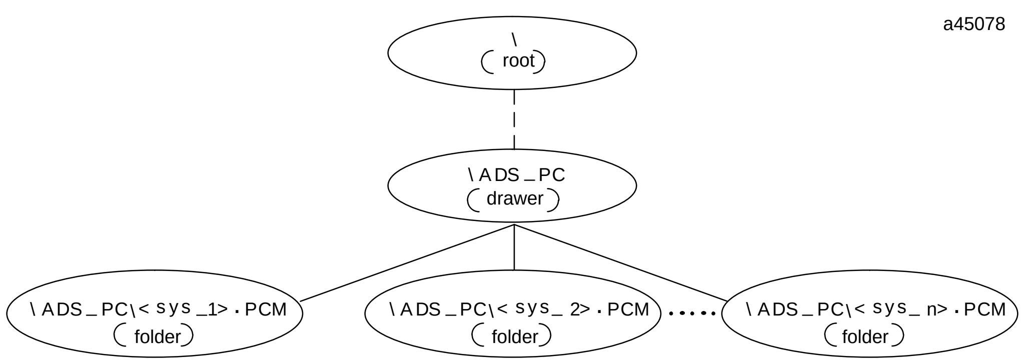
Section 2: Managing Your Folders

An important concept for the ADS software in general and the PC-based Builder in specific is that of the *folder.* A folder is a specially-named subdirectory on a computer hard disk which contains files making up one or more ADS systems (databases). An ADS folder must be a subdirectory which ends in an extension of .PCM. In general, it is a good idea to keep each of your ADS systems in a separate folder, for reasons discussed below.

One or more folders are said to reside in a *drawer.* A drawer is just another subdirectory on your computer disk immediately one level higher than the folders it contains. It can be any subdirectory, including being a folder itself. The concept of a drawer has most importance in the PCOP software used to install the ADS software and to manage its folders. On PCOPs folder selection screen will be listed the currently selected folder, along with all other folders residing in the same drawer. Placing all your folders in a common drawer will aid you in quickly identifying which folders you have when entering PCOP.

The PC-based Builder is easiest to use when you let it manage the creation and placement of the folder which will contain your system. The diagram below shows how the PC-based Builder will use \ADS_PC as the standard drawer for all your folders, and match the name of your folders with that of your systems, when executing the PC-based Builder by specifying

ADSBUILD <system name>



Alternatively, the PC-based Builder will let you manage the creation and placement of the folder which will contain your system. In this case you execute the Builder with the command

ADSBUILD <system name> <source folder>

where <source folder> is the full path designation for where the folder is to be found; the system name need not match the folder name. For example, to create the system LINE in the folder \FOLDERS\ACME.PCM, you would execute the Builder with the command

ADSBUILD LINE \FOLDERS\ACME.PCM

As a word of caution, if you specify the folder destination when creating your system, you will always need to specify it. If at some later time you specify only

ADSBUILD LINE

when executing the Builder, a new system named LINE will be created in the folder \ADS_PC\LINE.PCM!

Whether you allow the PC-based Builder to manage the naming and placement of your folder or you do it yourself, you are strongly encouraged to keep only a single system in your folder and to make sure that other non-system files are not created in the folder. All of the files making up your system will begin with the name of your system (except the file PID.PID) and end with one of the following extensions: .CFG, .ALM, .SCN, .REP, .HEL, .HLP, .PID., or .STR By keeping only a single system in a folder you will be able to take advantage of PCOPs folder load capability when you need to load your system to the ADCs RAM: disk.

You are also strongly encouraged to make periodic backups of your folder to guard against the accidental loss of system data. The general rule of thumb is to back up your folder after you have made significant changes to the system, or perhaps once or twice a day. The PCOP software provides a folder backup function within its “Folder” menu of functions which you may use to easily perform your backup operation. It also provides a folder restore function in case you find the need to go back to a previously saved version of your system.

Although you may execute the PC-based Builder and PCOP from any current MS-DOS directory, you may find it more convenient to use the MS-DOS “CD” (change directory) command to select the folder containing your system as the current directory. This has greatest benefit when using PCOP, since when PCOP is executed it looks to see if the current MS-DOS directory is a folder, and if so, automatically selects it and bypasses the initial “select a folder” screen.

Section 3: Building Your System

Before You Start

Although ADS requires no programming to construct a system and employs fill-in-the-blanks forms for data entry, ADS does offer you a great deal of flexibility in how you can construct a system. Rather than enforcing a single rigid structure, you can choose how many screens should be used to display a given amount of data, whether or not to employ pull-down menus and pop-up windows, how to display alarm information to the operator, which screens can be accessed from a given screen, etc. By taking some time to rough out an organization of the system you want to construct before actually beginning to build it will save you a lot of time and reduce the amount of "trial and error" rework you will need to do.

In particular, you will want to rough out the overall structure of your system, deciding what information you want to be accessible on a particular screen, what actions you want the operator to be able to invoke on a particular screen and how you want the operator to be able to "navigate" between the various screens. Since ADS connects serially to a terminal, as opposed to how a monitor connects to a computer, you will want to minimize the number of screen changes (which can take several seconds) an operator needs to make to carry out a particular task. When you do need to display a new screen, if you can use a small pop-up window it will take less time to display than displaying a different full size screen.

For those of you who are using a touch terminal, you will also need to be concerned about organizing the information on the various screens so that you can properly position the needed touch points. In particular, on screens that will require the input of numeric data you will need to organize your data so that you will have screen space to pop-up a numeric keypad without covering up the field you are trying to enter data into.

What To Do Before Creating Your First Screen

When you enter the Builder specifying the name of a new system the Builder will generate a new, initialized, system. You will need to tell the Builder several things about the system you intend to create before you actually start building it. The example screen below shows how the Builder initializes certain settings when generating a new system. In the upper third of the screen you will see the settings initially applied for the *terminal*, *ADC communications port* and *printer port*. At least the *terminal* will always have to be changed to specify the intended target terminal that will be connected to the ADC module; the other two will also sometimes need to be changed.

```
                          A D S   B U I L D E R

                   Current System Name:     NEW

Terminal:   MPC       (COM2:)  Default Scan Rate:            1.00 s
Printer:              (NULL:)  Default Alarm Scan Rate:      1.00 s
Dir:            \ADS_PC\NEW.PCM  Startup Screen:
                               ADS Print Destination:     STDPRN

Screens:                   0
Alarm pages:               0
Reports:                   0         Configuration operations
Alarm sources:             0         Screen operations
Data sources:              0         Alarm operations
Display formats:           0         Report operations
Translations entries:      0         Load/Save operations
Eng Unit Conv.entries:     0         Print system summary
Lookup table entries:      0         Options PID
Command scripts:           0         Terminal
                                     Exit
```

Before creating the first screen in a new system you should always go into the *Configuration operations* sub menu and open the *Modify System Parameters* data entry form. Doing so will result in a display such as the one shown below.

```
                          A D S   B U I L D E R

                   Current System Name:     NEW

Terminal:   MPC       (COM2:)  Default Scan Rate:            1.00 s
Printer:              (NULL:)  Default Alarm Scan Rate:      1.00 s
Dir:            \ADS_PC\NEW.PCM  Startup Screen:
                               ADS Print Destination:     STDPRN

Screens:                   0
Alarm pages:               0
Reports:                   0
Alarm sources:             0 ---------- Modify System Params ----------
Data sources:              0            System Name:  NEW
Display formats:           0               Terminal:  MPC
Translations entries:      0        Terminal Device:  COM2:
Eng Unit Conv.entries:     0         Printer Device:  NULL:
Lookup table entries:      0      Default Scan rate:     1.00
Command scripts:           0 Default Alarm Scan rate:     1.00
                                     Startup screen:  0
```

You should select the *Terminal* field and type in the name of the terminal you intend to connect to the ADC module. Once the proper terminal is selected, the Builder will be able to enable all the various attributes of your terminal, e.g. color, touch capability, supported character sets, screen size (lines and columns), etc., as you create new screens.

Refer to GFK-0641, *CIMPLICITY 90-ADS Alphanumeric Display System Reference Manual*, Chapter 3, "Configuration Operations", for a complete list of supported terminals, and for information on changing any of the other system parameter settings.

Section 4: Executing The System You Have Built

Keeping Your System On The RAM: Drive

The easiest way to use the PC-based Builder in conjunction with executing the system on the target terminal for check out is to keep the system on the ADC module's RAM: drive, "refreshing" it with changes made while in the PC-based Builder. When the system is completed it will already reside on the ADC module, so the computer only needs to be disconnected from the module (unless the computer is being used as the target terminal). The general steps to follow in building a system in this manner are listed below. Note that the following steps assume that you have followed the development tutorial in Chapter 6 so that you have a general knowledge of the Builder functionality. You may also need to refer to the *CIMPLICITY 90-ADS Reference Manual*, GFK-0641, for specific information.

1. Hard reset the ADC module. If a different system currently resides on the ADC module's hard disk, ensure that you have an archived copy of it and then delete it from the ADC module using PCOP.
2. Use the ADS Setup Utility (see Chapter 7) to select the options for the execute-only environment, the host computer, the target terminal (specify the target terminal port as the port to which your terminal is actually connected; typically COM2: for all but the CIBM and MIBM terminal tables) and the target printer (if a printer is being used).
3. Use PCOP (accessed either via the OI Menu program or by typing ADS at the MS-DOS prompt) to install the ADS software in execute-only mode, specifying the name you intend to use for your system, the target terminal table and (optionally) the target printer table. When the software installation is complete, the ADS Executor will automatically attempt to find and execute the system. If it does not exist on the module's RAM: drive nor in the currently selected folder (PC: drive), which will be the case if this is a new system, the error message "*Error opening system configuration file PC:<system name>.CFG*" will be displayed on the target terminal screen and the ADC module will hard reset itself. If the system is found, you should exit the system; this will also hard reset the ADC module. In either case, exit the PCOP software.
4. Execute the PC-based Builder specifying the appropriate system name and (if needed) the folder location.
5. If you are creating a new system, you should specify the appropriate target terminal name before creating any screens. By default the target terminal name will be either CPC, MPC, EIBM or VIBM. This must be changed in the Modify System Parameters data entry form (under Configuration Operations) to the terminal table used for your particular target terminal.
6. Create the screens, alarms, etc. that you want to see executed on the target terminal. Remember to go back to the Modify System Parameters data entry form and specify the starting screen number, if you have not already done so.
7. Save your system additions and changes to your computer's hard disk by using the "Save system to disk" option under "Load / Save Operations".

8. Update your system (database) files on the ADC module's RAM: drive by using the "Refresh system in RAM:" option under "Load/Save Operations". Note that the first time this option is executed after entering the Builder that the complete system will be loaded to the ADC module, even if it already exists on the RAM: drive. This is because the Builder has no way to compare the files on the ADC module with those on the computer to see which ones actually need updating. Subsequent system refreshes will load only those files that have changed to the ADC module's RAM: drive.

9. Execute your system by using the "Execute system in RAM:" option under "Load / Save Operations". You should see your system begin executing on the target terminal. If instead you receive the error message "*Function not available when ADC is Offline. Attach or reset ADC.*", you should make sure that your computer is connected to port 1 of the ADC module and then hard reset the ADC module. After hard resetting the ADC module, attempt to execute your system again.

10. When you have finished viewing the system on the target terminal, exit it by either pressing a function key to which the EXIT() command is attached or by holding down the [Ctrl] key on the *target terminal's keyboard* while simultaneously pressing the [E] key. Alternatively, you may hard reset the ADC module. Within a few seconds you should see "->" displayed on your computer screen.

11. To return to the Builder, hold down the [Alt] key on your computer's keyboard and simultaneously press the [Z] key. You should see the Builder's main menu screen.

Repeat steps 6 through 11 above until you complete your development.

Keeping Your System On The PC: Drive

Another way to use the PC-based Builder in conjunction with executing the system on the target terminal for check out is to let the system remain only on the computer (PC: drive) while it is being built. When the system is completed it can be loaded to the ADCs RAM: drive so that the computer can be detached from the module. The general steps to follow in building a system in this manner are listed below. Note that the following steps assume that you have followed the development tutorial in Chapter 6 so that you have a general knowledge of the Builder functionality. You may also need to refer to the *CIMPLICITY 90-ADS Reference Manual*, GFK-0641, for specific information.

1. Hard reset the ADC module. If a system currently resides on the ADC module's hard disk, ensure that you have an archived copy of it and then delete it from the ADC module using PCOP.

2. Use the ADS Setup Utility (see Chapter 7) to select the options for the execute-only environment, the host computer, the target terminal (specify the target terminal port as the port to which your terminal is actually connected; typically COM2: for all but the CIBM and MIBM terminal tables) and the target printer (if a printer is being used).

3. Use PCOP (accessed either via the OI Menu program or by typing ADS at the MS-DOS prompt) to install the ADS software in execute-only mode, specifying the name you intend to use for your system, the target terminal table and (optionally) the target printer table. When the software installation is complete, the ADS Executor will automatically attempt to find and execute the system. If it does not exist in the currently selected folder (PC: drive), which will be the case if this is a new system, the error message "*Error opening system configuration file PC:<system name>.CFG* " will be displayed on the target terminal screen and the ADC module

will hard reset itself. If the system is found, you should exit the system; this will also hard reset the ADC module (see note above concerning removing a system from the RAM: drive). In either case, exit the PCOP software.

4. Execute the PC-based Builder specifying the appropriate system name and (if needed) the folder location.
5. If you are creating a new system, you should specify the appropriate target terminal name before creating any screens. By default the target terminal name will be either CPC, MPC, EIBM or VIBM. This must be changed in the Modify System Parameters data entry form (under Configuration Operations) to the terminal table used for your particular target terminal.
6. Create the screens, alarms, etc. that you want to see executed on the target terminal. Remember to go back to the Modify System Parameters data entry form and specify the starting screen number, if you have not already done so.
7. Save your system additions and changes to your computer's hard disk by using the "Save system to disk" option under "Load / Save Operations".
8. Execute the "Terminal" option on the Builder's main menu. Press the [Enter] key on your computer's keyboard a couple of times. If you do not see one or more "–>" characters appear on your computer's screen, the ADC module is either not hard reset or it is not connected to your computer. If a system is running on the target terminal, exit it (see step 10 below); otherwise, hard reset the ADC module with its reset button (by depressing it for at least five seconds). Within a few seconds you should see "->" displayed on your computer screen.
9. While holding down the [Alt] key on your computer's keyboard simultaneously press the [E] key. You should see your system begin executing on the target terminal.
10. When you have finished viewing the system on the target terminal, exit it by either pressing a function key to which the EXIT() command is attached or by holding down the [Ctrl] key on the *target terminal's keyboard* while simultaneously pressing the [E] key. Alternatively, you may hard reset the ADC module. Within a few seconds you should see "->" displayed on your computer screen.
11. To return to the Builder, hold down the [Alt] key on your computer's keyboard and simultaneously press the [Z] key. You should see the Builder's main menu screen.

Repeat steps 6 through 11 above until you complete your development.

Note

When a system is loaded from the PC: drive and executed on the ADC module it will require MORE memory than when the system is loaded from the ADCs RAM: drive. Thus you can be assured that your system will still fit in memory when you have completed your system and want to place it on the RAM: drive. The easiest way to load a system from the computer to the ADC module is via the Builder's "Refresh system in RAM:" option under "Load / Save Operations". Alternatively, you may use PCOPs "Folder Load" capability, although you will need to be concerned with non-system files being located in the folder (this is something you don't have to worry about with the "refresh system" approach).

Chapter 9

The ADS Help Utility

To make your ADS operator interface systems easier to use, you can add comprehensive, context-sensitive on-line help entries. Up to 999 separate help entries can be defined, although the total size of the resulting help file must fit within 32,768 bytes of memory. Each entry, or index, is accessed by executing the HELP() command (see Chapter 3, Section 6 of the *CIMPLICITY 90-ADS Reference Manual*), specifying the particular help screen to be displayed. Both multi-page and multi-threaded help screen organization is available, as described below.

Any text editor which produces normal ASCII files can be used to create the help text for your ADS operator interface system. The file containing the text should be named

```
<system>.HEL
```

where <system> is the name of your ADS operator interface system (see Chapter 3, Section 1 of the CIMPLICITY 90-ADS Reference Manual for restrictions on naming your system). A sample ADS help text file is shown below.

```
%10 ADS Help Facility Explained
Up to 999 Help indices may be defined for a single system. These
indices function as entry points to one or more help screens which
serve to provide the user with helpful information.  The syntax for
specifying a help index is

    %<index> <title>

where <index> is a value between 1 and 999 and <title> is an ASCII
text string.
%PAGE
The help information related to a particular help index may be
broken over multiple pages by specifying the page break.

    %PAGE

Chaining to another group of help screens, identified by another
unique index, is made possible via the chain specifier

    %CHAIN <index>

where again <index> is a value between 1 and 999.
%CHAIN 768
%768 Chaining to Additional Help
Chaining to another help index allows you to access common help
information from multiple unique starting points without the
need to replicate the information for each instance of use.  Care
must be taken, however, to avoid chaining help indices together
into an infinite loop!
```

The following five screens show how this help information might look on your terminal display. The screen below is a standard display screen. Function keys [F1] and [F2] are used to access help information.

```
Press [F1] for basic information on how to use the online facility,
      including the use of multiple pages and chaining

Press [F2] for information only on how to use chaining within the online
      help facility
```

Press the [F2] key to view the help specific to chaining. After viewing the help information, pressing the [Enter] key will remove the help window from the screen.

```
 ────────────────── Chaining to Additional Help ──────────────────
|Chaining to another help index allows you to access common help   |
|information from multiple unique starting points without the      |
|need to replicate the information for each instance of use.  Care |
|must be taken, however, to avoid chaining help indices together   |
|into an infinite loop!                                            |
 ─────────────────── Press RETURN to continue ─────────────────────

Press [F1] for basic information on how to use the online facility,
      including the use of multiple pages and chaining

Press [F2] for information only on how to use chaining within the online
      help facility
```

Now press the [F1] key to access the general help information. Note that you now have the option of pressing the [Enter] key for more help, or of pressing the [F10] key to close the help window.

```
──────────────────── ADS Help Facility Explained ──────────
Up to 999 Help indices may be defined for a single system.  These
indices function as entry points to one or more help screens which
serve to provide the user with helpful information.  The syntax for
specifying a help index is

     %<index> <title>

where <index> is a value between 1 and 999 and <title> is an ASCII
text string.

────────────── Press RETURN for more, QUIT to continue ─────────

Press [F1] for basic information on how to use the online facility,
     including the use of multiple pages and chaining

Press [F2] for information only on how to use chaining within the online
     help facility
```

To view additional help information, press the [Enter] key. Note that the same size help window was maintained, and that you again have the choice of viewing additional help text or of closing the help window.

```
──────────────────── ADS Help Facility Explained ──────────
The help information related to a particular help index may be
broken over multiple pages by specifying the page break

     %PAGE

Chaining to another group of help screens, identified by another
unique index, is made possible via the chain specifier

     %CHAIN <index>

where again <index> is a value between 1 and 999.
────────────── Press RETURN for more, QUIT to continue ─────────

Press [F1] for basic information on how to use the online facility,
     including the use of multiple pages and chaining

Press [F2] for information only on how to use chaining within the online
     help facility
```

Press the [Enter] key again. Note that the help screen originally accessed by pressing the [F2] key has been "chained to" after originally pressing the [F1] key. As this is last available help screen, the user is only given the option of pressing the [Enter] key, which will close the help window.

```
 ------------------ ADS Help Facility Explained --------------
|Chaining to another help index allows you to access common help |
|information from multiple unique starting points without the    |
|need to replicate the information for each instance of use.  Care|
|must be taken, however, to avoid chaining help indices together |
|into an infinite loop!                                          |
 -------------------- Press RETURN to continue ----------------

Press [F1] for basic information on how to use the online facility,
      including the use of multiple pages and chaining

Press [F2] for information only on how to use chaining within the online
      help facility
```

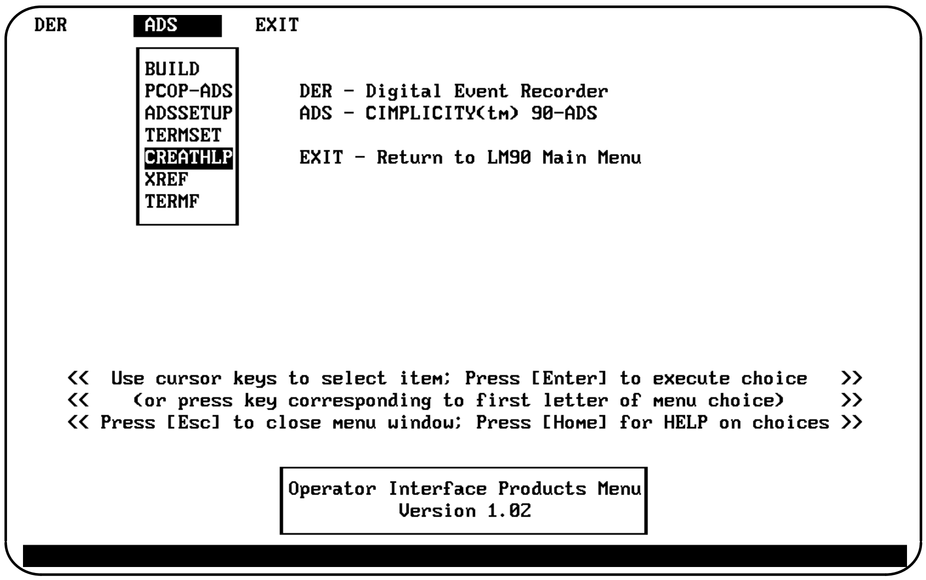
Each help entry point is defined by specifying a unique index for it, and is prefaced with the "%" character. The index you specify is the same one you will reference in a HELP command within your ADS operator interface system. Following the help index is the title to be displayed at the top of the help display. Note that the size and positioning of the help screen on your terminal display is calculated based on the row depth and the column width of the longest line of text for that entry.

Help related to a single help index may be broken up over multiple pages by using the %PAGE command to force a page break. All pages in a group will be sized based on the largest page in the group.

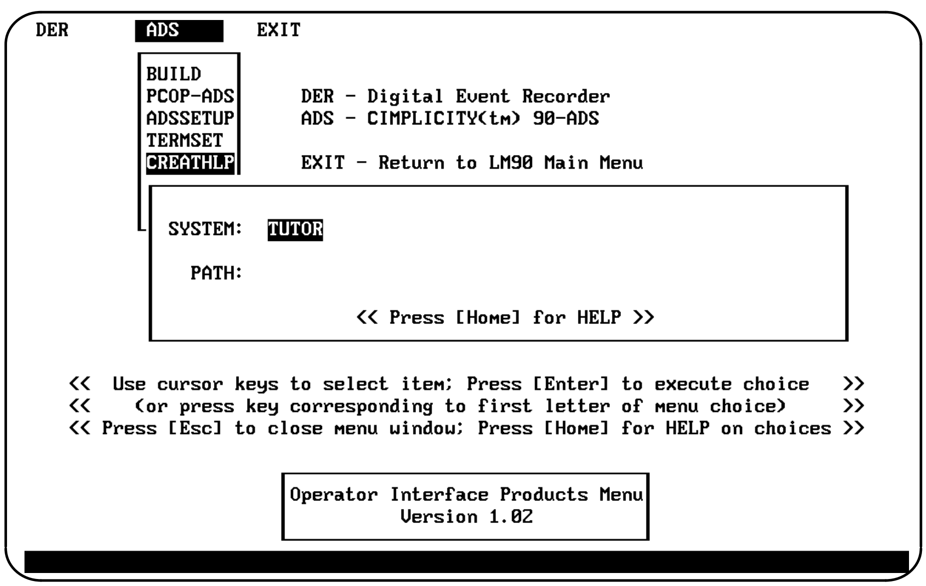
You can "chain" to help which is normally accessed by a different help index by using the %CHAIN inducer, where you indicate which new index to use.

After creating your help text file, you must convert it to a form that the ADS Executor (see chapter 13 in the *CIMPLICITY 90-ADS Reference Manual*) can understand. You can do this by using the ADS Create Help Utility.

There are two methods for entering the ADS Create Help Utility. The preferred method is to use the Operator Interface Products Menu, as shown in the screen below. Refer to Chapter 11 of this manual for details on using the Operator Interface Products Menu.



Upon executing, the "CREATHLP" menu item, you will be prompted for the name of the system and the path where it will be found. By default this data entry form will be filled out with the system and path that you last used with one of the ADS menu items.



To access this utility from the MS-DOS prompt, type the following command:

```
CREATHLP <system> (<path>)
```

where <system> is the name of your ADS operator interface system and <path> is an optional path specification for where to find your help text file. The path has to be specified only if neither of the following two criteria is met:

1. the <system>.HEL file is located in the current default MS-DOS subdirectory or
2. the <system>.HEL file is located in the system folder (<system>.PCM) located in the drawer \ADS_PC.

A file <system>.HLP will be created by the create help utility. It will warn you if too many lines or columns are used for particular indices, though you should also take into account the constraints of your particular terminal's display.

The resulting <system>.HLP file should ultimately reside in the same system folder as the rest of the files making up your ADS operator interface system, so that it can later be copied to the ADC as part of the overall system.

Chapter 10 The ADS Cross Reference Utility

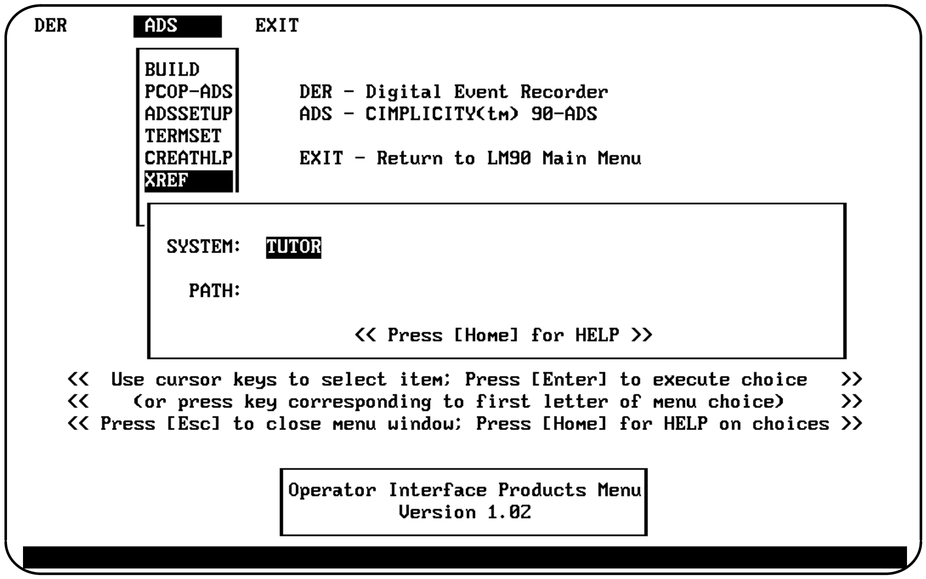
The Adsxref Utility is a PC based utility that can be used to create a listing of the PID loop definitions and a listing of all cross references in the system.

Section 1: Running the Adsxref Utility

There are two methods for entering the ADS Cross Reference Utility. The preferred method is to use the Operator Interface Products Menu, as shown in the screen below. Refer to Chapter 11 of this manual for details on using the Operator Interface Products Menu.

```
DER      ADS      EXIT

         BUILD
         PCOP-ADS      DER - Digital Event Recorder
         ADSSETUP      ADS - CIMPLICITY(tm) 90-ADS
         TERMSET
         CREATHLP      EXIT - Return to LM90 Main Menu
         XREF
         TERMF

   <<  Use cursor keys to select item; Press [Enter] to execute choice   >>
   <<    (or press key corresponding to first letter of menu choice)     >>
   << Press [Esc] to close menu window; Press [Home] for HELP on choices >>

                   Operator Interface Products Menu
                             Version 1.02
```

Upon executing, the "XREF" menu item, you will be prompted for the name of the system and the path where it will be found. By default this data entry form will be filled out with the system and path that you last used with one of the ADS menu items.



To access the Adsxref Utility from the MS-DOS prompt, type the following command:

```
ADSXREF <system_name>  (<system_path>)
```

where:

<system_name> is a name of an existing ADS system.

<system_path> is the optional complete path specification for where the ADS system may be found.

If the <system_path> specification is not provided, the system is expected to be found in a PCM folder of the same name as the system, beneath the \ADS_PC directory.

Command Line Flags

Once you become familiar with using the Adsxref Utility there are some command line flags that you may specify to disable certain events and/or change the terminal type. Following is a description of each of these flags and their valid settings:

Note

When specifying one or more flags from the command line, the system path MUST also be specified. The command line parameters are not case sensitive.

```
T:[C,M] –  This flag is used to select the type of
           terminal being used.
B:[Y,N] –  This flag enables/disables the prompt for
           building a nonexistent database.
R:[Y,N] –  This flag enables/disables the prompt for
           rebuilding a database that exists but is not
           up to date.
```

T Flag

The first time the Adsxref Utility is started up, the type of terminal being used (i.e. monochrome or color) is automatically detected. The setting of this flag is stored in an environment file.

Note

Some PCs are equipped with a CGA or VGA adapter and a terminal that displays shades instead of colors. In this particular setup some of the screens in the Adsxref Utility may look odd, in which case you may want to set this flag to T:M for monochrome.

B Flag

When a system is selected for which the cross reference database does not yet exist, a prompt is given to build the database. This prompt gives you the option to not build the database. If you always want a nonexistent database to be built, then this prompt can be eliminated by setting the flag to B:N. If the prompt is disabled, then the building of a nonexistent database WILL BE automatic.

R Flag

When a system is selected for which the cross reference database exists but is not up to date (i.e. changes have been made to the ADS system), a prompt is given to rebuild the database. This prompt gives you the option to not rebuild the database. If you do not want to see this prompt, it can be disabled by setting the flag to R:N. If the prompt is disabled, then the rebuilding of a database which is not up to date WILL NOT occur.

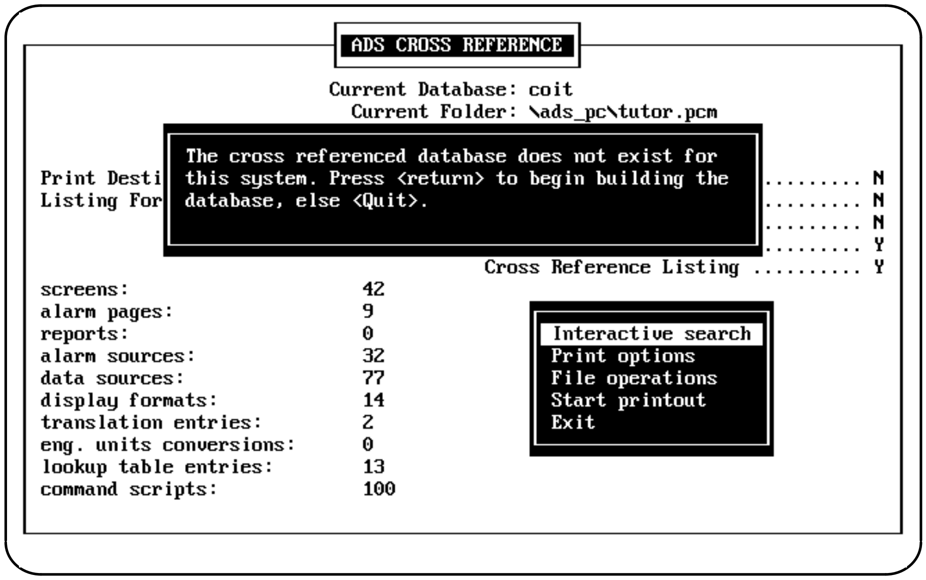
Any one or more of these flags can be specified on the command line at the MS-DOS prompt. Following is an example of a command line that might be used to invoke the Adsxref Utility:

```
ADSXREF XYZ \XYZ.PCM T:M B:N R:N
```

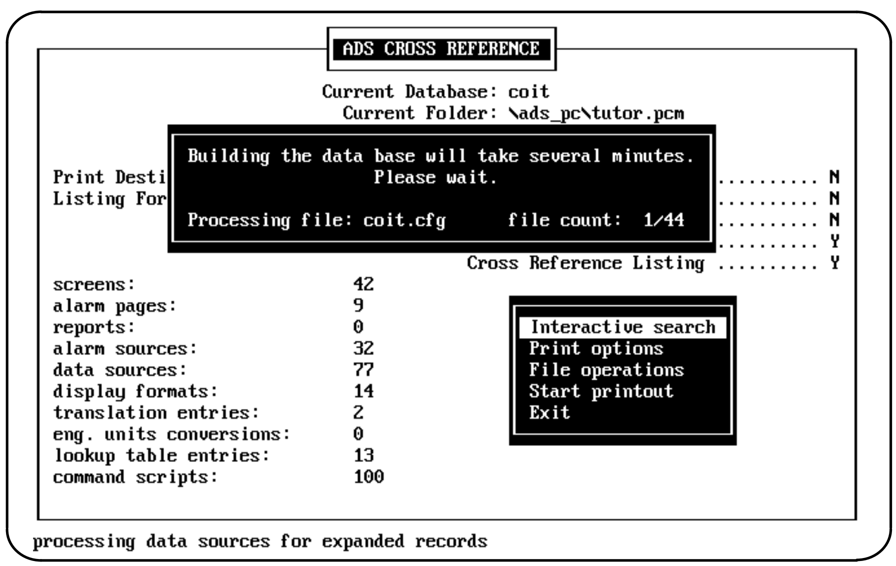
Once the adsxref utility has been started up, one of three scenarios will take place.

1. The database for the system selected does not exist.
2. The database for the system selected exists, but is not up to date.
3. The database for the system selected exists and is up to date.

The first condition is that the database for the system selected does not exist, in which case the database will be constructed. If the build prompt has not been disabled, the following screen will be displayed.

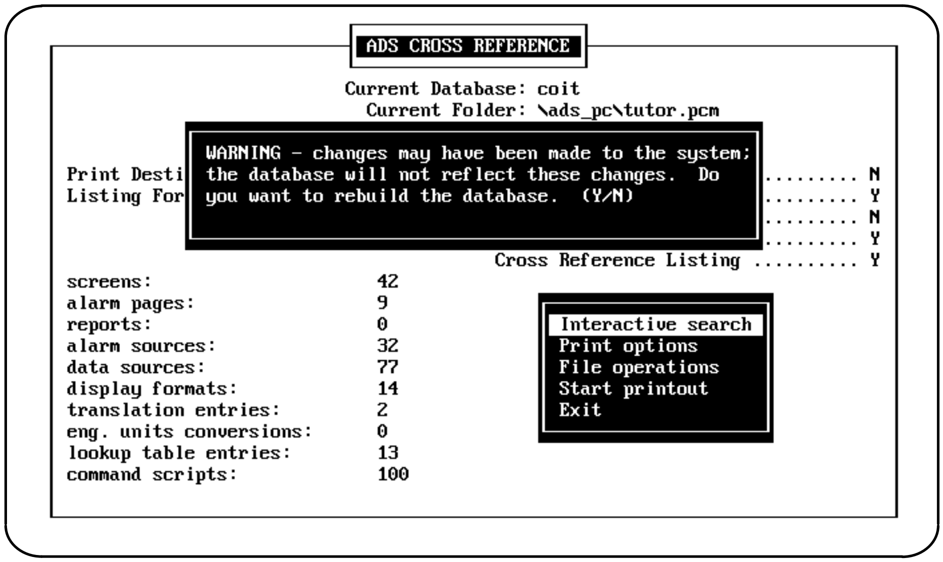


Press the [Return] key to begin the process of building the database. The following screen will be displayed:



The file currently being processed is displayed along with a file count. The file count shows two numbers. The first number is the count of the number of files that have been processed including the file currently being processed. The second number is the total number of files to be processed. The length of time required to process a file depends on the amount of information in the file that can be cross referenced. The .cfg file is the first file that is processed. Generally the .cfg file of a relatively large ADS system takes the longest time to process. A screen which contains a large number of dynamic objects will take longer to process than a screen file that contains only a few dynamic objects.

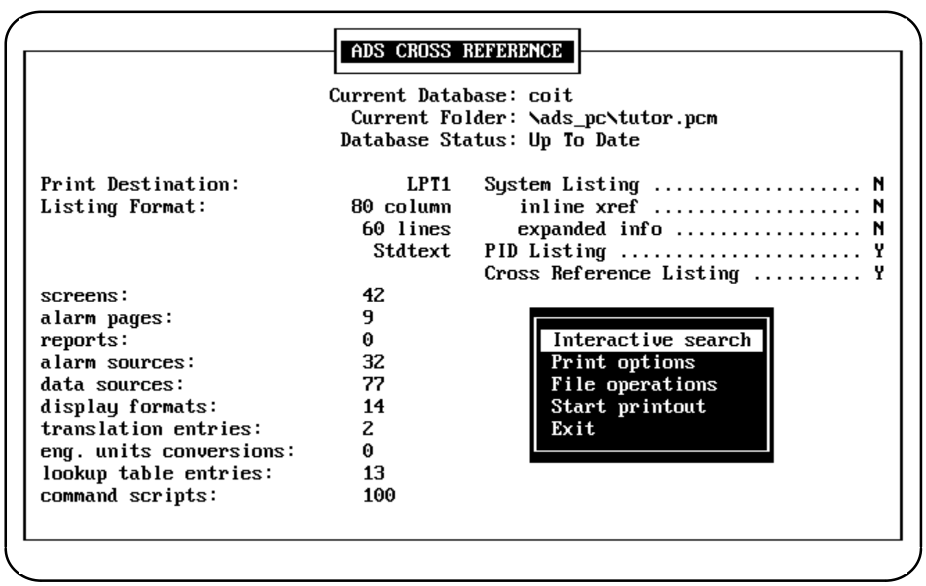
The second condition is that the database for the system selected exists, but is not up to date (i.e. changes have been made to the ADS system since the database was constructed). If the rebuild prompt has not been disabled, the following screen will be displayed:



Pressing the [Y] key will cause the process of rebuilding the database to begin. The process of rebuilding is the same as the process of building as described previously.

Pressing the [N] key will cause no action to be taken. The Database Status field entry on the main screen will be *Not Up To Date.*

The third condition is that the database exists and is up to date. If this is the case, then the following screen will be displayed:



The current system name and folder will appear at the top of the screen. Below that the status of the current database will appear. The status of the database can be one of three possibilities; *Non Existent*, *Not Up To Date*, or *Up To Date*.

A partial summary of the current print options selected appears in the upper left hand portion of the screen. The Print destination can be 1 of 5 options; LPT1, COM1, LPT2, COM2 or File. The options for the Printer format are either 80 column or 132 column output and 50 to 80 lines. The options for the File format are either Stdtext or Postscript.

A partial summary of the current listing options selected appears in the upper right hand portion of the screen. The response for all these fields is either Y or N. Y indicates that the information will be included in the listing and N indicates that the information will not be included in the listing. If the System Summary Listing is not selected, the inline xref and expanded info fields are automatically set N. These two fields are indented, indicating they are a subset of the System Summary Listing.

The print options and listing options information is saved in an environment file. If any of these parameters are changed, the change does not affect the setting of the parameter in the environment file. Changes are lost when the Adsxref Utility is exited; in this sense changes are temporary. The changes can be made permanent by saving the changes to the environment, which is available under "print options".

A summary of the system appears in the lower left hand portion of the screen as it does in the builder.

A menu of the adsxref functions appear in the lower right hand side of the screen. You can either use the and – keys to select the desired option and then press the [Enter] key, or you can press the key corresponding to the first character of the first word of the desired menu option.

Interactive search

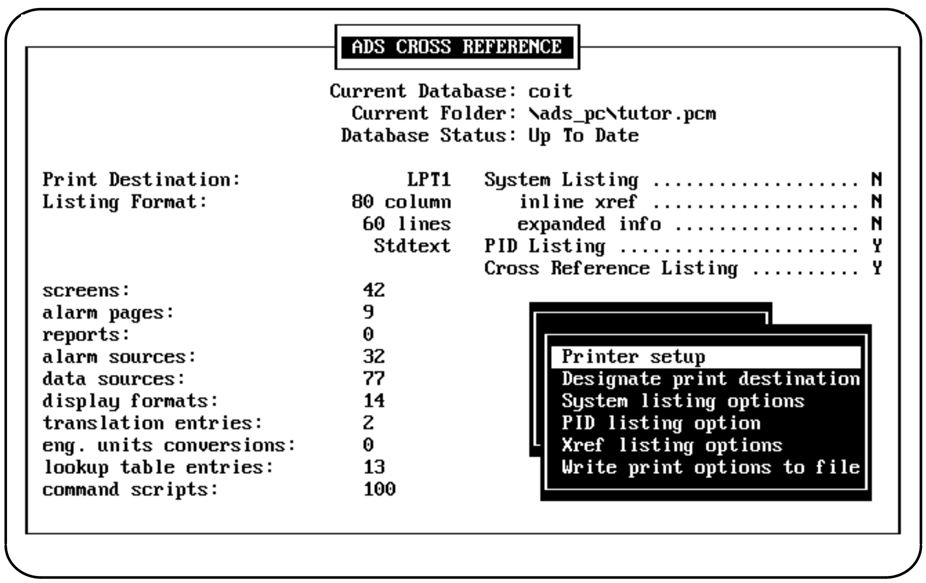
Note

The Interactive search option is not implemented in this release of CIMPLICITY 90-ADS.

Section 2: Print Options

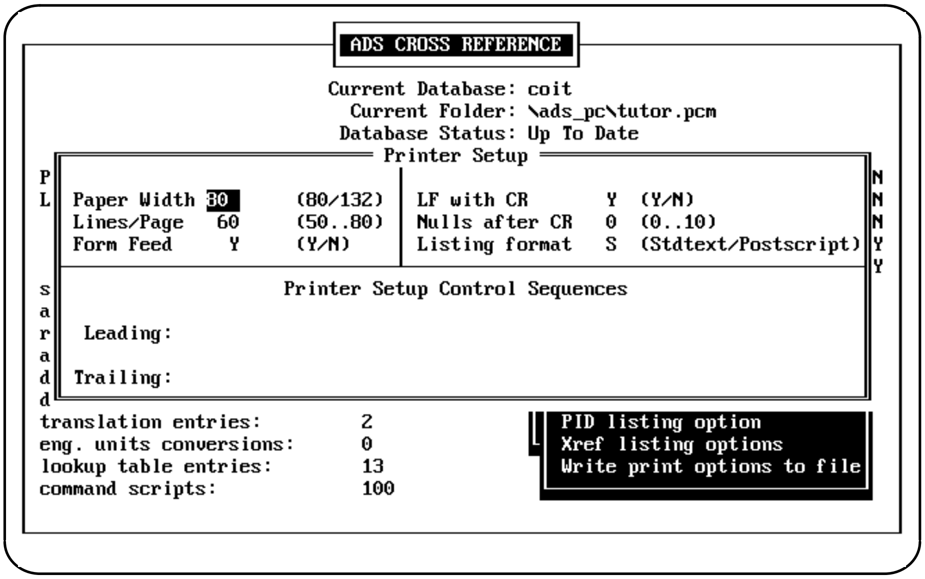
When the *Print options* option is selected, the following screen is displayed. Another menu window is opened on the screen, giving additional options of

- *Printer setup*
- *Designate print destination*
- *System listing options*
- *PID listing option*
- *Xref listing options*
- *Write print options to file*



Printer Setup

When the *Printer setup* function is selected, a data entry window is opened containing eight fields which can be set by the user: *Paper Width, Lines/Page, Form Feed, LF with CR, Nulls after CR, Listing format, Leading:,* and *Trailing:.*



For the fields that show the choices to the right, the user can either type in the choice or press the [Tab] key to toggle through the choices.

Paper Width: (80/132)

The entry for paper width determines the number of characters that will be printed on a line. If the printer is setup for standard 8 1/2″ wide paper, select 80 characters for the paper width. If the printer uses 11″ (or wider) paper, you can select either 80 or 132 characters.

Lines/Page: (50..80)

The default value for the number of lines to be printed on a page is 60. This can be changed to be from 50 to 80 lines per page.

If an associated group of lines will not fit on one page, the system will command the printer to advance to the next page after the number of lines specified by this entry. Note that some printers automatically insert a form feed after printing a certain number of lines (typically 66). If the printer has this feature, specify a shorter page length to prevent an automatic page eject.

Form Feed: (Y/N)

This selection determines whether the system automatically inserts an ASCII form feed (<FF>) character at the end of a page. This item should be set to Y (yes) if the printer recognizes a form feed.

Set this item to N if the printer does not recognize the form feed character. Doing this will cause the system to insert a sequence of carriage returns to advance to the top of the next page.

LF with CR: (Y/N)

The line feed character advances the paper to the next line for printing. This item determines whether the system automatically inserts a line feed (<CR><LF>) each time the printer head returns to the left page margin.

Note

Some printers can be set up to automatically advance to the next line by entering only <CR>. Refer to the user's documentation for your printer to determine how your printer works.

Set this item to N if you do not want the system to insert a line feed character after each carriage return character. Set this item to Y to have the system insert the <LF> character after each <CR> character.

Nulls after CR: (0..10)

This entry is usually set to 0. If a number from 1 to 10 is entered, the system will insert that number of null characters after each carriage return character. Some printers require these null characters to give the print head time to return to the left margin after the carriage return.

Printer Setup Control Sequences

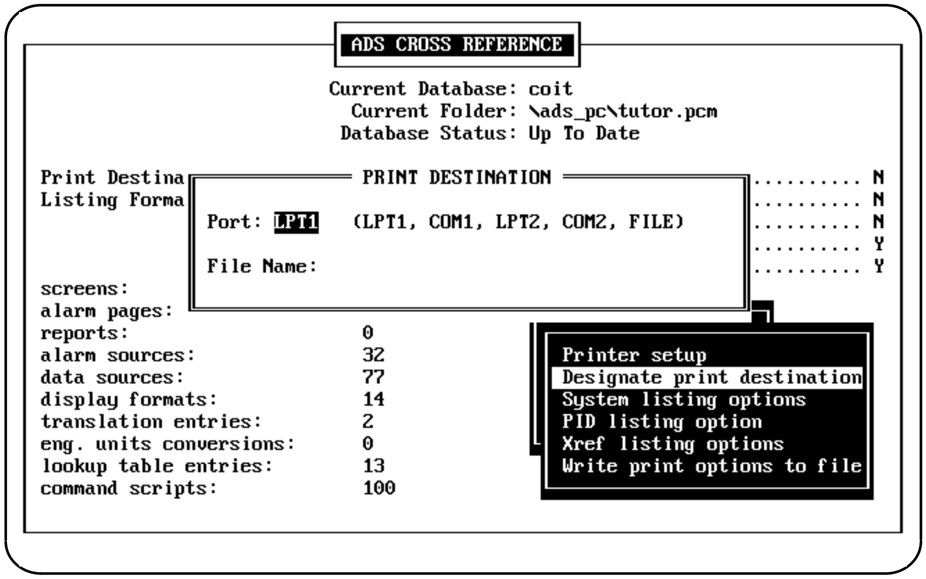
If the printer uses leading or trailing control characters, enter the characters here. If you move the cursor to either of these entries, a field will appear where you can enter the appropriate characters.

Printer control sequences are issued immediately before and after a listing. This feature can be used to put the printer into a particular mode (for example, compressed output), returning to the original mode after the listing is finished.

From 0 to 255 characters can be specified. To enter non-printing characters, use a backslash followed by the three-digit decimal equivalent of the ASCII code for the character(s). For example, to identify the Escape character <Esc>, you would enter \027. A leading zero is required. If you need to enter the backslash character itself,enter\\ (two backslashes).

Designate Print Destination

When the *Designate print destination* option is selected , a data entry window is opened containing two fields which can be set by the user: *Port and File name*.



Port: (LPT1,COM1,LPT2,COM2,File)

The port that the printer is connected to should be specified. If any of the ports other than FILE is selected, then the File Name field on the screen will not be accessible. If FILE is selected, then the File Name field will be accessible.

File Name

A default file name of <system>.lis will appear in this field; however any valid MS-DOS filename may be entered in this field. A drive specification or directory specification is not allowed in this field. The file will be put in the \ database subdirectory of the current folder.

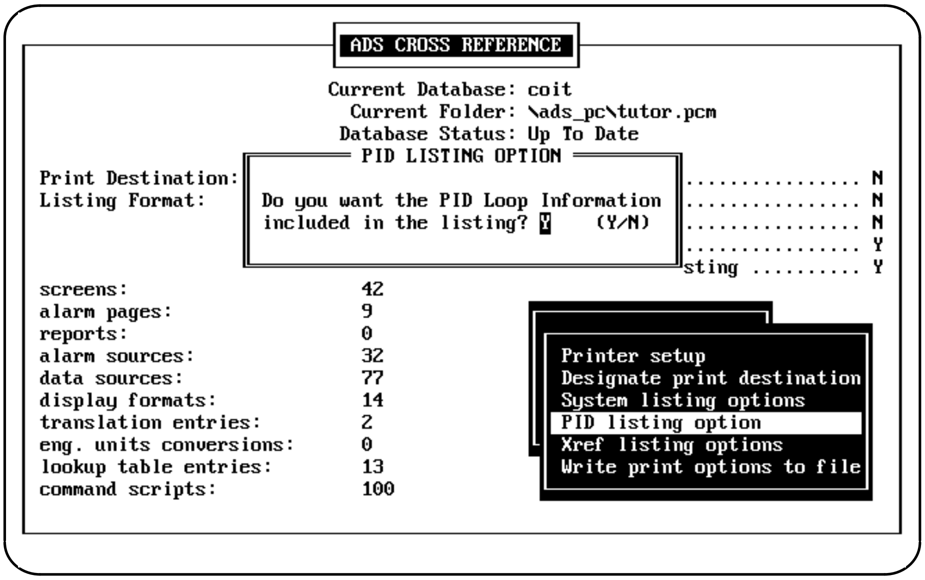
Systems Listing Options

Note

The System listing options is not implemented in this release of CIMPLICITY 90-ADS.

PID Listing Option

When the *PID listing option* is selected, a data entry window is opened containing one field as shown in the following screen.

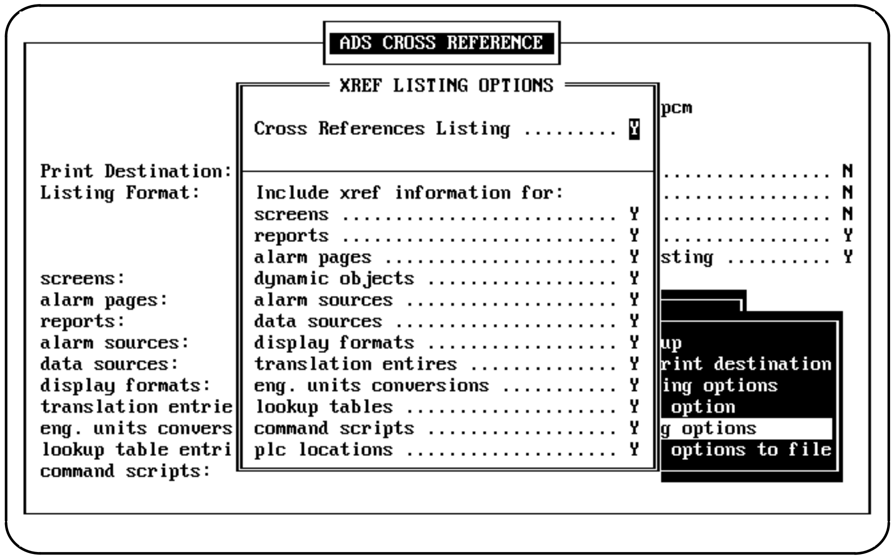


This field allows you to include or not include the PID loop definitions in the Adsxref listing. The selections are Y or N. If you select Y, the PID loop definitions will be included in the listing. If you select N, the PID loop definitions will not be included in the listing.

Xref Listing Options

When the *Xref listing option* is selected, a data entry window is opened containing 13 fields which can be set by the user:

- *Cross References Listing*
- *screens*
- *reports*
- *alarm pages*
- *dynamic objects*
- *alarm sources*
- *data sources*
- *display formats*
- *translation entries*
- *eng. units. conversions*
- *lookup tables*
- *command scripts*
- *plc locations*

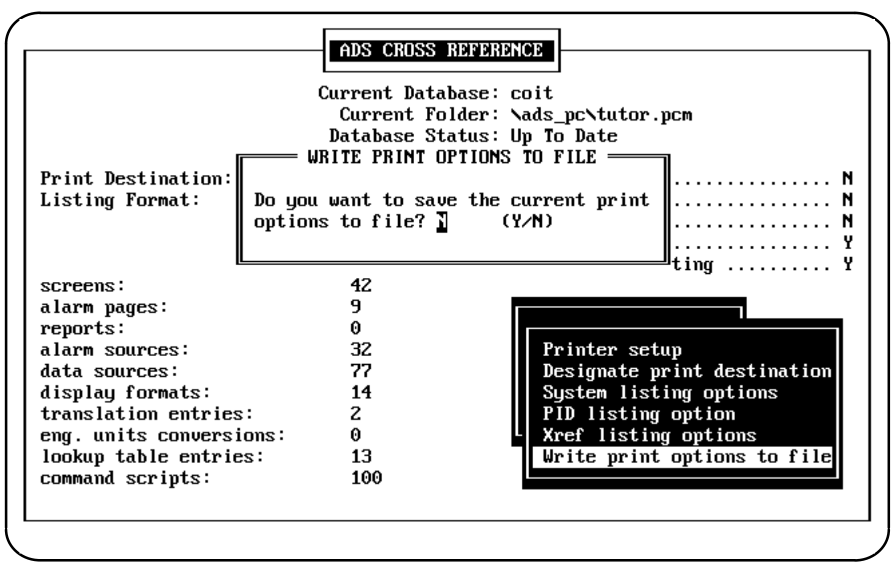


The first field *Cross References Listing* selects whether or not the cross references should be included in the listing. If this item is set to Y the cross references will be included in the listing. If this item is set to N the cross references will not be included in the listing.

The remaining items determine which ADS system parameters cross reference information will be included. If *Cross References Listing* is set to N, none of these items will be accessible.

Write Print Options to File

When the *Write print options to file* option is selected, a data entry window is opened containing one field which can be set by the user:



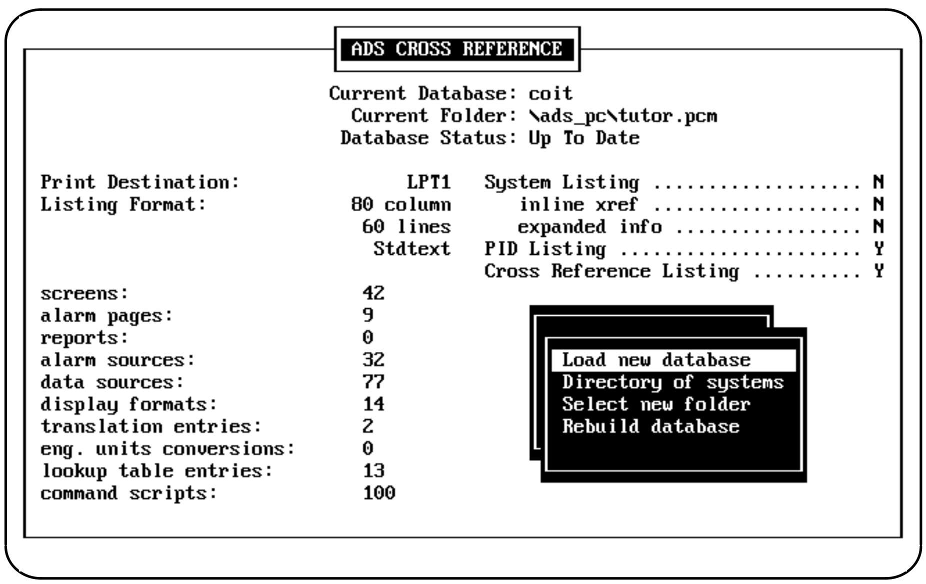
The selections for this option are Y or N. If you enter Y, the current settings of all print options will be saved in the environment file. These settings will become the new settings.

You can save the current print options to file. The print options are saved to the environment file, and are the options that will be used everytime a listing is printed. When you return to the main menu, these changes will be reflected on the screen.

Section 3: File Operations

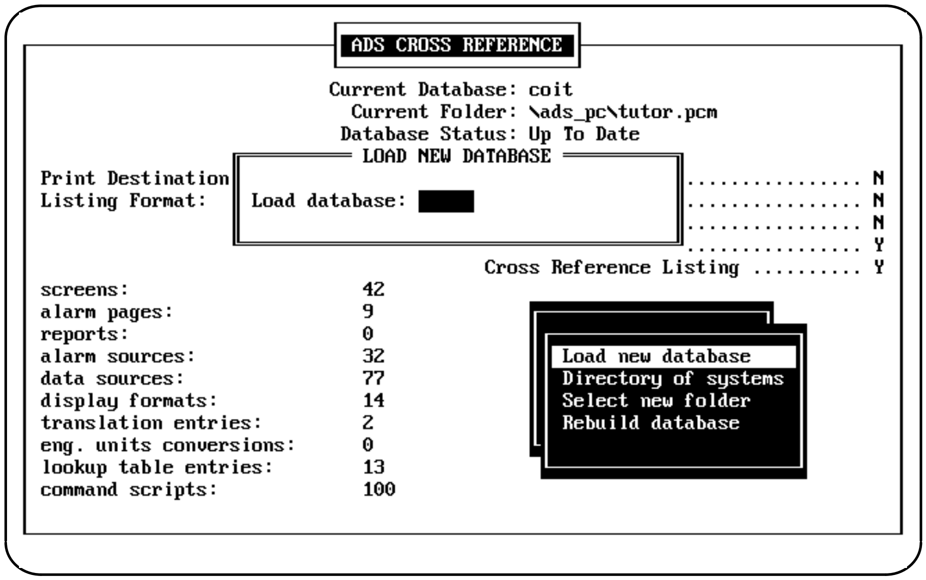
When the *File operations* option is selected, the following screen is displayed. Another menu window is opened on the screen, giving additional options of

- *Load new database*
- *Directory of systems*
- *Select new folder*
- *Rebuild database*

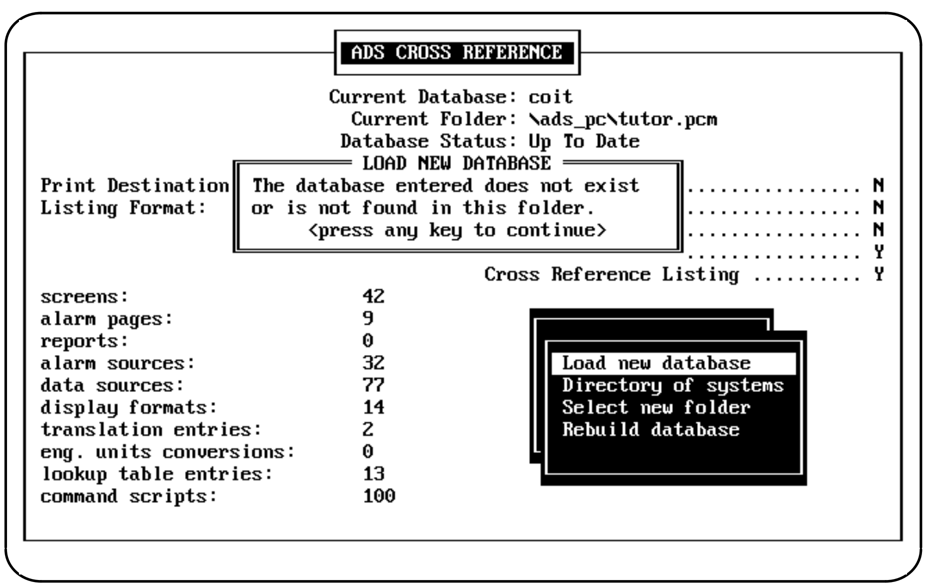


Load New Database

When the *Load new database* option is selected, a data entry window is opened containing one field.

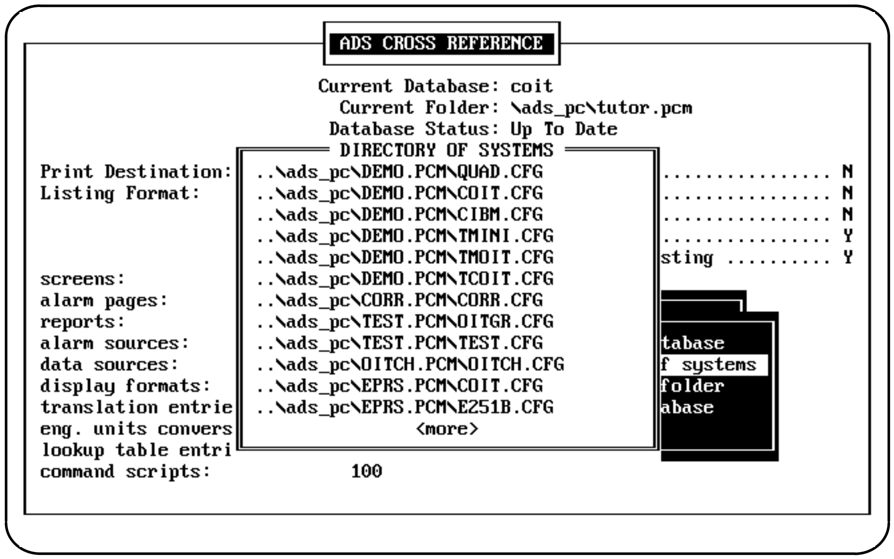


If the name of a valid existing system is entered, a process similar to the process at startup will occur. If a system name is entered that does not exist or is not found in the current folder, a status message will be displayed in the window as shown in the following screen.



Directory of Systems

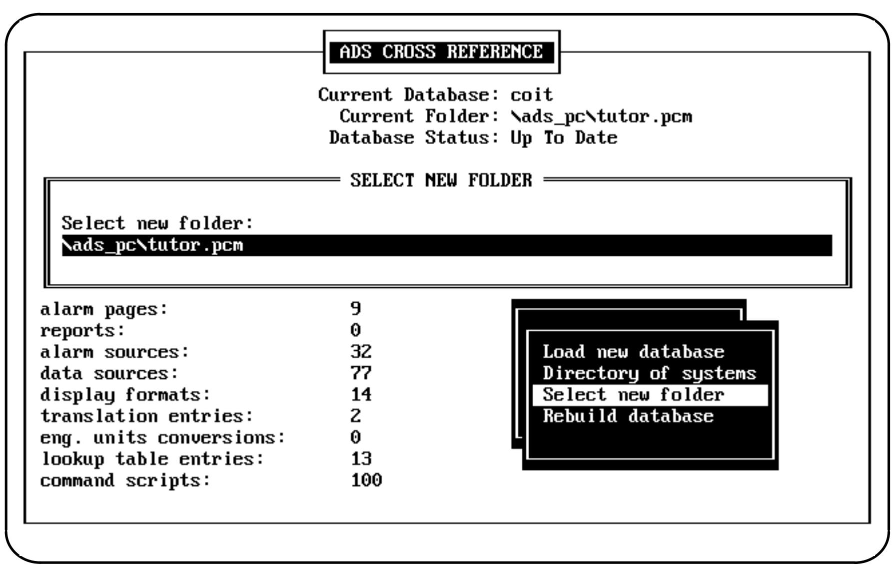
When the *Directory of systems* option is selected, a window is opened which displays the directory of all the ADS systems in the current drawer. The drawer is the directory in which the current folder is located.



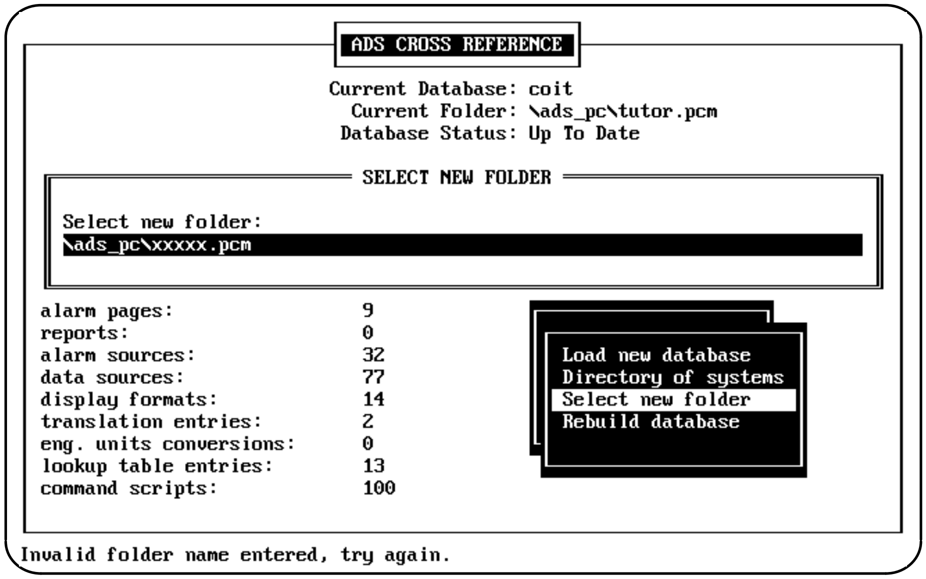
If the list of all the systems will not fit in the window, the word <more> will appear at the bottom of the display window. Use the [page up] and [page down] keys to view the next and previous pages.

Select New Folder

When the *Select new folder* option is selected, a data entry window is opened containing one field in which you can enter a folder name.



Any existing valid folder name may be selected. If an invalid folder name is entered, a message will appear at the bottom of the screen.



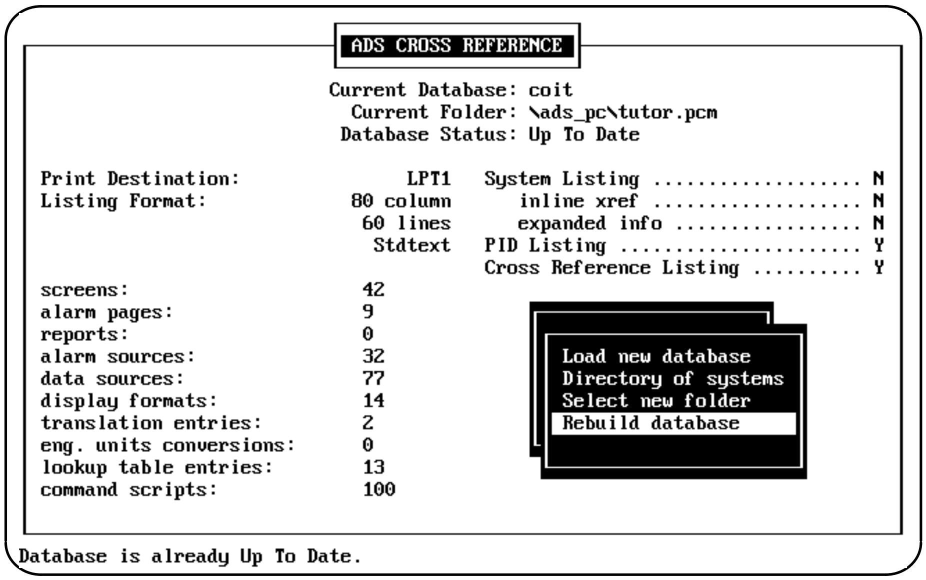
If a valid existing folder name is entered, it will become the new folder. The path field on the main screen will be updated with the path of the new folder.

Note

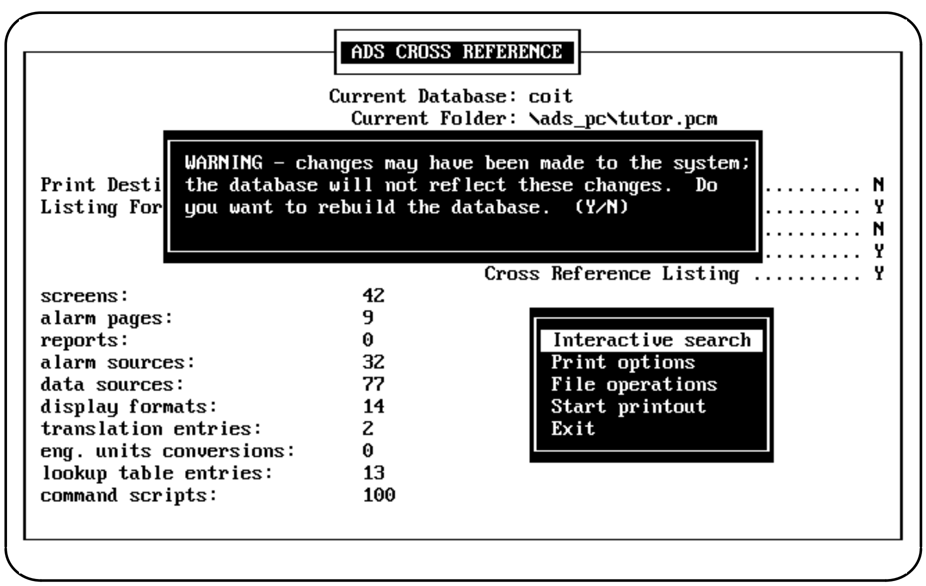
The system field is set to “None Selected” since a system has not yet been selected. You must now use the *Load new database* option to load the desired ADS system into working memory.

Rebuild Database

The *Rebuild database* option is used to force the current database to be rebuilt. If this function is selected and the database is already up to date, a message indicating the database is up to date will be displayed and the request will be denied.

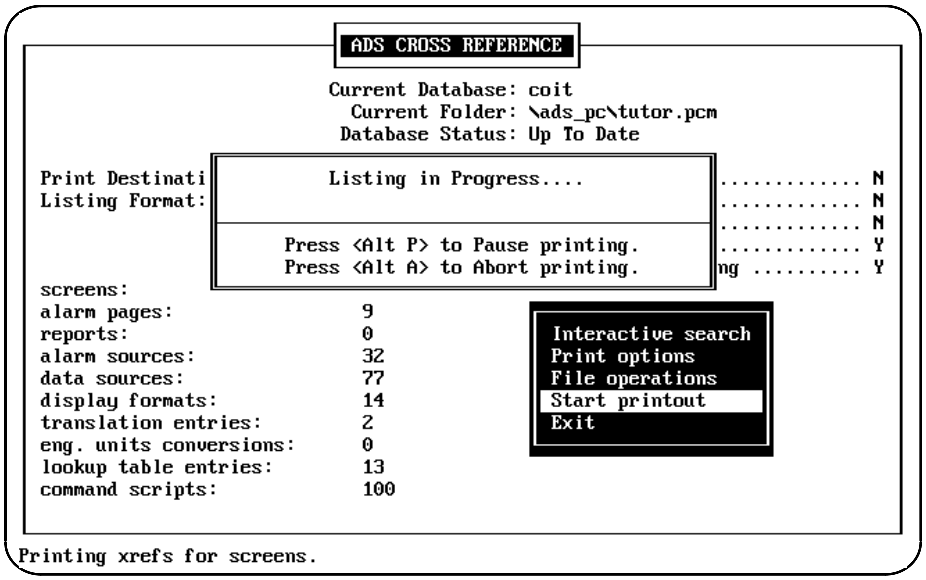


If the database is not up to date, the rebuilding process will begin. A message will be displayed in the window indicating that the database rebuilding is in process and may take several minutes.

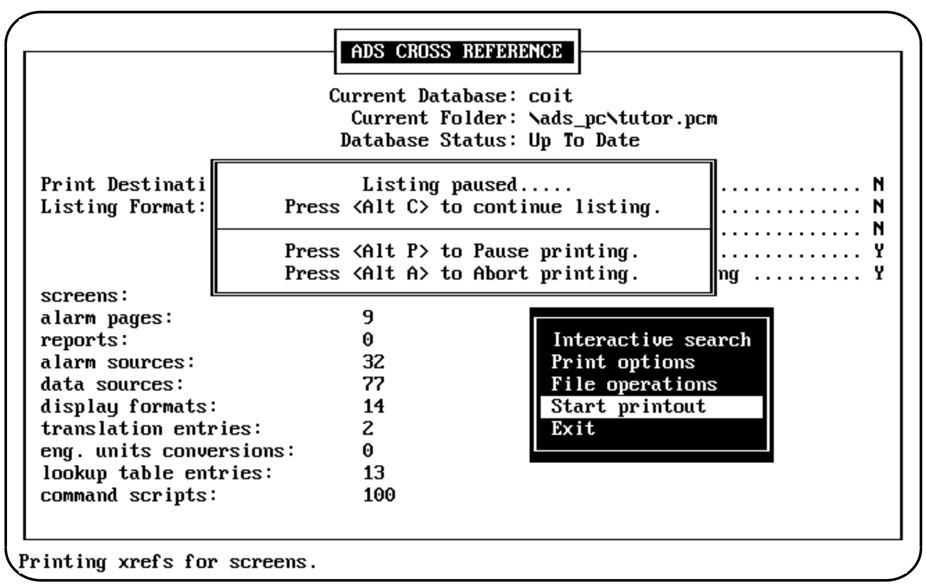


Section 4: Start Printout

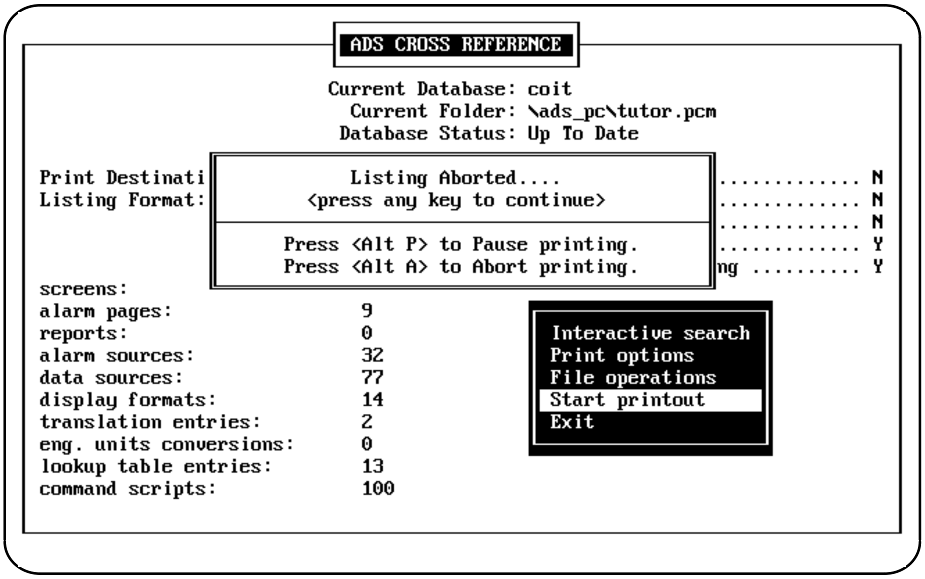
When the *Start printout* option is selected, the following screen is displayed.



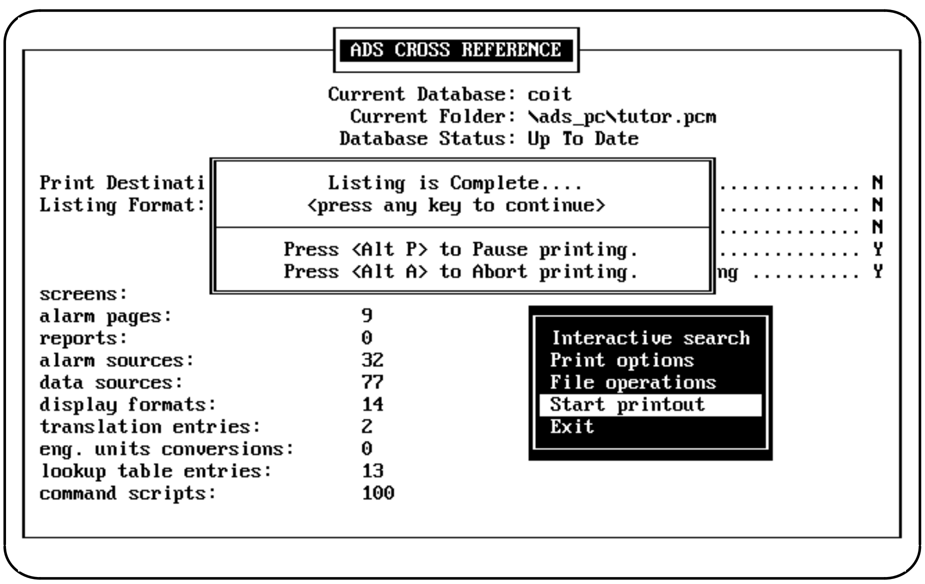
If <Alt P> is pressed to cause the listing to pause, the following screen will be displayed.



Printing of the listing can be resumed by pressing <Alt C>, or you can press <ALT A> to abort printing. If you select to abort the printing, the following screen will be displayed with a message indicating that the listing has aborted.

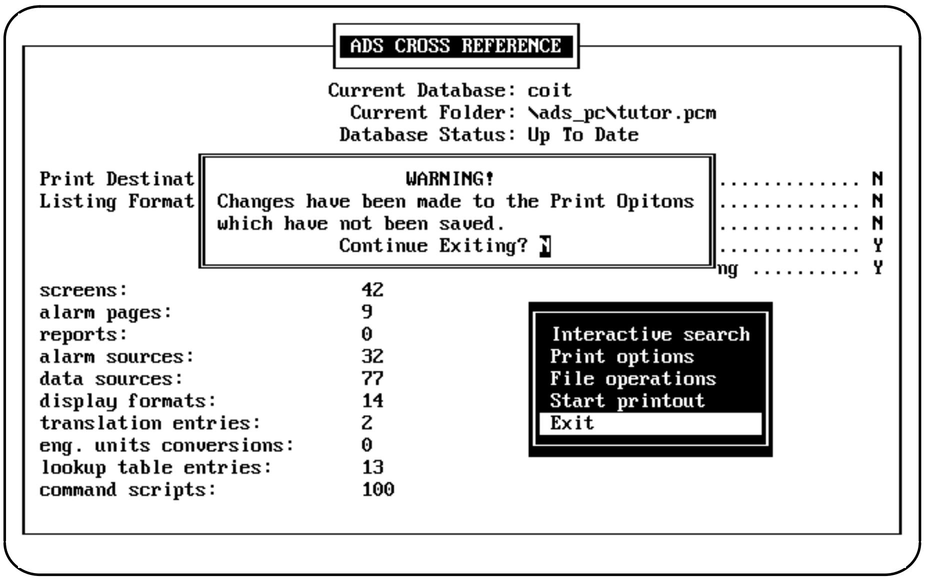


When the listing is completes, the following screen will appear.



Section 5: Exit

To exit the Adsxref utility, select the *Exit* option. If changes were made to any of the Print Options that have not been saved, the following screen will be displayed:



Chapter 11 The Operator Interface Products Menu

The Operator Interface Products Menu provides easy, menu-driven access to a variety of operator interface tools and utilities. Pressing the [OI] soft key on the Logicmaster 90 programming software main menu, or alternatively by typing

OI_MENU

at the MS-DOS prompt gains you access to the OI menu.

```
 DER        ADS        EXIT

                          DER - Digital Event Recorder
                          ADS - CIMPLICITY(tm) 90-ADS

                          EXIT - Return to LM90 Main Menu

   <<  Use cursor keys to select item; Press [Enter] to execute choice   >>
   <<    (or press key corresponding to first letter of menu choice)     >>
   << Press [Esc] to close menu window; Press [Home] for HELP on choices >>

                         Operator Interface Products Menu
                                   Version 1.02
```

Arranged horizontally at the top of the screen is a series of pull-down product menus plus an "EXIT" from the menu. When the menu is first entered the leftmost product menu is initially highlighted. The [←] and [→] cursor keys are used to highlight, or *select*, a particular menu. For example, pressing the [→] cursor key would select the *ADS* products menu.

```
DER          ADS          EXIT

                              DER - Digital Event Recorder
                              ADS - CIMPLICITY(tm) 90-ADS

                              EXIT - Return to LM90 Main Menu




   <<  Use cursor keys to select item; Press [Enter] to execute choice   >>
   <<    (or press key corresponding to first letter of menu choice)     >>
   << Press [Esc] to close menu window; Press [Home] for HELP on choices >>

                         Operator Interface Products Menu
                                   Version 1.02
```

Pressing the [Enter] key *pulls down* the currently selected menu, which in this case is the ADS products menu. The topmost menu option is initially highlighted. Note that a menu may be selected and pulled down in one operation by pressing the key corresponding to the first letter of the menu name (for example, pressing the letter [A] in our example for the ADS products menu).

```
DER          ADS          EXIT
            BUILD
            PCOP-ADS      DER - Digital Event Recorder
            ADSSETUP      ADS - CIMPLICITY(tm) 90-ADS
            TERMSET
            CREATHLP      EXIT - Return to LM90 Main Menu
            XREF
            TERMF



   <<  Use cursor keys to select item; Press [Enter] to execute choice   >>
   <<    (or press key corresponding to first letter of menu choice)     >>
   << Press [Esc] to close menu window; Press [Home] for HELP on choices >>

                         Operator Interface Products Menu
                                   Version 1.02
```

Once a menu has been pulled down, the [↑] and [↓] cursor keys may be used to select a menu option. For example, pressing the [↓] cursor key twice would select the *ADSSETUP* menu option.

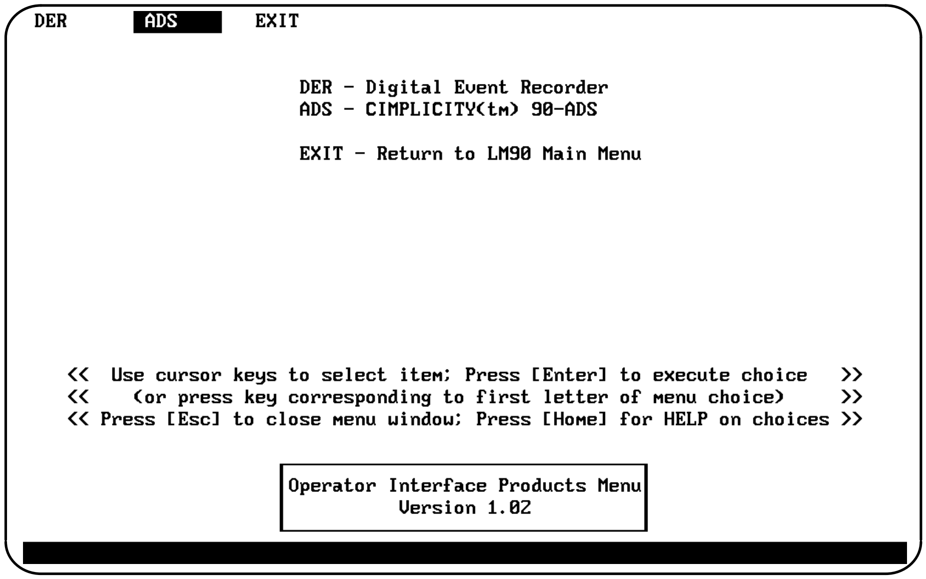
```
DER          ADS          EXIT

             BUILD
             PCOP-ADS       DER - Digital Event Recorder
             ADSSETUP       ADS - CIMPLICITY(tm) 90-ADS
             TERMSET
             CREATHLP       EXIT - Return to LM90 Main Menu
             XREF
             TERMF

    <<  Use cursor keys to select item; Press [Enter] to execute choice   >>
    <<    (or press key corresponding to first letter of menu choice)     >>
    << Press [Esc] to close menu window; Press [Home] for HELP on choices >>

                       Operator Interface Products Menu
                                 Version 1.02
```

Pressing the [Enter] key *executes* the menu option, which in this case is the ADS Setup Utility. Note that a menu option may be selected and executed in one operation by pressing the key corresponding to the first letter of the menu option name (for example, pressing the letter [A] in our example for the ADS Setup Utility).

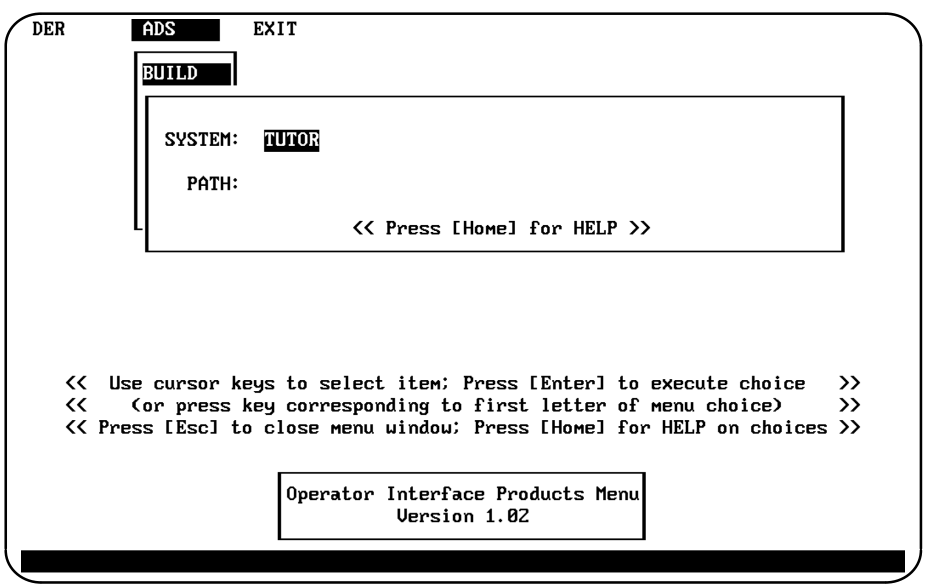
```
                     CIMPLICITY (tm) 90-ADS Setup Utility
                                Version 4.01

 DEVELOPMENT VERSION SELECTIONS:         EXECUTE-ONLY VERSION SELECTIONS:
   Menu                      78672         Executor                246144
   Builder                  257040         Fault Table Module       93136
   Executor                 199248           Max System (bytes):   293312
     Max System (bytes):     97632

                                           Development Version Selections
                                           Execute-Only Version Selections
                                           Page 2 Selections
                                           Leave Setup

                               PAGE 1 OF 2
```

Upon exiting the executed menu option you are returned to the Operator Interface Products Menu with the appropriate product menu selected, but not pulled down.

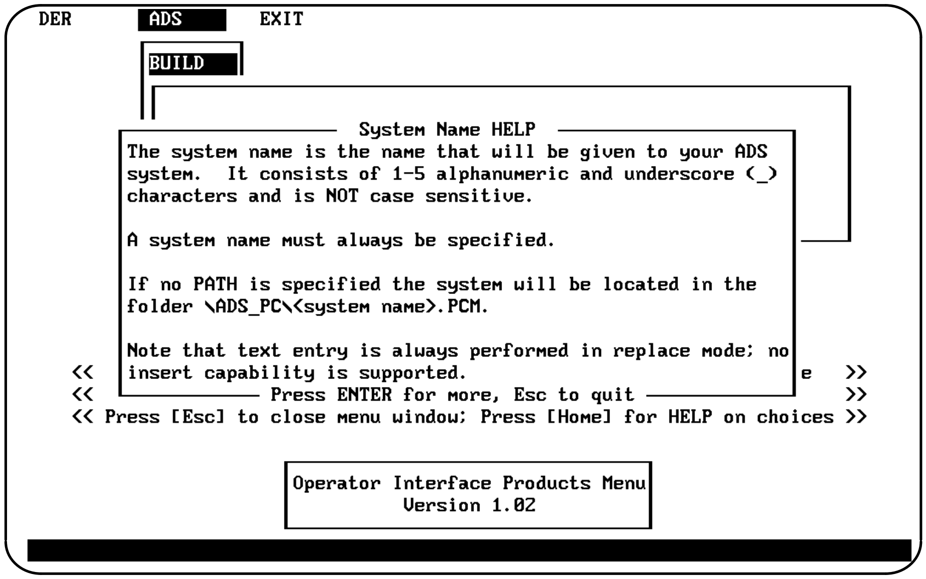
Should you need to ”back out” of a menu, press the [Esc] or [F10] key until you have returned to the menu level you wish to be at.



In some cases executing a menu option will result in a dialog box being displayed where you must provide additional information to carry out the request. For example, executing the *BUILD* menu option on the ADS products menu results in a dialog box being displayed which prompts for a *SYSTEM* and a *PATH*. A field in a dialog box is always filled out in ”replace” or ”overstrike” mode. The [Ctrl-X] key may be used to clear a field completely; the [←] and [→] cursor keys may be used to position the cursor within the field. The [↓] cursor key and [Enter] key is used to move forward from field to field; the [↑] cursor key may be used to move backwards from field to field. Pressing the [Enter] key with the bottommost field selected, or pressing the [Alt-F10] key from any field, completes the dialog box.



From any point in the Operator Interface Products Menu you may obtain context-sensitive help by pressing the [Home] key. For example, pressing the [Home] key in the example above would result in the following help display.



Appendix A Terminal Setup

This appendix defines the setup requirements which must be selected for the terminals which can be used with the ADS system. For serial port settings, refer to Chapter 2. If you wish to change the default serial port settings, refer to Appendix D. The terminal emulation package, TERMF, must be invoked when using a PC to emulate a VT100 terminal. A procedure for invoking TERMF can be found at the end of this appendix. The key codes you will need to use when defining touch points for either a GE Fanuc Touch Mini OIT, Nematron 12” Touch OIT, or a Lucas Deeco ST-2200 can be found in Appendix B (you will use the decimal key codes).

Monochrome and Color OITs; Nematron OptiTOUCH Terminals

- ONLINE operation
- ANSI
- NO ECHO
- NO AUTO LF
- NO WRAP
- Keyboard 1 (terminal); 5 for Nematron OptiTOUCH terminals
- Point-to-point communications
- SEND ANY CASE

Mini and Mini Touch OIT

- ONLINE operation
- ANSI
- NO ECHO
- NO AUTO LF
- NO WRAP
- Key Codes 5 (programmable) for touch version; 1 for non-touch version
- Point-to-point communications
- SEND ANY CASE

VT100 Compatible

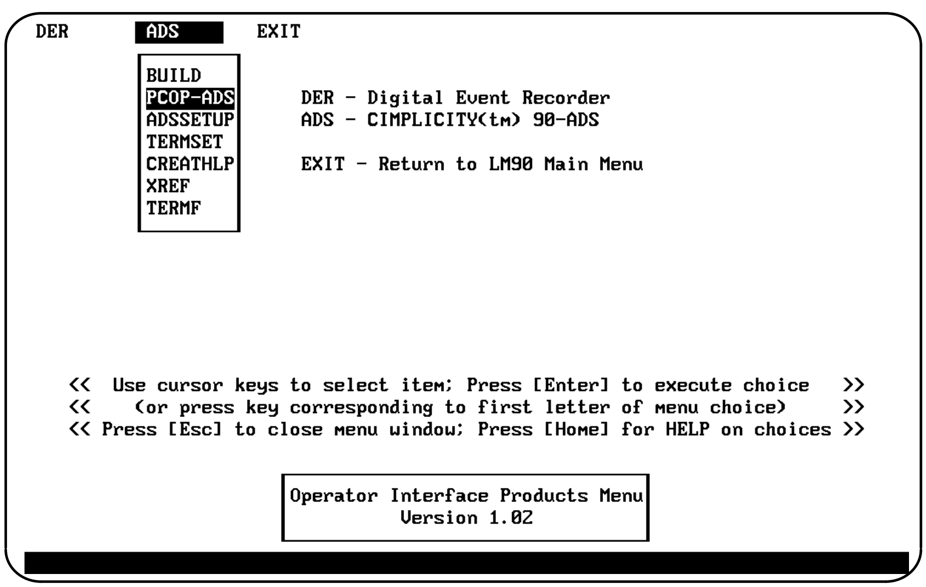
- Auto repeat ON
- Margin bell OFF
- ANSI
- Auto XON / XOFF (enabled)
- NO WRAP
- NO AUTO LF

Lucas Deeco

- VT320 7B
- NO Lock keys
- NO Lock features
- NO New Line
- INTERPRET Control Characters
- NO Auto Wrap
- NO Status Lines
- No Local Echo
- XOFF at 128
- NO Limit Xmit

MIBM/CIBM

- On computers using the IBM-PC 83-key keyboard, such as the GE Fanuc Workmaster (XT compatible), NUM LOCK should be OFF.
- You must access the PCOP software either through the Operator Interface Products Menu (OI Menu) or the \PCOP\BAT\ADS.BAT batch file.



- Aslongas \PCOP\BAT is in the computer's DOS PATH (this is set up as part of the PCOP installation), PCOP can be directly accessed by typing

  ADS [Enter]

  at the DOS prompt.

Note

If PCOP is accessed in any other way, the function keys will not operate as expected. Also, there may be a loss of characters when the terminal display is written to.

TERMF

TERMF is a terminal emulation software package, which can be invoked from PCOP. It can be used to make the PC emulate a VT100 terminal, with the additional capability to do file transfers. Not all VT100 escape sequences are supported; those which are not supported are either displayed on the screen or ignored. For more detailed information on running TERMF, refer to GFK-0487, which is the *Series 90 Programmable Coprocessor Reference Manual.*

Features of the TERMF terminal emulation software package include:

- The small size of TERMF, as compared with other terminal emulation packages.
- PC-to-PCM file transfer protocol.

Invoking TERMF

The TERMF terminal emulation software is invoked directly from the PCOP main menu by pressing the TERMF [F3] function key. If the ADS software is executing on the ADC module, pressing CTRL-W will refresh the terminal display.

Note

If you should exit TERMF via either the Alt-Z or Ctrl-Break key sequence to perform some operation and then re-enter TERMF, the Ctrl-W key must be pressed to refresh the display.

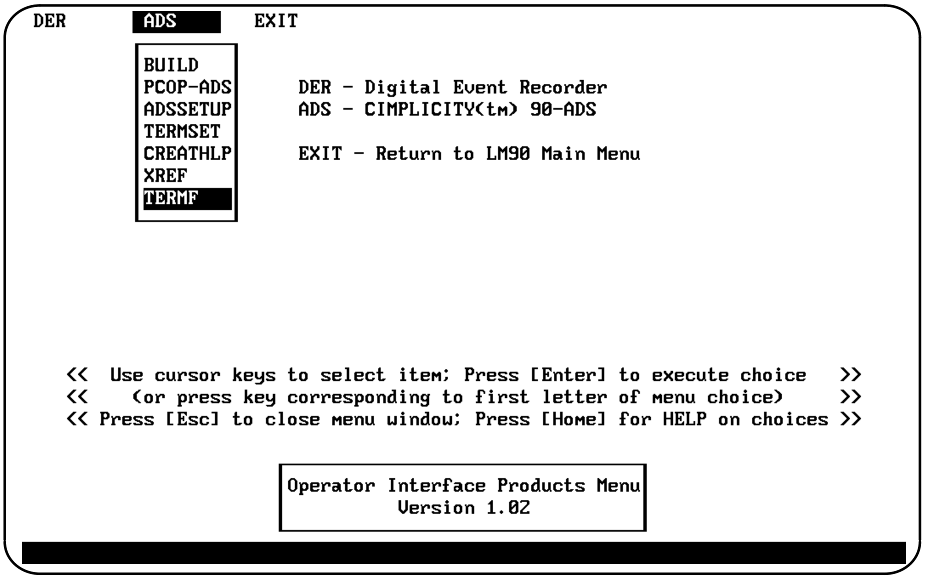
Returning to PCOP

The Alt-Z key combination enables you to return to PCOP from TERMF. Pressing Ctrl-Break exits to DOS.

When the symbol "->" is displayed on the TERMF screen, an ADC hard reset has occurred. You may need to return to PCOP. If you were in TERMF, press Alt-Z to return to PCOP, or press Ctrl-Break to exit to DOS and re-enter PCOP. The ADC module must be soft reset to restart the Access 90 Display System software.

Executing TERMF Directly

TERMF may be accessed directly either through the Operator Interface Products Menu (OI Menu) or by executingthe \PCOP\BAT\IBM_TERM.BAT file.



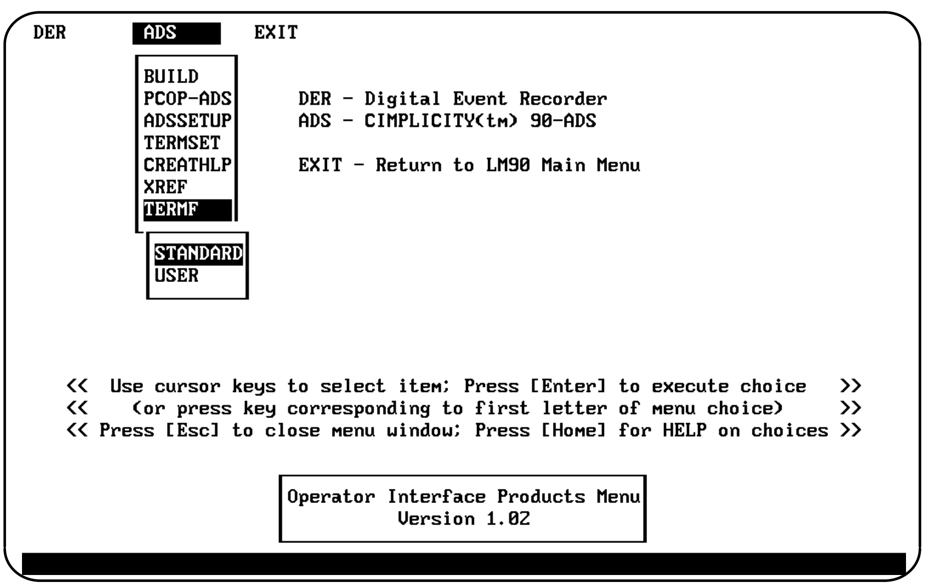
As long as \PCOP\BAT is in the computer's DOS Path (this is done as part of the PCOP installation) you may access TERMF directly by typing

IBM_TERM [Enter]

at the DOS prompt.

If you intend to use the file transfer capabilities of TERMF when accessing it directly via IBM_TERM.BAT, make sure that you first set default to the proper subdirectory on your computer's hard disk (by using the DOS "CD" command) and then execute IBM_TERM.BAT.

If you have previously used the TERMSET program to create a USER communications setup file (\PCOP\BAT\ADS_USER.DAT), you can use that file in TERMF by choosing the "USER" option



or by either of the commands **ADS USER** or **IBM_TERM USER**

If the USER parameter is not specified, the standard communication setup file (\PCOP\BAT\ADS_TERM.DAT) will be used.

Appendix B ASCII Codes

The Mini OIT and most other terminals use standard ASCII codes for display and communication.

The decimal values, hexadecimal values, characters, and descriptions for the standard ASCII characters are listed in the following table. Characters marked with an asterisk (*) are not processed.

Decimal	Hex	Character	Description
0	00	[Ctrl]–@	NUL, null or tape feed*
1	01	[Ctrl]–A	SOH, start of header
2	02	[Ctrl]–B	STX, start of text
3	03	[Ctrl]–C	ETX, end of text
4	04	[Ctrl]–D	EOT, end of transmission
5	05	[Ctrl]–E	ENQ, enquiry
6	06	[Ctrl]–F	ACK, acknowledge*
7	07	[Ctrl]–G	BEL, external bell output
8	08	[Ctrl]–H	BS, backspace
9	09	[Ctrl]–I	HT, horizontal tab
10	0A	[Ctrl]–J	LF, line feed
11	0B	[Ctrl]–K	VT, vertical tab*
12	0C	[Ctrl]–L	FF, form feed
13	0D	[Ctrl]–M	CR, carriage return
14	0E	[Ctrl]–N	SO, shift out
15	0F	[Ctrl]–O	SI, shift in
16	10	[Ctrl]–P	DLE, data link escape
17	11	[Ctrl]–Q	DC1, device control 1, XON
18	12	[Ctrl]–R	DC2, device control 2*
19	13	[Ctrl]–S	DC3, device control 3, XOFF
20	14	[Ctrl]–T	DC4, device control 4*
21	15	[Ctrl]–U	NAK, negative acknowledge*
22	16	[Ctrl]–V	SYN, synchronous idle*
23	17	[Ctrl]–W	ETB, end of transmission block
24	18	[Ctrl]–X	CAN, cancel escape sequence
25	19	[Ctrl]–Y	EM, end of medium*
26	1A	[Ctrl]–Z	SUB, substitute*
27	1B	[Ctrl]–[	(left square bracket) ESC, esc
28	1C	[Ctrl]–\	(backslash) FS, file separator*

Decimal	Hex	Character	Description
29	1D	[Ctrl]–]	(right square bracket) GS, group separator
30	1E	[Ctrl]–^	(caret) RS, record separator
31	1F	[Ctrl]–_	(underscore) US, unit separator*
32	20	[Space]	
33	21	!	(exclamation point)
34	22	‘‘	(double quotation mark)
35	23	#	(hatch, number sign, or pound)
36	24	$	(dollar sign)
37	25	%	(percent sign)
38	26	&	(ampersand)
39	27	’	(apostrophe or single right quote)
40	28	(	(left or open parenthesis)
41	29	)	(right or close parenthesis)
42	2A	*	(asterisk or star)
43	2B	+	(plus sign)
44	2C	,	(comma)
45	2D	–	(minus sign, hyphen, or dash)
46	2E	.	(period or dot)
47	2F	/	(slash or forward slash)
48	30	0	(zero)
49	31	1	
50	32	2	
51	33	3	
52	34	4	
53	35	5	
54	36	6	
55	37	7	
56	38	8	
57	39	9	
58	3A	:	(colon)
59	3B	;	(semicolon)
60	3C	<	(less than)
61	3D	=	(equals)
62	3E	>	(greater than)
63	3F	?	(question mark)
64	40	@	(at sign)
65	41	A	(begin uppercase letters)
66	42	B	
67	43	C	
68	44	D	
69	45	E	
70	46	F	
71	47	G	
72	48	H	

Decimal	Hex	Character	Description
73	49	I	
74	4A	J	
75	4B	K	
76	4C	L	
77	4D	M	
78	4E	N	
79	4F	O	
80	50	P	
81	51	Q	
82	52	R	
83	53	S	
84	54	T	
85	55	U	
86	56	V	
87	57	W	
88	58	X	
89	59	Y	
90	5A	Z	(end uppercase letters)
91	5B	[	(left or open bracket
92	5C	\	(backslash or reverse slash)
93	5D	]	(right or close square bracket)
94	5E	^	(up arrow sign or caret)
95	5F	__	(underscore)
96	60	’	(grave accent or single left quote)
97	61	a	(begin lowercase letters)
98	62	b	
99	63	c	
100	64	d	
101	65	e	
102	66	f	
103	67	g	
104	68	h	
105	69	i	
106	6A	j	
107	6B	k	
108	6C	l	
109	6D	m	
110	6E	n	
111	6F	o	
112	70	p	
113	71	q	
114	72	r	
115	73	s	

Decimal	Hex	Character	Description
116	74	t	
117	75	u	
118	76	v	
119	77	w	
120	78	x	
121	79	y	
122	7A	z	(end lowercase letters)
123	7B	{	(left or open squiggly brace)
124	7C	|	(verticalline)
125	7D	}	(right or open squiggly brace)
126	7E	~	(tilde)
127	7F	DEL	(delete or rubout)
128	80	[F1]	(begin function keys)
129	81	[F2]	
130	82	[F3]	
131	83	[F4]	
132	84	[F5]	
133	85	[F6]	
134	86	[F7]	
135	87	[F8]	
136	88	[F9]	
137	89	[F10]	
138	8A	[F11]	
139	8B	[F12]	
140	8C	[F13]	
141	8D	[F14]	
142	8E	[F15]	
143	8F	[F16]	(end function keys)
144	90	[Ctrl]–0	(begin control keys
145	91	[Ctrl]–1	
146	92	[Ctrl]–2	
147	93	[Ctrl]–3	
148	94	[Ctrl]–4	
149	95	[Ctrl]–5	
150	96	[Ctrl]–6	
151	97	[Ctrl]–7	
152	98	[Ctrl]–8	
153	99	[Ctrl]–9	(end control keys)
154– 169	9A– A9		not used
170– 171	AA– AB		IBM special key codes
172–	AC–		not used

Decimal	Hex	Character	Description
175	AF		
176– 177	B0– B1		IBM special key codes
178	B2		Cursor down
179	B3		IBM special key code (page down)
180	B4		Cursor left
181	B5		not used
182	B6		Cursor right
183	B7		Home
184	B8		Up
185	B9		IBM special key code (page up)
186– 191	BA– BF		not used
192– 204	C0– CC		IBM special key codes
205– 254	CD– FE		not used
255	FF		no keystroke

Appendix C Serial Port Pin Assignments and Cabling Diagrams

This appendix has two parts. The first part describes the serial ports for the Series 90-70 and the Series 90-30 Alphanumeric Display Coprocessor modules. The second part provides wiring information for cables for use with your CIMPLICITY 90-ADS system.

Serial Port Pin Assignments on the Series 90-70 ADC Module

The serial ports are accessed through port connectors on the ADC module and are used to communicate with external devices, such as computers and display terminals.

The Series 90-70 ADC module has two serial port connectors, which support both RS-232 and RS-485 modes of operation. These serial ports are identical, and either port can be used for most applications, The two ports are configurable for different communication parameters. In a typical Series 90 ADC application, you will attach a computer to port 1 and a terminal to port 2.

The connector pin assignments for the Series 90-70 ADC are shown below:

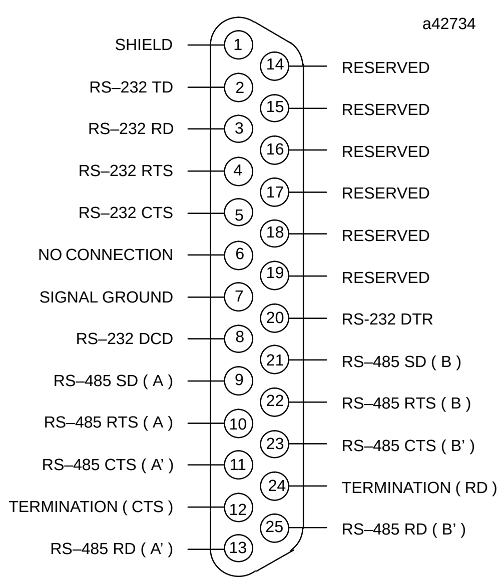


Figure C-1. Serial Port Pin Assignments for the Series 90-70 ADC

Note

In the figure above, SD (Send Data) and RD (Receive Data) are the same as TXD and RXD (used in the Series Six™ PLC). (A) and (B) are the same as – and +. A' and B' denote inputs, and A and B denote outputs. To terminate the RS-485 CTS input signal, jumper pins 11 and 12; to terminate the RD input signal, jumper pins 24 and 25.

Serial Port Pin Assignments on the Series 90-30 ADC Module

The Series 90-30 ADC has a single serial connector which supports two ports. One port has a fixed interface. Any application using port 1 must use the RS-232 interface. The Port 2 interface is selectable for either RS-232 or RS-485.

The connector pin assignments for the Series 90-30 ADC are shown below.

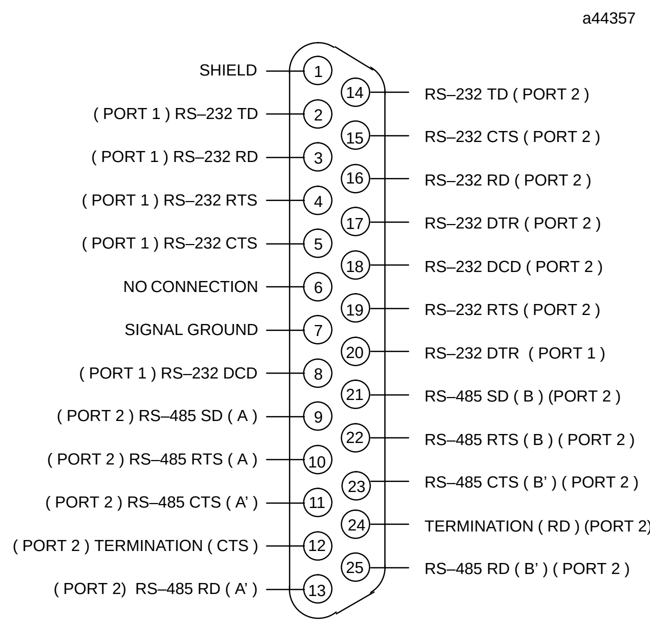


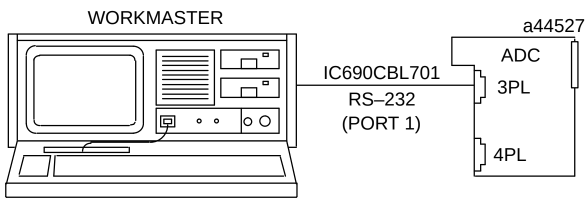
Figure C-2. Serial Port Pin Assignments for the Series 90-30 ADC

Cabling Information

Several prewired cables are available from GE Fanuc which can be used with your CIMPLICITY 90-ADS Operator Interface System.

The prewired cables shown in the following three illustrations provide the required signal connections between the RS-232 serial port on an ADC and a serial port on the computer. Each of the cables physically appear the same; the only difference is the internal pin connections.

An IC690CBL701 cable provides the required signal connections between an ADC and a Workmaster industrial computer.



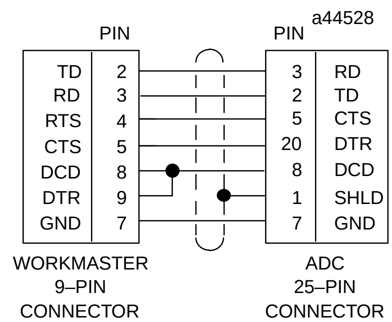
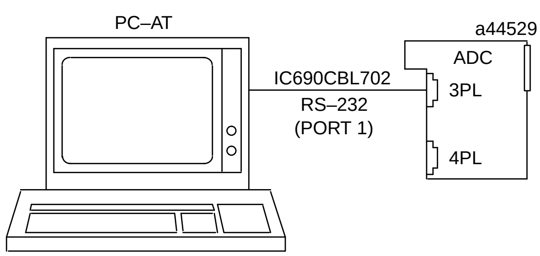


Figure C-3. ADC to Workmaster Computer

An IC690CBL702 cable provides the required signal connections between an ADC and an IBM PC-AT personal computer.



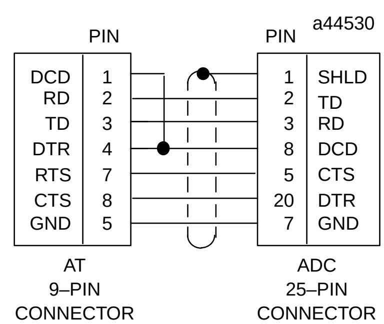


Figure C-4. ADC to PC-AT Personal Computer

An IC690CBL705 cable provides the required signal connections between an ADC and a Workmaster II computer or an IBM Personal System / 2 personal computer. It is also capable of connecting the ADC to a GE Fanuc OIT, a GE Fanuc Mini OIT, or to a DIGITAL VT100 terminal.

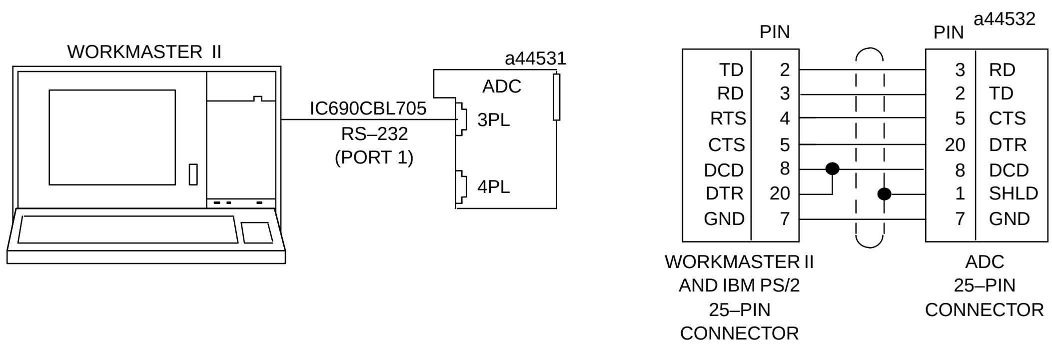


Figure C-5. ADC to Workmaster II Computer or PS/2 Computer

Connect the cable's 25-pin male connector to the top serial port female connector on the front of the ADC module. Then, connect the cable's 9-pin or 25-pin female connector to the male RS-232 connector (serial port) on the selected programming device. For more information on these cables, refer to GFK-0359, *Series 90-70 Programmable Controller Cables - PCM to Programmer.*

Wye Cable for Series 90-30 ADC

A WYE cable (IC693CBL305) is supplied with each Series 90-30 ADC module. The purpose of the WYE cable is to separate the two ports from a single physical connector, i.e., the cable separates the RS-232 from the RS-485 signals. In addition, the WYE cable makes cables used with the Series 90-70 ADC fully compatible with the Series 90-30 ADC. The WYE cable is one foot in length and has a right angle connector on one end that connects to the ADC module. On the other end, is a dual connector with one connector for port 1 and the other for port 2.

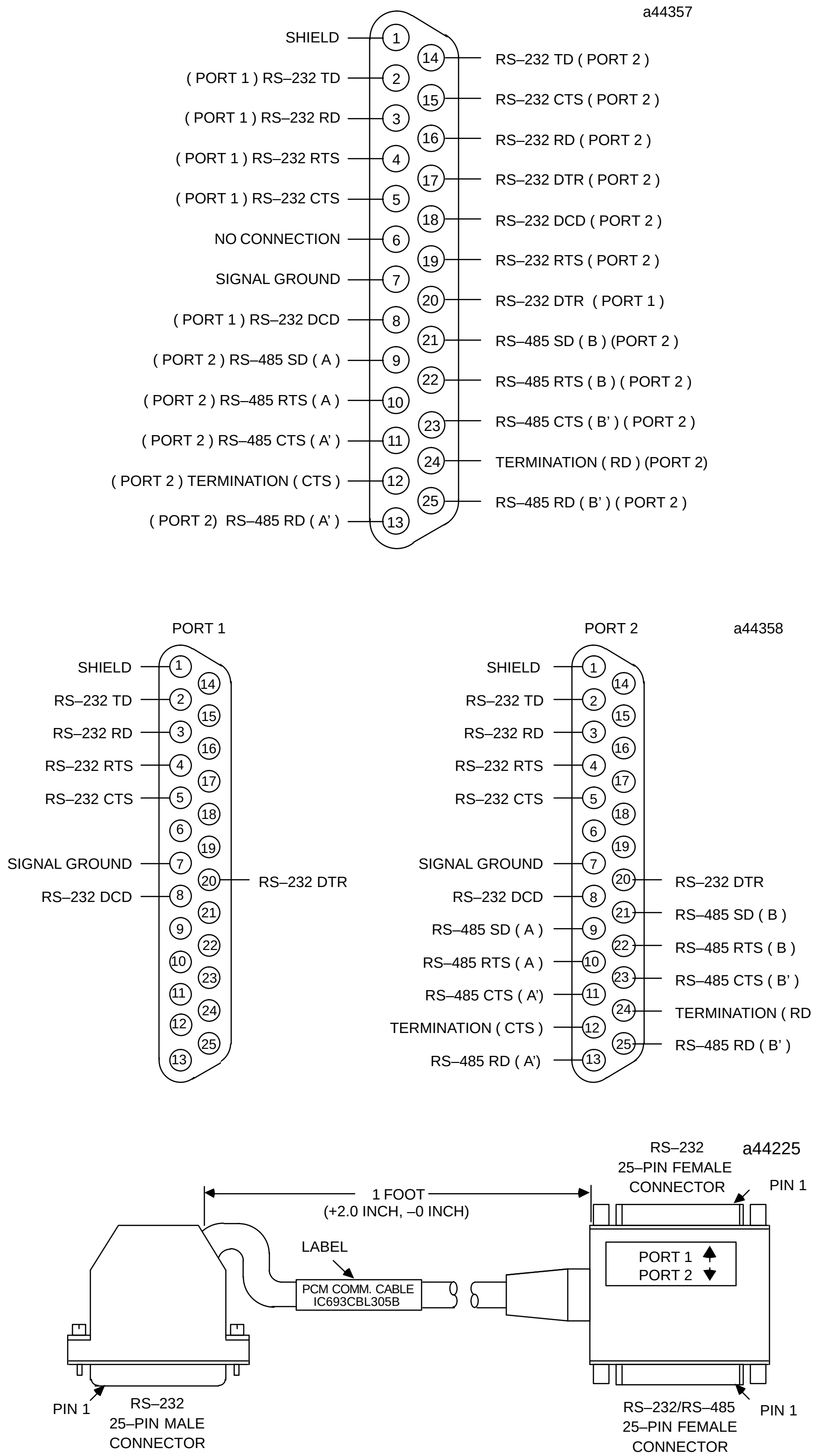


Figure C-6. WYE Cable Connections for the Series 90-30 ADC

In order to use an RS-232 cable on port 2 of the Series 90-30, either a special cable must be made according to the serial port pin assignments shown above or a WYE cable must be used. Standard Series 90-70 ADC cables can be used for the Series 90-30 ADC when the WYE cable is used.

Connecting an OIT to the ADC

The appropriate RS-232 and RS-485 cable connections from the ADC module's Port 2 to an OITs RS-232 port are shown in the following figures.

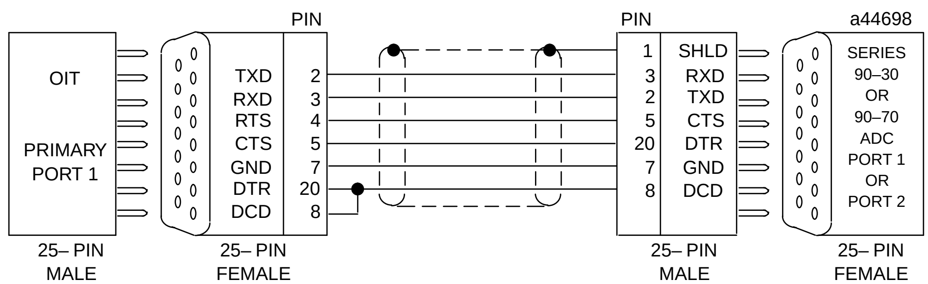


Figure C-7. ADC Port 2 Connection to an OIT, RS-232

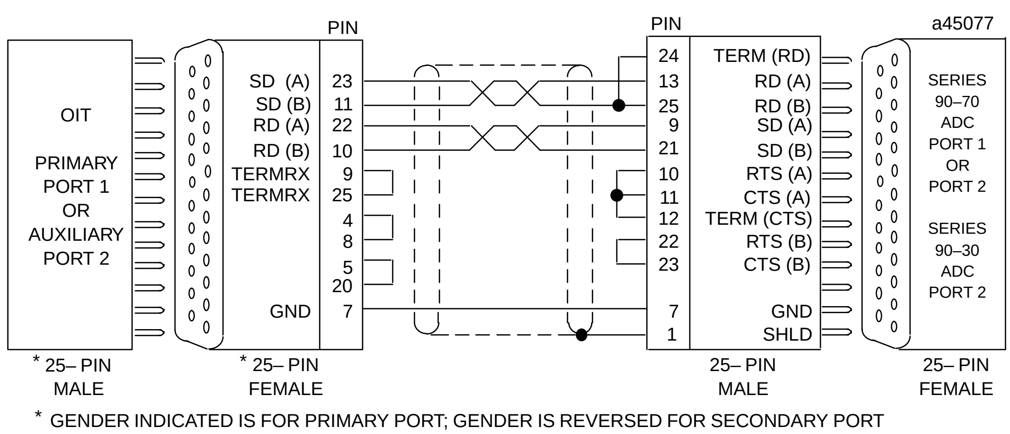


Figure C-8. ADC Connection to an OIT, RS-485

Note

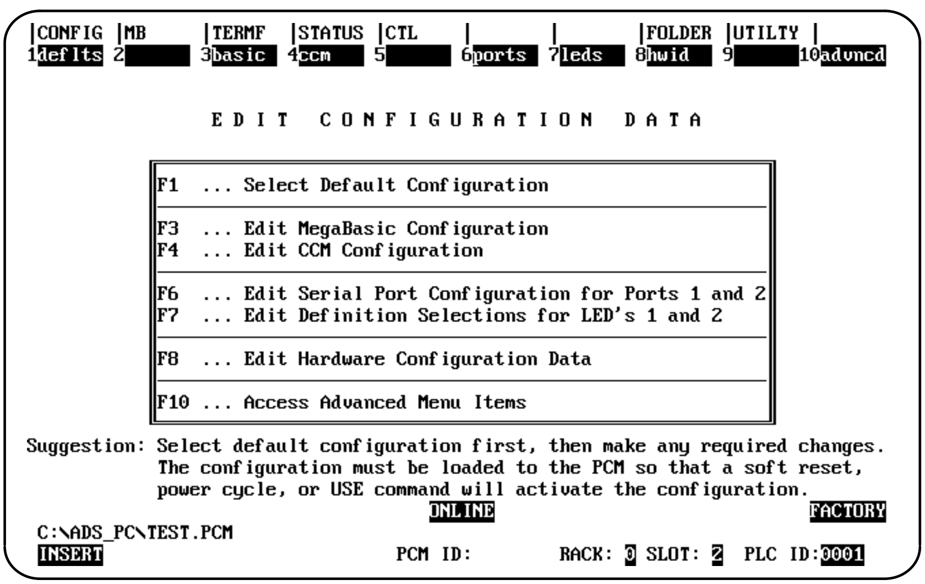
The examples of cable connections shown above are for a Series 90-70 ADC module installation. They can also be used with the Series 90-30 ADC module when connected to the WYE cable described previously.

Appendix D — Changing Default Port Settings

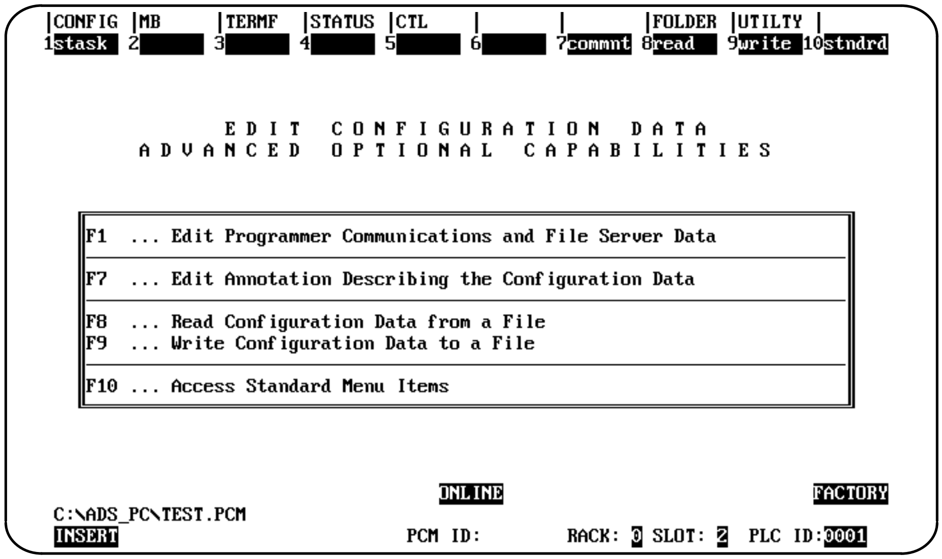
The serial port settings may be reset after the initial installation, if you want to do so. To do this, hard reset the ADC and follow the procedures in this appendix. You may also need to refer to the Series 90 Programmable Coprocessor Module User's Manual, GFK-0255 for more details.

If at all possible you should delay making any port setting changes to Port 1 while you are still developing your Operator Interface System, as communicating files to the ADC module will be more difficult. Your computer can be used as a printer (when running TERMF) during system development (use ASCII printer table).

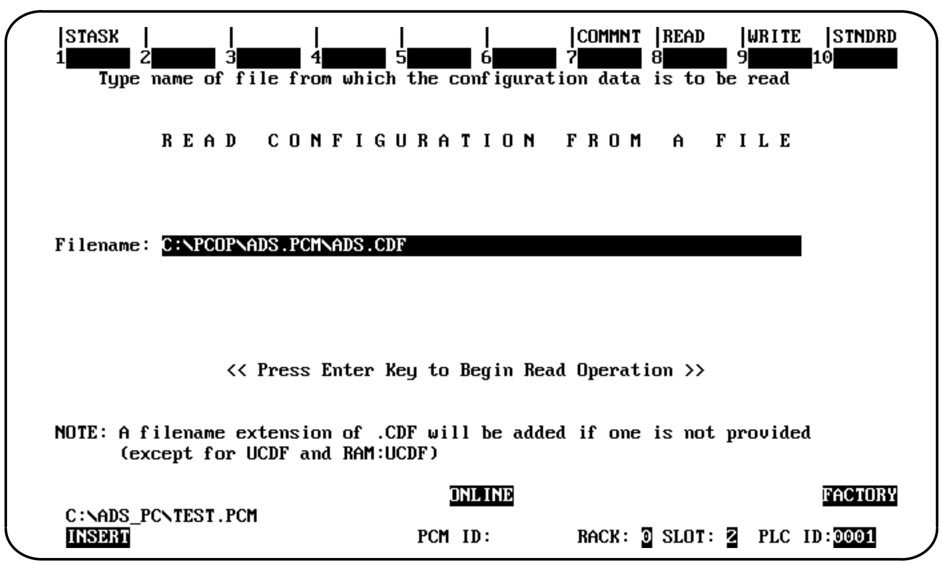
Assume that you want to change the settings for serial port 1 to accommodate a slower printer device. Following the guidelines in Chapter 5, enter PCOP either via the Operator Interface Products menu (ADS menu option "PCOP-ADS") or by using the "ADS" command at the MS-DOS prompt, and proceed to PCOPs main menu screen. From the main menu screen you must access the configuration menu by pressing either the [F1] key or the [Shift-F1] keys.



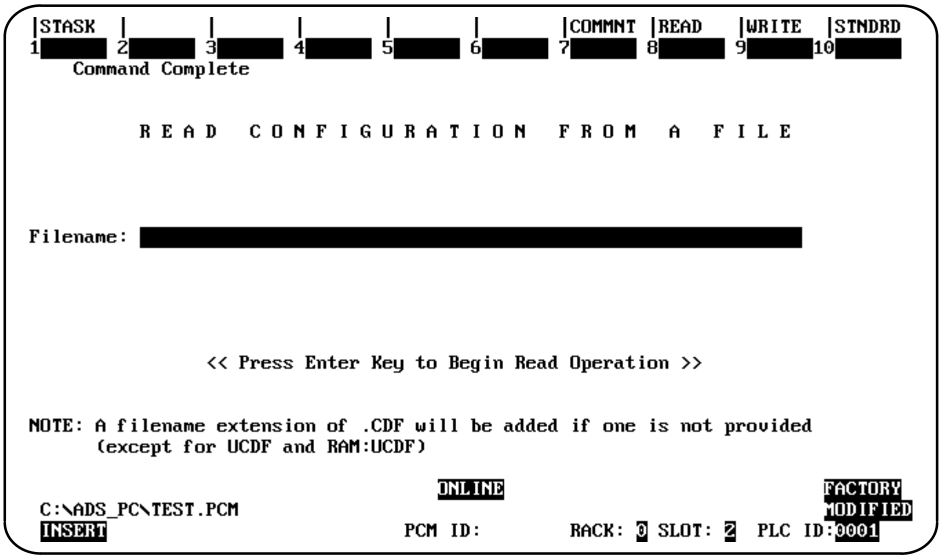
Next, press the [F10] key to access the Advanced Menu Items Option.



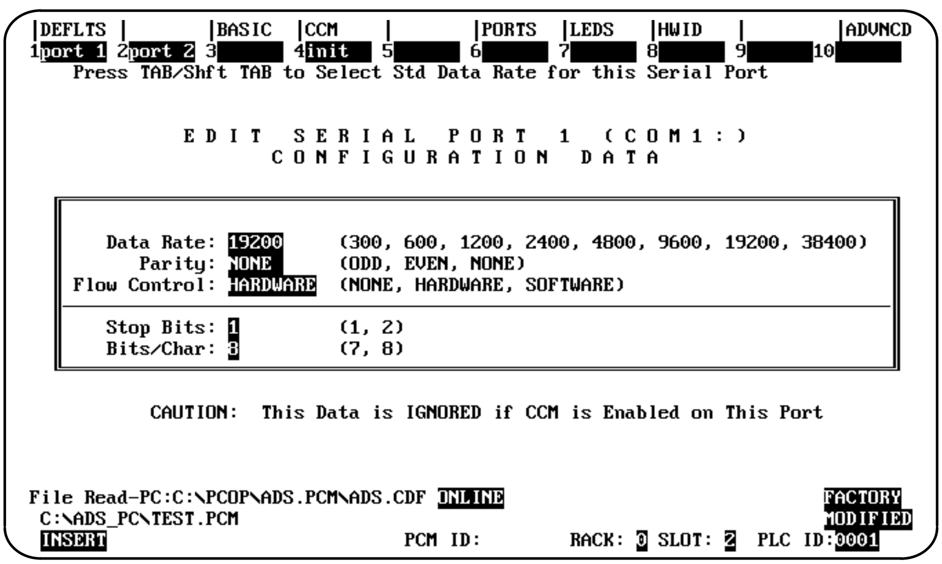
Press the [F8] key to access the Read Configuration Data From a File screen. The ADS configurationfile,C:\PCOP\ADS.PCM\ADS.CDFisselectedforreading.



Pressing the [Enter] key causes the specified configuration file to be read into PCOPs work space.



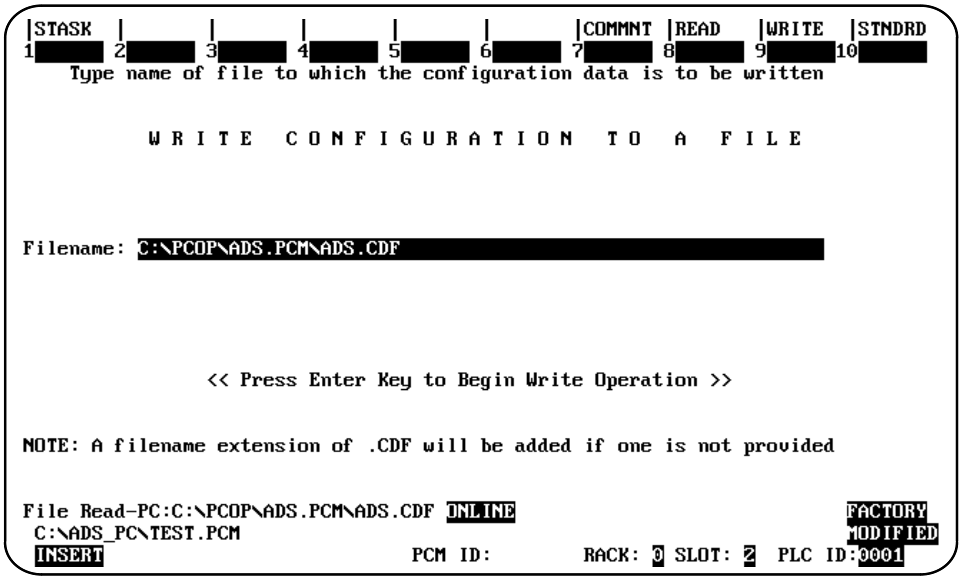
To edit the settings for port 1, first press the [Shift-F10] keys to return to the Standard Menu Items screen. Then, press the [F6] key to access the serial port 1 configuration screen. Any of the settings for port 1 may be changed on this screen. The settings for Port 2 may be accessed in turn by pressing the [F2] key.



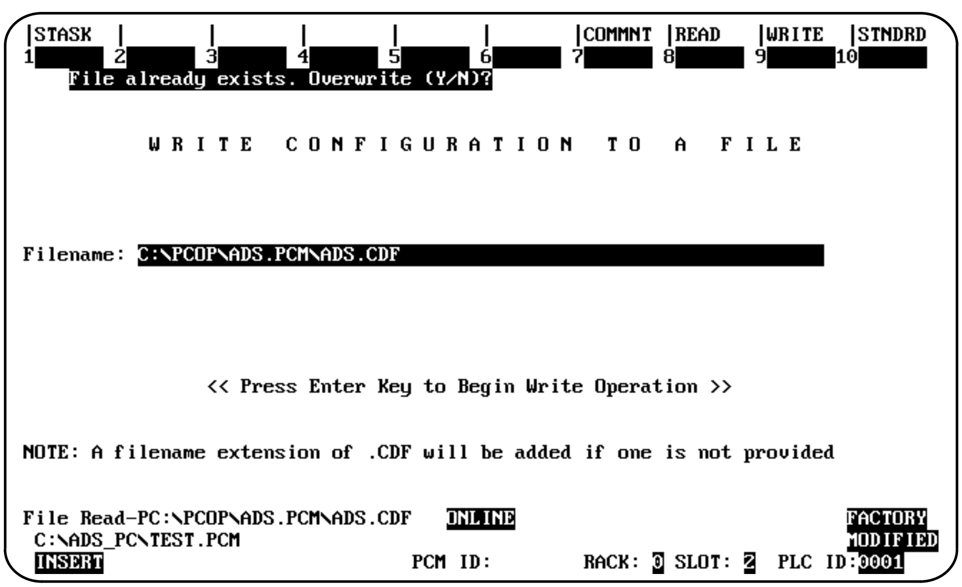
Note

If any changes are made to the Port 1 settings and you plan to load or save systems via the ADS Builder (the typical case) then you will also need to make the same changes to PCOPs configuration file. Refer the information on “Using TERMSET” at the end of this appendix.

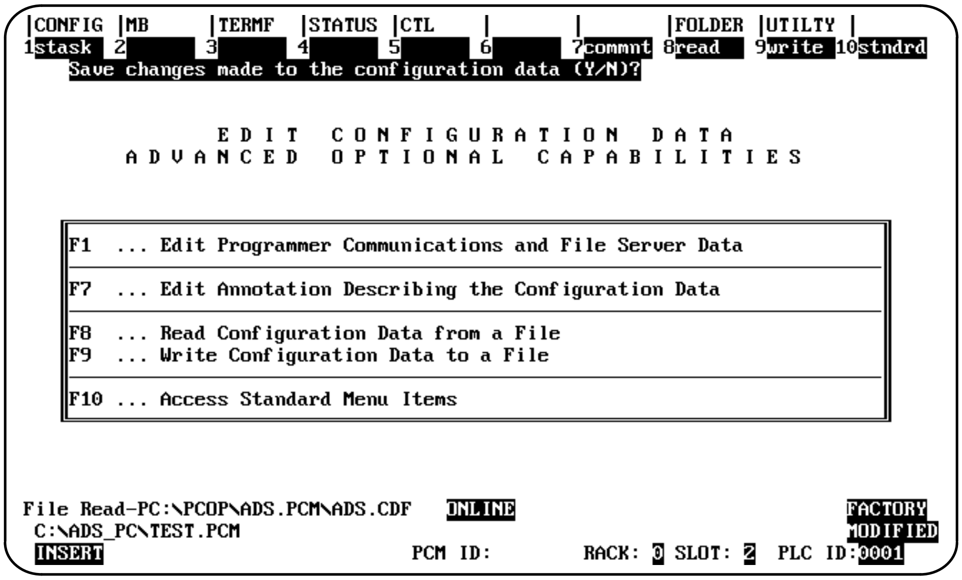
After making the required changes to the serial port settings, press the [Shift-F10] key sequence to access the Advanced Menu Items screen. Then, from this screen, press the [F9] key to access the Write Configuration to a File screen. The ADS configuration file, C:\PCOP\ADS.PCM\ADS.CDFisspecifiedforwriting.



Press the [Enter] key to cause the working space to be written to the specified configuration file. Since the file already exists, you will be prompted (Y / N) to confirm that the file is to be overwritten. To confirm the write operation, press the key sequence [Y] [Enter]. This will complete the write operation.



When the configuration is properly established, and written to the ADS configuration file, press the [Esc] key, then [Shift - F9] key sequence to access the Utility functions menu. You will be prompted as to whether the configuration changes in the work space should be saved in the standard configuration file UCDF.CDF. Answer yes to this prompt by pressing the [Y] key.



From this point press the [F9] key to enter the CIMPLICITY 90-ADS installation screen. Follow the instructions in Chapter 5 for how to install ADS on the ADC module. The new serial port settings will be stored to the ADC module during the process.

Note

If you need to restore the default configuration file type in the following command at the MS-DOS prompt.

COPY \PCOP\BAT\ADS_CDF.ORG \PCOP\ADS.PCM\ADS.CDF

Using TERMSET

Two different communications configuration files can be used with the ADS software, the default file (\PCOP\BAT\ADS_TERM.DAT), which will suffice for most users, and a special user file (\PCOP\BAT\ADS_USER.DAT) which is typically used to handle a slow printer connected to port 1 of the ADC. There are three changes you may need to make to the standard default communications file, concerning the COM port of your computer, the video adapter of your computer and the type of ADC module you are using. By default, the following configuration settings will be in effect for your computer:

1. COM1: (of your computer) is communications port to ADC port 1
2. video adapter is CGA with snow (setting works for all but MDA adapters)
3. will communicate to a Series 90-70 ADC module

Possible reasons for changing these three settings are given below, along with directions for how to change them.

Typically you will want to use your computer's COM1: port as the communications port. However, if your computer supports a second serial port, COM2:, it may be used instead if desired.

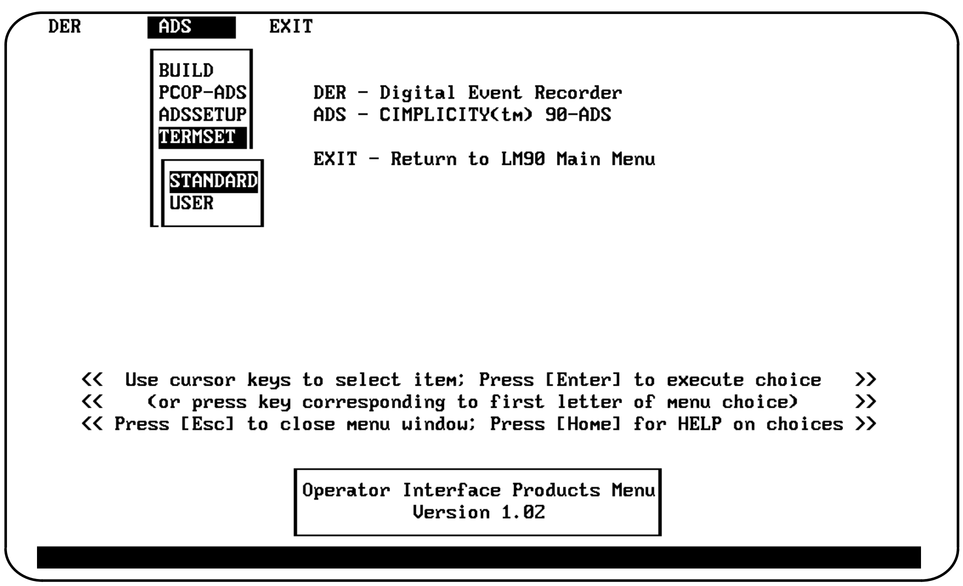
Most computers available today have either a CGA (with or without snow), EGA or VGA video adapter card installed in them. The default setting for PCOP, CGA with snow, functions as a "lowest common denominator" and will work for any of the designated video cards. You might still want to change this item if you have a different adapter for slightly better screen response when using your computer as a terminal (CIBM or MIBM terminal tables). If your computer has a monochrome video adapter (MDA) card you MUST change this item. Executing PCOP or TERMF on a computer with an MDA video adapter card with the video adapter selected as any other type will lead to a blank display on your computer screen.

Note

Your computer may have a CGA, EGA or VGA video adapter card even if it uses a monochrome monitor (e.g., the GE Fanuc Workmaster II computer, which has a VGA video adapter but a monochrome monitor). You should be certain that your computer has an MDA video adapter before changing the video adapter setting.

By default PCOP assumes you will be communicating with a Series 90-70 ADC module. If you communicate with a Series 90-30 ADC module instead, PCOP will warn you of this fact each time you enter that software package. This warning is harmless, and may be ignored. However, if desired this setting may be changed to avoid receiving the warning.

If you want to make any changes to the standard computer communications configuration file, execute the ADS menu option "TERMSET" specifying "STANDARD"



or type the command

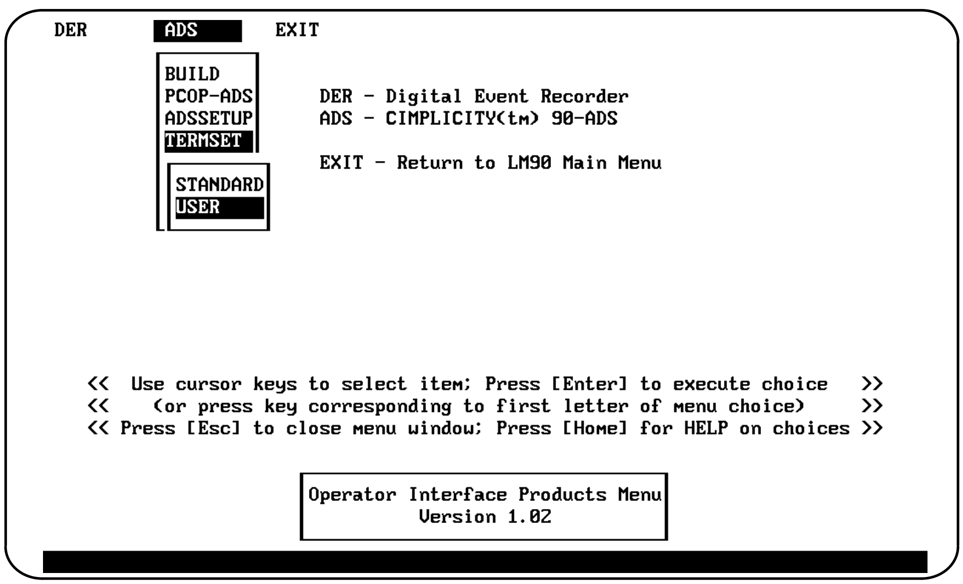
ADS_SET

at the MS-MS-DOS prompt, and follow the directions given below on how to use TERMSET.

If you have changed the ADC port 1 communications settings to accommodate a slow printer device, you will also need to change the configuration information used by PCOP and TERMF if your computer will need to communicate with the ADC module *while the ADS software is running* (but not when the ADC module is hard reset). The two situations where this may occur is if (1) the software running on the ADC module needs to access the PC: drive or (2) you need to use your computer temporarily in place of your printer. By default your computer's serial port communications settings are set up to match those of the ADCs port 1 **factory** settings. These are:

- 19200 baud
- 1 stop bit
- 8 data bits
- no parity
- hardware handshaking

If you need to change any of these settings, you **should not** make them to the standard computer communications setup file. Instead they should be changed **ONLY** in the "USER" communications file. If you want to make any changes to the user computer communications configuration file, execute the ADS menu option "TERMSET" specifying "USER".



or type the command

ADS_SET USER

at the MS-DOS prompt, and follow the directions given below on how to use TERMSET.

By default the standard and user computer communications files are exactly the same. Thus, if you need to modify the user file and you have already made changes to the standard file (e.g., to use your computer's COM2: port), you need to make the identical changes in the user file.

The following example will show how to use TERMSET to modify the computer's standard communications file to (1) use your computer's COM2: port to communicate with the ADC module, (2) specify that your computer has a VGA video adapter and (3) specify that you expect to be communicating with a Series 90-30 ADC module. The exact same process is followed when modifying the computer's user communications file.

Access the ADS menu option ”TERMSET” as described above.

The following screen should be displayed on your computer’s screen.

```
              TERMSET v 2.27 - Please select the desired function:

                              BASIC SETUP

                1  -  display/change comm port settings
                2  -  display/change video adapter settings

                         CUSTOM CONFIGURATIONS

                3  -  display/change keyboard settings
                4  -  display/change attribute settings
                5  -  display/change normal keybindings
                6  -  display/change application mode keybindings
                7  -  display/change cursor key mode keybindings
                8  -  display/change palette settings

                             EXIT TERMSET

                E  -  save file including any changes and exit
                Q  -  quit, discard any changes


                          Your selection please ?
```

To change your computer’s communications port setting to COM2:, press the [1] key to enter the “display / change comm port settings” menu.

```
               The setup for the serial port is:

                         data rate : 19200
                         flow ctrl : HARDWARE
                         parity    : NONE
                         stop bits : 1
                         bits/char : 8
                         comm port : COM1:
                         data mask : FF (Hex)
                         PCOP dflt : PCM 90-70

                Please enter one of the following numbers:

                   1  -  change data rate
                   2  -  change flow control technique
                   3  -  change parity
                   4  -  change stop bits
                   5  -  change bits per character
                   6  -  change communications port
                   7  -  change received character mask
                   8  -  change default PCOP - PCM connection

                   E  -  exit to previous menu

                       Your selection please ?
```

Press the [6] key to access the communications port selection data entry screen.

```
Please enter one of the following numbers:

  1  -  COM1: is communications port
  2  -  COM2: is communications port

  E  -  exit to previous menu

Your selection please ?
```

Press the [2] key to select COM2: as the communications port. Note that you are automatically returned to the previous menu screen and that COM2: is now shown as the selected communications port.

```
The setup for the serial port is:

               data rate : 19200
               flow ctrl : HARDWARE
               parity    : NONE
               stop bits : 1
               bits/char : 8
               comm port : COM2:
               data mask : FF (Hex)
               PCOP dflt : PCM 90-70

      Please enter one of the following numbers:

         1  -  change data rate
         2  -  change flow control technique
         3  -  change parity
         4  -  change stop bits
         5  -  change bits per character
         6  -  change communications port
         7  -  change received character mask
         8  -  change default PCOP - PCM connection

         E  -  exit to previous menu

             Your selection please ?
```

To change the designation for which type of ADC you plan to communicate with, press the [8] key. Note that the PCOP default toggles to now indicate “PCM 90-30”.

```
            The setup for the serial port is:

                          data rate : 19200
                          flow ctrl : HARDWARE
                          parity    : NONE
                          stop bits : 1
                          bits/char : 8
                          comm port : COM2:
                          data mask : FF (Hex)
                          PCOP dflt : PCM 90-30

                 Please enter one of the following numbers:

                    1  -  change data rate
                    2  -  change flow control technique
                    3  -  change parity
                    4  -  change stop bits
                    5  -  change bits per character
                    6  -  change communications port
                    7  -  change received character mask
                    8  -  change default PCOP - PCM connection

                    E  -  exit to previous menu

                        Your selection please ?
```

Press the [E] key to return to the main menu screen.

```
               TERMSET v 2.27 - Please select the desired function:

                                 BASIC SETUP

                 1  -  display/change comm port settings
                 2  -  display/change video adapter settings

                            CUSTOM CONFIGURATIONS

                 3  -  display/change keyboard settings
                 4  -  display/change attribute settings
                 5  -  display/change normal keybindings
                 6  -  display/change application mode keybindings
                 7  -  display/change cursor key mode keybindings
                 8  -  display/change palette settings

                                EXIT TERMSET

                 E  -  save file including any changes and exit
                 Q  -  quit, discard any changes


                           Your selection please ?
```

To change the video adapter selection to VGA, first press the [2] key to access the “display / change video adapter settings” menu.

```
The video adapter type is Standard Color Graphics Adapter (CGA) with snow

The page length is 25 lines.

The display of control sequences is disabled.

The normal display video mode is 3 (HEX).

Do you wish to change the video display setup ?
```

Press the [Y] key to confirm that you want to change the video display setup. An additional menu selection is displayed.

```
The video adapter type is Standard Color Graphics Adapter (CGA) with snow

The page length is 25 lines.

The display of control sequences is disabled.

The normal display video mode is 3 (HEX).

Do you wish to change the video display setup ? y
Please select the item to be changed:
  1  -  change video adapter selection
  2  -  change page length
  3  -  change display control sequences enable
  4  -  change normal display mode
```

Press the [1] key to change the video adapter selection. You are prompted with an additional menu asking you to select a particular video adapter.

```
The video adapter type is Standard Color Graphics Adapter (CGA) with snow

The page length is 25 lines.

The display of control sequences is disabled.

The normal display video mode is 3 (HEX).

Do you wish to change the video display setup ? y
Please select the item to be changed:
  1  -  change video adapter selection
  2  -  change page length
  3  -  change display control sequences enable
  4  -  change normal display mode
1
Please enter one of the following numbers:
  1 - Enhanced Graphics Adapter / Video Graphics Array (EGA/VGA)
  2 - Standard Color Graphics Adapter (CGA) with snow
  3 - Improved CGA with no snow
  4 - Monochrome Display Adapter (MDA)
  5 - Vega 7 Deluxe adapter / Multisync Display
  6 - Enhanced Graphics Adapter / Monochrome Display
```

To select the VGA video adapter, press the [1] key. Note that you are returned to the previous menu and that EGA / VGA has been selected as the video adapter.

```
The video adapter type is
Enhanced Graphics Adapter / Video Graphics Array (EGA/VGA)

The page length is 25 lines.

The display of control sequences is disabled.

The normal display video mode is 3 (HEX).

The display of long lines is enabled for CRT mode 1 (HEX).

The selected character font is normal ROM.

Do you wish to change the video display setup ?
```

Press the [N] or [Enter] key to return to the main menu screen.

```
TERMSET v 2.27 - Please select the desired function:

                  BASIC SETUP

   1  -  display/change comm port settings
   2  -  display/change video adapter settings

             CUSTOM CONFIGURATIONS

   3  -  display/change keyboard settings
   4  -  display/change attribute settings
   5  -  display/change normal keybindings
   6  -  display/change application mode keybindings
   7  -  display/change cursor key mode keybindings
   8  -  display/change palette settings

                 EXIT TERMSET

   E  -  save file including any changes and exit
   Q  -  quit, discard any changes


             Your selection please ?
```

Pressing the [E] key at this point will save the two changes you have made.

Note

You should not need to make any modifications on any other screen of TERMSET. If you do make changes on one of the other screens, the ADS software may not execute as expected. If you want to restore the original communications file which came on the ADS distribution diskette, you must do the following. If you need to restore the default standard communications file type in the following command at the MS-DOS prompt.

COPY \PCOP\BAT\ADS_TERM.ORG \PCOP\BAT\ADS_TERM.DAT

If you need to restore the default user communications file type in the following command at the MS-DOS prompt.

COPY \PCOP\BAT\ADS_USER.ORG \PCOP\BAT\ADS_USER.DAT

Any time that the ADC module is hard reset, you must access the PCOP software by typing

ADS

at the MS-DOS prompt. If you have modified the serial port settings for port 1, any time that the ADS software is executing you must access the PCOP software by typing

ADS USER

at the MS-DOS prompt. Failure to do so will result in a communications failure between the ADC module and the attached computer.

Note

As noted above, *ADS* is typed in at the MS-DOS prompt to access the PCOP software when the ADC module is hard reset. If you perform an ADS installation, the ADS software will automatically begin executing. If you have changed the default settings for port 1, you must first exit PCOP and then access it again by typing *ADS USER* at the MS-DOS prompt before performing the first load or archive of an ADS system.

The “USER” parameter may also be used in conjunction with the IBM_TERM.BAT file for directly accessing the TERMF utility.

Appendix E Converting a Version 1 System to Version 2

The file formats for the files making up an ADS operator interface system changed from Version 1 to Version 2 of the ADS product. Therefore, to use a system created with Version 1.01, 1.02, 1.03 or 1.04 of the ADS software with ADS Version 2.01 or later software, you must first pass it through the ADS Version 2 database conversion utility, UPDV1V2. This conversion utility will not alter your original database files unless you indicate a destination folder which is the same as the folder containing your V1 system (it is recommended that you choose a different folder for your V2 system).

A V1 system cannot be executed with the V2 (or later) ADS software until it has been converted. The converted system will execute as before, and will not require any manual editing on your part.

To execute the V1 to V2 conversion utility, type the following command at the MS-DOS prompt

```
UPDV1V2 <system name> <V1 source folder> { <V2 destination folder> }
```

where <system name> is the name of the V1 system to be converted, <V1 source folder> is the full path specification for where to find the V1 system (must be in a folder) and <V2 destination folder> is an optional full path specification for where the V2 equivalent system is to be stored (again which must be a folder). If the <V2 destination folder> is not specified, the converted system will be stored in the folder \ADS_PC\<system name>.PCM. If the specified destination folder does not exist, it will be created automatically.

As the V1 system is being converted, the conversion utility will display information concerning the process. In the following example, V1 system TEST is being converted into its equivalent V2 form. The command

UPDV1V2 TEST\FOLDERS\TEST.PCM

was typed in at the MS-DOS prompt. The converted system was placed in the folder \ADS_PC\TEST.PCM.

```
C:\>updv1v2 test \folders\test.pcm

C:\>echo off

Attempting to load v1 system \folders\test.pcm\test ...
Loading system configuration parameters from TEST.CFG ..

Loading system alarm definitions from TEST.ALM ..

Verifying system configuration ..  done
Attempting to load v1 screen ONE        (1  ) ...
Loading screen ONE (1) ..
Verifying screen ONE (1) ..  done
Attempting to load v1 screen TWO        (2  ) ...
Loading screen TWO (2) ..
Verifying screen TWO (2) ..  done
Attempting to save v2 system  TEST ...
Saving system configuration parameters in TEST.CFG ..
Saving system alarm definitions in TEST.ALM ..
Saving screen ONE (1) ..
Saving screen TWO (2) ..
   ... Saving v2 system TEST completed successfully
C:\>
```

A

B

C