GE Fanuc Automation

Programmable Control Products

PANELWARE™ MMI Application Manual for GE Fanuc Genius™ Protocol

User's Manual

GFK - 1115 *June 1995*

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Note

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

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This manual provides a quick guide to installing and operating PANELWARE™ Panels, describes configuration techniques, and outlines general use of the PANELWARE Configuration Software (PCS) with GE Fanuc Genius Protocol.

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Content of This Manual

Chapter 1. Overview provides a short description of the PCS and outlines the prerequisites for PCS operation with the PC and the PLC.

Chapter 2. C400 Panel Controller Hardware provides specifications, descriptions of connections and operational elements, and operating instructions for the C400 Controller.

Chapter 3. Quick Start provides installation instructions and introduces the operation and functionality of the PCS by means of several easy-to-follow examples.

Chapter 4. Configuring Communication with the PLC contains information on Panel Controller and PLC interface configurations and describes how to make the connection between the Panel and PLC.

Chapter 5. Connection Editor describes the PCS function that performs the organization of variables in the Panel (symbolic names) and addresses in the PLC.

Chapter 6. Demo Project briefly explains how to run the demo projects that are delivered with the software.

Appendix A. Cabling Information describes the required PCS to PLC and PC interface cables and provides several cabling diagrams.

Appendix B. Errors / Troubleshooting provides an overview of possible system errors and explains their causes and possible solutions.

Related Publications

PANELWARE Manuals

GFK-0848 ***PANELWARE™ Hardware Installation User's Manual***
Describes the PANELWARE Operator Panels and contains technical data, hardware installation instructions, and the general information required for putting the Panels into operation.

GFK-0849 ***PANELWARE™ Configuration Software Reference Manual***
Describes the PANELWARE Configuration Software and provides the program setups for Panels that are equipped with a programmable controller.

GFK-0850 ***PANELWARE™ MMI Application Manual for GE Fanuc Series 90™ Protocol (SNP)***
Contains specific information on the configuration of PANELWARE Panels that communicate by means of GE Fanuc Series 90 Protocol.

GFK-1112 ***PANELWARE™ Application Manual for Siemens SINEC L1 Driver***
Contains specific information on the configuration of PANELWARE Panels that communicate with Siemens controllers by means of the SINEC L1 protocol.

GFK-1113 ***PANELWARE™ Application Manual for the Modicon MODBUS (RTU/ASCII) Driver***
Contains specific information on the configuration of PANELWARE Panels that communicate with MODICON controllers by means of the MODBUS protocol.

GFK-1142 ***PANELWARE™ Configuration Software Quick Start Guide***
This guide, a companion to the *PANELWARE Configuration Software Reference Manual* (GFK-0849), provides basic information for configuring and using PCS.

Other Documents

GEK-90486-1 ***Genius™ I/O System and Communications User's Manual***
Reference manual for systems designers, programmers, and others involved in integrating Genius I/O products in a PLC or host computer environment. This book provides a system overview, and describes the types of systems that can be created using Genius products. Datagrams, global data, and data formats are defined.

GFK-0398 ***Series 90™-70 Genius™- Bus Controller User's Manual***
Describes the features and operation of the Series 90-70 Genius Bus Controller. Provides configuration and programming information needed to complete the interface between a Series 90-30 PLC and a Genius I/O Bus.

GFK-0585 ***Series 90 PLC SNP Communications Driver User's Manual***
Describes the software installation, operation, and programming of the GE Fanuc Series 90 Protocol Driver. The SNP is used to retrieve/store data or issue commands to a given Series 90 PLC via the serial port.

GFK-0852 ***Series 90™ PLC Serial Communications User's Manual***
This manual describes serial communications products for the Series 90 Programmable Logic Controller. Information is provided to implement a serial communications link between the Series 90 PLC, a host computer, peripheral device, or another PLC.

GFK-0898 ***Series 90-30 Programmable Controller I/O Module Specifications***
Describes the discrete and analog I/O modules for the GE Fanuc Series 90-30 PLC. Contains descriptions of each I/O module and provides specifications and wiring information for each module.

GFK-1034 ***Series 90™-30 Genius™ Bus Controller User's Manual***
Describes the features and operation of the Series 90-30 Genius Bus Controller. Provides configuration and programming information needed to complete the interface between a Series 90-30 PLC and a Genius I/O Bus.

We Welcome Your Comments and Suggestions

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Libby Allen
Senior Technical Writer

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Chapter 1 Overview

This chapter provides a short overview/description of the PANELWARE Configuration Software (PCS) and outlines the requirements for PCS operation with the PC and PLC. It includes the following information:

- PANELWARE Configuration Software (PCS) 1-2
- Hardware and Software Requirements 1-3
- PLC Requirements 1-4
- Document Conventions 1-5

PANELWARE Configuration Software

PANELWARE Configuration Software allows complex projects to be created, using easy-to-follow, menu-controlled instructions. These projects are actually programs that are transferred to a Panel and started there via a Panel power-on or Reset. The PCS-created Panel program (project) then takes over communication with the PLC and performs the following:

- Reads data from the PLC and displays it on the screen in the specified format (values, text, bar-graphs, graphics)
- Writes data to the PLC and executes PLC functions
- Displays static data, such as text masks and lines

Using PCS, projects can be created for the C400 Panel Controller.

Every project consists of at least the following components:

Table 1 - 1. PCS Project Component Descriptions

Project Component	Definition
Project Definition	Consists mainly of the hardware configuration of the Panel and the picture directory.
Picture Directory	A list of all pictures used in the project; also contains information on switching to other pictures. A picture change (making a different picture appear on the screen) can be performed either by pressing a defined key or via the direction of the PLC.
Pictures	Contains all information about what is to be displayed on the display module. Text, in/output fields, and on graphics-capable displays, lines, and bars, can all be components of a picture.
Keyboard Definition	Defines the keyboard function assignments (function keys, numeric, or alphanumeric keys can be defined).
Connection List	Lists all connections that the Panel can access. A connection defines the type of connection (protocol), the interface, and the location where the Panel can find the data (e.g., which CPU in a network).

Hardware and Software Requirements

PCS is delivered on two 3½-inch disks in 2DD (720K) format and on one 5¼-inch disk in 2S/HD (1.2M) format. The diskette(s) you use to install the PCS depends on your PC configuration.

Description	Catalog Number
PANELWARE Configuration Software (includes cable assembly)	IC641SWP950

Before starting the software installation, make sure the following requirements are met:

- Complete IBM PC compatibility (processor types: 80286 and higher)
- IBM compatible monochrome or color adapter
- One 3½ inch (720 Kbyte) or 5¼ inch (1.2 Mbyte) floppy disk drive
- For the installation, approximately 3 Mbytes must be free on the hard disk.
- 640 KB RAM, of which at least 512 KB must be available. Memory-resident programs should be removed if necessary to free up the RAM.
- Minimum 1 serial interface (COM1 or COM2)
- MS-DOS version 3.30 or higher
- The CONFIG.SYS file settings for FILES and BUFFERS must be set to a minimum of: FILES=40; BUFFERS=10.

Note

PCS can be executed in a DOS box under Windows 3.1 only in offline mode. To either download or upload a project to/from a Panel, you must exit Windows and run PCS from the DOS prompt.

PLC Requirements

To communicate with the C400 Genius Panel Controller, the PLC must meet the following requirements:

- Series 90-70 PLC
  - Genius Bus Controller (GBC), IC697BEM731
- Series 90-30 PLC
  - Genius Communications Module (GCM), IC693CMM301
  - Enhanced Genius Communications Module (GCM+), IC693CMM302
  - Genius Bus Controller, IC693BEM331
- Series Six
  - Genius Bus Controller with diagnostics, IC660CBB902
  - Genius Bus Controller without diagnostics, IC660CBB903
- Series Five
  - Genius Bus Controller, IC655BEM510

Document Conventions

Key Symbols

All keys used to operate PCS are shown in bold in this manual:

Table 1 - 2. Key Symbols

Key		Description
German	**English**	
↑	↑	Cursor up
↓	↓	Cursor down
←	←	Cursor left
→	→	Cursor right
↵	↵	Enter (Return)
Bild↑	**PgUp**	Cursor one page up
Bild↓	**PgDn**	Cursor one page down
Einfg	**Ins**	Switches between insert and overwrite modes
Entf	**Del**	The character in the cursor position is deleted
Esc	**Esc**	Exits from the current function; exits the editor or a menu
Space	**Space**	Space (Blank character)
Strg	**Ctrl**	Control key
Shift	**Shift**	SHIFT key
Alt	**Alt**	Alternate key
⇐	⇐	The character to the left of the cursor position is deleted (Back Space)

If two keys are to be pressed simultaneously in order to execute a function, the keys will be connected by the plus (+) character. Example:

`Ctrl + Ins`

Text that is to be entered directly using the keyboard is shown in **bold** and ***italic***. Example:

`panel`

Menu Functions

The names of pull-down menus and menu functions are shown in **bold**. Example:

Edit menu

Chapter 2

C400 Panel Controller Hardware

This chapter describes the C400 PANELWARE Panel Controller (IC750CTR400), its connections (interfaces) and all operational elements for which hardware must be configured on the modular Panel. The following sections of information are included:

- General Information 2-2
  - Power Requirement 2-2
  - Connecting Power to the Controller 2-2
  - Setting Number Switches 2-2
- Genius Panel Controller (C400) 2-3
  - Specifications 2-3
  - Overview of Connections and Operational Elements 2-5
- Operating the C400 Controller 2-7
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  - Loading and Starting Panel Programs 2-10
  - Update Mode/Reloading the Operating System 2-10

General Information

Power Requirement

24 VDC power must be supplied to the PANELWARE Controller unit. The Controller, in turn, supplies the Keyblock and Display modules with power.

When estimating the total 24 VDC power consumption for a system, add up the 24 VDC power supply requirements for all of the PANELWARE components being used, then add an additional 30% to allow for power on surge currents. Refer to the *PANELWARE™ Hardware Installation User's Guide* (GFK-0848) for details on displays and Keyblocks.

Connecting Power to the Controller

The 24 VDC power connector on the Controller is located on the top left corner of the unit. The mating connector is supplied with each Controller.

Caution

Do not try to run PANELWARE off a Series 90-30 power supply revision M or earlier. Although some configurations might function under this setup, it is not recommended. Damage to the 90-30 power supply could result.

The suitability of a Series 90-30, revision N or later power supply depends on the +24VDC isolated load requirements of the modules in your PLC. Refer to the *Series 90-30 Programmable Controller I/O Module Specifications* (GFK-0898) to determine additional load requirements of your system.

All components of a PLC and the devices it is controlling must be properly grounded. This is particularly important for the reasons listed below:

- A low-resistance path from all parts of a system to ground minimizes exposure to shock in the event of short circuits or equipment malfunction.
- PANELWARE Operator Panels require proper grounding for correct operation.

The importance of grounding can not be over emphasized.

Setting Number Switches

Number switch settings on the Panel Controller can be set using a small flathead screwdriver to turn the switch dial to the desired setting (so that the arrow points at the desired setting).

The assembled Panel configuration provides minimal space to reach the number switches once the Panel is installed. If possible, these settings should be made before the Controller is installed.

Genius Panel Controller (C400)

Specifications

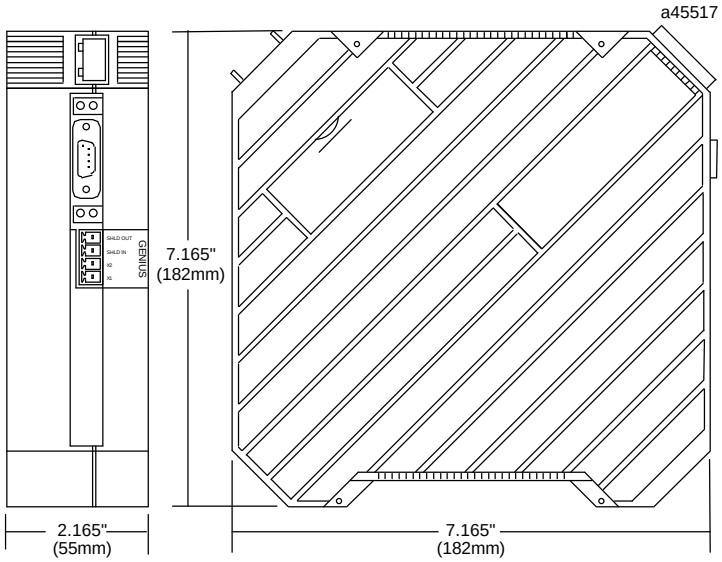


Figure 2 - 1. Genius Panel Controller (C400)

Table 2 - 1. Specifications for Genius Panel Controller (C400)

Technical Data	
Interfaces	IF0: RS-232 (not galvanically isolated) Genius: (isolated)
Programming	PANELWARE Configuration Software
Power supply	24 VDC (min. 18 VDC, max. 30 VDC)
Real-time clock	YES with battery installed (non-volatile)
Connection of	
Display modules	1
Keyblock modules	maximum of 7
Temperature	
Operating	0 to 50 °C (32 to 122 °F)
Storage	-20 to 60 °C (-4 to 140 °F)
Relative humidity	
Operating	10 to 95 % (non-condensing)
Storage	10 to 95 % (non-condensing)

Table 2 - 1. - Continued

Shock	conforms to IEC 68-2-27 15g equivalent, 150 m/sec^2, 11 msec, 3 axes (positive and negative)
Vibration	conforms to IEC 68-2-6 1g equivalent, 10-58 Hz; 0.075 mm 58-150 Hz; 9.8m/sec^2 20 cycles per axis
Processor	Motorola 68302 @ 16 MHz
24 VDC power requirements (typical)	185 mA, 24 VDC 260 mA, 18 VDC (minimum power voltage) 150 mA, 30 VDC (maximum power voltage)
Sealing	NEMA 12 and IP54 when properly mounted in a Panel
Noise immunity	conforms to IEC 801.2; IEC 801.3; IEC 801.4

Overview of Connections and Operational Elements

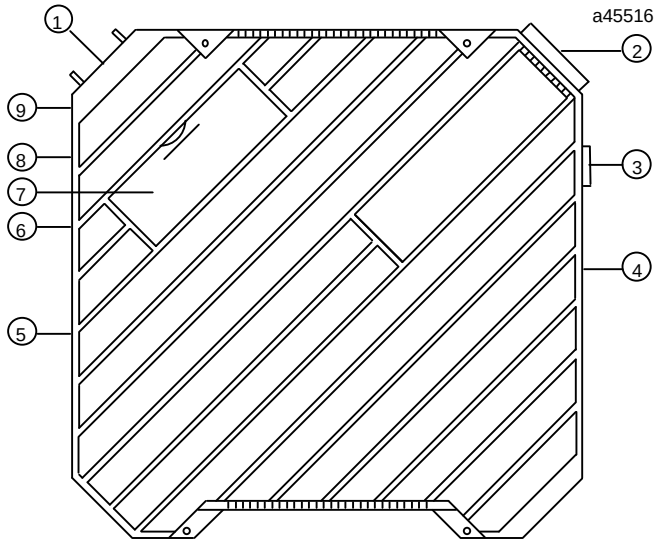
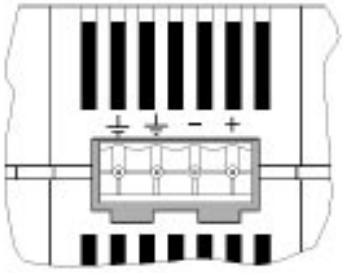


Figure 2 - 2. Genius Panel Controller (C400) Elements/Connections

1. Display Module Connector (ribbon cable)
2. 24 VDC Power Supply Connector
3. IF0: RS-232 (to PC), labeled 0
4. Genius Bus Connector
5. Keyblock Module Connector
6. Mode Switch - Operating Mode
7. Cover for Lithium Battery
8. Device Number Switches
9. Reset Button

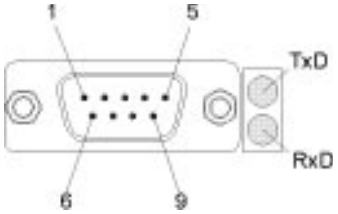
24 VDC Power Supply (item 2, Figure 2-2)



Pin	Description
+	+24 V
-	0 V
⏚	Ground
⏚	Ground

The ⏚ pins are to be connected using as short a cable as is possible. If the Panel is mounted in a cabinet, the connecting cable should be as short as possible.

IF0 - RS-232, Non-isolated (item 3, Figure 2-2)

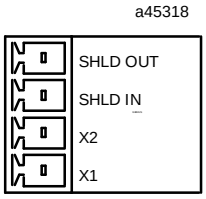


9 pin D-Type (M)

LED	Meaning
TxD	Send data over interface
RxD	Receive data over interface

Pin	Description	
1	NC	
2	RxD	Receive Data (Input)
3	TxD	Transmit Data (Output)
4	+ 5 V	Power Supply (200 mA available to user)
5	GND	Signal Ground
6	NC	
7	RTS	Request To Send (Input)
8	CTS	Clear To Send (Output)
9	NC	

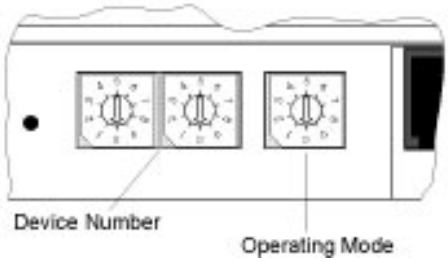
Genius Bus Connector, Isolated (item 4, Figure 2-2)



Pin	Description
SHLD OUT	Shield Out (to next physical device on bus)
SHLD IN	Shield In (from previous physical device on bus)
X2	Serial 2
X1	Serial 1

Mode Switch (item 6, Figure 2-2)

The mode of operation for the Panel Controller is selected by setting the Operating Mode switch (see Table 2-2 for operating modes).

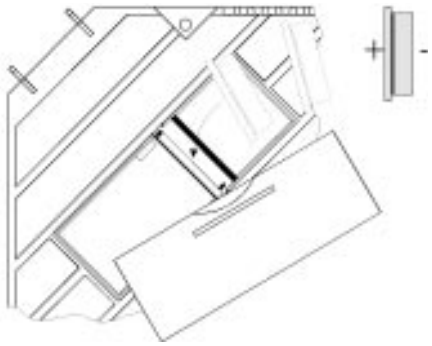


Device Number Switches (item 8, Figure 2-2)

The Genius bus address for the C400 Controller is set using the Device Number switches. Valid device numbers are 00 to 31, inclusive.

Lithium Battery (item 7, Figure 2-2)

The lithium battery is stored in its own compartment in the Controller and covered for its own and the user's protection. It should be replaced every two years, or whenever the software indicates that the battery is low.

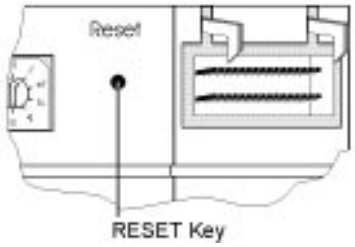


Warning

Lithium batteries are considered harmful waste. Dispose of them in accordance with the instructions in the Material Safety Data Sheet (MSDS) that accompany the battery, and in accordance with local regulations.

Reset Button (item 9, Figure 2-2)

A hardware reset can be executed by pressing this button. Depending on the setting of the mode selection switch, different functions can be executed. These functions are explained in the descriptions of the connections and operational elements that follow.



Operating the C400 Controller

FlashPROM

The Panel Controller has non-volatile memory called FlashPROM, which is split into two separate areas (banks) as follows:

System Bank contains the operating system, which is necessary for the Panel program created by the user to be processed. The system bank **can not** be deleted by the user.

Routine operating system updates to a higher revision level are performed with PCS in *Update-Mode*.

User Bank contains the Panel program that controls and is used by the display and Keyblock modules. The Panel program is created with PCS on a standard PC and downloaded in *Teach-Mode*.

RESET Modes

After a Reset or power-on, different operating modes can be activated depending on the settings of the mode switch (operating mode). The mode switch is used to select *run*, *update*, or *teach* mode. In addition, settings 1 — 5 select the baudrate in *run* mode.

Table 2 - 2. C400 Controller Mode Switch Settings

Switch Setting	Description
1	*Run Mode*, 153.6 kBaud extended
2	*Run Mode*, 76.8 kBaud
3	*Run Mode*, 38.4 kBaud
4	*Run Mode*, 153.6 kBaud standard
5	*Run Mode*, 153.6 kBaud standard, or the baudrate set in PCS
6	*Update Mode*: An update of the operating system can be performed with PCS.
7	*Teach Mode*: Panel programs that are created by means of PCS are transferred to the FlashPROM (User Bank)
8-9	*Not allowed*

Run Mode: The Panel Controller starts the operating system from the FlashPROM (Bank 0). Existing Panel programs (in FlashPROM User Bank) are started automatically.

Loading and Starting Panel Programs

A Panel program is created using PCS and then transferred (loaded) to the Panel through the serial interface when *Teach Mode* is selected. To start an application, *RUN Mode* must be selected. The following sections outline how to load, start, and reload the operating system.

Loading the Panel Program

1. Connect the PC (COM1 or COM2) to the Panel Controller (always IF0) using the appropriate serial cable (see Appendix A).

   Note

   If you are using a printer with the C400, the printer must be disconnected while the Panel program is loaded.

2. Select *Teach Mode* (position 7).
3. Press the Reset button.
4. Wait until *Teach-Mode* is displayed.
5. Start the transfer from PCS.
6. Wait until PCS acknowledges that the entire Panel program has been transferred.

Starting the Panel Program

1. Select *Run Mode* (position 5, or 1 — 4, as appropriate).
2. Connect the PLC to the Panel Controller.
3. Press the Reset button.

Update Mode/Reloading the Operating System

The Panel Controller's operating system can be reloaded from PCS. The steps for accomplishing this transfer are identical to those in the section, “Loading the Panel Program,” except that *Update Mode* (position 6) is selected. The *Update Mode* is only required to support future operating system upgrades.

To update in this mode, proceed as follows:

1. Select *Update Mode* (position 6).
2. Press the Reset button.
3. Begin the update operation with PCS.
4. Wait until PCS acknowledges that the update is complete.
5. Select *Run Mode* (position 5, or 1 — 4, as appropriate).
6. Press the Reset button to start the existing Panel program.

Chapter 3 Quick Start

This chapter provides a quick guide to installing and using PCS and, using step-by-step instructions, explains how to create a project. It includes the following information:

- Software Installation.....3-2
  - Calling the Setup Program.....3-2
  - Language Selection.....3-2
  - Installation Menu 3-3
- Starting PCS 3-5
- General Operation.....3-6
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  - Selection Windows 3-7
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Section 1 Software Installation

The Genius protocol driver is copied to your computer as part of the standard PCS installation (PCS version 1.8 or later). The PCS should be installed according to the instructions in the following sections.

Calling the Setup Program

Insert the PCS distribution diskette into the appropriate floppy disk drive. If you are using the two 3 1/2" diskettes, install the #1 disk first (the system will prompt you when it is time to insert disk #2).

Depending on the floppy drive designation (a or b), type one of the following commands at the DOS prompt, then press the ↵ (Enter) key:

```
C:\>a:setup
```

or

```
C:\>b:setup
```

After you press ↵ , the setup program is called and the menu for language selection appears on the screen.

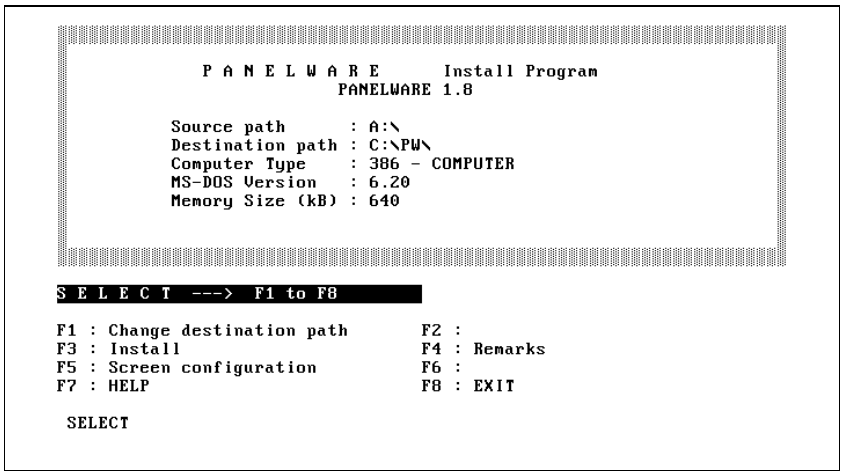
Language Selection

The **Language Selection** menu is used to select the language (English or German/Deutsch) in which you wish to configure the PCS during the installation procedure. This language is used as the default selection for the PCS.

Press the function key that corresponds to the desired language. When it has been selected, the **Install Program** menu is displayed on the screen.

Installation Menu

All system information that the software requires is entered or displayed in the **Install Program** menu. Computer type, DOS version, source path and memory size are entered automatically. You must enter the desired destination path.



From the **Install Program** menu, you can change destination paths, start the installation, configure the screen, and exit the installation.

Changing the Destination Path

The destination path (the directory in which the software is to be installed) is set to **C:\PW** by default. By pressing **F1 Change destination path**, you can specify a different disk drive and/or path into which the PCS will be installed.

Start Installation

Once the system information is correct in the **Install Program** menu, start the installation process by pressing **F3 Install**.

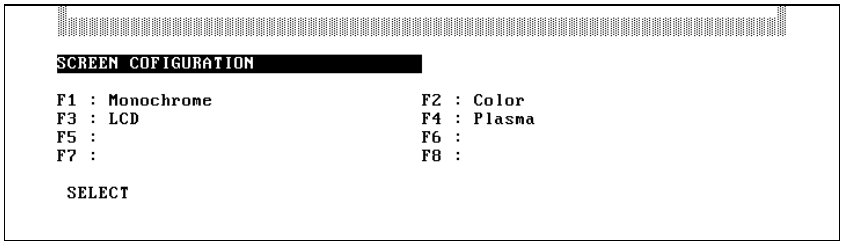
The setup program may recommend changes to the **CONFIG.SYS** file. These changes are only made if you confirm them at the prompt.

Caution

The PCS requires the minimum values recommended for *FILES* and *BUFFERS*. If you enter smaller values in the *CONFIG.SYS* file, problems could arise while running the PCS.

Screen Configuration

The **Screen Configuration** menu is displayed once the CONFIG.SYS file changes are made.



This screen allows you to set up the appropriate PCS screen type by pressing the function key that corresponds to your computer's display. When you select a display type, the system begins copying the PCS files to the destination directory you selected.

After all PCS installation files are copied to the destination directory, the following message is displayed:

```
Installation completed. Press any key to continue _
```

The **Install Program** menu reappears on the screen when any key is pressed.

Note

If the screen type that was selected during installation must be changed after installation, you can access the **Screen Configuration** menu again by pressing **F5 Screen configuration** from the **Install Program** menu and selecting the desired screen type.

Exiting the Installation

The setup (installation) program is exited when you press **F8 EXIT** from any of the menus. Before exiting, the following message will appear on the screen if changes were made to the CONFIG.SYS file:

```
System file modified: RE-BOOT (Y/N)?
```

To start the PCS properly, it is necessary to reboot the computer after installation when changes have been made to the CONFIG.SYS file.

Remove the distribution diskette from the floppy drive and press ***Y*** to reboot the computer in order to put the changes to the **CONFIG.SYS** file into immediate effect. If you do not remove the diskette from the floppy drive, the system will reboot from the floppy drive rather than the hard drive.

Caution

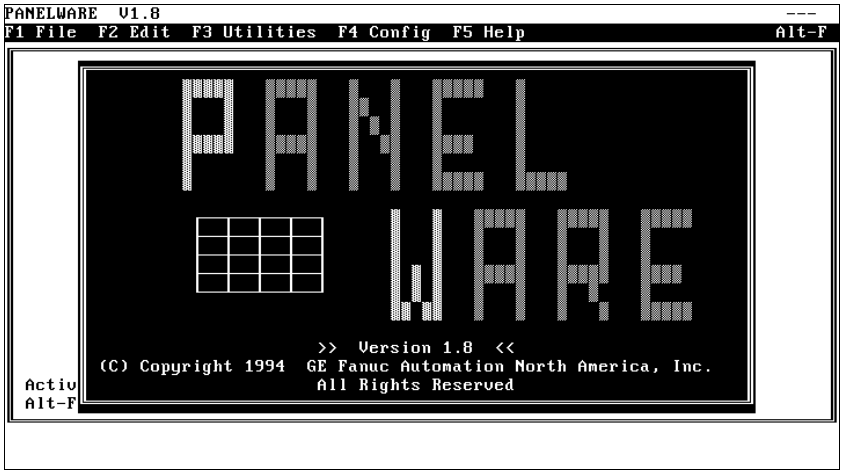
During the installation process, a batch file called PANEL.BAT is created in the root directory of your hard disk. This file should never be deleted, because it is used to access the PCS.

Section 2 Starting PCS

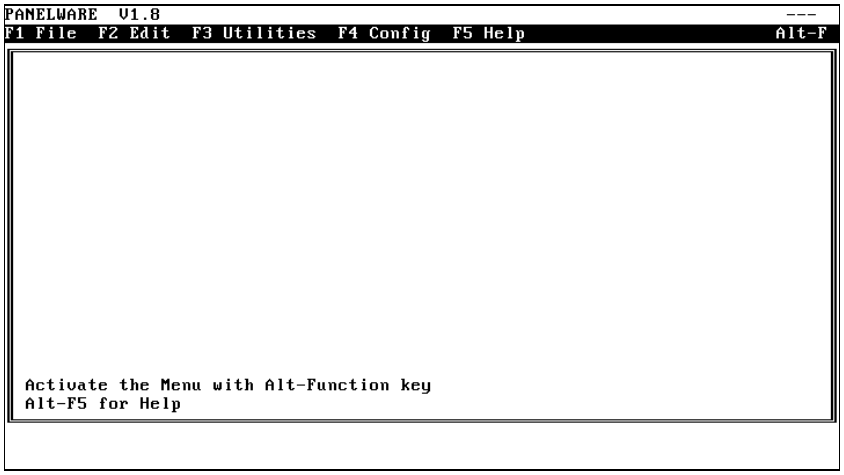
To start PCS, type the following command at the C: prompt, then press ↵ (if you installed the software on a drive other than C, substitute the correct drive ID for C:):

```
C:\>panel
```

The PCS is called up and the following copyright information is displayed on the screen:



After a delay, the **Main** menu, with its pull-down menu line and messages, is displayed:



Section 3 General Operation

Pull-Down Menus (Main Menu)

The pull-down menus of the **Main** menu can be opened at any time using two different methods:

- By pressing the alternate (**Alt**) key simultaneously with the desired function key (**F1** to **F5**)
- By pressing the **Alt** key simultaneously with the first letter of the desired menu name

For example, the **F1 File** menu can be opened by pressing either **Alt** + **F1** or **Alt** + **F**.

Once a menu is open, select the desired option by highlighting it using the cursor keys and pressing ↵. Any resulting window that the option calls up will be displayed in the blank window of the **Main** menu, with its associated function key line displayed below.

Key shortcuts (hot keys) for specific menu entries are displayed on the menu next to the associated entry.

Window Name

Every window that can be displayed within the **Main** menu has a name that is centered inside the top line margin of the window. For example:

- Window name **New Project**

- Window name **Edit Project**

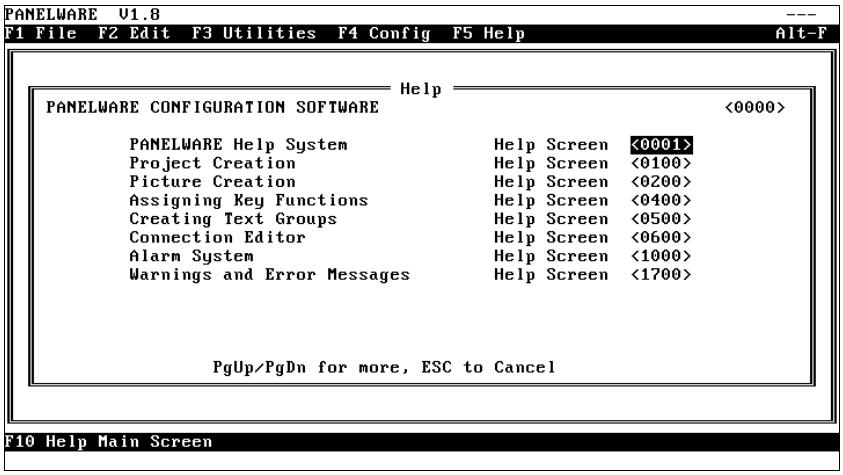
Selection Windows

If the ↵ character is displayed in the bottom line of a screen, a selection window can be opened by pressing the enter (↵) key. A selection can be made from these windows by moving through the list using the cursor keys until the desired entry is highlighted, then pressing ↵.

Context-Sensitive Help Screens

While using the PCS, context-sensitive help screens can be accessed at any time. If you press **Alt** + **F5** or **ALT** + **H** while working in the PCS environment, a help screen that corresponds to the current PCS function/activity is displayed. Using the **PgUp** or **PgDn** keys, you can flip forward or backward through the help screens. If all of the help text in a Help screen can not be seen, the ↑ and ↓ (Cursor Up/Down) keys can be used to scroll through to the end.

On some Help screens, related (cross-referenced) help may be signaled by the presence of one or more Help screen numbers. These cross-references are indicated with the respective Help screen number displayed between the < and > characters (e.g., **Help Screen <0000>**). The first of these numbers will be highlighted. The **Tab** and **BackTab** keys can be used to highlight a different screen number, then when you press ↵, that highlighted Help screen will be displayed. The **Alt** + **F1** key returns you to the previous Help screen level. Pressing **F10** returns you to the first Help screen <0000> at any time. The following example shows a typical Help screen:



To exit any Help screen, press **Esc**.

Screen Elements

The PCS display contains a few basic elements that are displayed at all times:

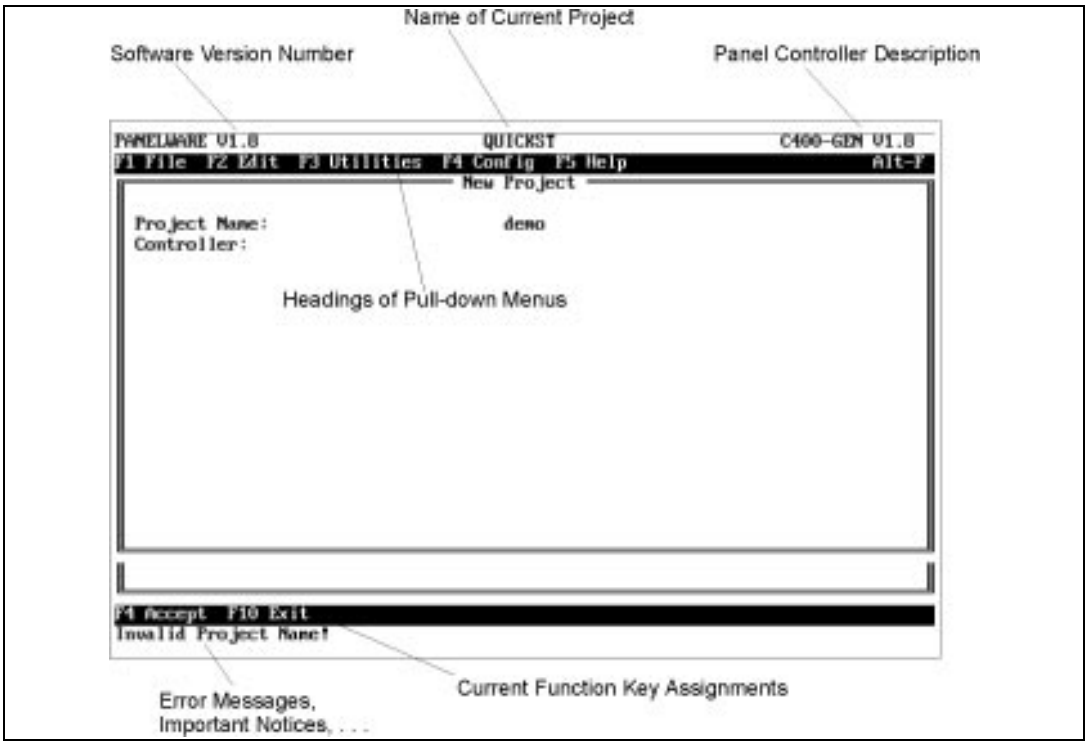
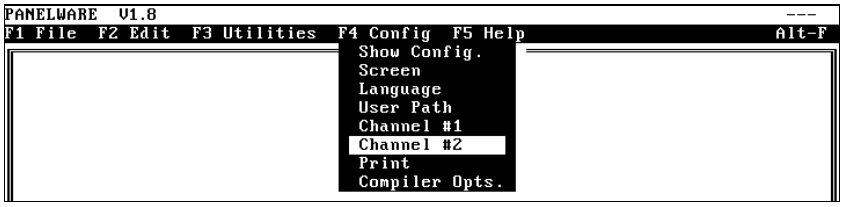


Figure 3 - 1. Basic PCS Screen Elements

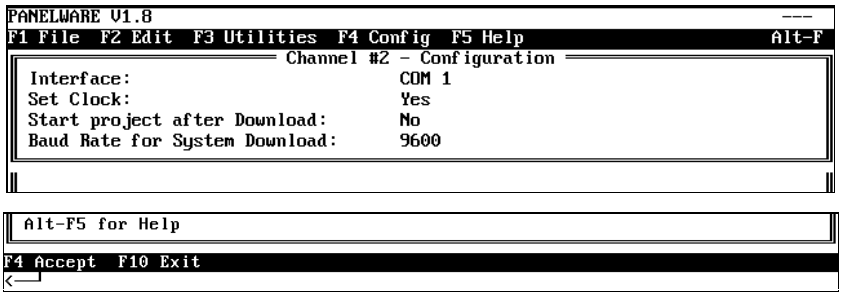
- In the top line (title line) of the screen, the software version number is displayed at the left, the name of the current project is in the middle, and the Panel Controller description (type and operating system version) is on the right.
- The next line down (menu line) contains the headings of the pull-down menus.
- The second to the last line (function line) of the screen displays the current function key assignments.
- The bottom line (message line) contains any error messages, important notices that relate to the project, or the character ↵, which indicates that a selection window can be accessed.

Section 4 PCS Configuration

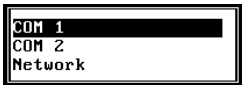
Before you can begin creating projects using the PCS, the appropriate interface to be used to connect your PC to the PANELWARE controller must be defined. The **F4 Config.** pull-down menu shown below can be opened by pressing **Alt** + **F4** or **Alt** + **C**:



To set up the interface, select the **Channel #2** command by highlighting the entry and pressing ↵ . This opens a window that allows you to choose from several options. At this point, you are only concerned with selecting an interface. When you highlight the **Interface** option, it is displayed inversely in the window and is selected by pressing ↵.



In a selection window, you can choose whether you want to use **COM1** or **COM2** as the PC interface to be used for programming the C400 Panel Controller. The **Network** setting is for future expansion.



Once a serial interface, e.g., COM2, is selected, the Panel Controller can be connected to this interface using a serial interface cable (see the *PANELWARE Hardware Installation User's Manual* — GFK-0848).

Note

The remaining Channel #2 options should be left at their default settings until you have successfully downloaded a project to the Panel Controller. See the *PANELWARE Configuration Software Reference Manual* (GFK-0849) for details on all of the Channel #2 configuration items.

Section 5 Creating a New Project

Throughout the remainder of this chapter, you will create an example project (named **QUICKST**) by following the steps that are outlined in the text. This sample project is designed to provide an overview of how the PCS works.

The following minimum hardware setup is required to execute the sample project you will create:

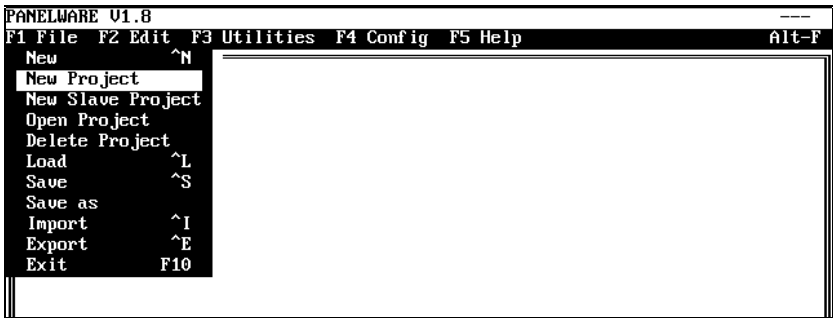
- one C400 Panel Controller
- one 4 x 20 LCD display module
- one 16-key Keyblock module
- one numeric (12+4) Keyblock module
- one PLC capable of Genius communications

Assemble the modules according to the instructions in the *PANELWARE™ Hardware Installation User's Manual* (GFK-0848) so that the numeric Keyblock module is the one to be connected to the Panel Controller.

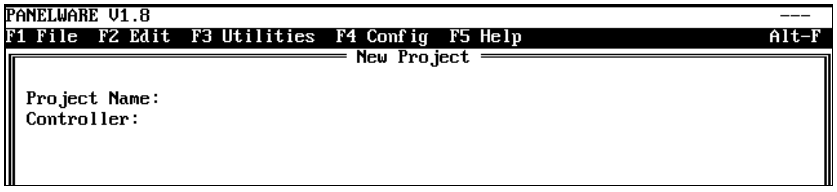
Note

Although your hardware configuration may be different than that specified above, creating the example project is still recommended as it will introduce you to the basic techniques you will need to use for any hardware configuration.

To create a new project, access the **F1 File** menu by pressing either the **Alt** + **F1** or **Alt** + **F** key combination. Select the **New Project** menu option using the cursor keys:

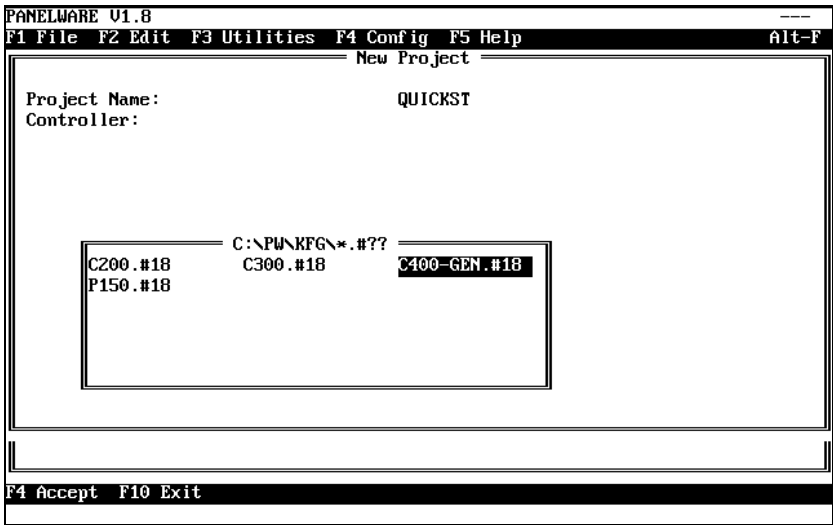


When the **New Project** option is highlighted inversely within the menu, press ↵ to open the **New Project** window, in which the project name and the type of Panel Controller to be used are entered.



Use the keyboard to type the desired name of the project (QUICKST) in the current cursor position. Press ↵ to accept the name and the cursor moves to the next line, where the type of controller can be defined.

Press ↵ again to open a selection window that contains a list of the available Controllers.



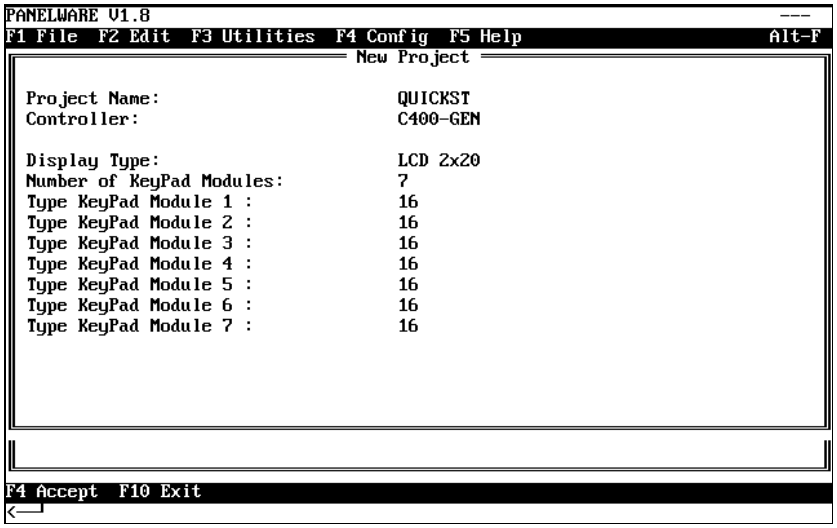
Note

The available Controllers are listed in the form <type>.#<OS version>, where <type> is the basic controller model (e.g., C400) and <OS version> is the operating system version number (e.g., V1.8).

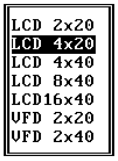
When you press ↵, the controller selection (**C400-GEN.#18** in the example above) is confirmed. Another window appears on the screen from which the display and Keyblock module types can be configured.

Caution

Both the <u>controller and the display type</u> must be defined when creating a new project. Once selected, you CAN NOT change them. You should know which controller and display type will be used before the project creation process is started.

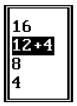


Select the **Display Type** entry and press ↵ to display a window that lists all display types. Select one of the display types (in the example, LCD 4x20) and press ↵.



The cursor jumps to the next line, **Number of Keyblock Modules**. Enter a number (1 through 7) and press ↵ to confirm the number of Keyblock modules in your configuration (e.g., 2).

The next step is to define the individual Keyblock modules (not all of the modules in the list have to be defined). When the cursor is in one of the **Type Keyblock Module x** lines, you can access a selection window that lists the Keyblock modules by pressing ↵.

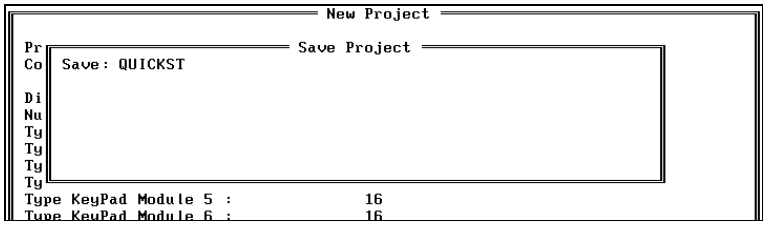


For this example, select the numeric (12+4) and the 16-key Keyblock modules as Keyblocks **1** and **2**, respectively. The following table defines the numbers in the **Keyblock Module** selection window:

Table 3 - 1. Keyblock Module Definitions

List Entry	Keyblock Module
16	16-key Keyblock module
12+4	Numeric Keyblock module
8	8-key Keyblock module
4	4-key Keyblock module

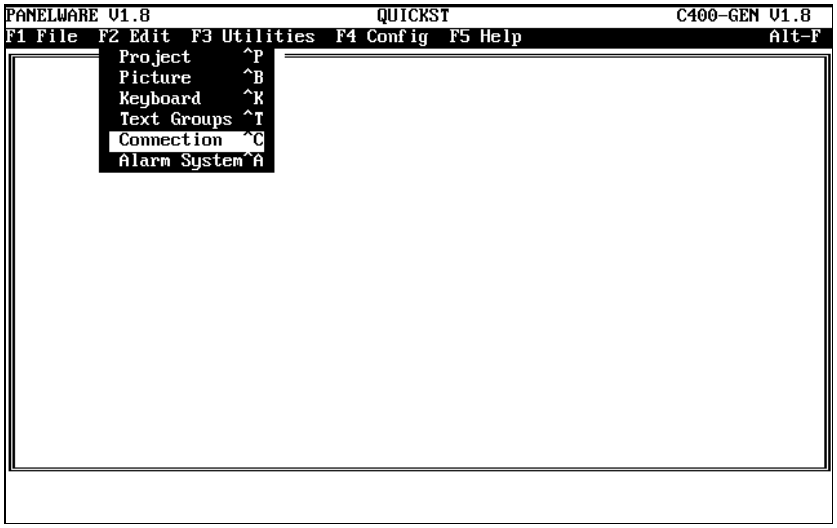
The new project definition can be saved and closed by pressing the **F4 Accept** function key. While the system is saving the project, the following screen is displayed:



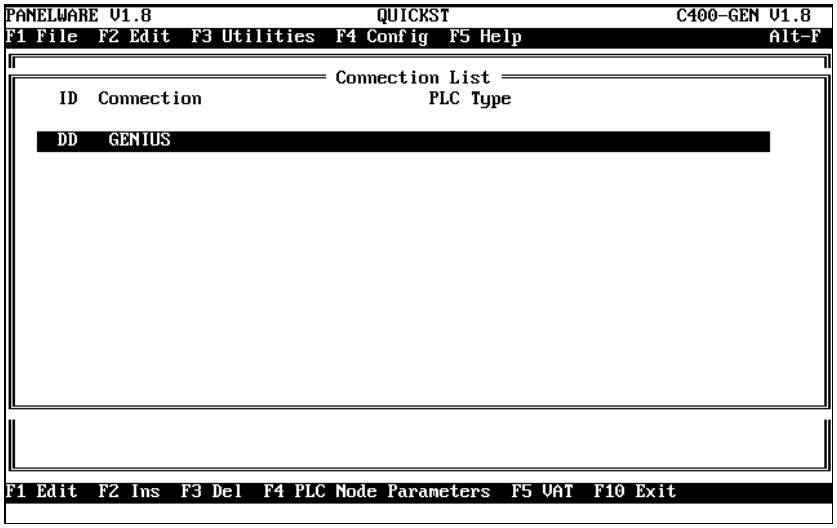
After the project is saved, the **New Project** window is closed and the project name (QUICKST) is displayed in the title line.

Section 6 Defining Connections

The next step after creating a new project is to define the connections. All PLCs and other devices that are to communicate with the Panel must be entered in the connection editor. To change or insert connections, select the **Connection** option from the **Edit** menu.



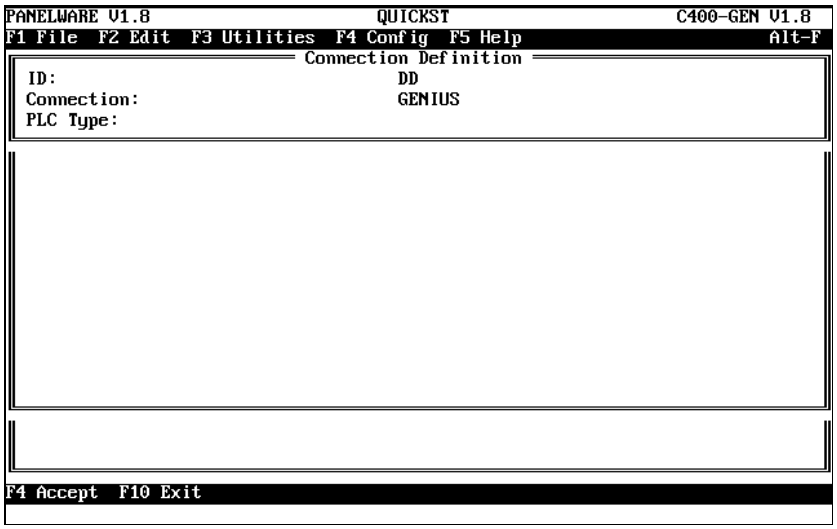
The following window, **Connection List** displays all entered connections:



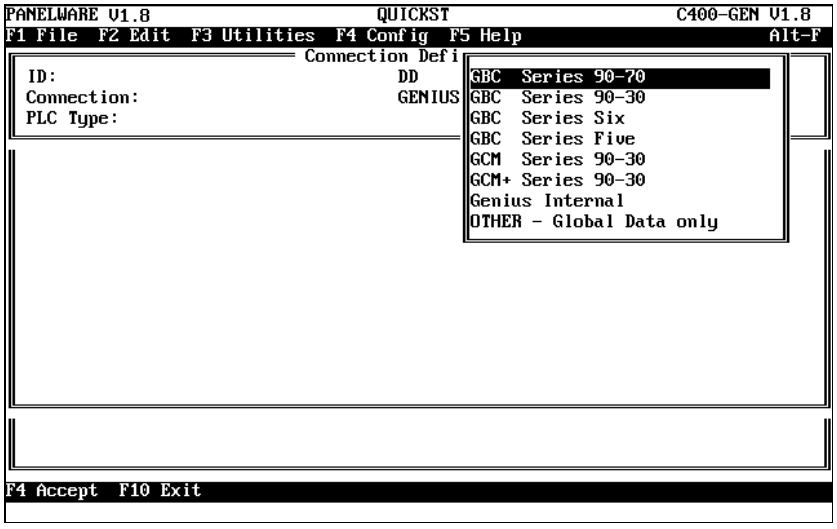
When creating a new project for the C400-Genius Controller, a default entry with the ID, **DD,** is made automatically (connection to a GE Fanuc PLC via the Genius bus). However, the associated PLC type is not defaulted and must be specified.

Connection to a GE Fanuc PLC via Genius

Press **F1 Edit** to edit the connection **DD Genius**:

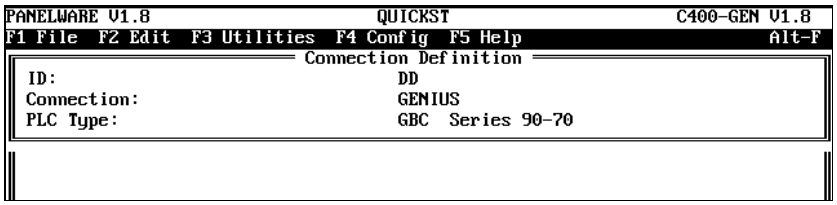


Move the cursor to the **PLC Type** line using the → or ↵ key:

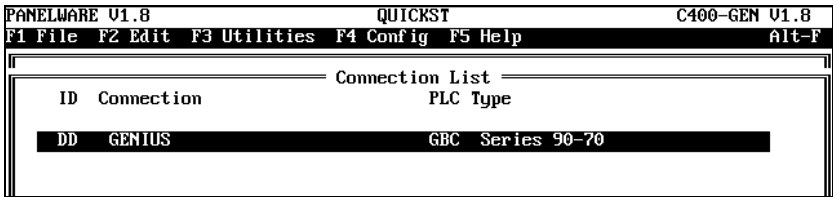


The PLC type to communicate with can be chosen from this selection window. For this example, use the cursor keys to highlight the entry **GBC Series 90-70** and press the ↵ key, closing the selection window.

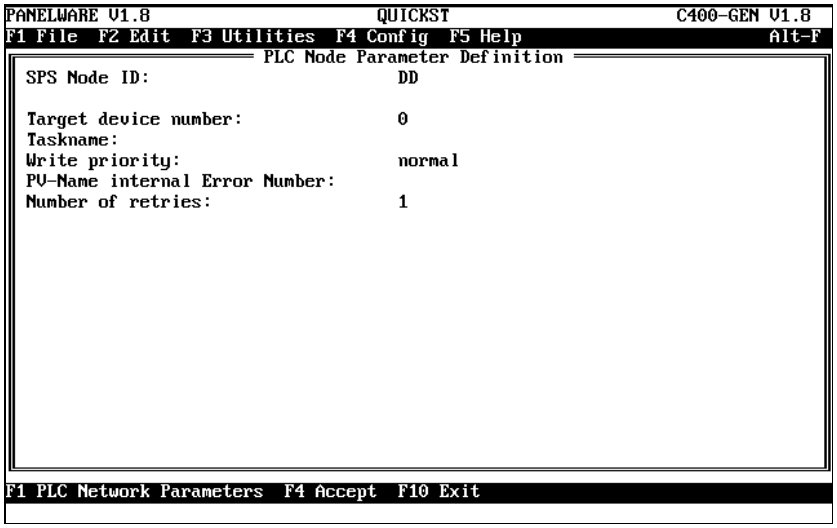
The **Connection Definition** window containing the new connection is displayed.



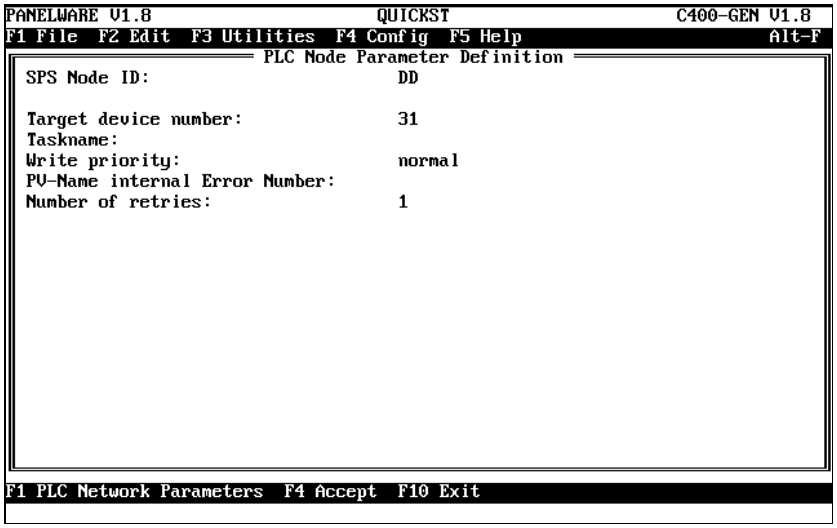
By pressing **F4 Accept**, the change is confirmed and shown in the **Connection List** window:



To configure the Genius bus aspects of the connection, press the **F4 PLC Node Parameters Key**.



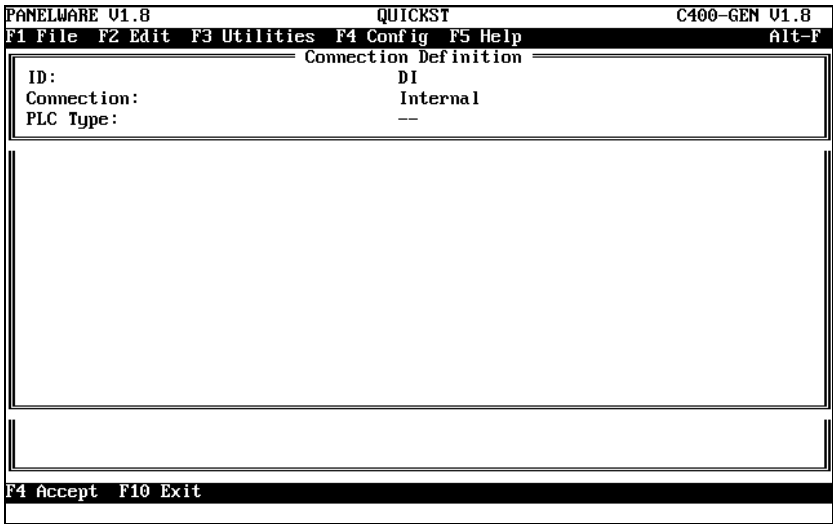
Here, the **Target device number**, or Genius bus address, of the connection is specified. Enter the bus address of your GBC (typically bus address 31) in the **Target device number** field.



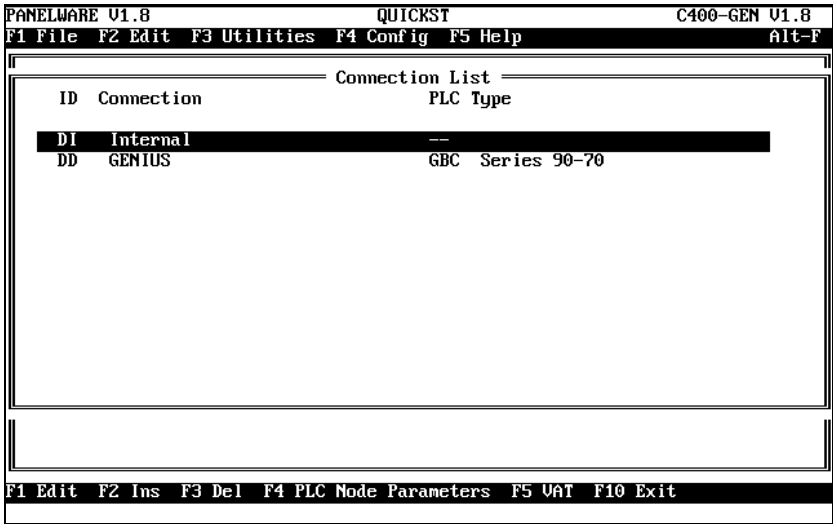
No other data needs to be entered into the **PLC Node Parameter Definition** screen for this example. Pressing **F4 Accept** completes the entry

Internal Connection

Now insert an internal connection into the connection list. This is done by first pressing the **F2 Ins** key and then specifying the ID **DI** in the window that appears.

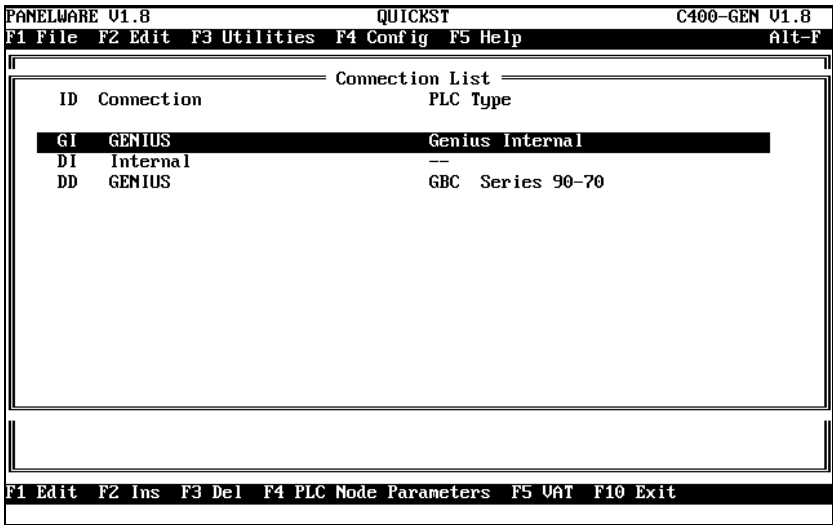


Choose **Internal** as the connection. Press **F4** to confirm this definition and see it displayed in the **Connection List** window.



Genius Internal Connection

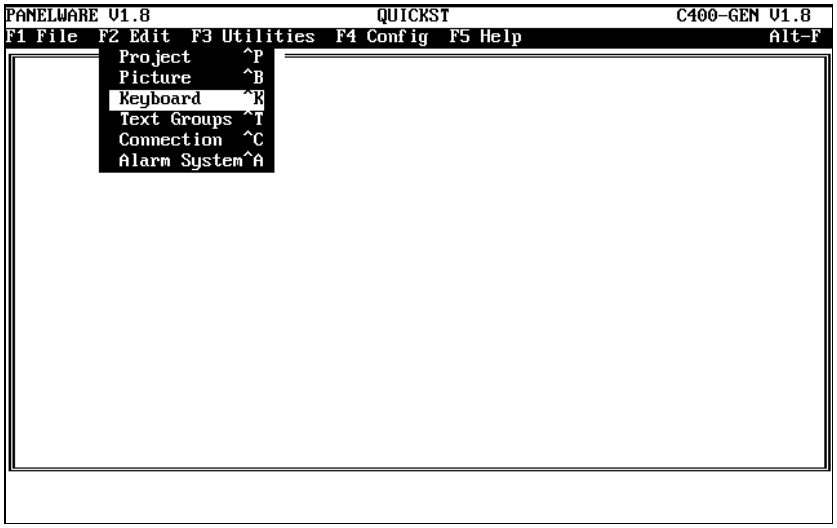
As a final connection, insert a Genius internal connection into the connection list. this is done by first pressing the **F2 Ins** key and then specifying the ID **GI** in the window that appears. Choose **Genius** as the **Connection** and **Genius Internal** as the **PLC Type**. This definition is now confirmed and the new connection displayed in the connection list upon pressing the **F4 Accept** key.



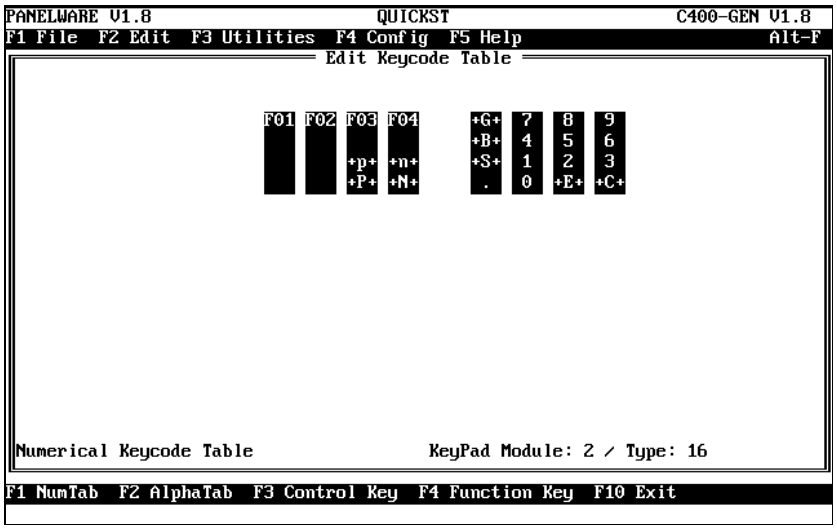
Section 7 Key Assignments

Every key on every Keyblock module can be defined according to the project's unique needs. You can also assign keys for numbers, letters, and the **Next** and **Previous** functions.

In order to assign functions to the keys, the **Edit Keycode Table** window must be accessed by selecting the **Keyboard** option from the **F2 Edit** pull-down menu or by pressing **Ctrl** + **K**:



The **Edit Keycode Table** window shown below is displayed (the default keycode settings that are shown will work for this example project):



Save the key assignments by pressing the **F10 Exit** function key.

The abbreviations on the Keyblock module keys have the following meanings:

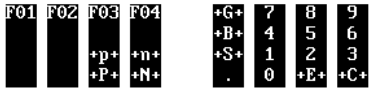


Table 3 - 2. Keyblock Abbreviation Definitions

Abbr.	Description
F1 ... F4	Function keys 1 through 4 (used for commands and picture changes)
+p+	Moves cursor to the previous INPUT field
+n+	Moves cursor to the next INPUT field
+P+	Changes to the previous picture
+N+	Changes to the next picture
+G+	Global alarm acknowledgment
+B+	Backspace; deletes the character before the cursor in an INPUT field
+S+	Changes the sign in a numerical INPUT field
+E+	Enter key; transmits the value entered in an INPUT field; labeled as ↵ on actual Keyblock
+C+	Cancels (deletes) an INPUT field; labeled as ← on actual Keyblock
.	Decimal point
0 ... 9	Numbers 0 - 9 for the entry of numbers

Section 8 Creating Pictures

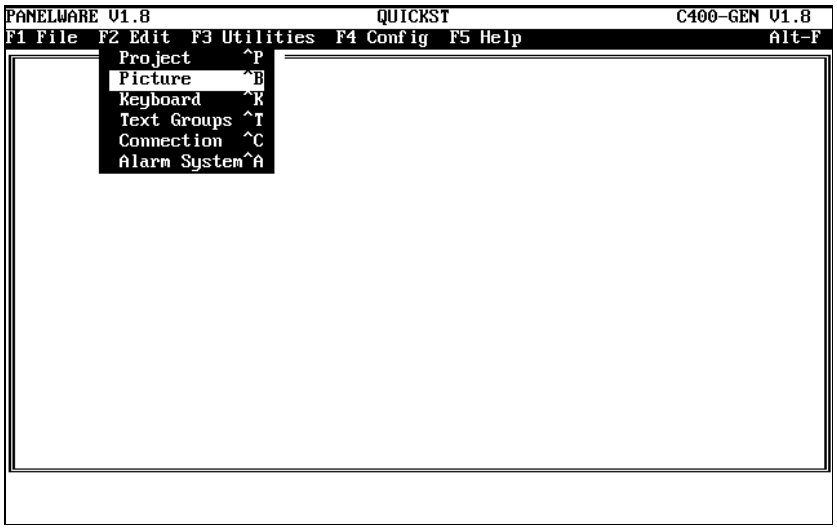
Pictures make up the basic elements of every Panel project. They include static elements such as text and lines[1], and/or dynamic elements like input and output fields. Output fields allow information, such as temperature, RPM, etc., to be updated and displayed for the user. Input fields can be used to display entries given to the process that you enter using the keyboard.

A project must contain at least two pictures—one picture that displays when the Panel powers up, and another that displays in the event of a communications failure. This example project will contain three pictures, as follows:

1. **Picture 1** is the picture where values will be entered using the keyboard, transmitted to the PLC and output in another field.
2. **Picture 2** is the start-up picture that is to be displayed when the Panel and PLC are switched on. Only the Panel's date and time, and the scan rate of the Genius bus will be displayed.
3. **Picture 3** is displayed if there is a communications failure between the PLC and the Panel. Only text providing notice of a communications error will be displayed in this picture.

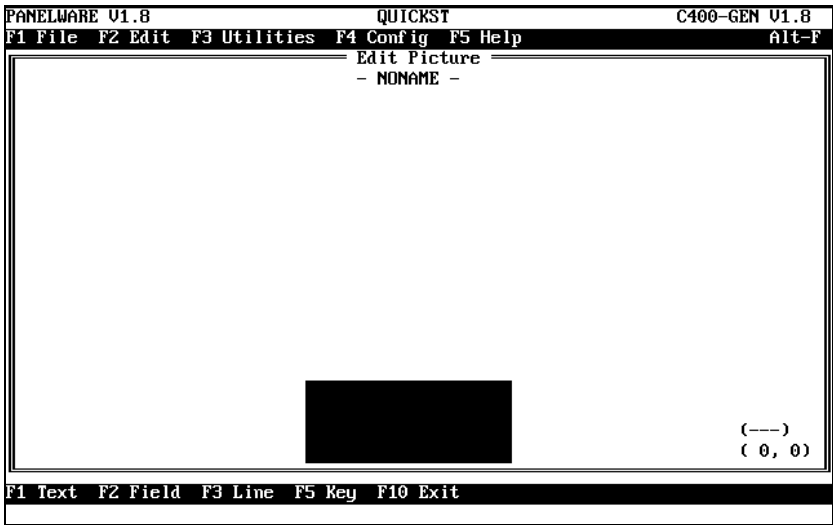
Picture 1

To edit or create a picture using the picture editor, select the **Picture** option from the **F2 Edit** pull-down menu or press **Ctrl** + **B**.



[1] Lines can only be inserted in a picture if a graphic display has been selected in the project definition. See the *PANELWARE™ Hardware Installation User's Manual* (GFK-0848) for a list of available graphic displays.

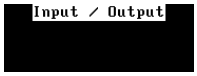
The blank **Edit Picture** window shown below is displayed:



The size of the dark rectangle (picture) at the bottom of the screen corresponds to the selected display type (display type LCD 4x20 is shown above, i.e., the rectangle consists of 4 lines and 20 characters per line). Text or fields can now be entered into this rectangle.

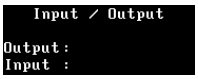
In the first line, enter the text ***Input / Output*** as follows:

Move the cursor to position **(3,0)** (the current cursor position is indicated in the lower right-hand corner of the screen as Column/Row). A text field can now be created simply by typing in the desired text (***Input / Output***). It is also possible to start a text field by pressing the **F1 Text** function key and then entering the desired text.

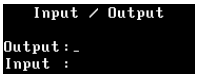


As long as the cursor is within this text field, the field is displayed inversely (on color monitors it has a red background). Press ↵ to complete the text field. The inverse display is switched off and the text is displayed normally.

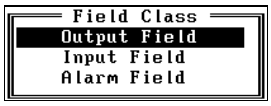
Move down to lines 2 and 3, and enter the following text:



Next to the **Output:** text, begin creating an output field by moving the cursor to the following position (8,2):

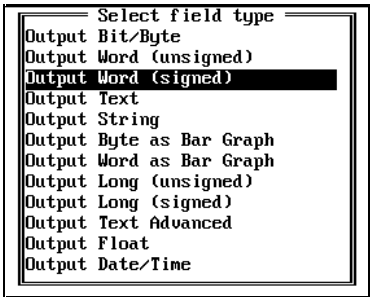


Press the **F2 Field** function key to open the **Field Class** selection window.

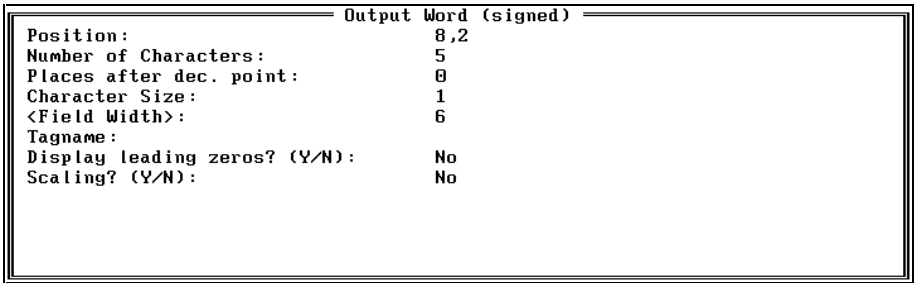


Select the **Output Field** entry from the list and press ↵ to access the **Select Field Type** window.

Several output field types can be chosen from this widow:



For this example, select the **Output Word (signed)** field type. This results in a data entry form (with default entries) being opened on the screen.



In the **Output Word** window, change the following entries as shown by highlighting them using the cursor keys, then typing the new text:

Places after dec. point: ***2***
Tagname: ***VALUE1***

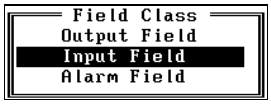
Note

To complete an entry, you must press ↵. If you change an entry and then press a cursor key instead, your entry will be ignored and the previous contents of the entry will be restored.

VALUE1 is a symbolic name for a memory location in the PLC. Assigning symbolic names to the actual PLC addresses is accomplished using the connection editor.

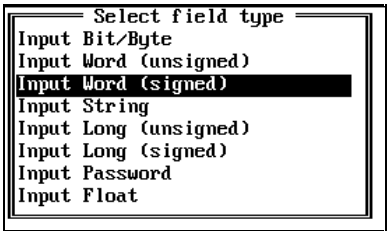
Press the **F4 Accept** function key to close the field and confirm it as part of the picture. The field should be displayed within the picture:

Move the cursor to the **Input:** text line and press the **F2 Field** function key. Select the **Input field** option from the **Field Class** window that is displayed:



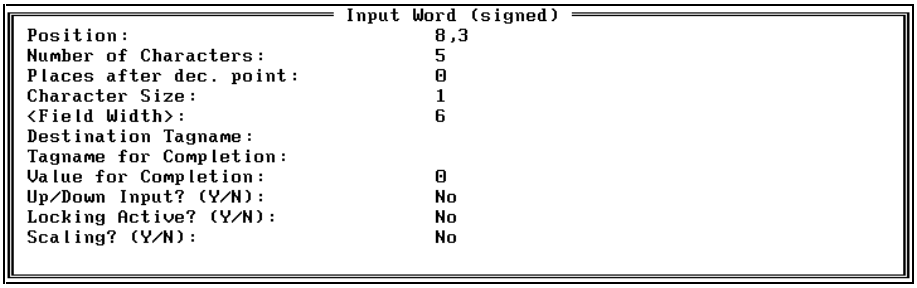
The **Select Field Type** window containing all of the input field types is displayed.

For this example, select the **Input Word (signed)** field type:



In the **Input Word** window that is displayed, change the following entries as shown by highlighting them using the cursor keys, then typing the new text:

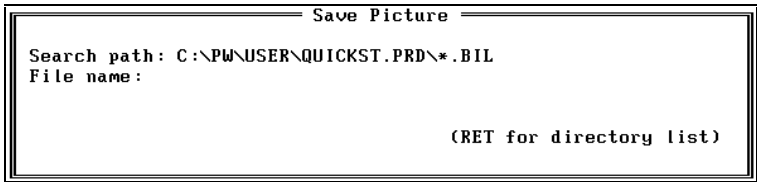
Places after dec. point: ***2***
Tagname: ***VALUE1***



Press the **F4 Accept** function key to close the field and confirm it as part of the picture. The field should be displayed within the picture as shown below:

Press the **F10 Exit** function key to end this picture editing session. Because this is a new picture, a window will open to confirm whether or not the picture should be saved:

Type ***Y*** to request that the picture be saved, and a prompt will request you to enter the filename under which the picture will be saved:



Type the desired filename using the keyboard (e.g., **PICT_1**). PCS saves the picture under the filename you type and assigns a .BIL extension (e.g., **PICT_1.BIL**) automatically when you press ↵.

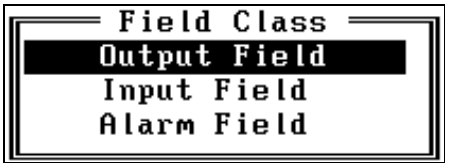
Picture 2

Picture 2 will serve as the *start-up* picture for the project.

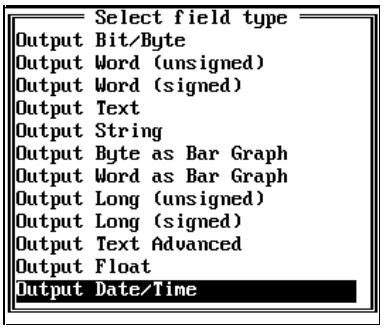
Access the picture editor by selecting the **Picture** option from the **F2 Edit** pull-down menu or by pressing **Ctrl** + **B**.

In line 1 of the rectangle, type the text ****** Start-up Pict ****** and press ↵.

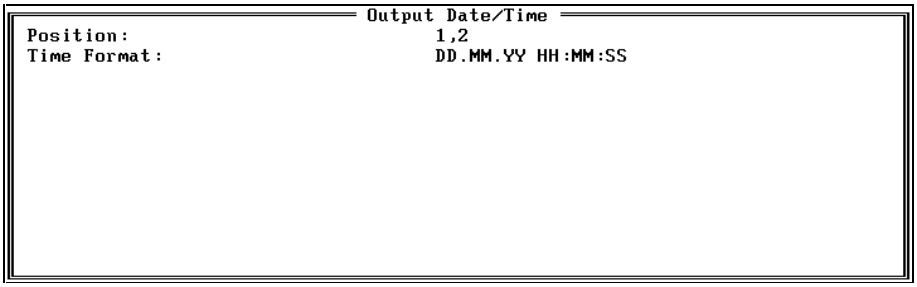
Move the cursor to position (1,2) and press the **F2 Field** function key, then select the **Output Field** option from the **Field Class** window:



From the **Select field type** window that is displayed, select the **Output Date/Time** option:



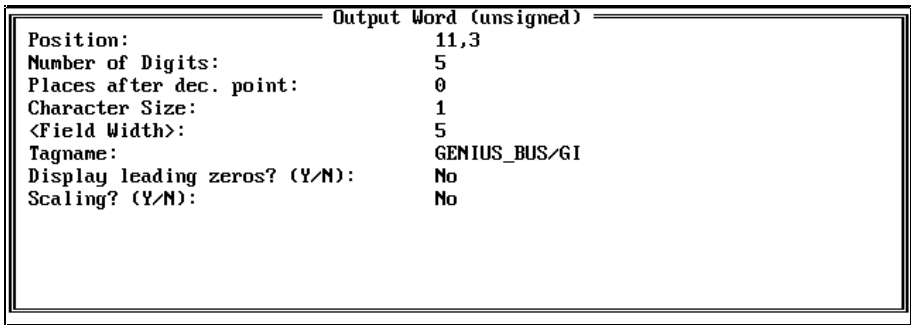
The output format for the date and time is selected from the following window that is displayed:



Do not make any changes in this window and press the **F4 Accept** function key. The Date/Time field will be displayed in the start-up picture:

Move the cursor to position (1,3), type the text ***Bus Scan:***, and press ↵. Next, move the cursor to position (16,3), type the text ***ms***, and again press ↵.

Using the same process detailed above for creating the Output Date/Time field, position the cursor at (11,3), and create an **Output Word (unsigned)** field with the following definition:



Press the **F4 Accept** key to close the field and confirm it as part of the picture. The field should be displayed within the picture as shown below:

Press the **F10 Exit** function key to end this picture editing session. Because this is a new picture, a window will open to confirm whether or not the picture should be saved.

Type ***Y*** to request that the picture be saved, then type the desired filename (START-UP) using the keyboard. The picture is saved under the name you type and assigned a .BIL extension automatically when you press ↵.

Picture 3

An *error* picture that will display on any communication error is created in exactly the same way as any other picture. Input or output fields that would access variables from the PLC are of no use, however, because the error picture is supposed to show an error in communications. Internal variables can be shown (e.g., error variables that are used to display the type of communications error). See the *PANELWARE™ Configuration Software Reference Manual* (GFK-0849) for details.

Using the steps followed to create the first two pictures, create the following error picture and save it under the name ERROR:

The Output Bit/Byte field in the picture is defined as follows:

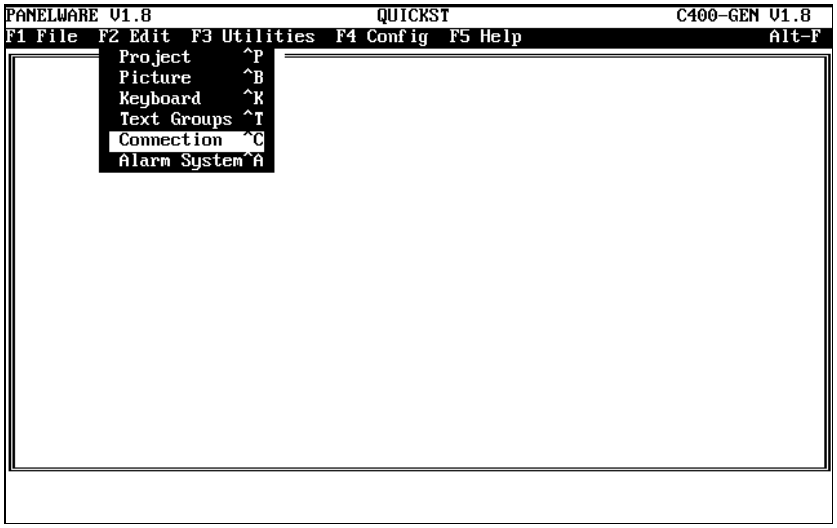
Output Bit/Byte

Position:	15,3
Number of Digits:	1
Places after dec. point:	0
Character Size:	1
<Field Width>:	1
Tagname:	ERR_NR/DI
Display leading zeros? (Y/N):	No
Scaling? (Y/N):	No

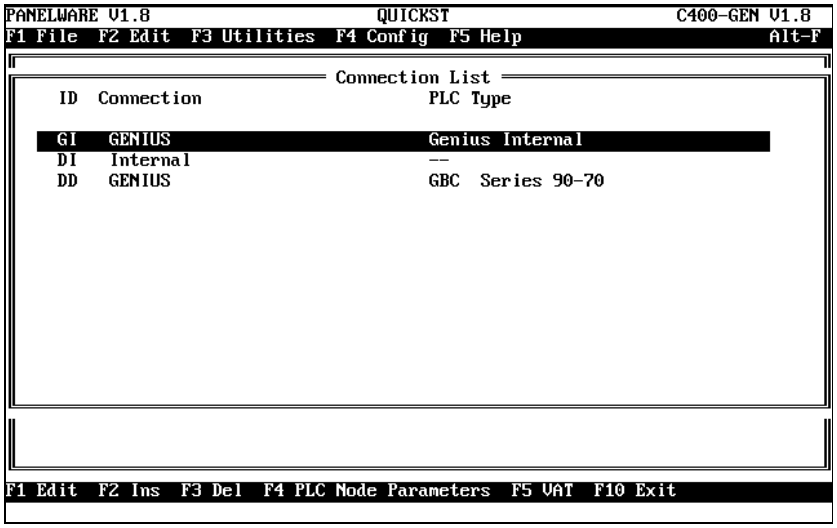
Section 9 Defining the Project Variables

All variables used in the project (symbolic variable names) must be connected to specific addresses in the PLC CPU.

In order to define these connections, access the connection list by selecting the **Connection** option from the **F2 Edit** pull-down menu or by pressing **Ctrl** + **C**.



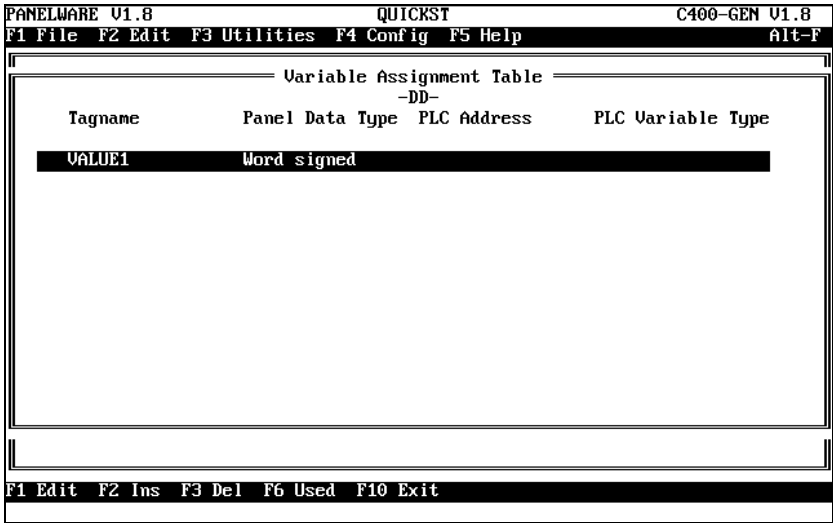
The **Connection List** window shown below is opened:



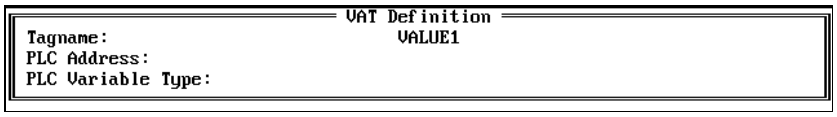
Genius Device Connection

Use the cursor keys to highlight connection **DD Genius**, and then press the **F5 VAT** function key to display the associated variable assignment table (VAT) on the screen.

All variables that have been used in a picture's input or output fields in the project are listed in the **Variable Assignment Table** window. In this example project, only one name, **VALUE1**, is displayed:



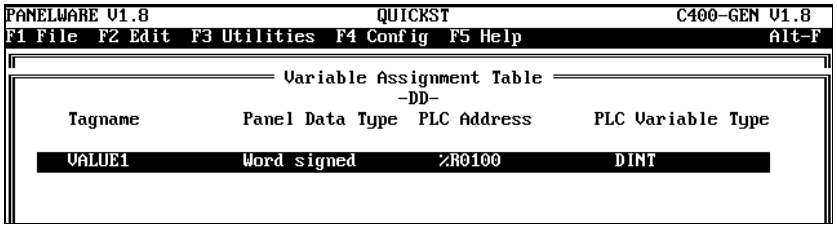
To assign an address in the PLC CPU to the VALUE1 variable, press the **F1 Edit** function key. The **VAT Definition** window shown below is opened:



The PLC address can be entered directly at the PLC Address line using the keyboard (e.g., ***%R0100***).

If the cursor is in the **PLC Variable Type** line, a variable type selection window that shows all valid variable types can be opened by pressing ↵. Select **DINT** from the selection window.

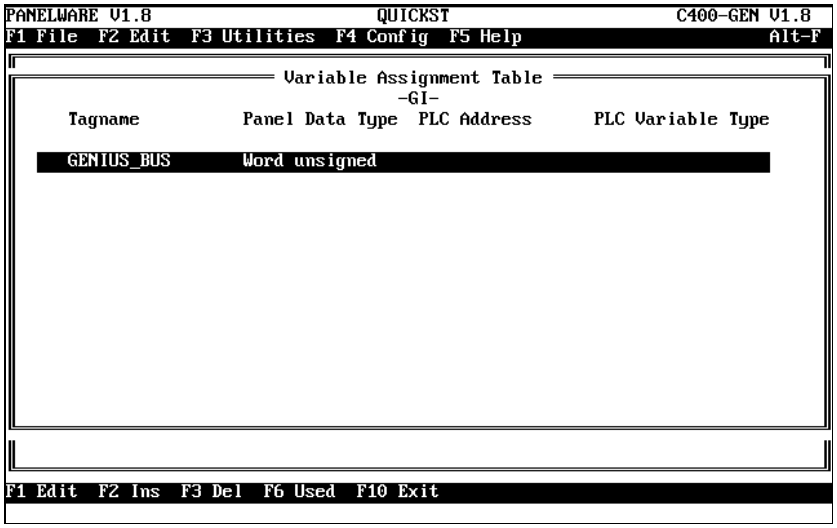
The definition that is entered can be saved by pressing the **F4 Accept** function key. Once saved, the newly selected variable is shown in the VAT.



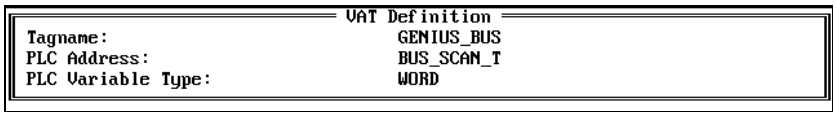
Pressing the **F10 Exit** function key causes the connection list to appear on the screen again.

Genius Internal Connection

Select the **GE Genius Internal** connection from the connection list and press either **F5 VAT** or ↵ to display the connection in the Variable Assignment Table:



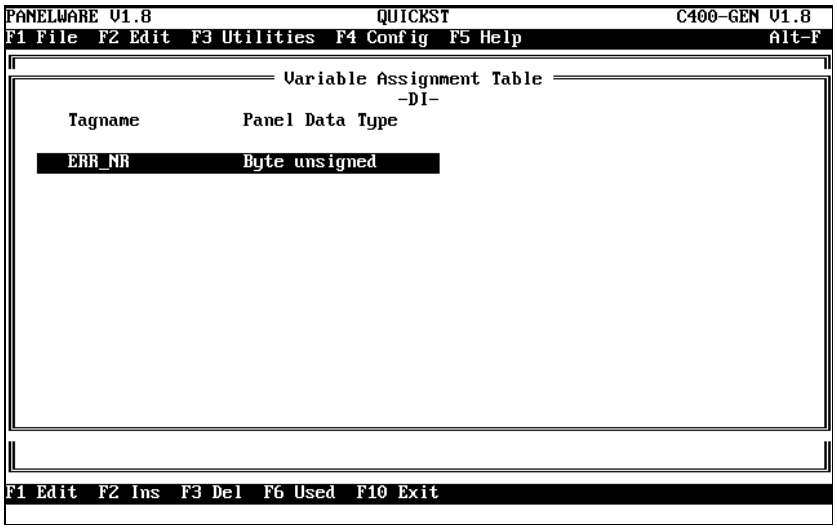
Press the **F1 Edit** function key to open the VAT Definition window for the **GENIUS_BUS** tagname. Edit the definition for GENIUS_BUS as shown below (Follow the same procedure that was used for editing the tagname VALUE1 in the DD connection — see page 30):



After accepting the entry (by pressing **F4**), press **F10 Exit** to return to the **Connection List** window.

Internal Connection

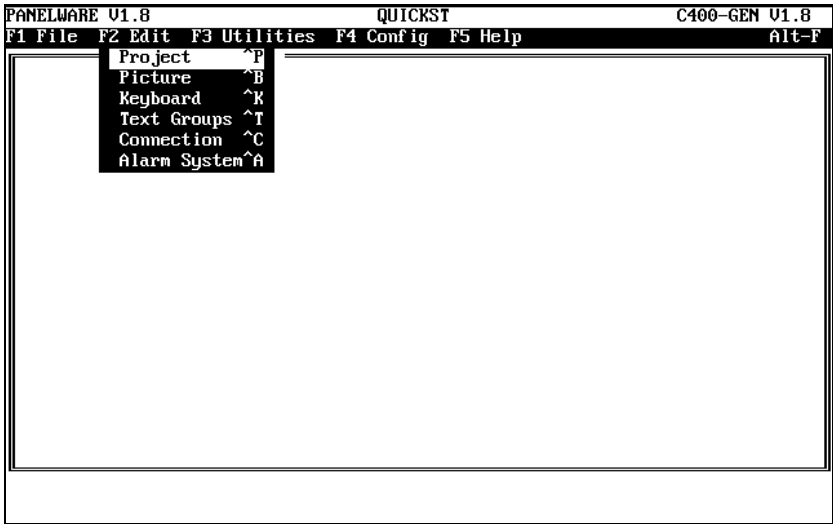
Select the **DI Internal** connection from the connection list and press **F5** or ↵ to view its VAT:



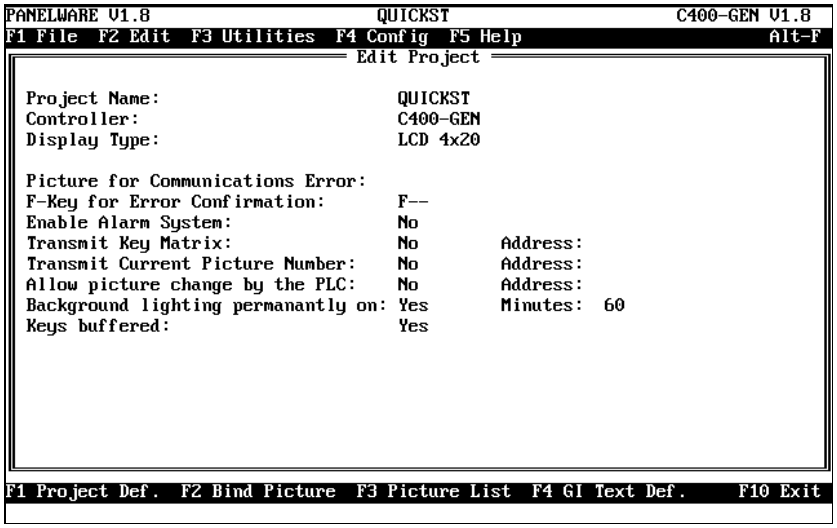
This is the variable that will be output in the error picture. The internal variables cannot be edited. You can close the VAT by pressing **F10 Exit**, which calls the connection list once again. Press the **F10 Exit** key again to close the connection list and return to the main menu.

Section 10 Binding Pictures in the Project

The pictures that you have created for this project still have to be bound into the project definition. To begin the binding process, select the **Project** option from the **F2 Edit** pull-down menu or press **Ctrl** + **P**.



The **Edit Project** window shown below is opened:



The picture binding process for this project consists of the following three steps:

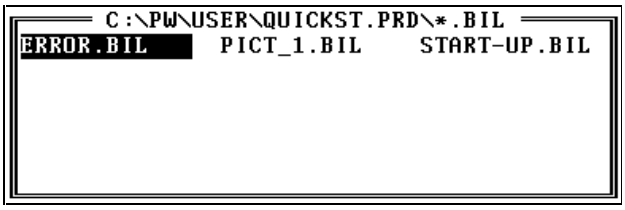
1. Entering the filename of the ERROR picture
2. Binding the three project pictures
3. Organizing the picture directory

These processes are explained in the sections that follow.

Picture for a Communications Error

From the **Edit Project** window, press the **F1 Project Def.** function key to move the cursor to the **Picture for Communications Error** line in the window. The function line options are changed as shown below:

The file name of the error picture can be entered directly using the keyboard or the following selection window can be accessed by pressing the **F5 Pictures** function key.

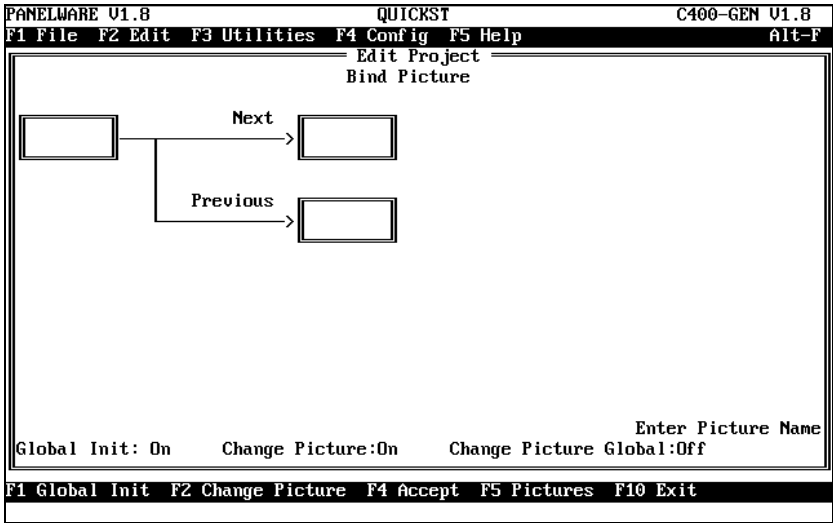


Highlight the desired filename (ERROR.BIL) and press ↵, then confirm the project definition by pressing the **F4 Accept** function key.

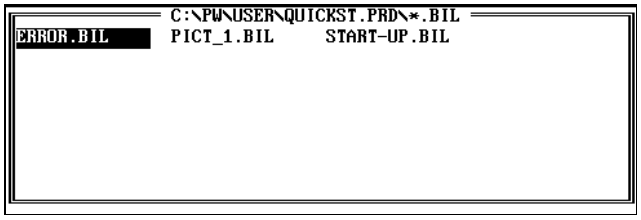
Picture Binding Overview

Binding a picture into the project means that all possible branches (picture changes) that the picture can have are defined. A picture change can be made using the **Next**, **Previous** or **optional** function keys[2].

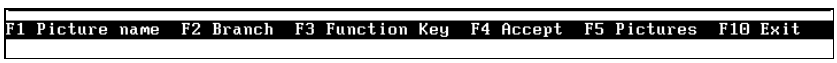
When you press the **F2 Bind Picture** function key from the **Edit Project** window, the **Bind Picture** window appears on the screen:



When the cursor is located in one of the boxes in the window, a picture name can be entered directly by using the keyboard or a selection window containing picture names can be accessed by pressing the **F5 Pictures** function key.



In the first box (left-hand side of the screen), enter the name of the picture to be bound into the project. When you press ↵, the picture is accepted and the cursor moves to the upper right-hand box. You can switch between the upper and lower right-hand boxes using the cursor keys. When the cursor is in one of the boxes on the right-hand side, the function line at the bottom of the screen changes as shown below:



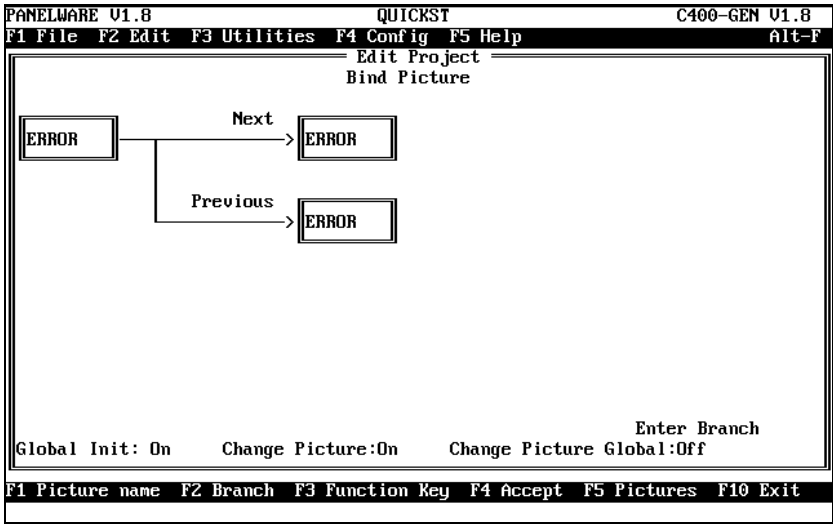
Press the **F1 Picture name** function key to move the cursor back to the box on the left-hand side of the screen. Use these cursor location controls to bind this project's pictures as described in the following sections.

---

[2] The user can define keys to be used for Next, Previous or function keys (see *"Key Assignments"* in this chapter).

Error Picture

Bind the ERROR picture into the example project as follows:



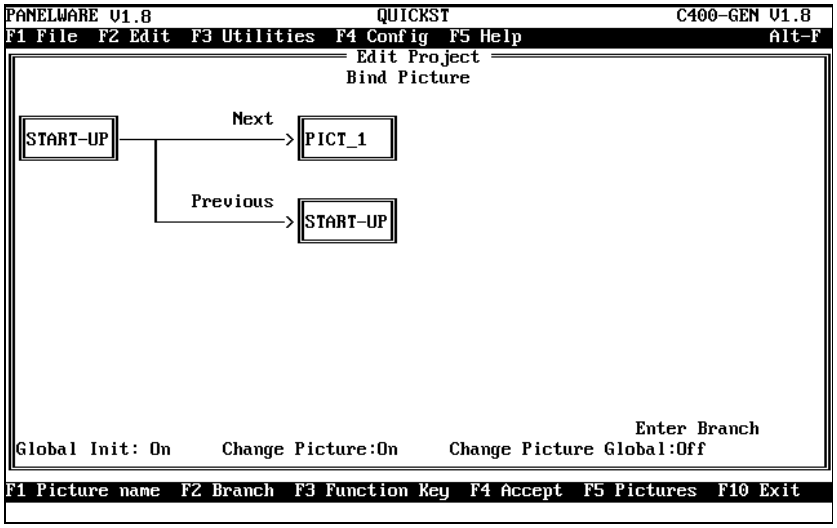
Caution

You should not branch from the ERROR picture to a picture that has fields displaying data from the PLC in it because the fields will not be updated or processed if a communications error occurs.

Save the configuration by pressing the **F4 Accept** function key.

Start-up Picture

Bind the START-UP picture into the example project as follows:

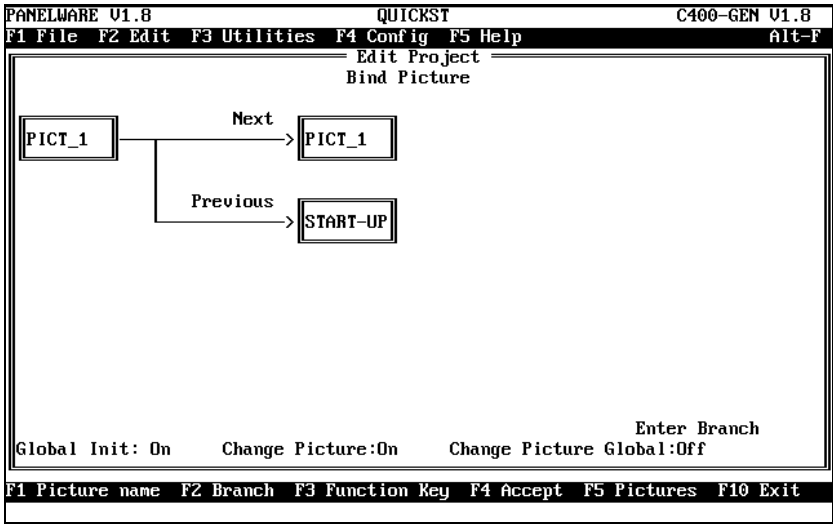


If the START-UP picture is bound into the project as shown, the user will be able to switch to the PICT_1 picture by pressing the **Next** key on the Panel. The **Previous** key performs a refresh of the screen for the START-UP picture.

Save the configuration pressing the **F4 Accept** function key.

Pict_1

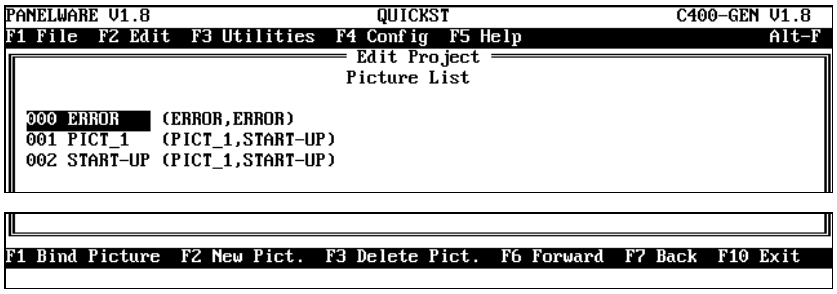
Bind the PICT_1 picture into the example project as follows:



If the PICT_1 picture is bound into the project as shown, the operator will be able to switch back to the START-UP picture using the **Previous** key on the Panel. Pressing the **Next** key causes a refresh of the screen for the PICT_1 picture. Save the configuration by pressing the **F4 Accept** function key.

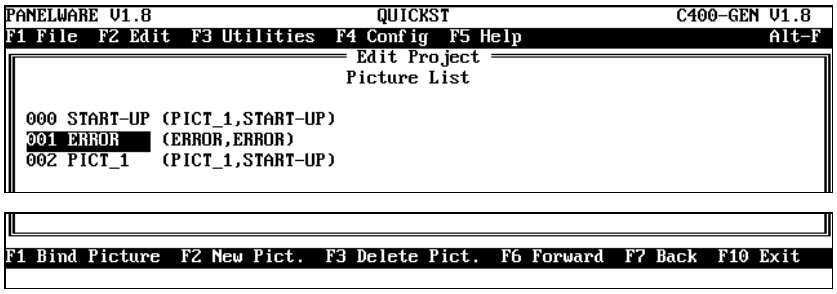
Picture List Organization

When you press the **F3 Picture List** function key from the **Edit Project** window, a list of all of the pictures that are bound to the project is displayed:



The picture defined as the ERROR picture is not allowed to be placed in the top position in the picture list; the picture in the top position must be the one initially displayed when the Panel is power cycled (start-up picture).

Accordingly, in this example, the ERROR picture must be moved down from its top position in the list using the **F7 Back** function key. This will move the item in the current cursor position down one line in the list, and move the next item one line up as shown below:



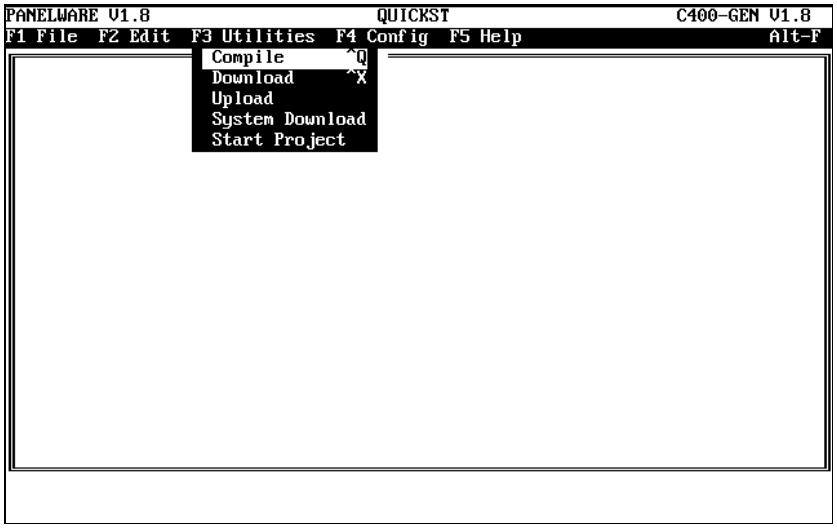
The START-UP picture should now be in the correct position (000).

Press the **F10 Exit** function key to save the changes and redisplay the **Edit Project** window. Press **F10 Exit** again to return to the **Main** menu.

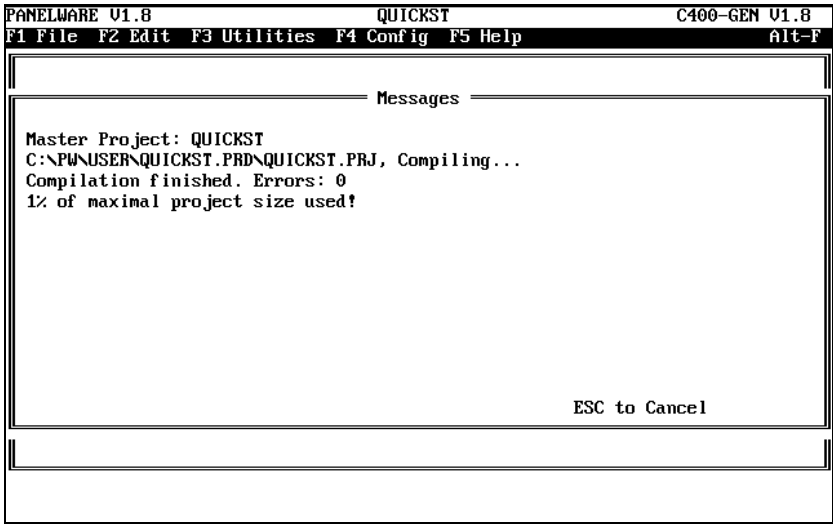
Section 11 Compiling the Project

In order to create, transfer and run your project on the Panel, it must be compiled (translated).

To compile the example project, select the **Compile** option from the **F3 Utilities** pull-down menu or press **Ctrl** + **Q**:



The compilation procedure status messages are displayed in the **Project Compiler** window that is displayed. If the project is compiled successfully, the following message is displayed:



The amount of memory the project will occupy in the user memory (user Flash) in the Panel is also displayed.

Press **Esc** to close the **Project Compiler** window and return to the **Main** menu.

Section 12 Downloading the Project to the Panel

In order to download a compiled project to the Panel, the Panel must first be connected to the PC. The connection and the cable that should be used are described in Appendix A of the *PANELWARE™ Hardware Installation User's Manual* (GFK-0848).

Caution

Ensure that the cable is connected to the serial interface of the PC that is defined as Channel #2 in the configuration (COM1 or COM2).

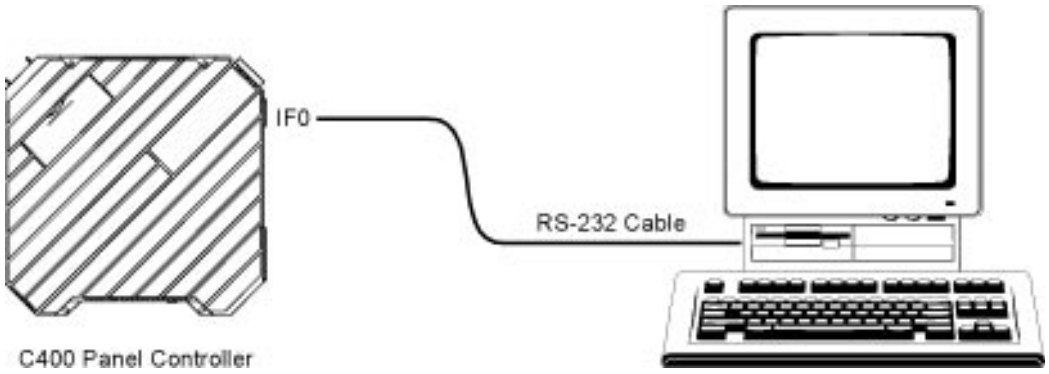


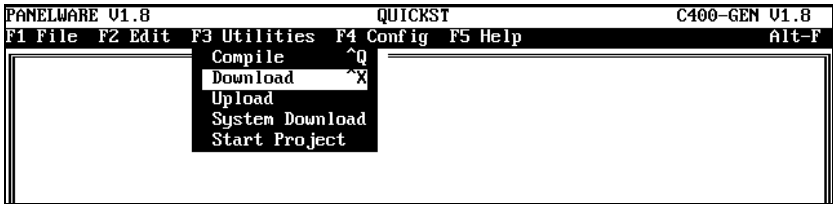
Figure 3 - 2. Panel/PC Serial Connection

Before the download process can be started, the following steps must be completed (see the *PANELWARE Hardware Installation User's Manual* for more information):

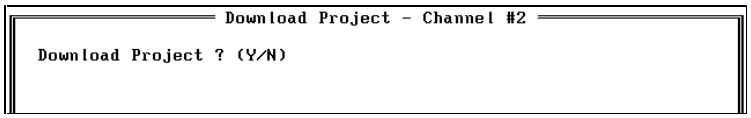
1. Apply power to the Panel by connecting the 24 VDC cable.
2. Connect the PC and the Panel as shown above.
3. Set the operating mode to *Teach-Mode* (operating mode switch to position 7).
4. Press the Reset button on the Panel.

   Wait until the "**Teach-Mode**" message is displayed on the Panel screen.

Once these steps have been performed, the download process can be started by selecting the **Download** option from the **F3 Utilities** pull-down menu or by pressing **Ctrl** + **X**:

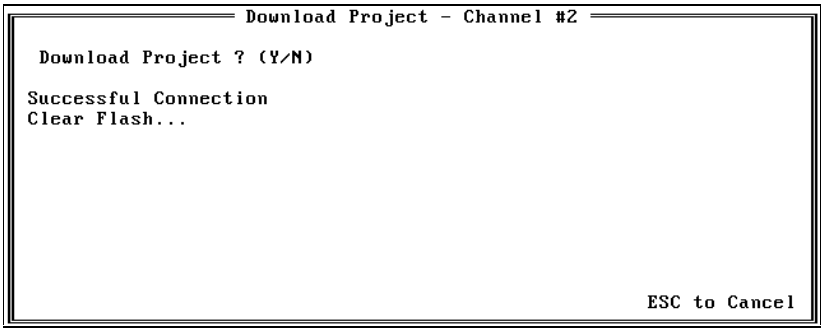


The **Download Project** title and the number of the channel (**Channel #2**) are centered in the top margin of the window that appears on the screen to prompt you to begin the process.

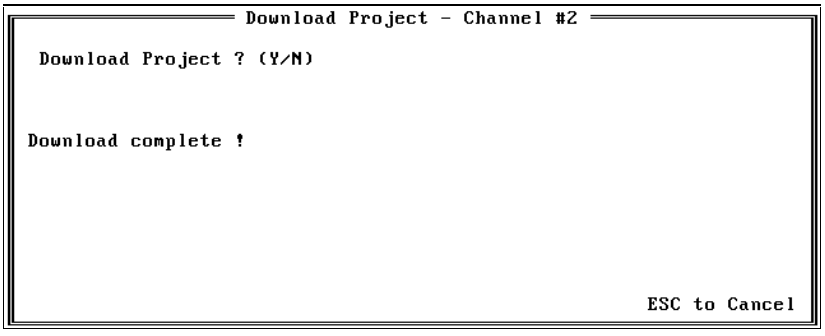


Start the download process by typing ***Y.***

In order to begin the download, the PCS tries to make a connection with the Panel. If the connection is successful, the following messages are displayed on the screen:



When the compiled project has been loaded to the Panel successfully, the message **`Download complete!`** is displayed.



Press **Esc** to close the **Download Project** window and return to the **Main** menu.

Section 13 Connecting the PLC and the Panel

In order for communication to take place between the Panel and the PLC, the following connection must be made:

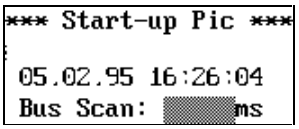
Figure 3 - 3. PLC/Panel Connection

Section 14 Starting the Project

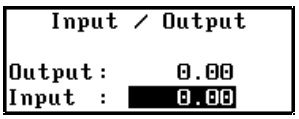
If the project has been downloaded completely, the application can be started after the following steps are completed:

1. Set the operating mode to *Run-Mode* (operating mode switch to position 5).
2. Connect the PLC and the Panel.
3. Press the Reset button on the Panel.

After switching the Panel on or pressing the Reset button, the Start-up picture appears on the screen:



Press the "**Next**" key on the Panel, and PICT_1 will appear on the screen:



The inverse display area is an input field in which values can be entered using the numerical keys (on the numeric Keyblock). After the entry is confirmed by pressing ↵, the value that was entered should appear in the output field above. (See the "Key Assignments" section in this chapter for individual key descriptions.)

If the connection is not made between the PLC and the Panel, or if it is improperly made (cable defective, wrong interface, etc.), the following message is displayed shortly after the Reset button is pressed:

Section 15 Exiting PCS

If the **Main** menu is active, the PCS program can be ended by pressing the **F10 Exit** function key or by selecting the **Exit** option from the **F1 File** pull-down menu. This causes the following message to appear on the screen.

If you enter **Y**, the PCS program is exited. If you enter **N**, the PCS program is not exited and the **Main** menu remains active.

Note

If you turn off or reboot your computer before exiting PCS, clusters will be lost on your hard disk. Lost clusters do not imply that your disk is damaged, only that there is disk capacity that is unused but not managed by the DOS (operating system). This condition may be checked for, and corrected, by using the DOS CHKDSK utility. See your PC's MS-DOS manual for details on running CHKDSK.

Chapter 4

Configuring Communication with the PLC

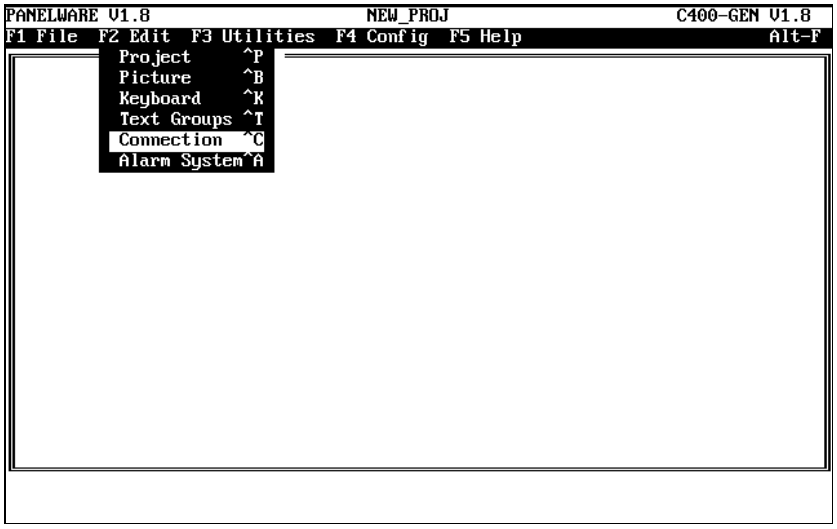
This chapter provides information on how to configure the interfaces of the Panel Controller and the PLC to make the connection between them. The following information is included:

- Genius Protocol Parameters (Definition in PCS) 4-2
  - PLC Types 4-3
  - PLC Node Parameter Definitions 4-5
  - PLC Network Parameter Definitions 4-7
- SNP 90 Protocol Parameters (Definition in PCS) 4-9
- Settings on the Panel 4-10
- Panel Interface 4-10
- Configuration of the PLC Interface 4-10
  - Genius 4-11
  - SNP 4-11

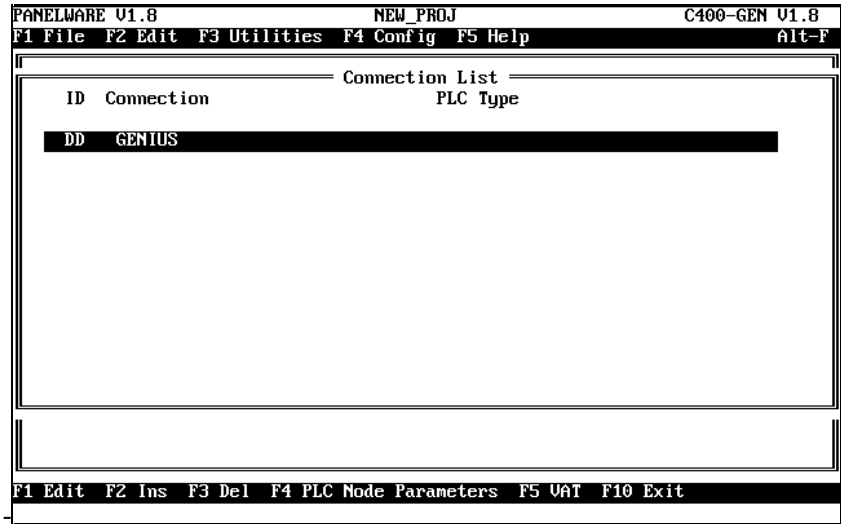
Genius Protocol Parameters (Definition in PCS)

The parameter definitions for the Genius bus network, and the devices being communicated with on it, are entered in the connection editor of the PCS as follows:

Access the connection list by pressing **Ctrl** + **C** or by selecting the **Connection** option in the **F2 Edit** pull-down menu.



From the **Connection List** window that is displayed, use the cursor keys to select (highlight) the connection to be defined.



PLC Types

Every Genius connection must be configured to specify a **PLC Type**. Except for the case of the PCS-created **DD GENIUS** default connection, this PLC type must be provided when inserting a new connection. For the **DD GENIUS** default connection, the PLC type must be provided before a successful project compilation can occur.

In either case, a **PLC Type** selection window is accessed when editing the Connection Definition.

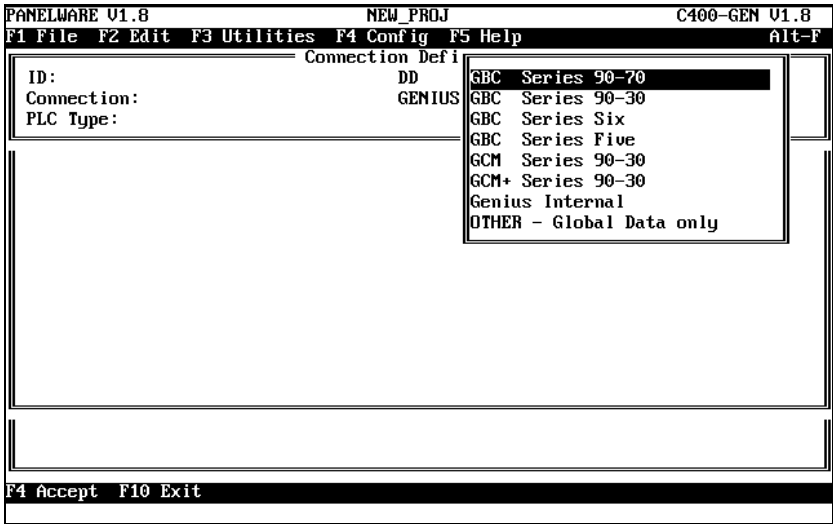


Table 4-1 summarizes the types of data that can be accessed for each PLC type.

Table 4 - 1. Summary of PLC Data Types

PLC Type	Interface	Memory Types Supported
GBC Series 90-70	Series 90-70 Genius Bus Controller (GBC), IC697BEM731	%R, %AI, %AQ, %P, <block> %L, %I, %Q, %T, %M, %S, %SA, %SB, %SC, %G, %GA, %GB, %GC, %GD, %GE, %GI*, %GAI*
GBC Series 90-30	Series 90-30 GBC, IC693BEM331	%R, %AI, %AQ, %I, %Q, %T, %M, %S, %SA, %SB, %SC, %G, %GI*, %GAI*
GBC Series Six	Series Six GBC, with diagnostics (IC660CBB902) or without diagnostics (IC660CBB903)	%R, %I, %O, %GI*, %GAI*
GBC Series Five	Series Five GBC, IC655BEM510	%R, %I, %I1+, %I2+, %I1-, %O, %O1+, %O2+, %O1-, %O2- %GI*, %GAI*
GCM Series 90-30	Series 90-30 Genius Communications Module, IC693CMM301	%GI*, %GAI*
GCM+ Series 90-30	Series 90-30 Enhanced GCM, IC693CMM302	%GI*, %GAI*
Genius Internal	Connection for the C400-GEN PANELWARE Controller itself, IC750CTR400. Only one Genius Internal connection per project is supported	%GQ*, %GAQ* HW_STATUS** BUS_ERR_CNT** BUS_SCAN_T** BUS_ADR** GENI_FW**
OTHER — Global Data only	Genius device that does not fit into one of the above categories	%GI*, %GAI*

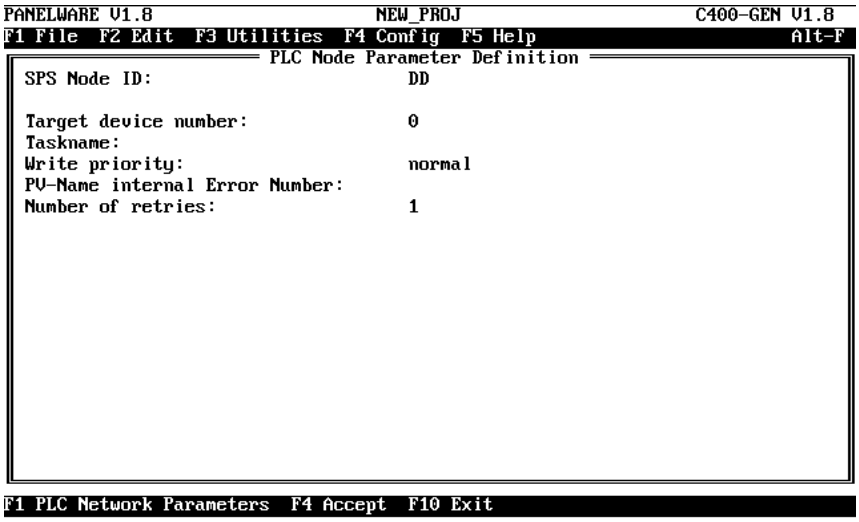
* The PANELWARE Genius Controller can receive Global Data from any connection capable of supplying it, and can send its own Global Data to other devices on the bus. Memory types %GI and %GAI refer to receiving global data in bit or word mode, respectively; %GQ and %GAQ refer to broadcasting global data in bit or word mode, respectively.

** The special variables available for the Genius Internal connection are defined as follows:

- Interface. A value of **0** indicates no error; an non-zero value indicates an internal hardware failure. **HW_STATUS** (internal data type of BYTE) — hardware status of the C400 Controller Genius Please note the code for later reference when communicating with GE Fanuc Technical support.
- **BUS_ERR_CNT** (internal data type of WORD UNSIGNED) — the count of the total Genius bus errors detected by the C400 Controller Genius interface since the Controller was last reset.
- **BUS_SCAN_T** (internal data type of WORD UNSIGNED) — the current bus scan time, as observed by the C400 Controller Genius interface and updated each bus scan. It represents the amount of time in milliseconds between the Controller's two previous turns on the bus. If the Controller cannot access the Genius bus, the bus scan time will be set to 65535.
- **BUS_ADR** (internal data type of BYTE) — the Genius serial bus address assigned to the C400 Controller via the device number rotary switches when the Controller was last reset.
- **GENI_FW** (internal data type of BYTE) — the firmware revision of the C400 Controller Genius interface hardware. For proper display of the revision, use an **OUTPUT BIT/BYTE** field with one place after the decimal point to yield a display format of X.Y, where "X" is the major revision and "Y" is the minor revision.

PLC Node Parameter Definitions

Additional information must be supplied for every defined connection except for an Internal or GENIUS Internal connection. Use the cursor keys to highlight the desired connection, then press the **F4 PLC Node Parameters** key to access the **PLC Node Parameter Definition** window.



Note

In most instances, the default settings indicated in the window will suffice. The one exception is the Target device number setting, which must be set to match the Genius bus address of the device represented by the connection. Parameters indicated by an ***** must correspond to the configuration of the PLC interface at the other end.

- **Target device number***

  This is the Genius serial bus address, or device number, of the device represented by the connection. This value ranges between 0 and 31, inclusive, and must be provided for every connection.

- **Taskname***

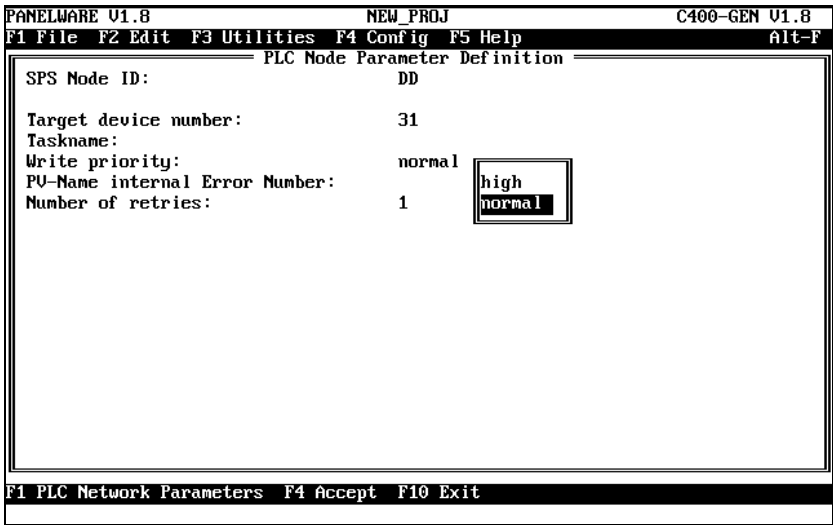
  This parameter must be specified only if you wish to access %P or %L data via a Series 90-70 GBC. If you do wish to specify it, supply the 1 — 7-character Taskname of the program running in the 90-70 CPU.

- **Write priority**

  Data can be written to another device on the Genius bus in one of two ways: via global data, or via datagrams. Only the %GQ and %GAQ data types are handled by global data writes; all other memory types are handled by datagrams.

  Datagrams can be sent with either *normal* or *high* priority. Normal priority means that the C400 Controller will send the datagram only if no other datagram or similar background message has been sent by any other device on the Genius bus during the current bus scan. High priority means that the datagram will be sent when the C400 Controller has its turn on the bus, regardless of the number of datagrams and other background messages that have already been sent during the current bus scan.

  Sending datagrams with high priority could adversely affect bus scan time. Also, excessive numbers of datagrams sent to a device during a single bus scan could result in some of the datagrams being ignored. Refer to the *Genius™ I/O System and Communications User's Manual* (GEK-90486-1) for details.



- **PV-Name internal Error Number**

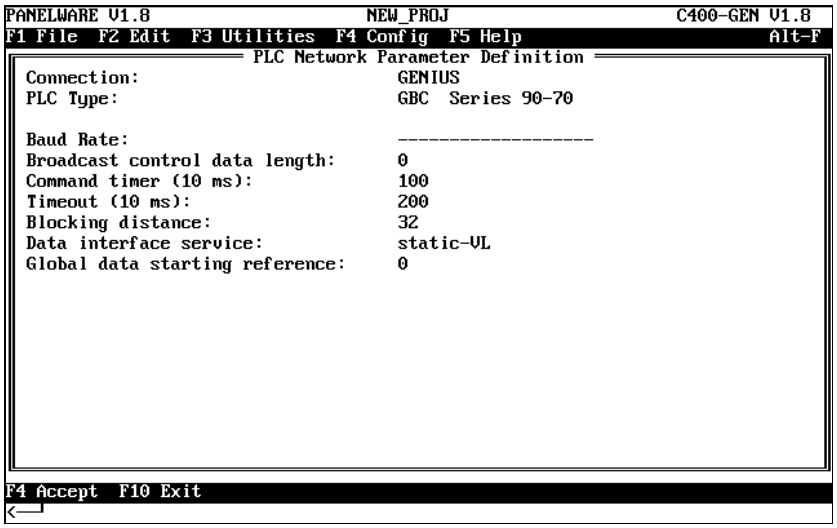
  The Genius driver maintains specific error information for each of the possible devices on the Genius bus. A word variable from the PANELWARE Internal Connection, **USERWORDnn**, can optionally be specified here to obtain the specific error information for this connection. The referenced internal variable should be unique (not used in the parameter definitions of another connection) and is specified without the internal connection identifier (e.g., **USERWORD01** instead of **USERWORD01/DI**). Refer to Appendix B for a list of error codes that could be encountered here.

- **Number of retries**

  Defines the number of times a **read device** datagram will be sent to a device following a transmission failure before the user-defined communications error picture is displayed.

PLC Network Parameter Definitions

In addition to the unique information that must be supplied for each defined connection, information must be provided concerning the Genius bus itself. From any **PLC Node Parameter Definition** window, you can access the **PLC Network Parameter Definition** window by pressing the **F1** function key.



Note

In many instances, the default settings indicated in the window will suffice. Those parameters indicated with an ***** must correspond to the configuration of the PLC interface at the other end.

- **Baud Rate***

  The baud rate of the Genius bus can be specified via PCS whenever mode switch setting 5 or 7 is selected. The following can be selected to specify the baud rate for mode switch settings 5 and 7.

  ---------- use system default (153.6 kBaud standard)
  153.6 kBaud standard
  153.6 kBaud extended
  76.8 kBaud
  38.4 kBaud

  If mode switch settings 1 — 4 are used, this parameter is ignored.

- **Broadcast control data length**

  Defines the number of bytes that are to be broadcast as global data. This parameter can range between 0 and 128, inclusive. Note that other devices on the Genius bus must be configured as to how much global data they will accept from any other device, including a PANELWARE C400 Controller. Data can be lost if they are configured to accept less than is being transmitted. To minimize the impact on the scan time of the Genius bus, this value should be set no higher than the actual amount of global data you need to broadcast.

- **Command timer (10 ms)**

  Specifies the time, in increments of 10 ms, allotted for the C400 Controller to execute each command on the Genius bus. The default is 1 second (100 x 10 ms). Note that this timer controls only the execution of the command; it does not govern the response of the target device. If needed, this timer can be adjusted within the range of 50 — 500 ms, inclusive.

- **Timeout (10 ms)**

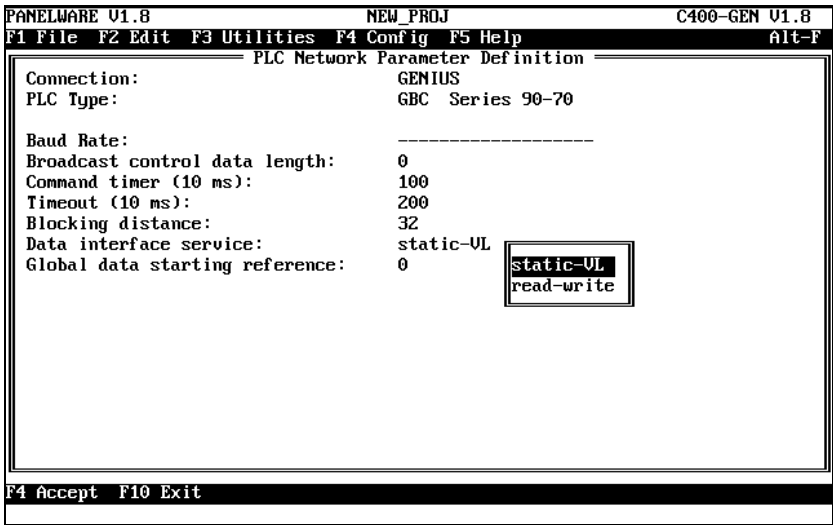
  Specifies the time, in increments of 10 ms, allotted for a target device to respond to a request from the C400 Controller. The default time is 2 seconds (200 x 10 ms). If needed, this timer can be adjusted within the range of 50 — 500 ms, inclusive.

- **Blocking distance**

  This parameter controls the maximum byte length of datagrams used in requesting data from a GBC. Increasing this value can decrease the number of datagrams that must be sent, but at the expense of a longer bus scan. If needed, this value can be adjusted within the range of 16 — 128, inclusive (default is 32).

- **Data interface service**

  Variables can either be accessed individually from the PLC or as a group via a *static variable list*. For example, specifying **static-VL** for the data interface service allows you to retrieve %R1, %R6, and %R8 in a single datagram request, whereas the read-write service requires three (albeit shorter) requests. You will almost always want to specify the **static-VL** service, because it yields faster data response times. The one exception to this would be an application that contains a high proportion of key commands in relationship to the amount of data displayed on any one picture or the amount of data gathered for generating alarms. Because key commands are processed only between requests, shortening the processing time of all requests can yield faster key response. If your key commands appear to execute too slowly, you can try setting the data interface service to **read-write** and compare the performance.



- **Global data starting reference***

  This parameter must be set only if you will be communicating with a Series Six or Series Five PLC. It specifies the offset within the Series Six/Five register memory where global data broadcast by the C400 Controller is to be placed. Note that this parameter affects *all* Series Six and Series Five PLCs on the Genius bus. You should set this offset within the range of 1 — 16384, inclusive, to specify a fixed register offset. If you wish the offset to be calculated by the C400 Controller based on its own bus device address, leave the offset specified as 0. In this case, the actual offset will be calculated according to the formula

  (BusAdr * 64) + 1

  where BusAdr is the serial bus device address of the C400 Controller when it powers up on the Genius bus. This calculation will yield offsets as seen in the table below:

C400 Bus Address	Global Data Starting Reference
0	1
1	65
2	129
.	.
.	.
.	.
31	1985

SNP 90 Protocol Parameters (Definition in PCS)

For details on using SNP90 communications with the C400 Controller, refer to the *PANELWARE MMI Application Manual for GE Fanuc Series 90 Protocol (SNP)* — GFK-0850.

Settings on the Panel

A Panel with a C400 Panel Controller can read from and write to a PLC, either through a Genius interface or an RS-232 interface. In order to make this possible, the following must take place:

1. A project compiled with PCS is downloaded to the Panel (see “Downloading the Project to a Panel” in chapter 3).
2. The Panel is operated in Run-Mode (see “Starting a Project” in chapter 3).

Panel Interface

The Genius interface connector is always used for the Genius connection to the Series 90, Series Six, and/or Series Five PLC. The IF0 connector normally used by PCS to download projects to a Panel and optionally as an alarm printer interface, can also be used as an SNP connection to a Series 90 PLC.

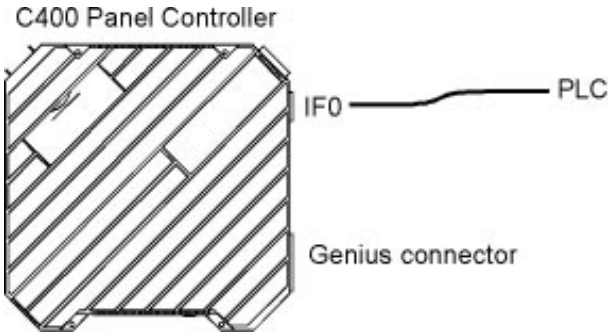


Figure 4 - 1. Panel to PLC Connections

Configuration of the PLC Interface

Caution

If a CMM interface is used for communication with a PANELWARE Panel, it must be operated with the *SNP90* protocol.

A PANELWARE Panel can be connected to the following interfaces of GE Fanuc Series 90-30 and 90-70 PLCs using Series 90 Protocol (table 4-2) or Genius Protocol (table 4-3).

Table 4 - 2. Panel to PLC Interface Connections for Genius Protocol

Module	Interface
Series 90-30 Genius bus interface module, found on one of the following backplanes: 5-slot backplane with built-in CPU (Model 311) 10-slot backplane with built-in CPU (Model 321) 5-slot backplane with built-in CPU (Model 313) 10-slot backplane with built-in CPU (Model 323) 5-slot backplane with modular CPU (Model 331/340/341/351) 10-slot backplane with modular CPU (Model 331/340/341/351)	GCM, IC693CMM301 GCM+, IC693CMM302 GBC-30, IC693BEM331
Series 90-70 Genius bus interface module: Processor 80C186: Models 731, 732, 771, 772 Processor 80386DX: Models 780, 781, 782, 788, 789 Processor 80486DX: Models 914, 915, 915, 924, 925	GBC-70, IC697BEM731
Series Six Genius bus interface module	GBC with diagnostics, IC660CBB902 GBC without diagnostics, IC660CBB903
Series Five Genius bus interface module	GBC, IC655BEM510

Table 4 - 3. Panel to PLC Interface Connections for SNP

Module	Interface
Power supply of the 90-30 or 90-20 series, found on one of the following backplanes: 5-slot backplane with built-in CPU (Model 311) 10-slot backplane with built-in CPU (Model 321) 5-slot backplane with built-in CPU (Model 313) 10-slot backplane with built-in CPU (Model 323) 5-slot backplane with modular CPU (Model 331/340/341/351) 10-slot backplane with modular CPU (Model 331/340/341/351) Series 90 Micro PLC	RS-485-compatible interface 15 pin D-type (F) **Note:** This interface can not be used if there is not a power supply in the main rack. Also, an RS-232 to RS-422 converter (IC690ACC901 — converter with cable) is required.
All CPUs of the 90-70 series: Processor 80C186: Models 731, 732, 771, 772 Processor 80386DX: Models 780, 781, 782, 788, 789 Processor 80486DX: Models 914, 915, 915, 924, 925	RS-485-compatible interface 15 pin D-type (F) **Note:** An RS-232 to RS-422 (IC690ACC901 — converter with cable) is required.
CMM module CMM711 (Series 90-70)	RS-232 from Port 1 RS-232 from Port 2
CMM module CMM311 (Series 90-30)	RS-232 from Port 1 RS-232 from Port 2

Chapter 5 PCS Connection Editor

This chapter provides a description of the PCS Connection Editor. It includes the following information:

- General Information 5-2
- Accessing the Connection List 5-2
- Elements of the Connection List 5-3
- Using Function Keys in the Connection List 5-3
  - Overview 5-3
  - Editing/Inserting Connections 5-4
  - Defining/Changing an ID 5-4
  - Defining/Changing a Connection 5-4
  - Deleting Connections 5-5
  - Editing Protocol Parameters of a Connection 5-5
- Editing the Variable Assignment Table (VAT) 5-6
  - Elements of the VAT 5-6
  - Function Keys of the VAT 5-7
  - Editing/Inserting Variable Assignments 5-8
  - Entering/Changing the Tagname 5-8
  - Entering/Changing the PLC Addresses 5-8
  - Entering/Changing PLC Variable Types 5-9
  - Deleting Variable Assignments 5-10
  - Marking Unused Variables 5-10
- Global Data Format 5-11
- Data Type Conversions 5-12

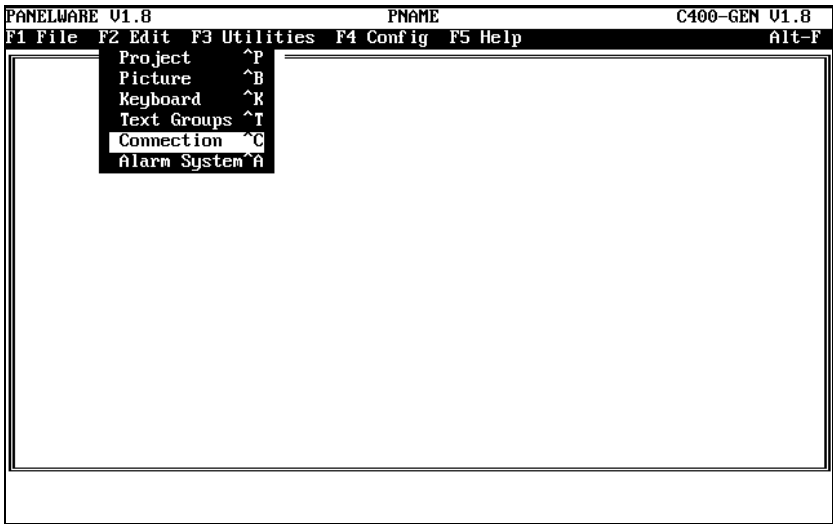
General Information

All of the variables (symbolic variable names) that are to be used in a project must be assigned an address in the PLC CPU.

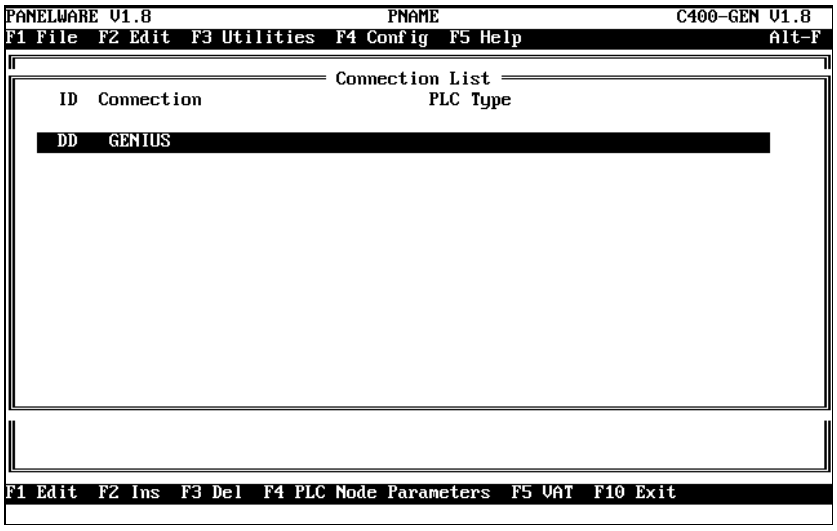
Every PLC connected to the Panel must be entered in the project's connection list. Each of these entries accesses an additional list called the variable assignment table (VAT), in which all variables of a connection are assigned a PLC address (tagname).

Accessing the Connection List

To edit or insert connections, the **Connection List**, must be opened from the Main menu. (The Connection List can only be accessed if a project is loaded.) Select the **Connections** option from the **F2 Edit** pull-down menu, or press **Ctrl** + **C**.



The **Connection List** window is displayed:



Elements of the Connection List

A single entry in the connection list consists of the following three segments:

- **ID:** Identification for a connection (PLC station). The assignment of variables to certain connections is accomplished through the ID. If input or output fields are defined as part of a picture, the PLC address (tagname) must be entered with the ID (e.g., **`VALUE1/ID`**). Variable names without an ID are automatically assigned the default connection **DD**. An ID consists of one to two alphanumeric characters of your choosing.
- **Connection:** Type of connection, either **Genius**, **SNP90** or **Internal**:

  Genius: The connection to the PLC is accomplished over the Genius bus.

  SNP90: The connection to the PLC is accomplished over the RS-232 interface (IF0) on the Panel. The GE Fanuc SNP90 protocol is used for the transmission.

  Internal: Internal variables are located within the Panel. A list of these internal variables is provided in the *PANELWARE Configuration Software Reference Manual* (GFK-0849).
- **PLC Type:** Further description of the PLC.

Using Function Keys in the Connection List

Whenever a connection list is displayed, six function keys are active to allow editing, inserting, and deleting of connections, protocol parameters, and the VAT.

Overview

F1 Edit ..... **Editing Connections**
Allows the selected connection to be edited (changed).

F2 Ins ..... **Inserting Connections**
Inserts a new connection into the list.

F3 Del ..... **Deleting Connections**
Deletes the selected connection.

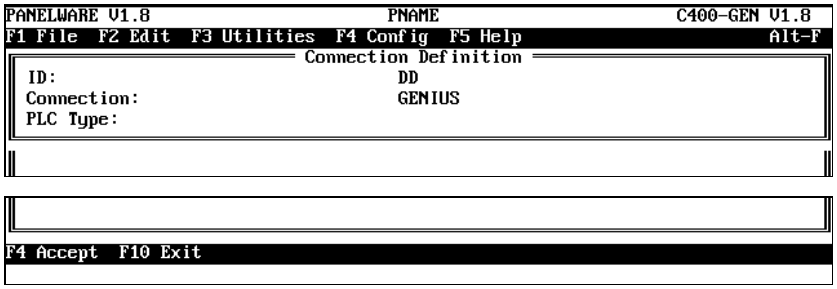
F4 PLC Node Parameters ..... **Editing PLC Node Parameters**
Allows the PLC node parameters (protocol parameters) of the selected connection to be edited.

F5 VAT ..... **Editing Variable Assignment Table (VAT)**
Displays the variable assignment table of the selected connection so that it can be edited.

F10 Exit ..... **Closing the Connection List**
Closes the **Connection List** window and redisplays the Main menu.

Editing/Inserting Connections

Pressing **F1 Edit** or **F2 Ins** in the **Connection List** window opens the **Connection Definition** window, in which a connection can be entered or modified:



F4 Accept .....Saves and then closes the connection definition.

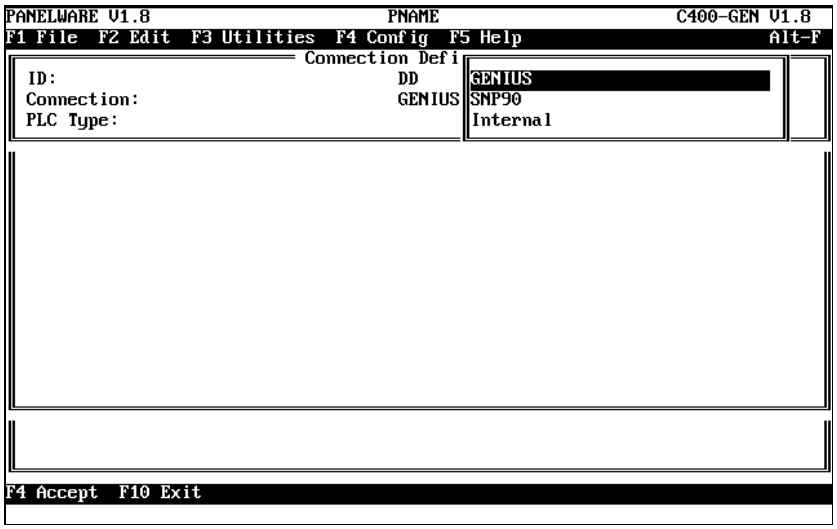
F10 Exit .....Closes the connection definition without saving.

Defining/Changing an ID

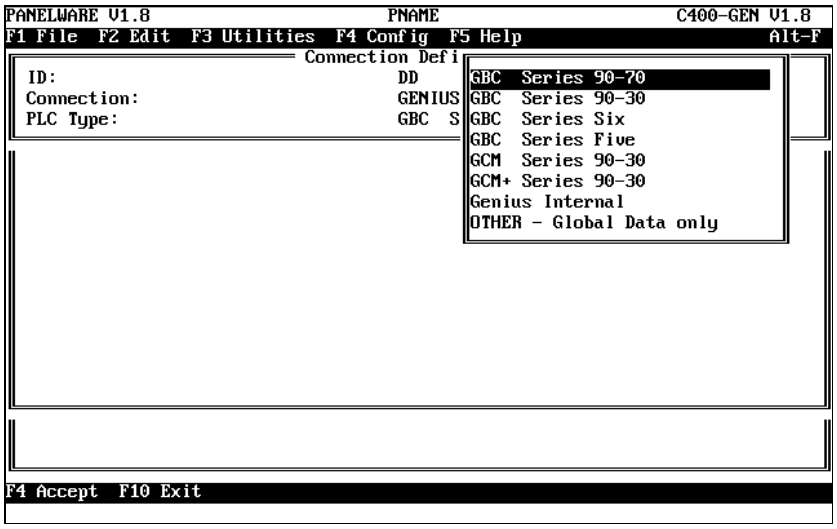
If the cursor is in the **ID** line, the identification code can be changed to any one to two letter-number combination.

Defining/Changing a Connection

If the cursor is in the **Connection** line, a selection window can be accessed by pressing ↵. Use the cursor up (↑) or down (↓) keys to choose the type of connection required (Genius, SNP90 or Internal) and press ↵ to insert it in the **Connection Definition** window.

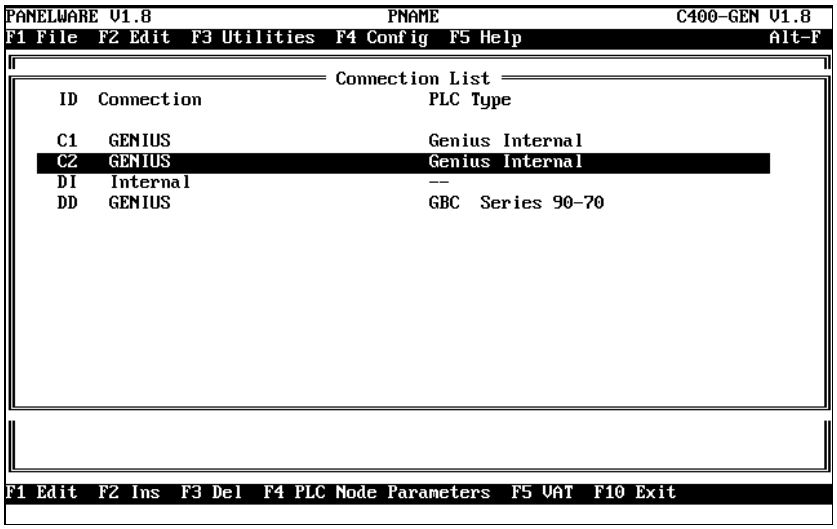


With the cursor in the **PLC Type** line, press ↵ to display a selection window that lists PLCs. After selecting a PLC Type, press **F4** to accept the new connection and return to the **Connection List** window.



Deleting Connections

Connections can be deleted from the connection list by highlighting the desired connection and pressing the **F3 Del** function key.



After **F3 Del** is pressed, the selected connection disappears from the list.

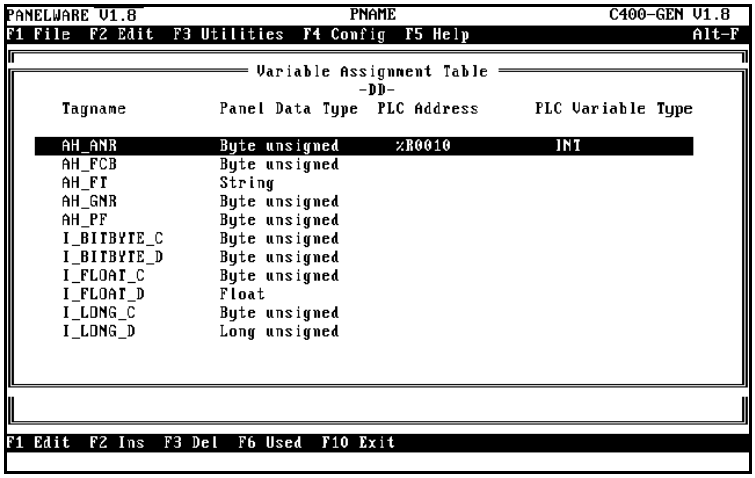
Editing PLC Node Parameters of a Connection

The **F4 PLC Node Parameters** function key has no effect on **Internal** connections. A more thorough discussion of Genius protocol parameters can be found in "Configuring Communication with the PLC" in chapter 4.

Editing the Variable Assignment Table

The VAT is used to assign absolute PLC addresses to symbolic variables. All connection variables that are entered as PLC addresses during the project creation are listed in the **Variable Assignment Table.**

When you press the **F5 VAT** key from the connection list, the VAT screen for the selected connection is displayed. The following screen is an example:



Elements of the VAT

The VAT for any connection consists of the following elements:

- **Tagname**: Symbolic name as follows:

  - Entered for an input or output field as the PLC address with the ID for this connection.

  - Entered for PLC addresses of the alarm system with the ID for this connection (PLC address for the alarm bit field, global alarm or bypass image).

  - Entered for a key command or LED function with the ID for this connection.

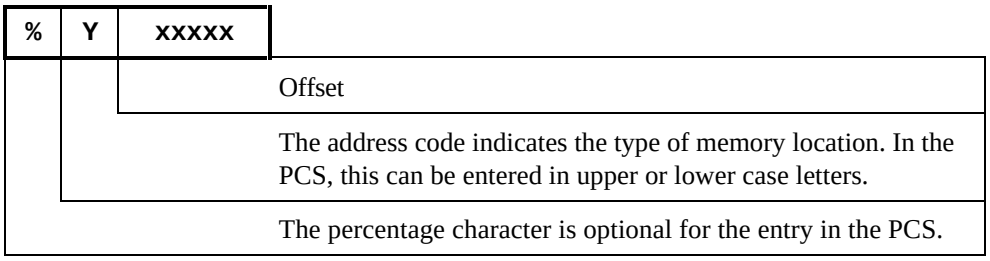
  - Entered in the project definition screen with the ID for this connection.

- **Panel Data Type:** Indicates (automatically) the data type of the field that the variable uses (e.g., for Output Byte, *Byte unsigned*). Every field type is assigned a certain Panel data type that cannot be changed by the user.

- **PLC Address:** The PLC address can only be defined for Genius and SNP90 connections. You must enter the PLC address using the syntax and format that the connected PLC will understand.

  For a series 90-30 or 90-70 PLC, an address is constructed as shown below:

  Example: **%Yxxxxx**



The address `%R0010` could also be entered using the following formats:

%R10, %r10, r010, R00010, ...

- **PLC Variable Type:** The PLC variable type can only be entered for Genius and SNP90 connections. You must enter the variable data type in the PLC (in most cases, it is identical to the Panel data type). For different data types, a data conversion must be performed (automatically). PCS only makes those data types available that the Panel can display or convert for the PLC address (see "Data Type Conversions" in this chapter).

Function Keys of the VAT

F1 Edit ..... **Editing a variable assignment**
Allows the selected variable assignment to be changed.

F2 Ins ..... **Inserting a variable assignment**
Inserts a new variable assignment.

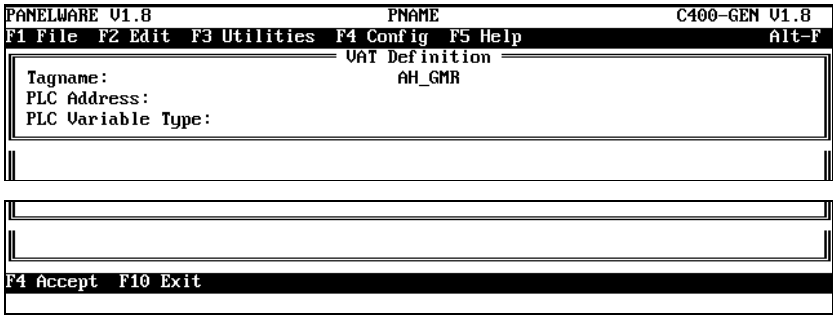
F3 Del ..... **Deleting a variable assignment**
Deletes the selected variable assignment.

F6 Used ..... **Marking an unused variable**
All variables that are displayed in the VAT but not used in the project can be marked with a ***** character using this function and then deleted later using the **F3 Del** function.

F10 Exit ..... **Closing the VAT**
Closes the **Variable Assignment Table** window and redisplays the **Connection list** window on the screen.

Editing/Inserting Variable Assignments

Pressing the **F1 Edit** or **F2 Ins** key from the VAT window opens the **VAT Definition** window, which allows a variable assignment to be entered or modified:



Note

Only the Tagname and PLC Address fields may be defined prior to the tagname being referenced somewhere in the project.

F4 Accept .....Saves and closes the VAT definition.

F10 Exit .....Closes the VAT definition without saving.

Entering/Changing the Tagname

If the cursor is in the **Tagname** line, the symbolic variable name can be changed or entered. Names that are already used in the VAT cannot be used twice and are rejected with the following error message:

```
Variable name already exists!
```

Entering/Changing PLC Addresses

If the cursor is in the **PLC Address** line, the PLC address can be entered or changed using the syntax and format that the connected PLC requires.

Entering/Changing PLC Variable Types

If the cursor is in the **PLC Variable Type** line, a selection window can be opened by pressing the ↵ (Enter) key. This window lists the data types that are permitted for this PLC address.

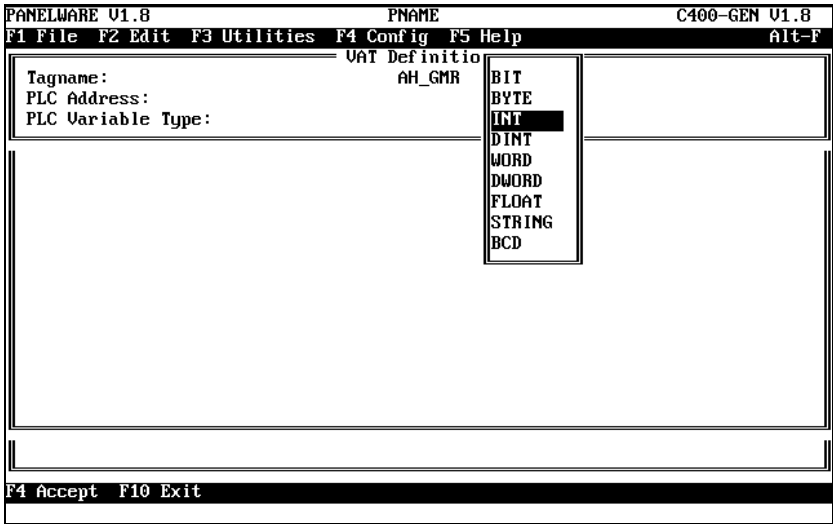


Table 5-1 provides a list of the data types allowed for PLC addresses, depending on the Panel data types and the address codes of the PLC address. Table 5-2 lists the address codes that make up Groups 1 and 2.

Table 5 - 1. Allowable PLC Address Data Types

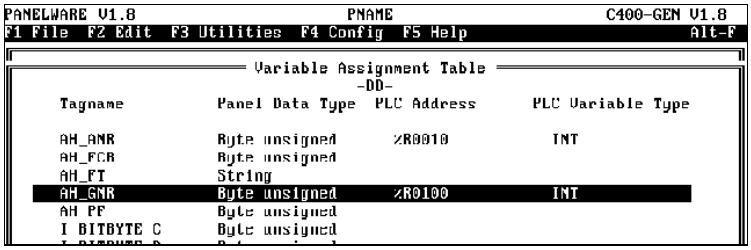
Panel Data Type (PDT)	PLC Variable Type	
	Group 1	Group 2
Bit	WORD	BIT
Byte unsigned	INT, WORD	BIT, INT, WORD
Word unsigned	INT, WORD, DWORD	BIT, INT, WORD
Word signed	INT, WORD, DINT	INT, WORD
Long unsigned	DWORD, DINT	----
Long signed	DWORD, DINT	----
Float	FLOAT	----
String	STRING	----

Table 5 - 2. Address Code Groups

Series 90-30/Series 90-70	
Group 1	Address codes %R, %AI, %AQ, %P, %L, %GAI, %GAQ
Group 2	Address codes %I, %Q, %T, %M, %G, %GA, %GB, %GC, %GD, %GE, %S, %SA, %SB, %SC, %GI, %GQ
Series 5	
Group 1	Address codes %R, %GAI, %GAQ
Group 2	Address codes %I, %I1+,%I2+, %I1-, %O, %O1+, %O2+, %O1-, %O2-, %GI, %GQ
Series 6	
Group 1	Address codes %R, %GAI, %GAQ
Group 2	Address codes %I, %O, %GI, %GQ

Deleting Variable Assignments

Variable assignments can be deleted from the VAT by selecting an entry and pressing the **F3 Del** function key.



After the **F3 Del** key is pressed, the selected variable disappears from the list.

Marking Unused Variables

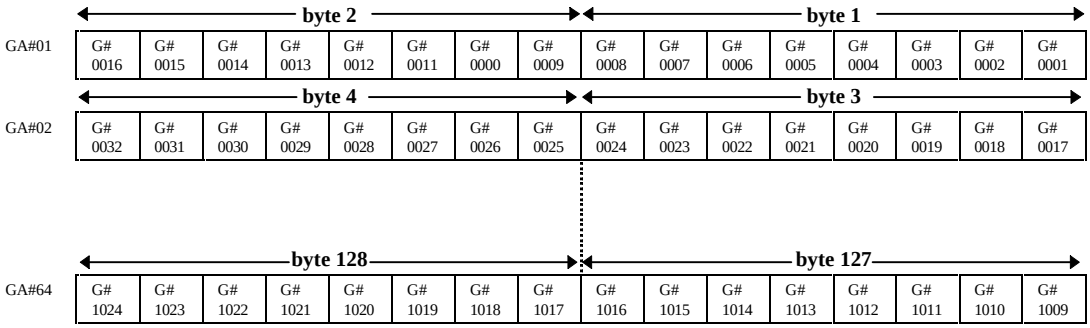
All variables that are not used in a project but still exist in the VAT can be marked with a ***** character using the **F6 Used** function. These can be deleted later using the **F3 Del** function. To mark all unused variables, press the **F6 Used** function key.

Note

The **F6 Used** function only provides valid information after a successful compilation.

Global Data Format

Global Data is used to automatically broadcast up to 128 bytes of data from one host to all others on the Genius bus. Typically, this data is a collection of both discrete and analog values. To facilitate transmitting/receiving global data as either discrete or analog values, a *double mapping* scheme is used. Two separate reference structures, one discrete and the other analog, are used to access a single memory area. This double mapping is described in the table below (substitute ***I*** for input data, and ***Q*** for output data where the **#** symbol appears).



Global data output references, %GQnnnn and %GAQnn, can appear *only* in a Genius Internal connection, because they pertain only to the C400 Controller itself. The input references, %GInnnn and %GAInn, can appear in any Genius connections *except* the Genius internal connection.

Data Type Conversions

The following basic Panel and PLC data types are supported:

Table 5 - 3. Variable Data Types

Format in the PCS		
Panel Data Type	**PLC Data Type**	**Value Range**
Bit	BIT	0 ... 1
Byte unsigned	(does not exist)	0 ... + 255
Word unsigned	WORD	0 ... + 65535
Word signed	INT	- 32768 ... + 32767
Long unsigned	DWORD	0 ... + 4294967295
Long signed	DINT	- 2147483648 ... + 2147483647
Float	FLOAT	$\pm 1.401298 \times 10^{-45}$ ... $\pm 3.402823 \times 10^{+38}$*
String	STRING	Byte field (character string)

* A maximum of 7 digits of significance (precision).

The PLC and Panel data types can sometimes differ while reading from the PLC or writing to the PLC. When this happens, a data type conversion is performed automatically as shown in Table 5-4.

Table 5 - 4. Data Type Conversions (Panel Data Type/PLC)

Legend:

Byte u. ..... Byte unsigned

Word u. ..... Word unsigned

Word s. ..... Word signed

Long u. ..... Long unsigned

LSB ..... Least Significant Bit (Lower Bit)

MSB ..... Most Significant Bit (Upper Bit)

LOB ..... Low Order Byte (Lower Byte)

HOB ..... High Order Byte (Upper Byte)

PDT ..... Panel Data Type

PDT		Data Type Conversion		PLC
Bit	→	No conversion.	→	BIT
	←	No conversion.	←	
Bit	→	The value of Bit is copied to the LSB of WORD. The rest of the bits of WORD are set to 0.	→	WORD *
	←	Values higher than 1 are limited to 1.	←	
Byte u.	→	The LSB of Byte u. is copied to BIT.	→	BIT
	←	The value of BIT is copied to the LSB of Byte u. The rest of the bits of Byte u. are set to 0.	←	
Byte u.	→	Byte u. is copied to the LOB of WORD. The HOB of WORD is set to 00.	→	WORD *
	←	Values higher than 255 are limited to 255.	←	
Byte u.	→	Byte u. is copied to the LOB of INT. The HOB of INT is set to 0.	→	INT *
	←	Values higher than 255 are limited to 255. Negative values are limited to 0.	←	

PDT		Data Type Conversion		PLC
Word u.	→	The LSB of Word u. is copied to BIT.	→	BIT
	←	The value of Bit is copied to the LSB of Word u. The rest of the bits of Word u. are set to 0.	←	
Word u.	→	No conversion.	→	WORD *
	←	No conversion.	←	
Word u.	→	Values higher than 32767 are limited to 32767.	→	INT *
	←	Negative values are limited to 0.	←	
Word u.	→	Word u. is copied to the lower word of DWORD. The upper word is set to 0.	→	DWORD
	←	Values higher than 65535 are limited to 65535.	←	

Table 5 - 4. - Continued

Word s.	→	Negative values are limited to 0.	→	WORD *
	←	Values higher than 32767 are limited to 32767.	←	
Word s.	→	No conversion.	→	INT *
	←	No conversion.	←	
Word s.	→	Word s. is copied to the lower word. For a negative value, the upper word is filled with FFFF (hexadecimal). For a positive value, the upper word is filled with 0.	→	DINT
	←	Values higher than 32767 are limited to 32767. Values lower than -32768 are limited to -32768.	←	
Long u.	→	No conversion.	→	DWORD
	←	No conversion.	←	
Long u.	→	Values higher than 2147483647 are limited to 2147483647.	→	DINT
	←	Negative values are limited to 0.	←	
Long s.	→	Negative values are limited to 0.	→	DWORD
	←	Values higher than 2147483647 are limited to 2147483647.	←	
Long s.	→	No conversion.	→	DINT
	←	No conversion.	←	
Float	→	No conversion.	→	FLOAT
	←	No conversion.	←	
String	→	For odd string lengths, a null byte is added to the end.	→	STRING
	←	No conversion.	←	

* For PLC addresses in group 2 ensure that the offset of the address meets the following condition: **(Offset - 1) must be 0 or a multiple of 8**

Tables 5-5 and 5-6 provides another overview of the permitted combinations of Panel and PLC data types. In addition, the address codes and possible limitations on the offset are listed for the PLC data types.

Note

The statement (offset - 1)%8 calculates the modulo (remainder) of the division from (offset - 1)/8. This calculation ensures that the address is on a byte boundary (address -1 is a multiple of 8).

Table 5 - 5. Possible Data Type Conversions for Series 90

Panel Data Types	PLC Data Types						
	BIT	**WORD**	**INT**	**DWORD**	**DINT**	**FLOAT**	**STRING**
Bit	I, Q, M, T, S, SA, SB, SC, G, GA, GB, GC, GD, GE, GI, GQ (offset-1)%8=0	R, AI, AQ, I, Q, M, T, P, L, GAI, GAQ, S, SA, SB, SC, G, GA, GB, GC, GD, GE, GI, GQ (offset-1)%8=0					
Byte u.	I, Q, M, T, S, SA, SB, SC, G, GA, GB, GC, GD, GE, GI, GQ	R, AI, AQ, I, Q, M, T, P, L, GAI, GAQ, S, SA, SB, SC, G, GA, GB, GC, GD, GE, GI, GQ (offset-1)%8=0	R, AI, AQ, I, Q, M, T, P, L, GAI, GAQ, S, SA, SB, SC, G, GA, GB, GC, GD, GE, GI, GQ (offset-1)%8=0				
Word u.	I, Q, M, T, S, SA, SB, SC, G, GA, GB, GC, GD, GE, GI, GQ	R, AI, AQ, I, Q, M, T, P, L, GAI, GAQ, S, SA, SB, SC, G, GA, GB, GC, GD, GE, GI, GQ (offset-1)%8=0	R, AI, AQ, I, Q, M, T, P, L, GAI, GAQ, S, SA, SB, SC, G, GA, GB, GC, GD, GE, GI, GQ (offset-1)%8=0	R, AI, AQ, P, L, GAI, GAQ			
Word s.		R, AI, AQ, I, Q, M, T, P, L, GAI, GAQ, S, SA, SB, SC, G, GA, GB, GC, GD, GE, GI, GQ (offset-1)%8=0	R, AI, AQ, I, Q, M, T, P, L, GAI, GAQ, S, SA, SB, SC, G, GA, GB, GC, GD, GE, GI, GQ (offset-1)%8=0		R, AI, AQ, P, L, GAI, GAQ		
Long u.				R, AI, AQ, P, L, GAI, GAQ	R, AI, AQ, P, L, GAI, GAQ		
Long s.				R, AI, AQ, P, L, GAI, GAQ	R, AI, AQ, P, L, GAI, GAQ		
Float						R, AI, AQ, P, L, GAI, GAQ	
String							R, AI, AQ, P, L, GAI, GAQ

Table 5 - 6. Possible Data Type Conversions for Series Five/Series Six

Panel Data Types	PLC Data Types						
	BIT	**WORD**	**INT**	**DWORD**	**DINT**	**FLOAT**	**STRING**
Bit	I, I1+,I2+, I1-, O, O1+, O2+, O1-, O2-, GI, GQ I, O, GI, GQ (offset-1)%8=0	R, GAI, GAQ (offset-1)%8=0					
Byte u.	I, I1+,I2+, I1-, O, O1+, O2+, O1-, O2-, GI, GQ I, O, GI, GQ	R, GAI, GAQ (offset-1)%8=0	R, GAI, GAQ (offset-1)%8=0				
Word u.	I, I1+,I2+, I1-, O, O1+, O2+, O1-, O2-, GI, GQ I, O, GI, GQ	R, GAI, GAQ (offset-1)%8=0	R, GAI, GAQ (offset-1)%8=0	R, GAI, GAQ			
Word s.		R, GAI, GAQ (offset-1)%8=0	R, GAI, GAQ (offset-1)%8=0		R, GAI, GAQ		
Long u.				R, GAI, GAQ	R, GAI, GAQ		
Long s.				R, GAI, GAQ	R, GAI, GAQ		
Float						R, GAI, GAQ	
String							R, GAI, GAQ

Chapter 6 Demo Project

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Section 1 General Information

A demo project, which is copied to the hard disk during the installation, is delivered in the same package as PCS. Project **DEMO_400** is for use with a C400 Controller. The demo provides an overview of PANELWARE features.

Even if you do not have the PANELWARE hardware needed to execute the demo project, it will still be useful to examine the demo to learn more about how to take advantage of PANELWARE's many features.

Project Name	Directory	Required Hardware
DEMO_400	**Dest.path\USER\DEMO_400.PRD** The demo project is stored in this directory after the installation.	PLC Hardware: A GE Fanuc PLC PANELWARE Hardware: PANELWARE Panel with C400 Controller

See chapter 1 for an explanation of which GE Fanuc PLCs can be connected to a PANELWARE Panel, using the C400 Controller.

Section 2 Required Hardware

The following PANELWARE hardware components are required for the demo project (see the *PANELWARE™ Hardware Installation User's Manual*–GFK-0848):

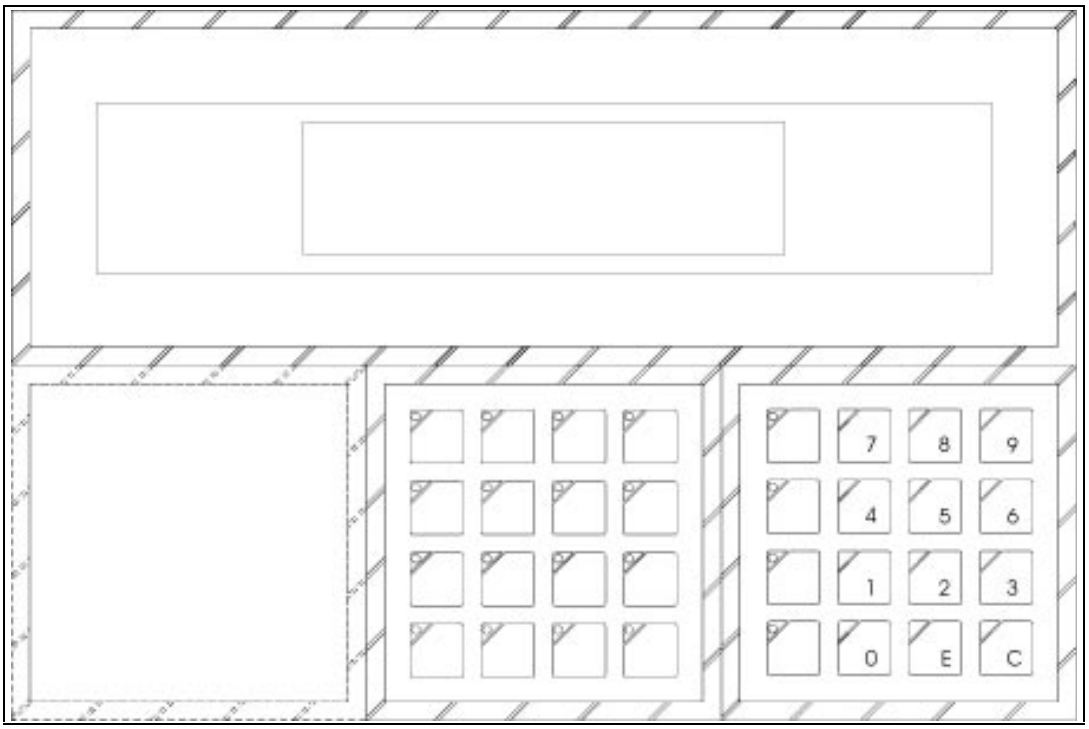
- ❑ 1 - C400 Panel Controller
- ❑ 1 - 8 x 40 LCD Display Module
- ❑ 1 - 12+4 key Keyblock Module
- ❑ 1 - 16 key Keyblock Module
- ❑ 1 - connection cable between the PC and the Panel
- ❑ 1 - connection cable between the Panel and the PLC (see Appendix A)

Assemble these modules according to the instructions in the *PANELWARE™ Hardware Installation User's Manual* (GFK-0848). Ensure that the 12+4 Keyblock module is the first Keyblock module that is attached directly to the Panel Controller.

Note

The numeric Keyblock module shown throughout the following sections may not look like yours, which may not have the E and C keys. Instead, the E key (ENTER) may be the ↵ symbol and the C key (CLEAR) may be the ← symbol.

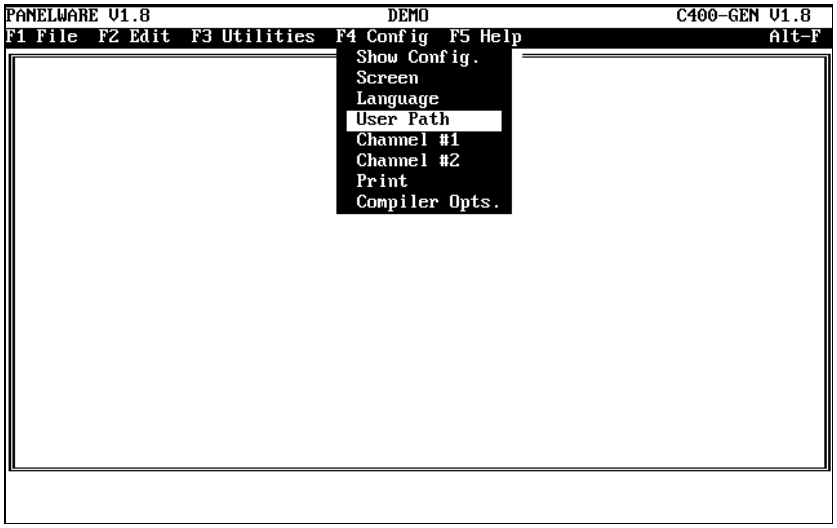
The assembled Panel should look like the following figure:



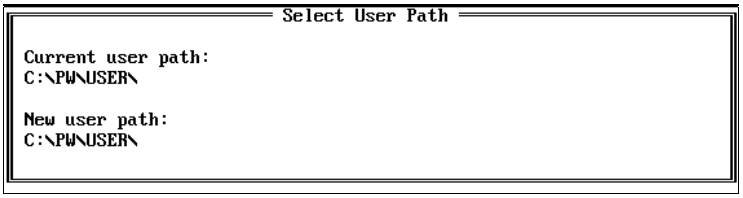
Section 3 Downloading the Demo Project

Defining the User Path

In order to load the demo project into PCS, make sure that the user path is set to **`Dest.path\USER`**. To define the user path, open the pull-down menu, **F4 Config**, and select the function **User Path**:



The user path can be changed in the following window:

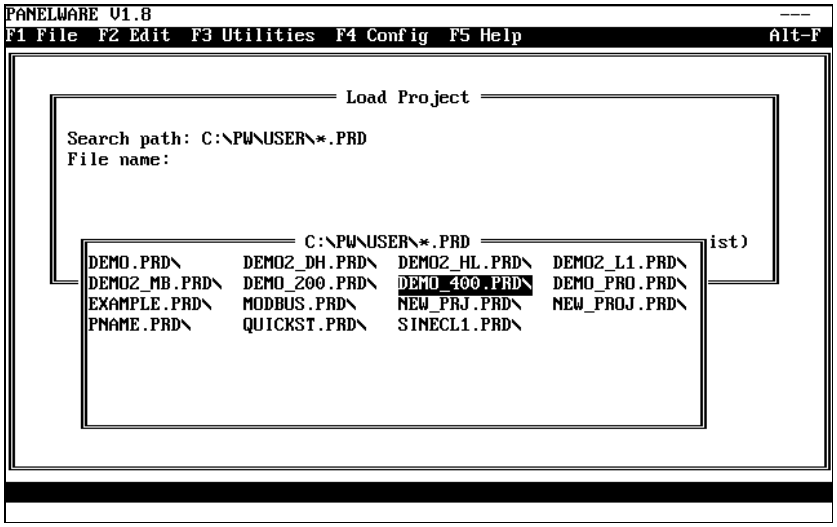


If you have changed the user path after the installation, enter the path ***`Dest.path`*`\USER\`** in this position (the default setting made by the installation program is **`C:\PW\USER\`**).

Loading the Project

To load the DEMO project, select the **Open Project** option from the **F1 File** pull-down menu and press the ↵ (Enter) key to access the selection window containing the list of current projects. Highlight the desired DEMO project and press ↵ to select/open it.

The cursor can be moved to the **DEMO_400** project (Project for a PANELWARE Panel with a C400 controller):

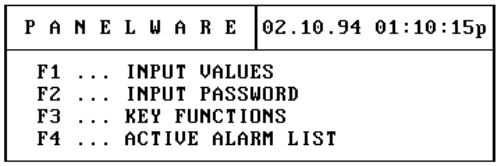


After the project selection has been confirmed by pressing the ↵ (Enter) key, the **Edit Project** window appears on the screen. Close this window by pressing the **F10 Exit** key or the **Esc** key.

Downloading and Starting the Project

Download the project to the Panel by following these steps:

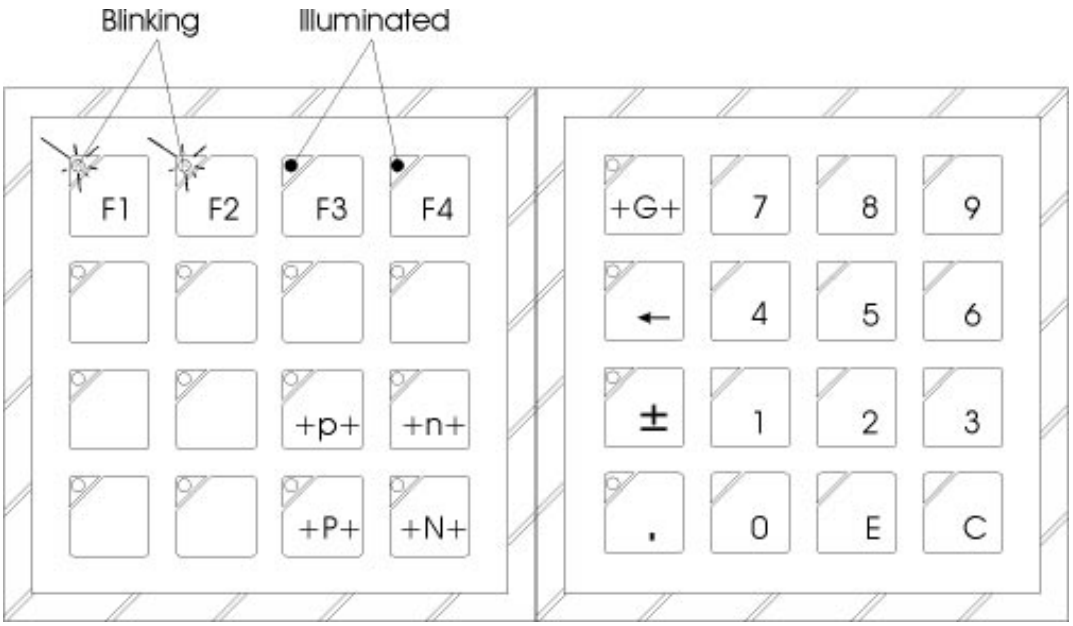
- **Panel:**
  - Supply the Panel with power by connecting the 24 VDC power.
  - Select **Teach Mode** (operating mode switch in position 7).
  - Press the RESET button on the Panel.
  - Wait until **Teach Mode** is seen on the Panel display.
  - Make the connection between the PC and the Panel
- **PCS:**
  - Press the **Ctrl** + **X** keys simultaneously, or select the **Download** function from the **Utilities** pulldown menu.
  - The question **`Download Project? (Y/N)`** is displayed
  - Start the download by pressing ***Y***.
  - Wait until the message **`Download Complete!`** appears
- **Panel:**
  - Make the connection between the Panel and the PLC
  - Switch to *Run-Mode* (operating mode switch to position 5)
  - Press the RESET button on the Panel
  - The following picture will appear on the Panel display:



Section 4 Description of the Demo Project

General Information

The following symbols and representations will be used in the project description:



Keys:

F1 ... **F4**	Function 1 to 4 (Function depends on the current picture)
+p+/**+n+**	Cursor to previous/next input field
+P+/**+N+**	Change to previous/next picture
+G+	Group acknowledgment for alarms
0 ... **9**	Numbers 0 to 9
.	Decimal point
←	If the cursor is in an input field, this key deletes the last entered character.
±	Sign change in numerical input fields
E	Confirmation of the entry in an input field
C	Deletes the entry in an input field

Key LEDs:

Function keys with specific functions are defined for every picture. The LEDs for keys that have assigned functions are either lit or blinking.

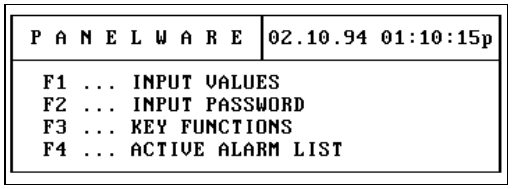
Note

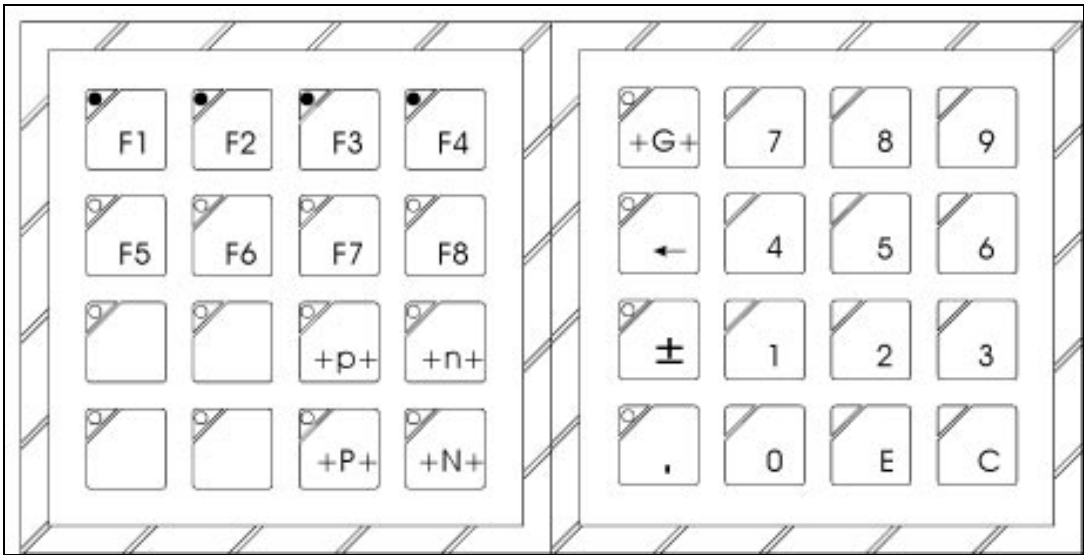
The numeric Keyblock module shown throughout the following sections may be different from yours, which may not have the **E** and **C** keys. Instead, the **E** (Enter) key may be the ↵ symbol and the **C** key (CLEAR) may be the ← symbol.

Main Menu

If the demo project has been successfully downloaded to the Panel and if you have started the Panel in *Run-Mode*, the main menu appears (This is the same as the Startup Picture):

The date and time are displayed in the top right-hand corner of the menu. The *F1* to *F4* entries provide information about the functions assigned to keys **F1** to **F4**. These key LEDs (F1 through F4) are illuminated on the Keyblock module, as well, as shown below:





Use function keys **F1** – **F4** to change to another picture:

F1 Changes to the **INPUT VALUES** picture.
In this picture, you can enter or change two values of different types, which are then displayed in two output fields.

F2 Changes to the **INPUT PASSWORD** picture.
You can use this picture to enter a password and its function.

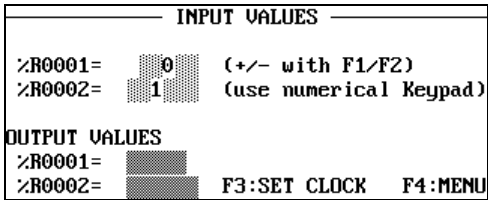
F3 Changes to the **KEY FUNCTIONS** picture.
The keys can be assigned with certain functions so that locations in the PLC memory can be influenced immediately.

F4 Changes to the **ACTIVE ALARM LIST** picture.
Displays a list of all active alarms.

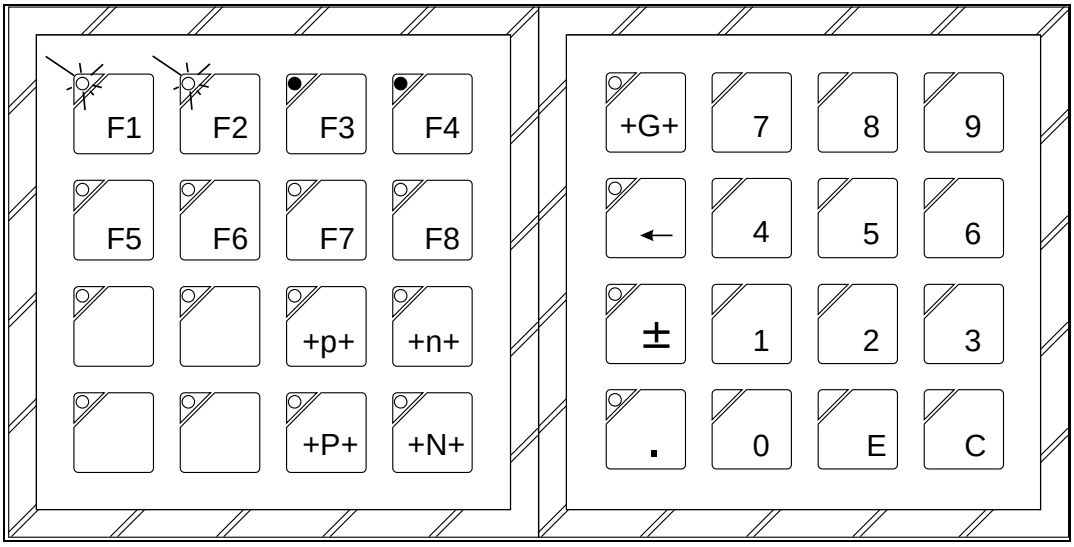
Value Entries

INPUT VALUES Picture

If you have pressed the **F1** key in the main menu, the following picture appears on the screen:



Key LEDs:



By pressing key **F1**/**F2**, the content of PLC address `%R0001` is increased/decreased in steps:

F1 Increases the value by 1 initially, then at greater increments the longer the key is pressed

F2 Decreases the value by 1 initially, then at greater increments the longer the key is pressed

The contents of PLC address `%R0002` can be changed by directly entering a value through the keyboard numeric keys. Keys **+p+** and **+n+** switch between the two input fields.

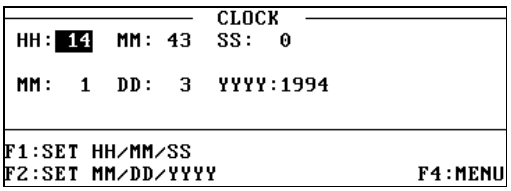
The contents of the two PLC variables are displayed again in two output fields. The display is defined with preceding zeros. Keys **F3** and **F4** are used to switch to one of the following pictures:

F3 Changes to the **CLOCK** picture
The date and time of the Panel can be entered/changed in this picture.

F4 Picture changes back to the main menu.

CLOCK Picture

If you press the **F3** function key while the **INPUT VALUES** picture is on the screen, the **CLOCK** picture appears on the Panel display:



Key LEDs:

To change the date and time, enter the desired data in the input fields, using the **+p+** and **+n+** keys to switch between the fields. Two function keys are used to set the internal time or date:

F1 The Panel internal time is set according to the entered values for HH (Hours) , MM (Minutes) and SS (Seconds).

F2 The Panel internal date is set according to the entered values for MM (Month), DD (Day) , and YYYY (Year).

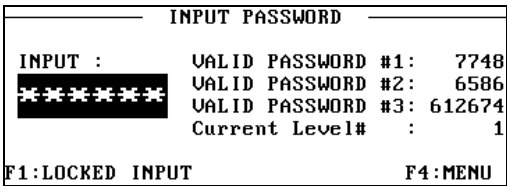
Pressing the **F4** function key returns you to the main menu.

Entering a Password

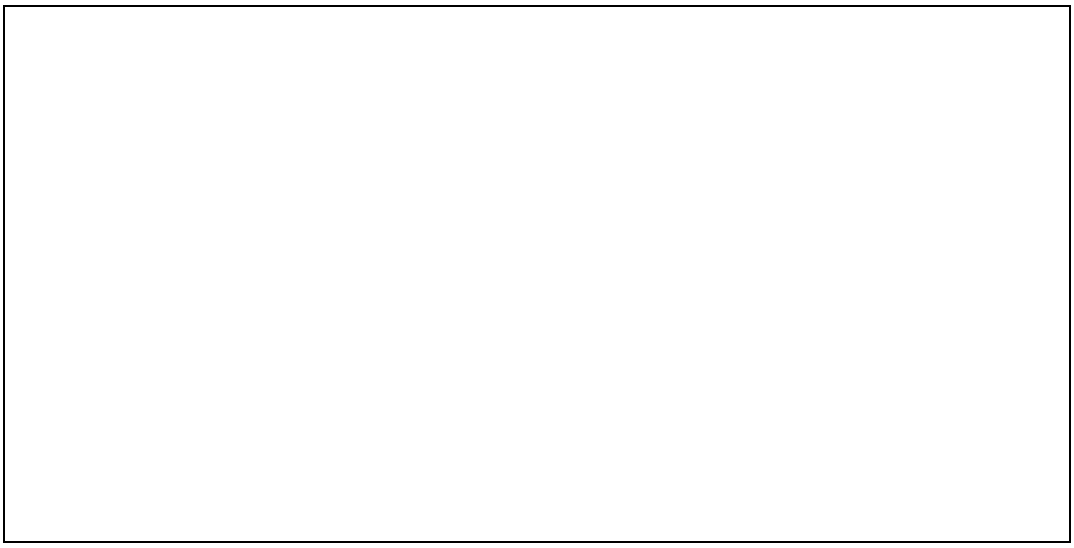
The following sections describe how to use the pictures that have to do with passwords and locked input.

INPUT PASSWORD Picture

If you press the **F2** function key while in the main menu, the **Input Password** picture appears on the Panel display:



Key LEDs:



This picture allows you to enter the password(s) that will allow you to change locked input fields. Entering a password switches you to a different password level that changes the access rights of different functions.

With keys **F1** and **F4** you can switch into the following pictures:

F1 Switches to the **LOCKED INPUT** picture.
Depending on the password level, certain values can be changed in this picture.

F4 Picture change back to the main menu.

LOCKED INPUT Picture

If you press the **F1** function key while in the INPUT PASSWORD picture, the LOCKED INPUT picture appears on the Panel display:

```
INPUT FIELDS ARE LOCKED DEPENDING ON THE
CURRENT PASSWORD LEVEL

INPUT #1:  114  (LOCKED IF PASSWORD
                 NOT VALID)
INPUT #2:  5123  (LOCKED IF LEVEL < 3)

F1:PASSWORD                        F4:MENU
```

Key LEDs:

If an invalid password has been entered, you cannot change the value for INPUT #1. The value for INPUT #2 can only be changed if the proper password for password level 3 is entered.

With keys **+p+** and **+n+**, you can switch to the other input field if allowed (depends on your password level).

Keys **F1** and **F4** are used to switch to one of the following pictures:

F1 Switches back to the **INPUT PASSWORD picture**
The entry of a password and its function is performed in this picture.

F4 Changes picture back to the main menu.

Key Functions

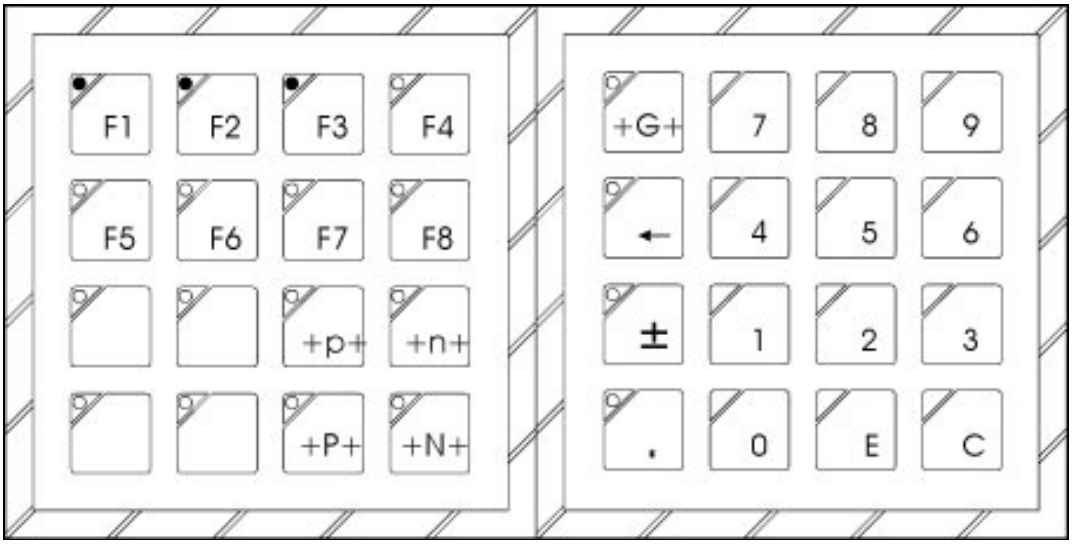
If you press the **F3** function key while in the main menu, the **KEY FUNCTIONS** picture appears on the Panel screen:

```
KEY FUNCTIONS
                    PLC-address     to value
F1:SET WORD:        %R0005=      23 (1000)
F2:TOGGLE WORD:     %R0006=       0 (0/2000)

F3:MOM.BIT          %GQ001=       0 (->1)

                                      F4:MENU
```

Key LEDs:



Keys **F1** – **F3** are assigned with key functions, i.e., specific variables in the PLC are changed when they are pressed.

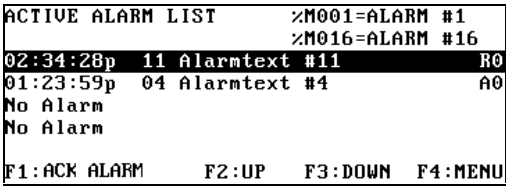
F1 A value of 10000 is written to PLC address `%R0005`.

F2 PLC address `%R0006` is toggled between values 0 and 20000. This key always switches from one of two values to the other.

F3 A value of 1 is output as global data bit **`b0`** (%GQ001) as long as the key is held down; a value of 0 is output as long as the key is released.

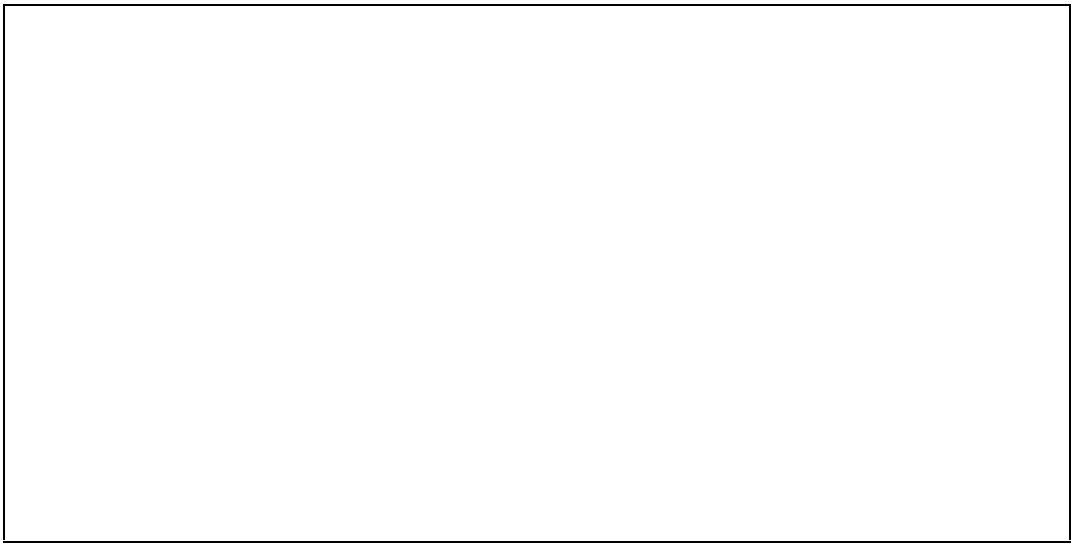
Pressing the **F4** key returns you to the main menu.

Alarm List



Pressing the **F4** key while in the main menu causes the ACTIVE ALARM LIST to appear on the Panel display:

Key LEDs:



Alarms are displayed according to an alarm bit field that is found in memory location `%M001` through `%M016` in the PLC. For example, if `%M008` is changed from 0 to 1 in the PLC, alarm 8 is entered in the alarm list. (More information about the alarm bit field structure in the PLC can be found in chapter 4.) Also, see the *PANELWARE™ Configuration Software Reference Manual* (GFK-0849) for a more detailed description of alarms.

An entry in the list contains the following information:

Alarm time	When the alarm occurred
Alarm number	Number of the alarm (corresponds to the bit number in the alarm bit field)
Alarm text	Short description of the alarm
Information	Information about the type of alarm
Priority	Priority of the alarm

The following functions are assigned to keys **F1** – **F3**:

F1	Acknowledgment for the selected alarm.
F2/F3	Scroll through the alarms in the alarm list (F2=Up; F3=Down). Scrolling through the list selects an alarm (inverse display), which can be acknowledged by pressing the F1 key.

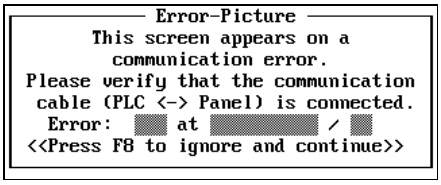
Pressing the **F4** key returns you to the main menu.

Error Picture

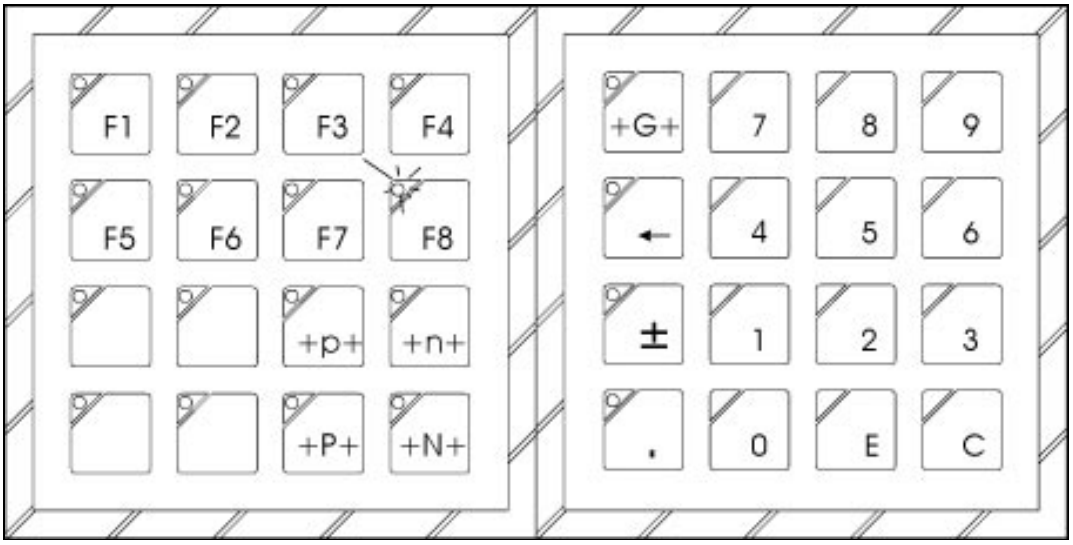
Note

To simulate an error, simply unplug the cable between the Panel and the PLC and the ERROR picture will be displayed.

If the connection between the Panel and the PLC is disrupted for any reason, the error picture, which contains information about the error, is displayed on the Panel display. More detailed information on error numbers and text can be found in the *PANELWARE™ Configuration Software Reference Manual* (GFK-0849).



Key LEDs:



Note

If the Main menu is active, disrupting the connection between the Panel and the PLC will not cause the ERROR picture to be displayed. The ERROR picture will only be displayed if the picture is changed to one containing fields that should be displaying values from the PLC.

Key **F8** is used to ignore the communication error and return to the original picture. Correcting the error automatically restores the original picture. The use of a function key to ignore the communications error is useful when multiple PLC connections are defined in the project and you wish to use the MMI although one or more connections have been lost.

Section 5 Creating the Demo Project

General Information

This section presents a step by step description explaining how to create a demo project. The section also contains useful information for creating your own projects in the future.

More information on using PCS can be found in the *PANELWARE™ Software Configuration Reference Manual* (GFK-0849). This section is based on chapter 10, “Editing a Project”, in that manual.

Creating a Project

The list below shows the steps to be taken in creating a new project:

1. Prepare a basic concept before you start.
2. Create the new project.
3. Define hardware setup (choose all connections).
4. Define key assignments.
5. Create the required pictures.
6. Create connection list.
7. Define your text groups.
8. Bind pictures to the project.
9. Check for errors, particularly in keycode table.
10. Compile your project.
11. Download the project to the Panel.

Preparing a Concept

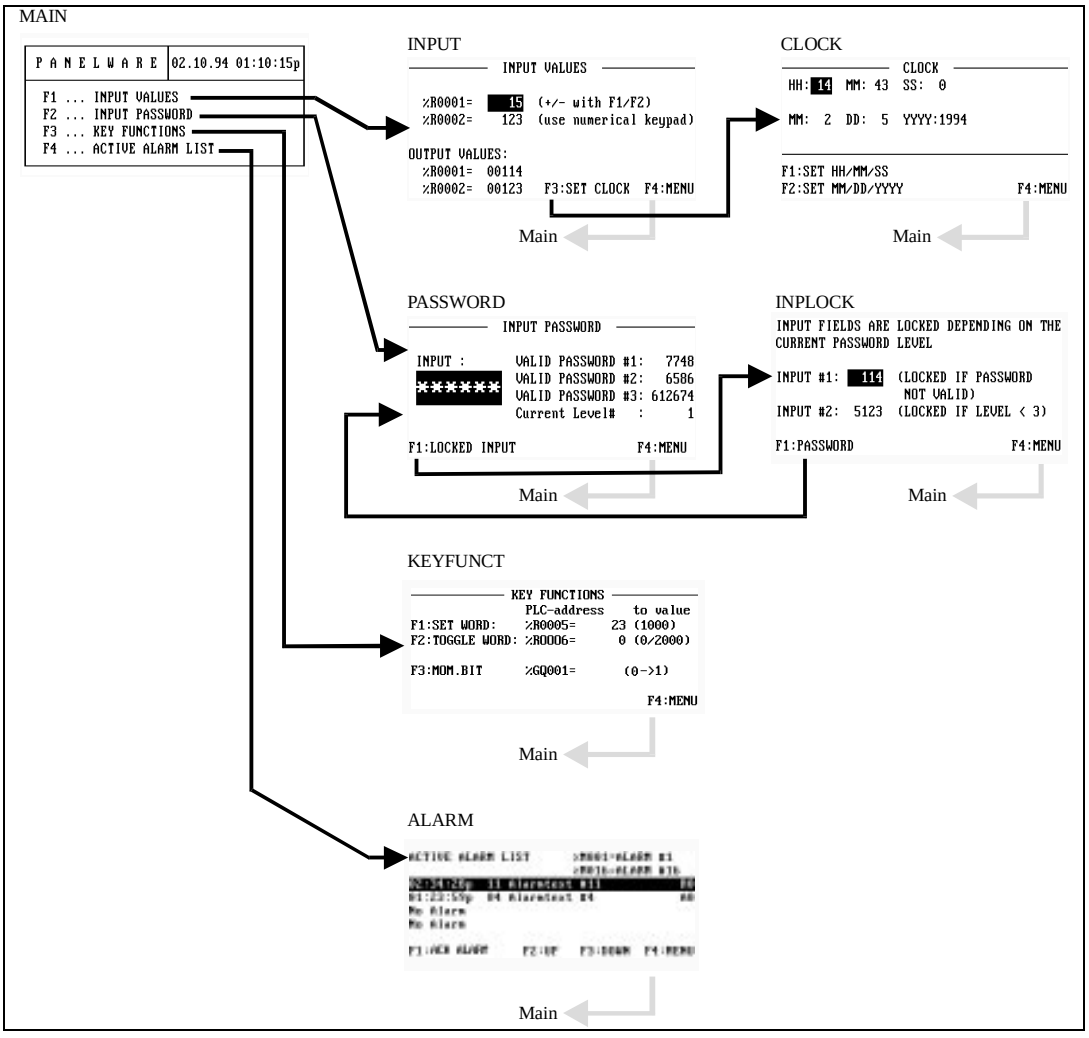
Before you create a new project with PCS, you should form a concept based on the following information:

- What information should be displayed?
- What do you need to enter using the Keyblocks?

For modular PANELWARE Panels, the first two questions will help you determine the type of Display and number of Keyblock modules required.

- How many pictures do you need and how do you need to branch from one picture to another?
- Which memory locations in the PLC are to be accessed? (Make a list of the variables required for every picture.)

The branching structure of the demo project that is described looks like the following diagram. The picture names are on the upper left of each picture. The pictures are stored on your computer's hard drive under these names, with an extension of **`.BIL`**.

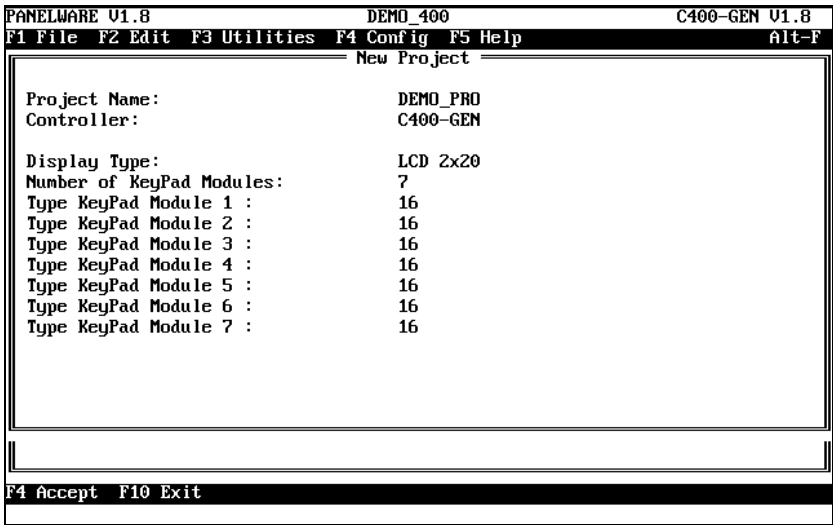


Creating a New Project

A new project is created by selecting the **New Project** option from the **File** menu. Before you execute this function you should know exactly what Panel components will be used .

Carry out the following steps:

- Select the **New Project** option from the **File** menu. The **New Project** window appears on the screen.
- Enter the project name ***DEMO_PRO*** and confirm your entry by pressing ↵ (Enter), which will also move the cursor to the next line.
- Press ↵ again to open a selection window in which you can select the C400 Panel Controller.
- Press ↵. PCS displays the hardware definition:



- Press ↵ in the **Display Type** line and another selection window appears in which the LCD 8x40 display module can be selected.
- Now, enter the number of desired Keyblock modules (***2***). The entry must be confirmed with ↵. This also moves the cursor to the next line.
- The cursor is now in the **Type Keyblock Module 1** line. By pressing the ↵ key, a selection window appears containing all of the possible types of Keyblocks. Select the desired Keyblock module for the first position and confirm the entry with ↵.
- Repeat step 7 until all Keyblock modules that you require are defined. In the demo project, the following types are required for the first two Keyblock modules:

Type Keyblock Module 1	12+4
Type Keyblock Module 2	16

- If all of the entries that are required have been defined, you can confirm the whole definition by pressing the **F4 Accept** key, which closes and saves the hardware definition. The window is closed and the main menu appears. At the top of the screen, the project name **DEMO_PRO** is displayed. If, instead of **F4**, either the **Esc** or **F10 Exit** key is pressed, all entries are disregarded and none are saved.

Note

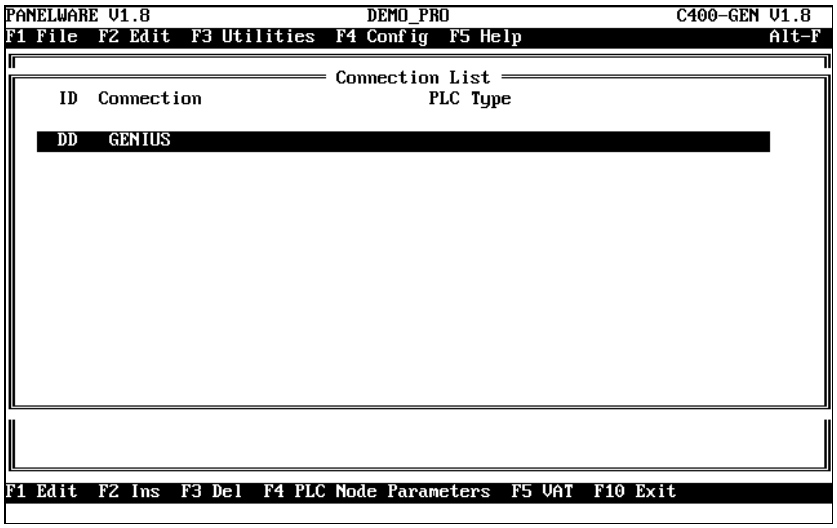
Further information on the use of the project editor can be found in chapter 4 of the *PANELWARE™ Software Configuration Reference Manual*.

Selecting the Connections

Every PLC that is connected with a modular PANELWARE Panel must be defined in the connection list. Each connection has a separate list, called the Variable Assignment Table (VAT). The VAT contains all variables that are used in the project and their assignments to physical PLC addresses.

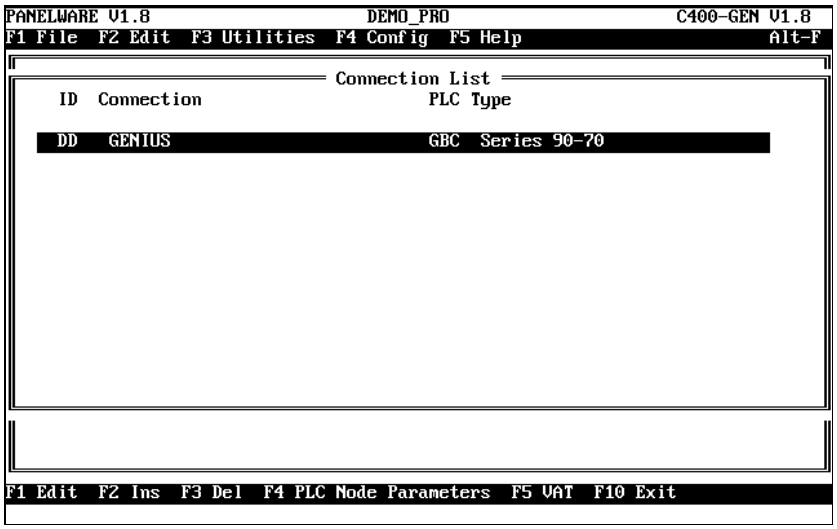
Execute the following steps to define the connections used in the demo:

1. Select the **Connection** function from the **Edit** menu. The **Connection List** window appears. The connections that are already defined are shown in this list. The connection with the ID **DD** is automatically inserted when a new project is created.



2. Edit the default connection DD Genius.

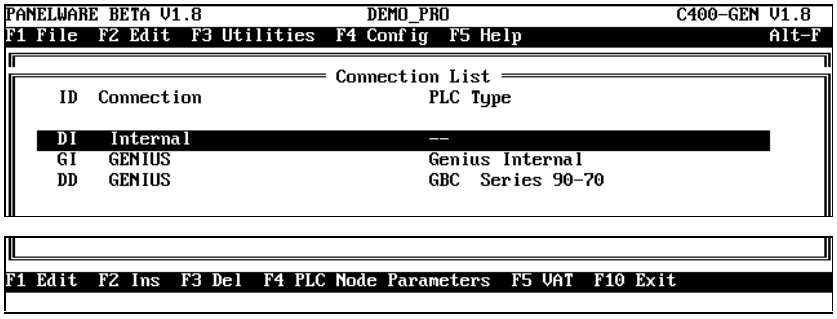
- Press **F1 Edit**.
- Specify the GBC type corresponding to your PLC (90-70 in this example).



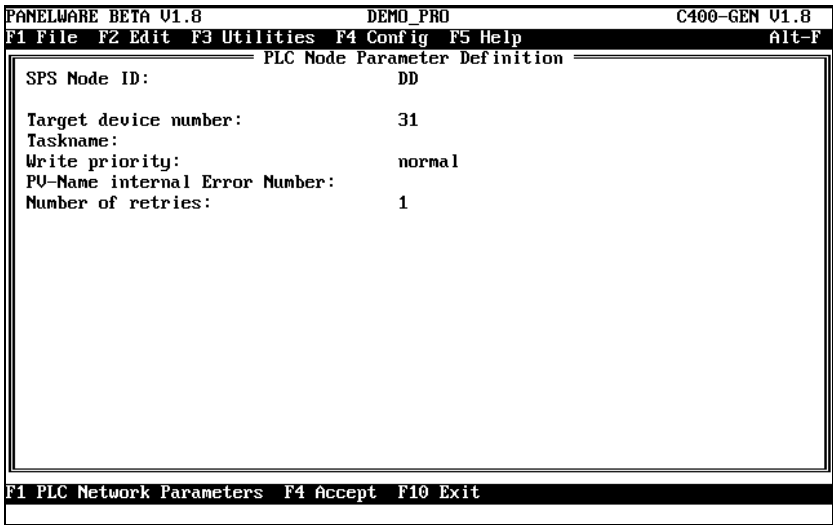
- Press **F4 Accept**, to confirm your changes. The connection list is displayed with the changed default connection.

3. Insert the additional connections that are required for your project (define ID and connection).

- Press **F2 Ins** and insert a **Genius Internal** connection with the ID, **GI**.
- Press **F4 Accept** to confirm the entry.
- Press **F2 Ins** and insert an Internal connection with the ID, ***DI***.
- Press **F4 Accept** to confirm the entry. The connection list is displayed with the connections that you have added:

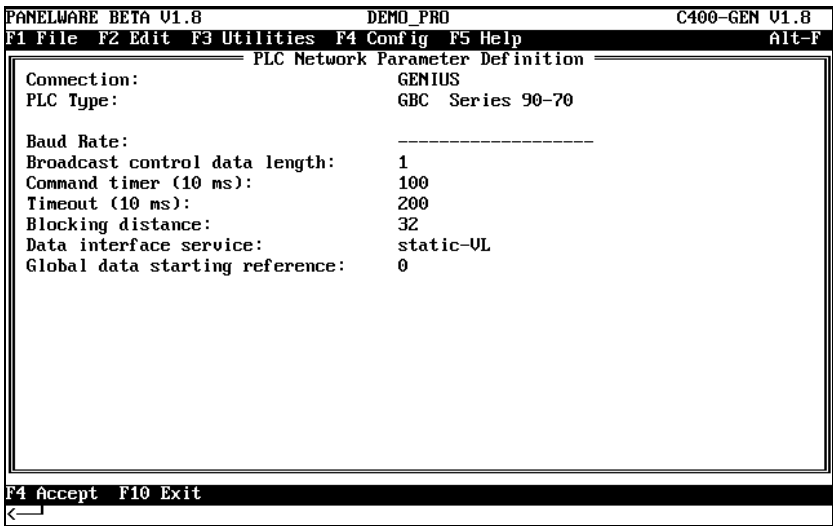


4. Select the connection **DD Genius** from the connection list with the cursor keys and then press **F4 PLC Node Parameters**. The standard protocol parameters can be seen in the following screen:



The standard definitions for the parameters shown above can be used as they are for our demo project, with the exception of the target device number. Enter the Genius serial bus address of your GBC (typically 31) and press **F4 Accept**. For the specific meanings of the protocol parameters and the PLC configuration, see "Configuring Communication with the PLC" in chapter 4.

5. From the **PLC Node Parameters Definition** screen, press **F1** to display the **PLC Network Parameters Definition** screen.

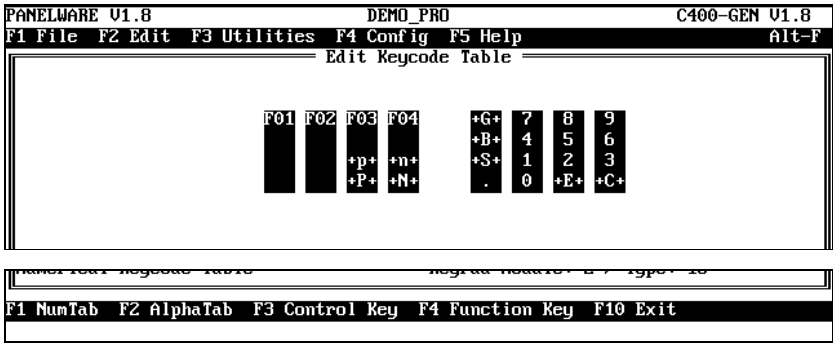


All fields can be left at their default settings for this demo project, with the exception of the **Broadcast control data length**. Change it to ***1***, and press **F4 Accept**.

5. 6. Close the **Connection List** window by pressing **F10 Exit**.

Defining Key Assignments

1. Select the **Keyboard** function from the **Edit** menu.



2. Define function keys **F5**–**F8** now. This is started by moving the cursor to the respective key.
3. Press **F4**. A small window appears in the lower right-hand corner of the screen, in which the function number of the key can be entered (e.g.: ***5***).
4. Confirm the entry by pressing ↵. The respective key assignment is then indicated by **F05**. The key assignments should now look like this:

5. It is not necessary to define control keys for this demo project the default definitions will be used.
6. Leave the **Edit Keyboard Table** window by pressing **F10 Exit**.

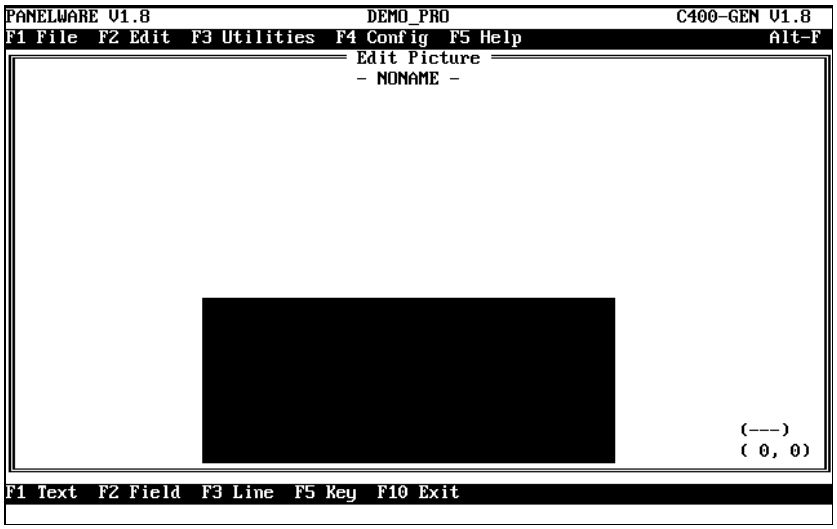
Creating the Pictures

The picture is the basis of a Panel project. Pictures consist of text, lines, fields, key functions and LED functions. These elements can be divided into two groups. There are static elements such as text and lines or dynamic elements like input and output fields. (Lines can only be inserted in a picture if a graphic display has been selected in the project definition.)

- Text and lines make up the *Mask*.
- Fields are defined for user entries and for displaying values from the PLC. Output fields can be used to display information such as temperature and RPM. Input fields can be used to enter values to be sent to the PLC.

The number of fields, keys and LED functions that can be used in a picture depends on the Panel used (see Appendix A in the *PANELWARE™ Configuration Software Reference Manual* – GFK-0849).

If the main menu is active, you can use the **Picture** option from the **Edit** menu or use the key combination **Ctrl** + **B** to access the picture editor.

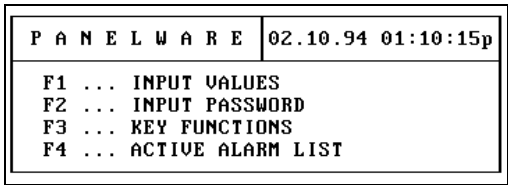


The size of the rectangle corresponds to the selected display type (in this case, display type LCD 8x40 is shown); i.e., the rectangle consists of 8 lines and 40 columns (characters per line). Text or fields can be inserted into the rectangle.

Press **F10 Exit** or the **Esc** key can be used to close the picture editor. If the picture is not yet saved, (in this case having the name, NONAME) or the picture has been changed, PCS asks whether the picture should be saved or not.

More information about the picture editor can be found in chapter 5 of the *PANELWARE™ Configuration Software Reference Manual* (GFK-0849).

MAIN Picture (Main Menu)

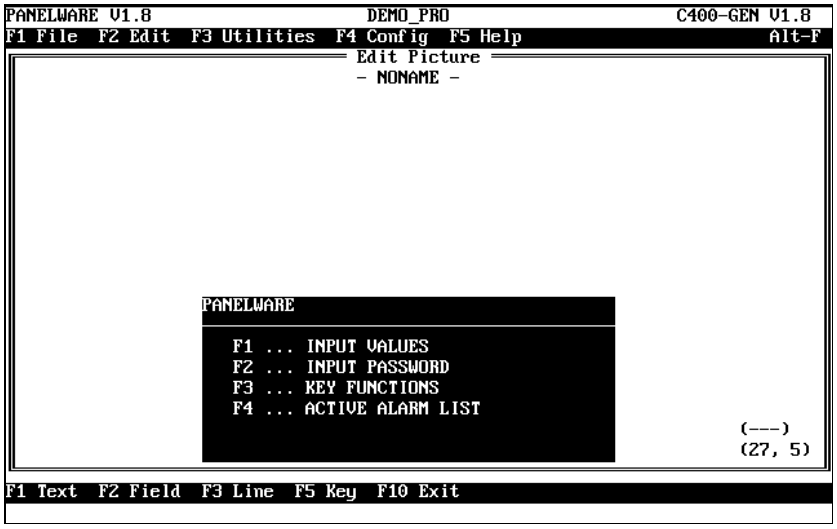


No data from the PLC is shown in this picture. The date and time are taken from the internal real-time clock in the Panel.

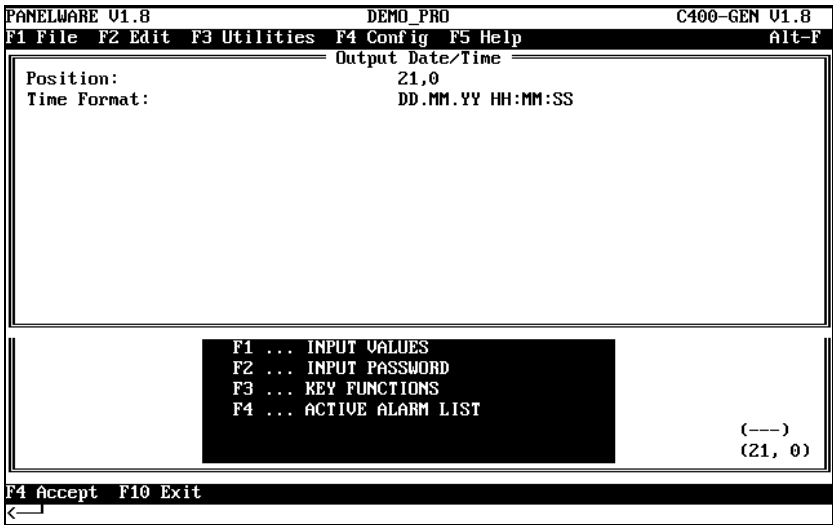
Text is also displayed informing the user of the function keys that can be used for switching to the next pictures. Assigning the function keys to their actual functions is done in the project editor.

To create this picture follow these steps:

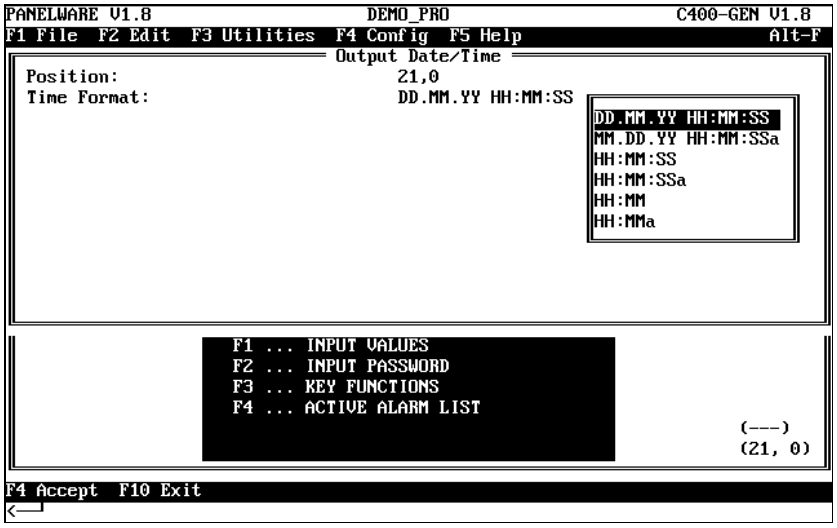
1. Open the picture editor from the main menu with key combination **Ctrl** + **B** (see “Creating the Pictures”).
2. Insert all lines and text in the rectangle so that it looks like the one below:



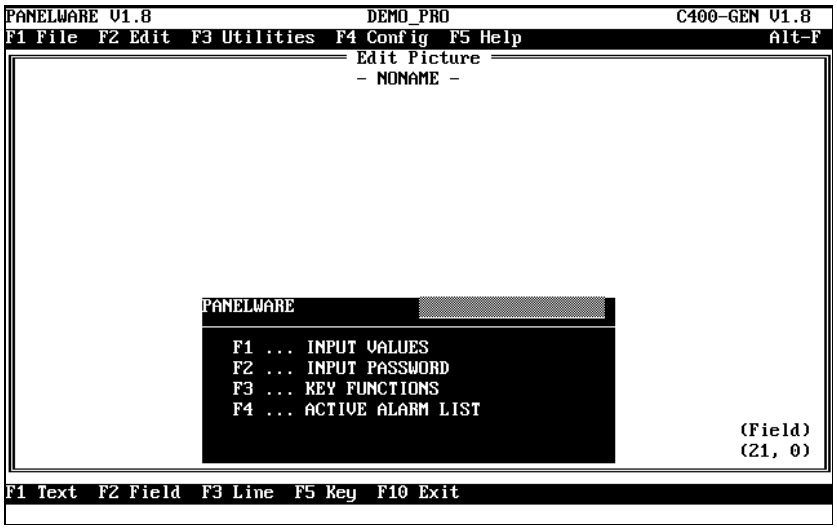
3. Move the cursor to position (21,0). The cursor position is indicated in the lower right-hand corner of the window, as (column, row).
4. Insert a field for displaying the date and time:
   - Press F2 Field.
   - Select the entry Output Field from the Field Class selection window and then press the ↵ key.
   - Select the Output Date/Time output field from the Select Field Type selection window. The following window will appear:



- Press ↵ to open a selection window where you can define the output format. Select the desired format from the window:

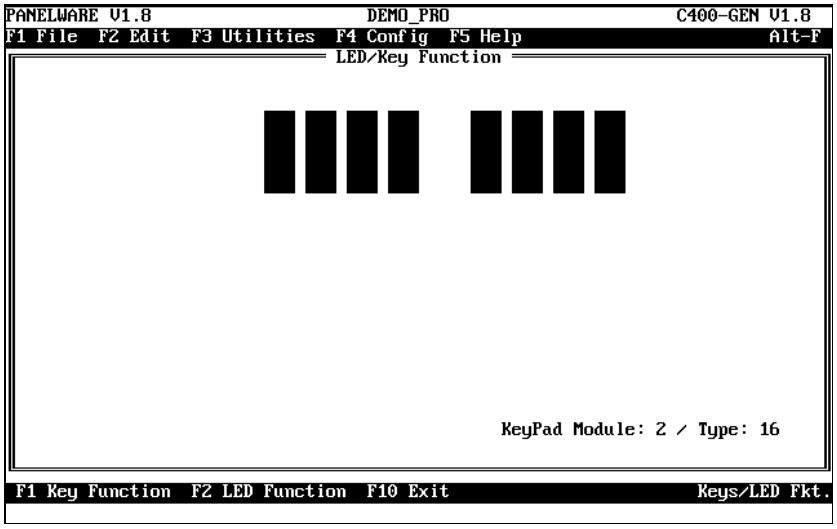


- Confirm the selection with ↵.
- Confirm the entered field parameters with **F4 Accept**.
- The output field **Date/Time** is inserted in the picture:

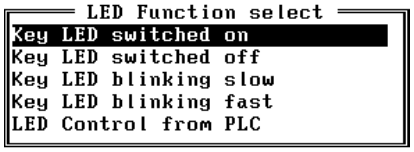


5. The next step is to define the LED functions. The key LEDs of function keys F1 to F4 should light up if the main menu is on the display.

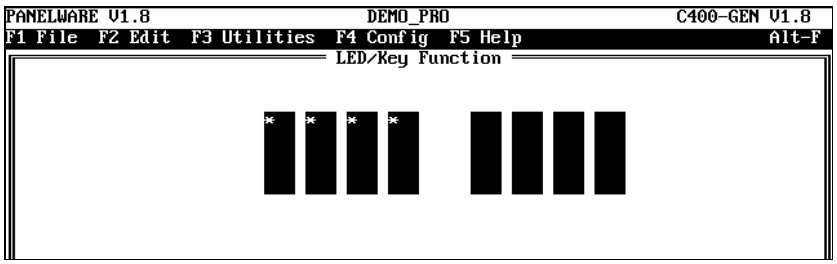
   - Press **F5 Key**. All Keyblock modules that are defined in the project are displayed:



The top four keys of the left-hand Keyblock module are defined as function keys F1 to F4 (see “Defining Key Assignments”).

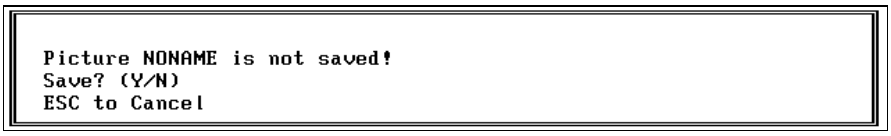


- Move the cursor to the upper left-most key of Keyblock module (left-most module). Press **F2 LED Function**. All LED functions are offered in the next window.
- Select the function **Key LED switched on** and press ↵. A window appears in which the selected LED function is displayed again. Confirm your selection now with the **F4 Accept** function key. The LED function is inserted and indicated with a ***** character.
- Move the cursor to the next key to be assigned with an LED function. Execute these steps again for function keys F2 to F4. The following picture should be seen on the screen:

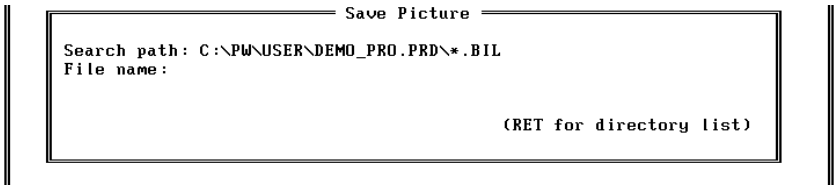


- Now press the **F4 Accept** key to confirm your entries. The picture editor appears again.

6. The picture that you have created is not saved yet. Pressing the **Esc** key or the **F10 Exit** function key calls the following message:



- If the **N** key is pressed the entire picture is **discarded and not saved**. When you press **Esc,** the picture is not saved. The definition is not lost however. You can return to editing the picture. Pressing the **Y** key opens a window in which you can enter a name for the picture:

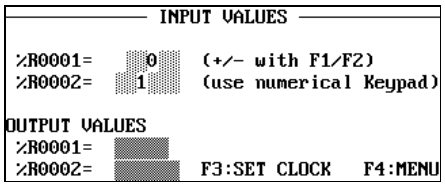


- Give the picture the file name MAIN and confirm your entry with ↵. The picture is then saved together with the LED functions and the main menu appears on your screen again.

7. If you want to call up the same picture again for further editing, follow these steps:

   - While the main menu is on the screen, press key combination **Ctrl** + **B** or select the **Picture** function from the **Edit** pulldown menu. The picture editor is called.
   - Now press **Ctrl** + **L** or select the **Load** function from the **File** pulldown menu to load a picture into the picture editor.
   - Enter the name ***MAIN*** in the **Load Picture** window that appears now and press the ↵ key to load the picture.
   - Instead of entering the picture name directly with the keyboard, you can also call up a selection window with a list of all pictures in the project by pressing the ↵ key when you would normally type in the picture name. By moving the cursor to the desired picture name and pressing the ↵ key twice, the respective picture is loaded into the picture editor.
   - As soon as the picture has been loaded, it can be edited.

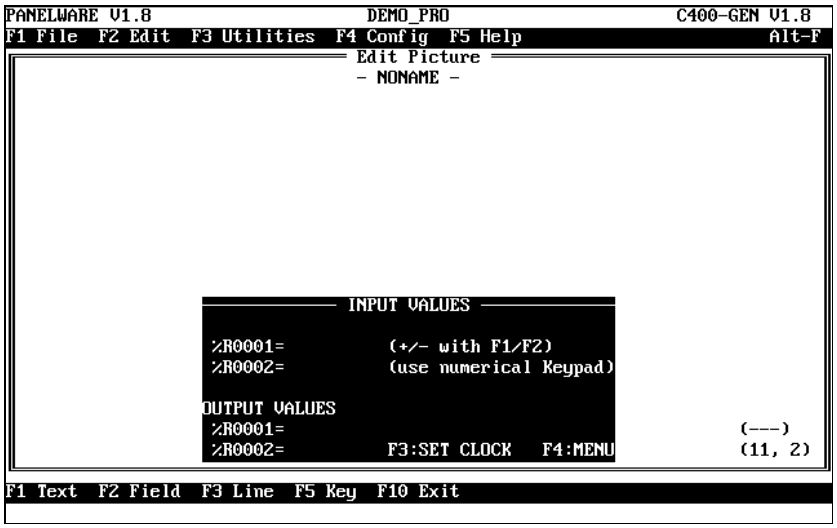
INPUT Picture (Value Entries)



Input and output fields are demonstrated in this picture. By pressing the F1 and F2 keys, the value changes in steps in the first input field. The active input field is displayed inversely in a running project. You can switch between the two input fields by pressing **+p+** and **+n+** (see “Defining Key Assignments”).

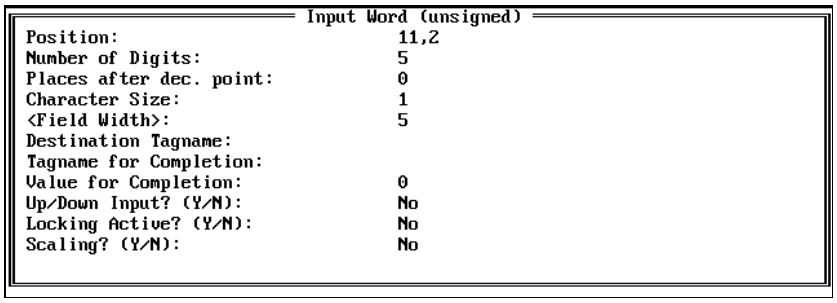
Follow these steps to create the picture:

1. Call the picture editor from the main menu with key combination **Ctrl** + **B** (see above “Creating the Pictures”).
2. Insert all lines and text so that your picture looks like this:

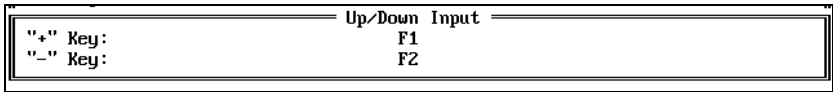


3. Insert an input field that increments/decrements using keys F1 and F2, respectively. Follow these steps:

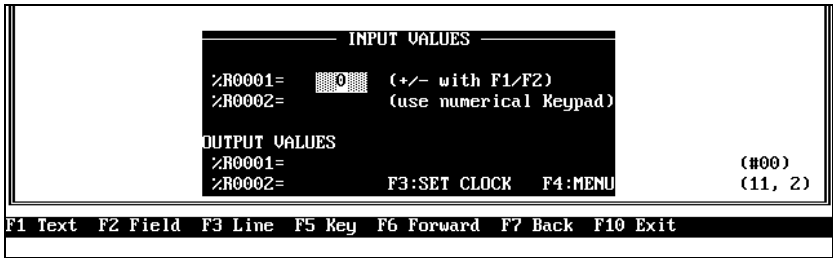
   - Position the cursor at (11,2).
   - Press **F2 Field**.
   - Select **Input Field** from the **Field Class** selection window and press the ↵ key.
   - Select the input field **Input Word (unsigned)** from the **Select Field Type**, which will bring a parameter definition window onto the screen for entering or changing the parameters of the input field:



   - Enter ***INP_WORD*** as the **Destination Tagname** and confirm the entry with ↵. The declaration of this address is done collectively in the connection editor.
   - Move the cursor to the *Up/Down Input* line. press the **Y** and then ↵, to define the field as an up/down input.
   - Now, press **F1 Up/Down Input**. The following window appears:



   - In the window shown above, the **F1** function key is defined as the key for incrementing the value (F key +) and **F2** for decrementing (F key -).
   - Press **F4 Accept** to confirm the definition and to close the **Up/Down Input** window.
   - Now, press the **F4** key again to confirm your entries and to close the **Input Word (unsigned)** window. The input field is shown on the screen:

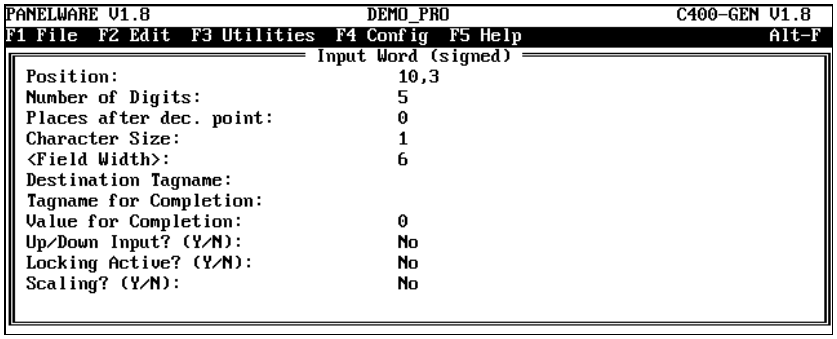


Tip

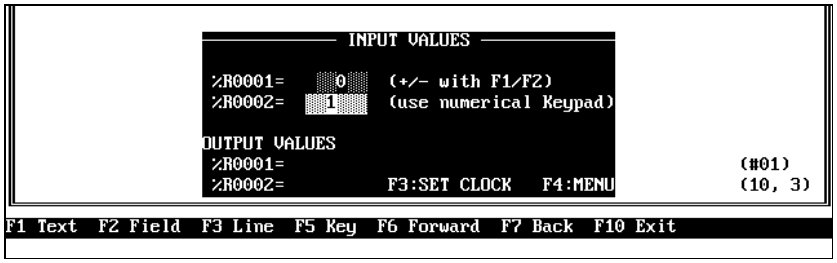
If the field ends up in the wrong position in your picture, you can easily move it. First, move the cursor into the field. With key combination **Ctrl** + **Cursor** key, the field can be moved to the desired position.

4. Now, insert an input field into the picture in which a value — data format: Word (signed) — can be entered directly through the Panel Keyblock. This is done as follows:

   - Position the cursor at (10,3).
   - Press **F2 Field**.
   - Select the **Input Field** option from the **Field Class** window and then press the ↵ key.
   - From the **Select Field Type** window, choose the **Input Word (signed)** option, which opens a window for defining the parameters for the selected input field:

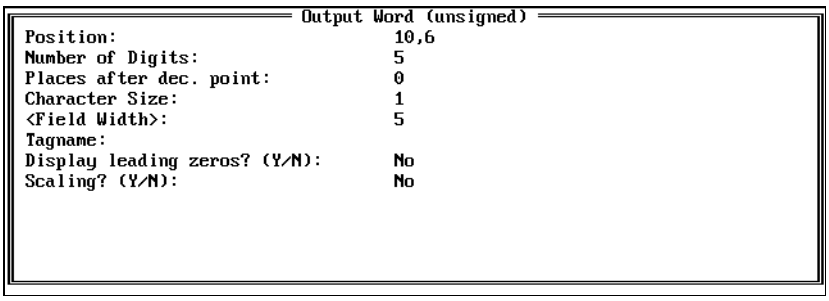


   - Enter ***INP_INT*** as the **Destination Tagname** and confirm the entry by pressing ↵. The declaration of this address is done collectively for all variables in the connection editor.
   - Do not change any more parameters. End the definition with **F4 Accept**. The **Input Word (signed)** window is closed. The input field can now be seen in the picture:

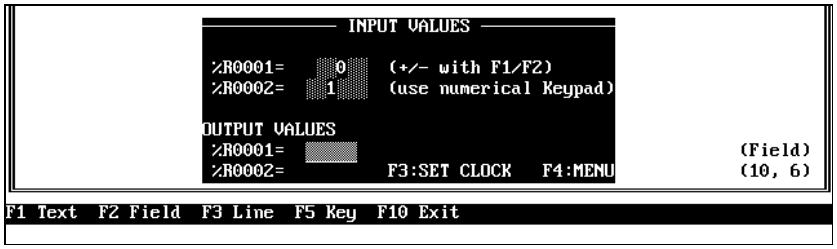


5. Insert an output field that will display the value that is entered in the first input field, into the picture. This is done as follows:

   - Position the cursor at (11,6).
   - Press **F2 Field**.
   - Select the **Output Field** from the **Field Class** window and press the ↵ key.
   - Select the **Output Word (unsigned)** from **Select Field Type**, which opens the window in which the parameters for the selected input field can be entered/changed:

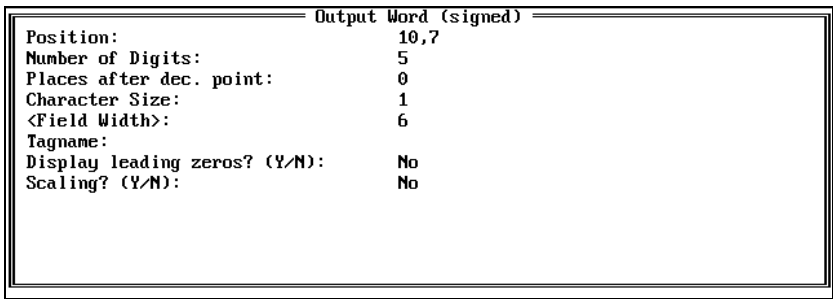


   - Enter ***OUT_WORD*** as the **Destination Tagname** and confirm the entry by pressing ↵. The declaration of this address is done collectively for all variables in the connection editor (see "Editing the Connections" in this chapter).
   - To display preceding zeros, move the cursor to the **Display leading zeros** line and enter ***Y*** followed by ↵ to activate the leading zeros display.
   - End the definition with **F4 Accept**. The **Output Word (unsigned)** window is closed. The output field is displayed again:

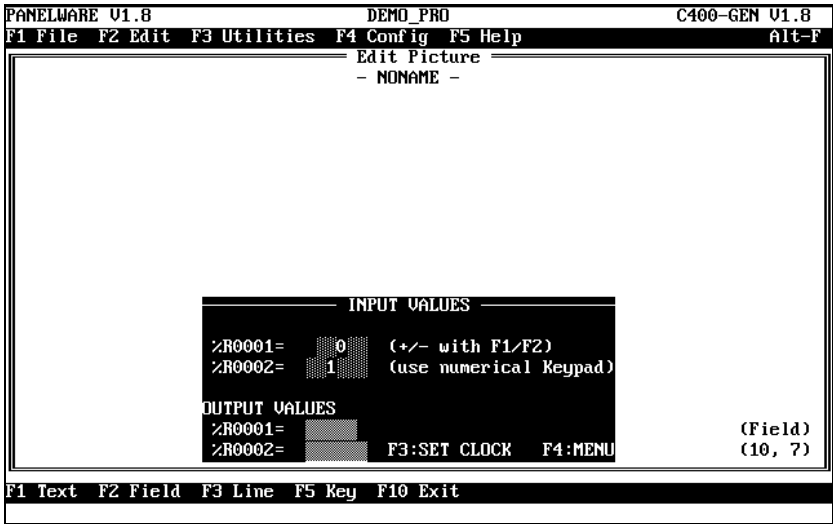


6. Insert an output field into the picture. The value that is entered in the second input field will be displayed in this output field. This is done as follows:

   - Position the cursor at (10,7).
   - Press **F2 Field**.
   - Select the **Output Field** entry from the **Field class** window and press the ↵ key.
   - Select the entry **Output Word (signed)** from **Select field type** window. This opens a window in which you can enter or change the parameters for the selected input field:



   - Now, enter ***OUT_INT*** as the **Destination Tagname** and confirm your entry with ↵.The declaration of this address is done along with all other variables in the connection editor (see “Connections” in this chapter).
   - In order to display preceding zeros, move the cursor to the **Display leading zeros** line. Enter ***Y*** and then ↵ to activate the preceding zero display.
   - End the entry with **F4 Accept**. The window **Output Word (signed**) is closed. The output field is then seen in the picture:



7. Next, the LED functions must be defined.

   - Function keys F1 and F2 should be assigned LED function **Key LED blinking slow.** The value in the first input field (see step 3) can be changed in steps with these keys.
   - Function keys F3 and F4 should be assigned LED function **Key LED switched on**. These keys switch to other pictures.
   - For the description of how to assign an LED function to a key, see step 5 under "Main Picture" on page 6-26.

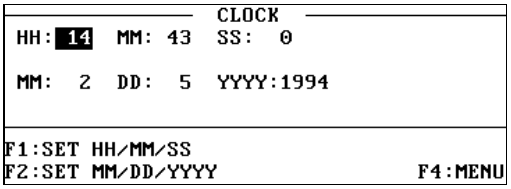
8. Save this picture under the name **INPUT**:

   - Press **Esc** or **F10 Exit**.
   - PCS warns you that the picture is not yet saved.
   - Enter ***Y*** to save the picture.

Enter picture name ***INPUT*** in the **Save Picture** window and press the ↵ key. The picture is then saved and the main menu appears again.

CLOCK Picture (Setting the Real Time Clock)

The date and time of the internal real time clock can be set in this picture. By pressing keys on the Panel, the date and the time are entered in input fields on the Panel display. The real time clock however, is only set when function key **F1** (SET HH/MM/SS) or **F2** (SET MM/DD/YYYY) is pressed.



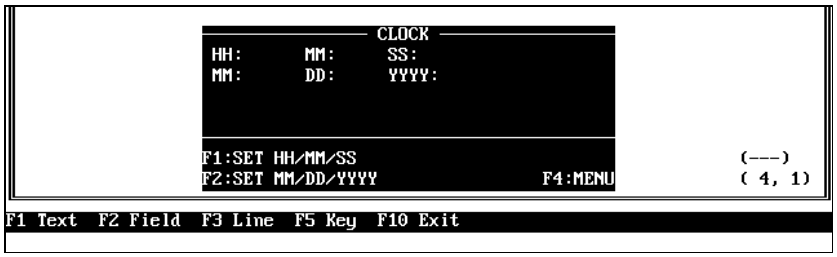
To set the real time clock on the PANELWARE Panel, internal variables are used. The following table lists these variables and their functions:

Variable name	Data type	Description
DATE_YY_S	Word unsigned	Year (Format **19xx**)
DATE_MM_S	Byte unsigned	Month
DATE_DD_S	Byte unsigned	Day
TIME_HH_S	Byte unsigned	Hours
TIME_MM_S	Byte unsigned	Minutes
TIME_SS_S	Byte unsigned	Seconds
DATE_SET	Byte unsigned	By writing a non-zero value to this variable, the date of the real time clock is overwritten with the values of variables DATE_YY_S, DATE_MM_S and DATE_DD_S.
TIME_SET	Byte unsigned	By writing a non-zero value to this variable, the real time clock is overwritten with the values of variables TIME_HH_S, TIME_MM_S and TIME_SS_S.

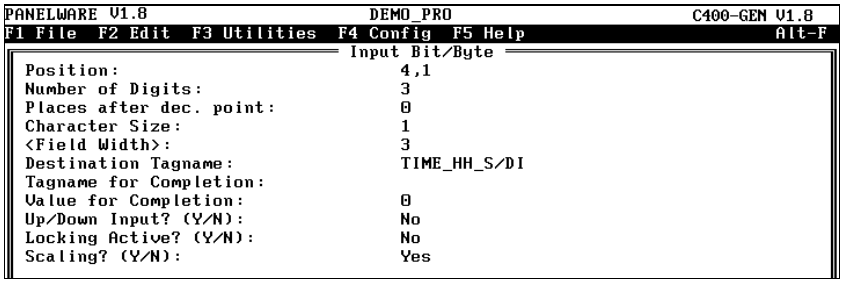
The input fields are scaled, limiting the entry to a valid range for time and date values. Date and time are set through key functions.

Follow these steps to create this picture:

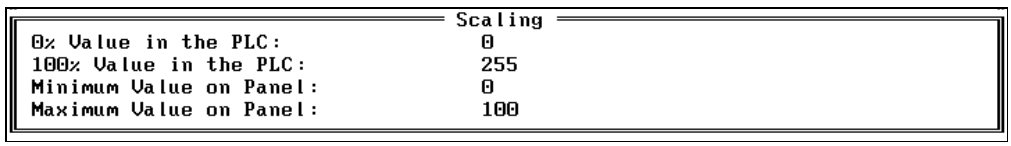
1. Open the picture editor from the main menu with key combination **Ctrl** + **B**.
2. Insert all lines and text so that your picture looks like this:



3. Insert a scaled input field for the **Hours (HH)** entry in the picture. Follow these steps:
   - Position the cursor at (4,1).
   - Press **F2 Field**.
   - Select the entry **Input Field** from the **Field class** selection window and then press the ↵ key.
   - Select the **Input Bit/Byte** input field from the **Select field type**. Bit/Byte must be selected because the internal variable TIME_HH_S is of data type **Byte unsigned** (data types of the field and the internal variable must be the same). The window in which the parameters for the selected input field can be entered or changed is displayed:



   - Enter ***2*** in the **Number of Digits** line and press the ↵ key.
   - Enter ***TIME_HH_S/DI*** as the **Destination Tagname** and confirm the entry with ↵. In order to inform PCS that the entered variable is an internal variable, the connection ID, **DI** must be supplied, separated by a / character. Any lower case characters are automatically converted to upper case.
   - Move the cursor into the **Scaling** line. Enter ***Y*** and then press ↵, to activate the scaling for this field.
   - Now press **F3 Scaling**. The following window appears:



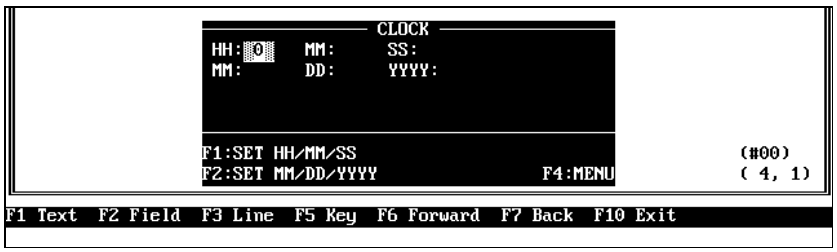
- To achieve a limit on the entry between 0 and 23, the scaling parameters are changed as follows:

  0% Value in the PLC:..... 0
  100% Value in the PLC:..... 23
  Minimum Value on Panel:..... 0
  Maximum Value on Panel: 23

  Setting the scaling parameters to these values stops any entries outside of the range from 0 to 23.

- Press the **F4 Accept** key to confirm the entry and to close the **Scaling** window.

- Press the **F4 Accept** key to confirm the field parameters and to close the **Input Bit/Byte** window. The input field for the **Hours (HH)** is shown in the picture:



4. Insert the input fields for minutes (MM:), seconds (SS:), month (MM:), Day (DD:), and Year (YYYY:) into the picture. Use the input field **Input Bit/Byte**, for all but the **Year** field, which must be Input Word Unsigned. Basically these fields are inserted the same as the input field for hours. The table below shows the field parameters and the scaling parameters for each of the input fields:

Field No. (see figure on page 6-37)		Field or Scaling parameters	
0	HH (Hours)	**Field parameters:**	
		Position:	4,1
		Number of Digits:	2
		Places after dec. point:	0
		Character size:	1
		Field size:	3
		Destination Tagname:	TIME_HH_S/DI
		Tagname for Completion:	
		Value for Completion:	0
		Up/Down Input? (Y/N):	No
		Locking Active? (Y/N):	No
		Scaling? (Y/N):	Yes
		Scaling parameters:	
		0% Value in the PLC:	0
		100% Value in the PLC:	23
		Minimum Value on Panel:	0
		Maximum Value on Panel:	23
1	MM (Minutes)	**Field parameters:**	
		Position:	12,1
		Destination Tagname:	TIME_MM_S/DI
		Remaining Parameters	*Identical to field 0*
		Scaling parameters:	
		0% Value in the PLC:	0
		100% Value in the PLC:	59
		Minimum Value on Panel:	0
		Maximum Value on Panel:	59
2	SS (Seconds)	**Field parameters:**	
		Position:	20,1
		Destination Tagname:	TIME_SS_S/DI
		Remaining Parameters	*Identical to field 0*
		Scaling parameters:	
		0% Value in the PLC:	0
		100% Value in the PLC:	59
		Minimum Value on Panel:	0
		Maximum Value on Panel:	59
3	MM (Month)	**Field parameters:**	
		Position:	4,3
		Destination Tagname:	DATE_MM_S/DI
		Remaining Parameters	*Identical to field 0*
		Scaling parameters:	
		0% Value in the PLC:	1
		100% Value in the PLC:	12
		Minimum Value on Panel:	1
		Maximum Value on Panel:	12
4	DD (Day)	**Field parameters:**	
		Position:	12,3
		Destination Tagname:	DATE_DD_S/DI
		Remaining Parameters	*Identical to field 0*
		Scaling parameters:	
		0% Value in the PLC:	1
		100% Value in the PLC:	31
		Minimum Value on Panel:	1
		Maximum Value on Panel:	31

After all fields have been entered, the screen will look as follows (the field numbers in the picture correspond to the numbers in the table on page 6-36):

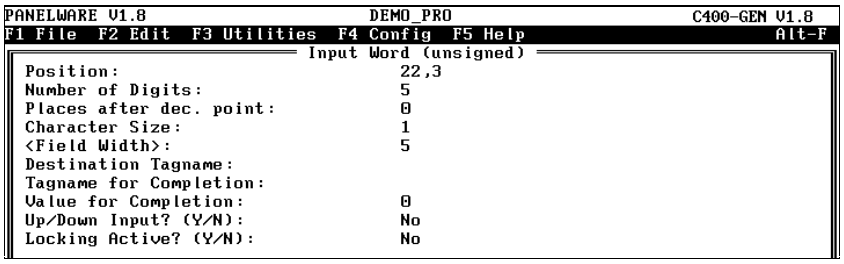
When the project is running, you can switch to the previous picture or the next picture by pressing the **+p+** key or the **+n+** key respectively (see “Defining Key Assignments”). The numbering shown in the picture above represents the sequence that the pictures are in.

Tip

This sequence can be changed. Move the cursor into an input field. With function keys **F6 Forward** and **F7 Back** you can change the number of the selected picture in the sequence.

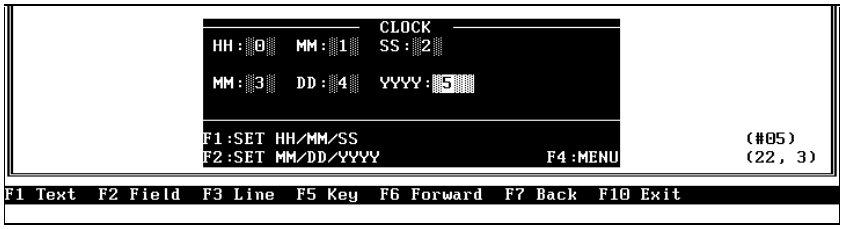
5. Insert the input field for the year (YYYY:) into the picture.

   - Move the cursor to the position in which the field should be inserted and press **F2 Field**.
   - Select the **Input Field** entry from selection window **Field class** and then press the ↵ key.
   - Select the **Input Word (unsigned)** input field from the **Select field type** selection window. You must select this field because the internal variable DATE_YY_S has data type **Word unsigned** (data type of the field and the internal variable must be the same). The window in which the parameters for the selected input field can be entered/changed appears:



   - Enter ***4*** in the **Number of Digits** line and then press ↵.
   - Enter ***DATE_YY_S/DI*** as the **Destination Tagname** and confirm the entry with the ↵ key. In order to inform PCS that the entered variable is an internal variable, the connection ID , **DI** is separated from the rest by a / character. Any lower case characters are automatically converted into upper case characters.

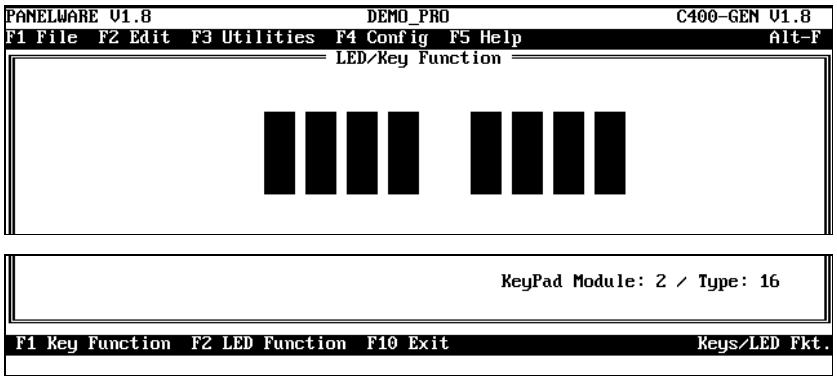
- Press **F4** to confirm the field parameters and to close the **Input Word (unsigned)**. The input field for the **Year (YYYY)** is displayed in the picture:



6. Next, the key functions must be defined. By pressing **F1** or **F2**, the internal variable TIME_SET or DATE_SET is written to with value 1 to set the time or date of the real time clock with the entered values.

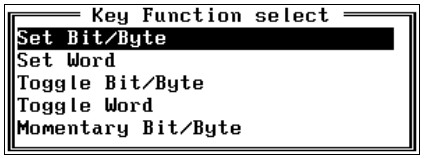
   While a project is running, pressing a key that has an assigned function writes a predefined value to a certain memory location (in the PLC or Panel).

   - Press the **F5 Key** function key. All Keyblock modules in the project are shown:



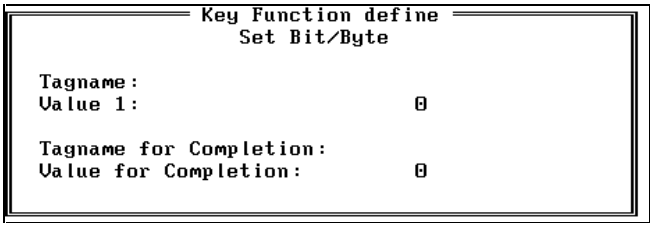
   The four upper keys of the left-hand Keyblock module are defined as function keys F1 to F4 (see page 6-22).

   - Move the cursor to the top left-hand key of Keyblock module 2 (Left module). Press **F1 Key Function**. All key functions can be seen in the following window:

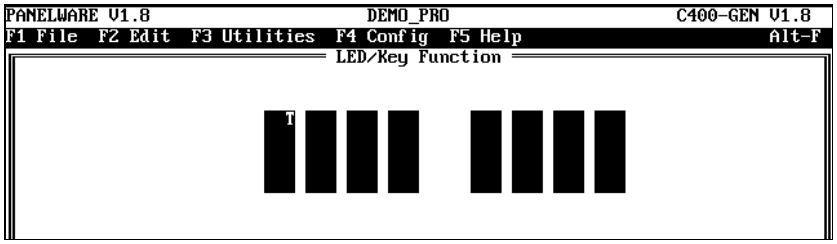


   - Select the function **Set Bit/Byte** (the internal variable has data type **Byte unsigned**) and press ↵. The PLC address and the value that is to be transmitted to the PLC should be entered in the window that appears.

   - Enter ***TIME_SET/DI*** for the **Tagname** and press the ↵ key. Enter ***1*** in the **Value 1** line and press ↵.



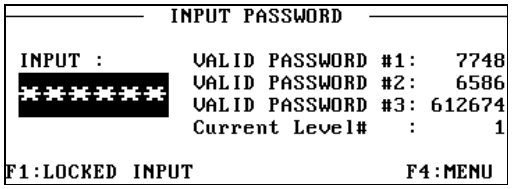
- Confirm your entry with **F4 Accept**. The key function is inserted and indicated by the character **T**:



- Move the cursor to key F2 now. Perform those steps described again. Enter ***DATE_SET/DI*** for the Tagname and a **1** again for the **Value 1**.
- Press **F4 Accept** to confirm and save this entry and then press **F10** to close the **LED/Key Functions** window. The main PCS menu appears again.

7. Now, the LED functions have to be defined.
   - Function keys F1, F2 and F4 are all assigned LED function **Key-LED switched on**.
   - A description of LED function assignments for the individual keys can be found in step 5 under “Main Picture” (see page 6-26)
8. Save the picture under the name ***CLOCK***:
   - Press **Esc** or **F10 Exit**.
   - PCS warns you that the picture is not yet saved.
   - To save the picture, enter ***Y***.
   - Enter the name ***CLOCK*** in the **Save Picture** window and press the ↵ key. The picture is saved and the main menu appears again.

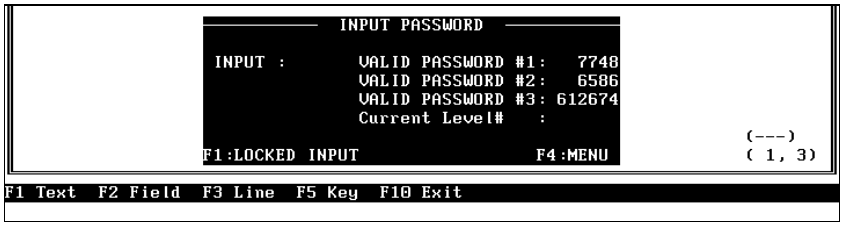
PASSWORD Picture (Password Entry)



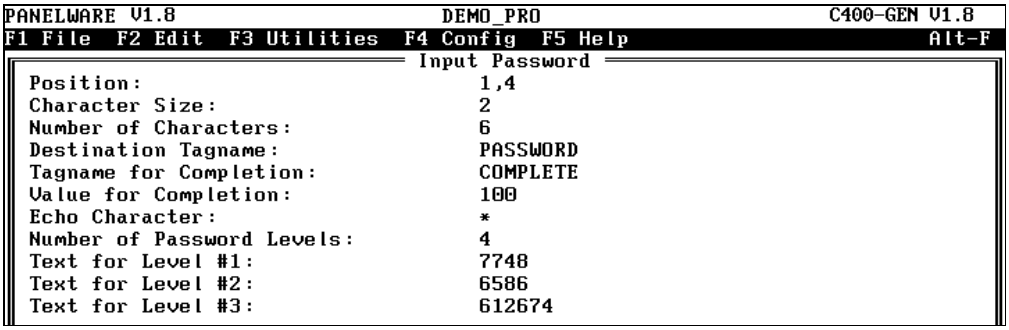
A password can be entered in this picture. The input will be compared with three valid passwords, each of which each corresponds to a different level of access. The current password level is also displayed. If an invalid password is entered, the user only has access to password level 0. The method of password level evaluation is shown by means of the next picture (INPLOCK).

Execute the following steps to create this picture:

1. Call the picture editor from the main menu with key combination **Ctrl** + **B** (see page 6-23).
2. Insert all lines and text into the rectangle so that your picture looks like this:



3. Now enter an input field for the password entry into the picture. Follow these steps:
   - Position the cursor at (1,4).
   - Press **F2 Field**.
   - Select the **Input Field** entry from the **Field class** selection window and then press the ↵ key.
   - Select the **Input Password** input field from the **Select field type** selection window. The window in which the parameters for the selected input field can be entered or changed is displayed:



- Enter the following parameters for the password input field:

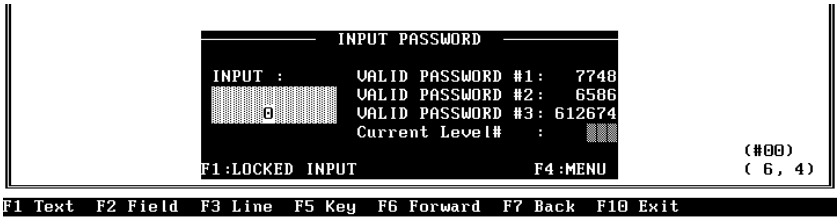
  Character Size:..... ***2***
  Number of Digits: ***6***
  Destination Tagname: ..... ***PASSWORD***
  Tagname for Completion: ..... ***COMPLETE***
  Value for Completion:..... ***100***
  Echo Character: ..... *******
  Number of Password Levels: ***4***
  Password for Level #1:..... ***7748***
  Password for Level #2:..... ***6586***
  Password for Level #3:..... ***612674***

  For *Number of Password Levels*, 0 also counts as a level. (0= no/wrong password.)

Tip

Instead of defining a number combination, as was used in the demo project, you can define a password from any combination of letters, numbers and/or other characters.

- Press **F4 Accept** after the parameters have been entered. The input field for the password is inserted into the picture:



4. Insert the output field for the active password level in cursor position (37,5). Output field **Output Bit/Byte**

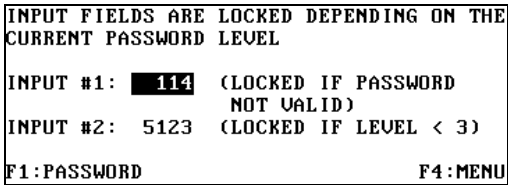
   Position:.....37,5
   Number of Digits: 3
   Places after dec. point: 0
   Character Size:.....1
   Field Width:.....3
   Tagname:.....PASSWORD
   Display leading zeros? (Y/N): .....No
   Scaling? (Y/N):.....No

5. The next step is to define the LED functions.

   - Function keys F1 and F4 will be assigned LED function **Key LED Switched on**. These keys are used to switch to another picture.
   - The method used in assigning LED functions to certain keys is described in step 5 under the “Main Picture” on page 6-26.

6. Save the picture under the name **PASSWORD**.

INPLOCK Picture (password protected entry of values)



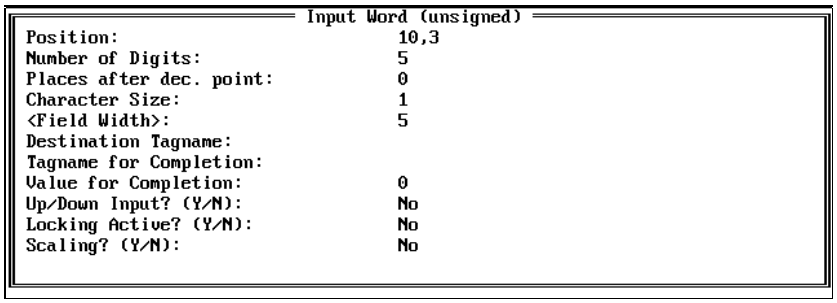
This picture is a demonstration of password protected value entries. The picture contains two input fields:

- The first input field is locked (i.e., no entry is possible), if the entered password is invalid (active password level = 0).
- In the second input field, entries can only be made if the password for level #3 has been given.

Execute the following steps for the creation of this picture:

1. Call the picture editor from the main menu by pressing key combination **Ctrl** + **B** (see page 6-23).
2. Insert all lines and text into the rectangle so that your picture looks like this:

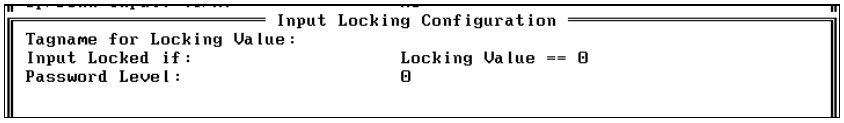
3. Insert the first input field into the picture. To do this follow the steps below:
   - Position the cursor at (10,3).
   - Press **F2 Field**.
   - Select the **Input Field** entry from the **Field Class** window and then press the ↵ key.
   - Select the input field **Input Word (unsigned)** from the **Select field type**. The window in which the parameters for the selected input field can be entered/changed is displayed:



- Change the field parameters as follows:

  Position:.....10,3
  Number of Digits: ***5***
  Places after the dec. point:..... ***0***
  Character Size:..... ***1***
  Field Width:..... ***5***
  Destination Tagname: ..... ***INPUT#1***
  Tagname for Completion:
  Value for Completion:..... ***0***
  Up/Down Input? (Y/N): ..... ***No***
  Locking Active? (Y/N):..... ***Yes***
  Scaling ? (Y/N)..... ***No***

- Press **F2 Locking**. The following window appears on the screen:



- For the first parameter **Tagname for Locking Value**, enter the address of the input field for the password **(*PASSWORD***).

- The second parameter **Input Locked if** determines the value at which the input field is locked or enabled for entries. Move the cursor to this line and press the ↵ key. This calls a selection window. Select the entry **Locking Value == 0**. This causes the input field to be locked if the locking value is 0 (an invalid password is entered).

- The third parameter is not evaluated if the locking condition **Locking Value == 0** is selected.

- Press **F4 Accept** to close the **Input Locking Configuration** window.

- Now press **F4 Accept** to close the **Input Word (unsigned)** window. The field is then shown in the actual cursor position.

4. Insert the second input field into the picture.

   - Insert the input field **Input Word (unsigned)** into the picture (at cursor position 10,5) with the following parameters:

     Field parameters

     Position:.....10,5
     Number of Digits: ***5***
     Places after the dec. point:..... ***0***
     Character Size:..... ***1***
     Field Width:..... ***5***
     Destination Tagname: ..... ***INPUT#2***
     Tagname for Completion:
     Value for Completion:..... ***0***
     Up/Down Input? (Y/N): ..... ***No***
     Locking Active? (Y/N):..... ***Yes***
     Scaling ? (Y/N)..... ***No***

     Press **F2 Locking** and enter the following parameters for the input locking configuration:

     Tagname for Locking Value:..... ***PASSWORD***
     Input Locked if:.....Locking Value < Password Level
     Password Level: ***3***

     – For the first parameter **Tagname for Locking Value** enter the address that you have entered in the input field for the password (***PASSWORD***).

     – Locking Conditions **Locking Value< Password Level** causes the input field to be locked if the locking value is less than the password level.

     – A password level of value 3 ensures that only one entry is possible in this field if the password for level #3 has already been given.

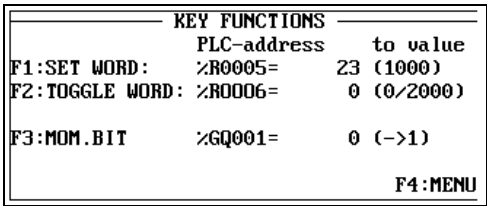
5. The next step is to define the LED functions.

   - Function keys F1 and F4 will be assigned LED functions **Key LED switched on**. These keys are used to switch to another picture.

   - The method used in assigning LED functions to specific keys is described in step 5 under “Main Picture” (see page 6-26).

6. Now save the picture under the name **INPLOCK**.

KEYFUNCT Picture (Key Functions)

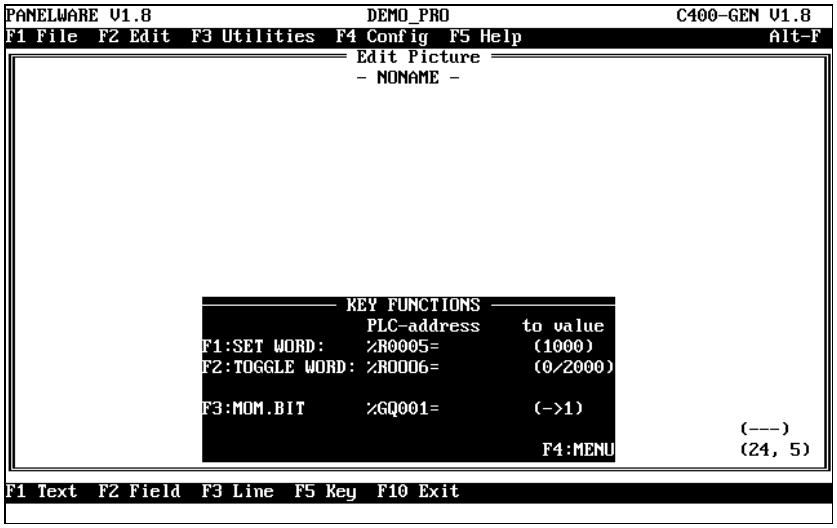


This picture demonstrates key function possibilities. Function keys F1 to F3 on the PANELWARE Panel will be assigned certain key functions:

- By pressing F1, a value of 10 000 should be written to a word in the PLC.
- By pressing F2 the contents of a memory location in the PLC should be switched between two different values (data type: Word unsigned).
- As long as F3 is pressed down, the contents of a PLC address will be a value of 1. As soon as the key is released, a value of 0 should be written to the address again.

Execute the following steps to create this picture:

1. Call the picture editor from the main menu by pressing key combination **Ctrl** + **B** (see page 6-23).
2. Insert all lines and text so that your picture looks like this:



3. Insert the first output field and the respective key functions into the picture:

   - Insert an output field type, **Output Word (unsigned)**, with the following parameters:

     Position:.....24,3
     Number of Digits: ***5***
     Places after the dec. point:..... ***0***
     Character Size:..... ***1***
     Field Width:..... ***5***
     Tagname:..... ***SETWORD***
     Display leading zeros? (Y/N): ..... ***N***
     Scaling ? (Y/N)..... ***No***

   - In order to write to memory location SETWORD by pressing F1, a function must be assigned to a function key. Assign the key that will be defined as function key F1 (see "Defining Key Assignments"), using the key function **Set Word** with the following parameters:

     Tagname:..... ***SETWORD***
     Value 1:..... ***10000***

     It is not necessary to define the parameters **Tagname for Completion** and **Value for Completion**.

   Press **F5 Key** to display the LED/Key function menu. Step 6 under "Clock Picture" (see page 6-38) describes how to assign a function to a single key.

4. Insert the second output field and its key function into the picture:

   - Insert an output field of type **Output Word (unsigned)** with the following parameters:

     Position:.....24,4
     Number of Digits: ***5***
     Places after the dec. point:..... ***0***
     Character Size:..... ***1***
     Field Width:..... ***5***
     Tagname:..... ***TOGGWORD***
     Display leading zeros? (Y/N): ..... ***No***
     Scaling ? (Y/N)..... ***No***

   - To switch the memory location TOGGWORD between two different values by pressing F2, a key function must be assigned to this function key. Assign the key function **Toggle Word** to the key that will be defined as function key F2 (see "Defining Key Assignments"), with the following parameters.

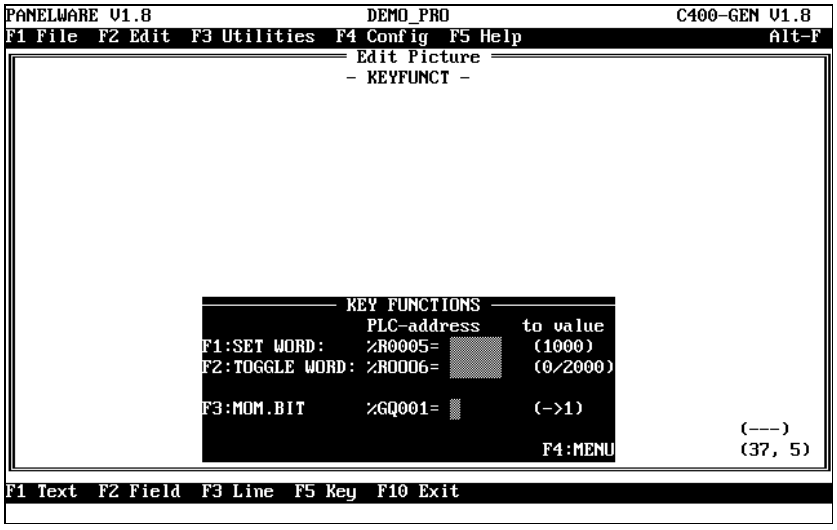
     Tagname:..... ***TOGGWORD***
     Value 1:..... ***0***
     Value 2:..... ***20000***

     There is no need to define parameters **Tagname for Completion** and **Value for Completion**. Step 6 of section "Clock Picture" describes how to assign a key function to a single key (see page 6-38).

5. Insert the third output field and its key functions into the picture:

   - Insert an output field of type **Output Bit/Byte** with the following parameters:

     Position:.....24,5
     Number of Digits: ***1***
     Places after the dec. point:.....***0***
     Character Size:.....***1***
     Field Width:.....***1***
     Tagname:.....***GLB_BIT_01/GI***
     Display leading zeros? (Y/N): .....***No***
     Scaling? (Y/N):.....***No***



   - To transfer the status of the F3 function key to the memory location GLB_BIT_01/GI, assign the key function **Momentary Bit/Byte** to the key that will be defined as function key F3 (see “Defining Key Assignments”) with the following parameters.

     Tagname:.....***GLB_BIT_01/GI***
     Value 1:.....***1***

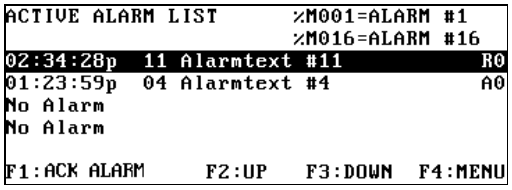
     There is no need to define parameters **Destination Tagname** and **Destination Value**. As long as the F3 key is held down, the value 111 will be written to memory location GLB_BIT_01/GI. Only when the key is released, will value 0 be written to the memory location again.

   Step 6 of section “Clock Picture” describes how to assign a key function to a single key (see page 6-38).

6. Assign the LED function **Key LED switched on** to function keys F1 to F4 . Step 5 in “Main Picture” explains how to assign LED functions to individual keys (see page 6-26).

7. Save this picture under the name ***KEYFUNCT.***

ALARM Picture (Alarm List)

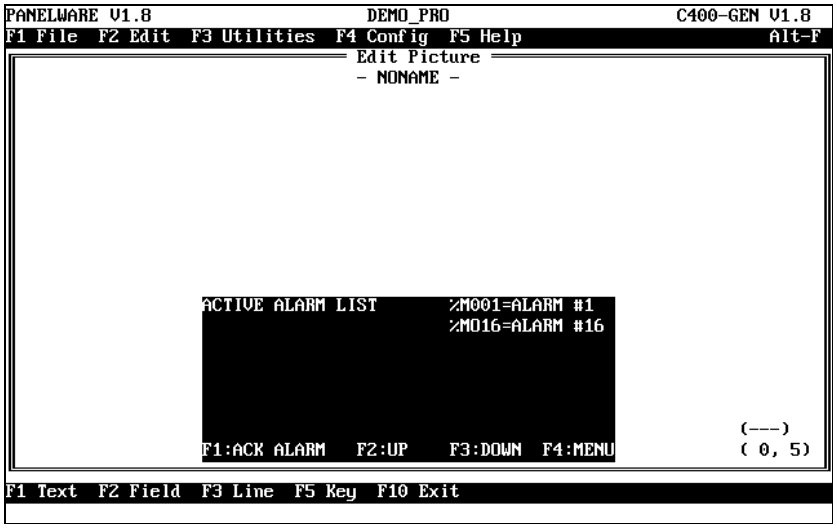


This picture shows a list of active alarms. The alarm bit field (16 bits in the demo project) is read from the PLC. Every bit represents an alarm. If an alarm occurs (bit changes from 0 to 1), it will appear in the alarm list. This alarm list can be displayed with the alarm field **Active Alarm**. To display a list of four active alarms (as shown in the picture above), insert four fields into the picture.

Execute the following steps to create this picture:

1. Call the picture editor from the main menu with key combination **Ctrl** + **B** (see page 6-23).

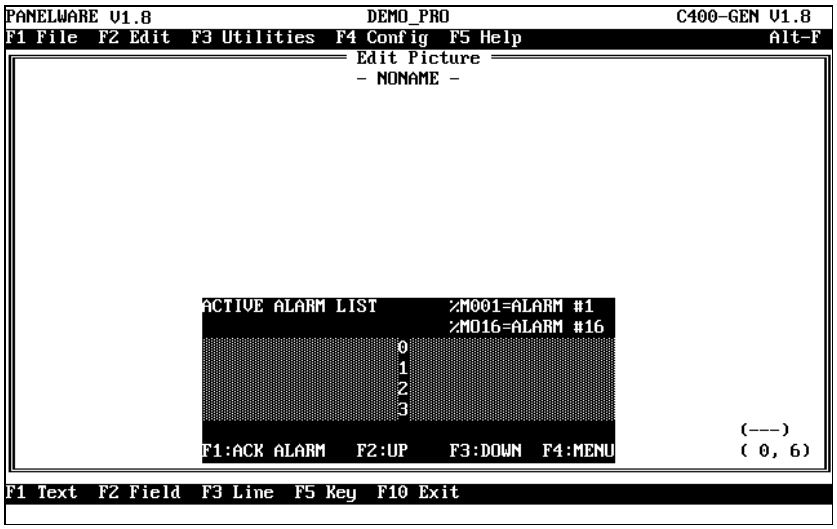
2. Insert all lines and text into the rectangle so that your picture looks like the one below:



3. Now insert the first alarm field **Active Alarm** in cursor position 0,2 with the following parameters:

   Position:.....0,2
   Field Width:.....***40***
   F key for Acknowledge:.....***F1***
   Function Key for Up:.....***F2***
   Function Key for Down:.....***F3***

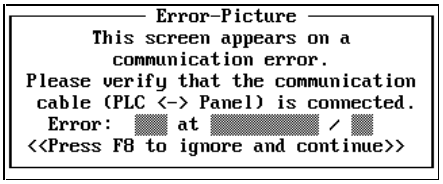
4. The next three fields are inserted with the same parameters, each field a line lower in the picture. The picture should then look like this:



5. Assign function keys F1 to F4 with LED function **Key LED switched on**. Step 5 in "Main Picture" explains how to assign LED functions to individual keys (see page 6-26).

6. Save this picture now under the name ***ALARM***.

ERR_PIC Picture (Error Picture)



The error picture is displayed if an error occurs in the communication with the PLC. Three internal variables containing notes on the cause of the error are displayed in the picture (for more information on these variables see Appendix D “Internal Variables” in the *PANELWARE™ Configuration Software Reference Manual* – GFK-0849).

To create this picture, complete the following steps:

1. Call the picture editor from the main menu with key combination **Ctrl** + **B** (see page 6-23).
2. Insert all lines and text into the rectangle so that it looks like the one in the screen shown below:

3. In cursor position 12,5 insert an output field **Output Bit/Byte** with the following parameters:

   Position:.....12,5
   Number of Digits: ***3***
   Places after the dec. point:..... ***0***
   Character size: ***1***
   Field width:..... ***3***
   Tagname:..... ***ERR_NR/DI***
   Display leading zeros? (Y/N): ..... ***No***
   Scaling? (Y/N):..... ***No***

4. Insert an output field **Output String** in cursor position 19,5 with the following parameters:

   Position:.....19,5
   String length:..... ***10***
   Character size: ***1***
   Tagname:..... ***ERR_NAME/DI***

5. Insert an output field **Output String** in cursor position 32,5 with the following parameters:

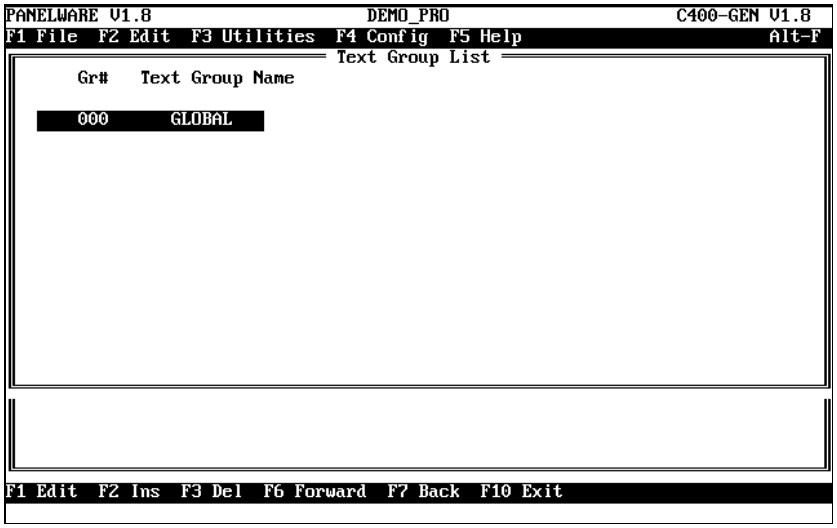
   Position:.....32,5
   String length:..... ***2***
   Character size: ***1***
   Tagname:..... ***ERR_NODE/DI***

6. Assign function key F8 with LED function Key LED blinking slow. This is explained in step 5 under “Main Picture” on page 6-26.
7. Save the picture under the name ERR_PIC.

Defining the Text Groups

A text group named **GLOBAL** exists for every project. This text group cannot be deleted. Text #0 of this text group contains commands for clearing the display and the key LEDs. These commands are always executed after every picture change.

In the demo project, no text is used from a text group except text #0 from the group **GLOBAL**. This text group is automatically created during the creation of a new project.

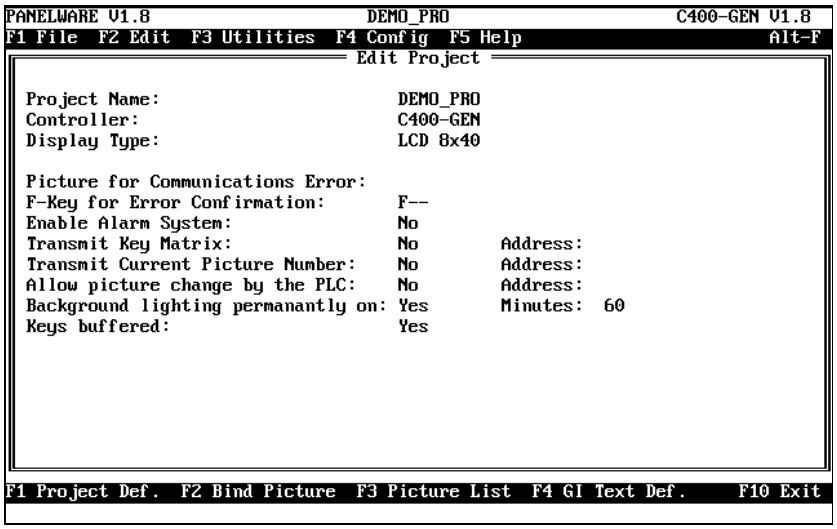


Binding Pictures to the Project

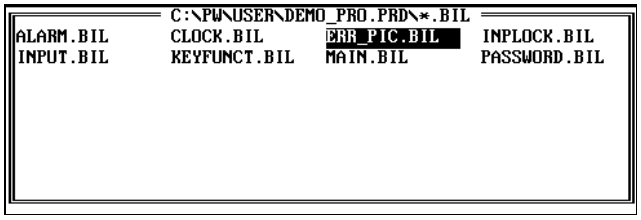
Every picture used must be bound into the project. Binding the pictures is done in the project editor (see Chapter 4, “Project Editor” in the *PANELWARE™ Configuration Software Reference Manual* — GFK-0849).

Error Picture

The name of the error picture is entered in the main menu of the project editor. The project editor is selected via the **Project** menu option from the **Edit** menu, or by using key combination **Ctrl** + **P**. The **Edit Project** window appears on the screen:



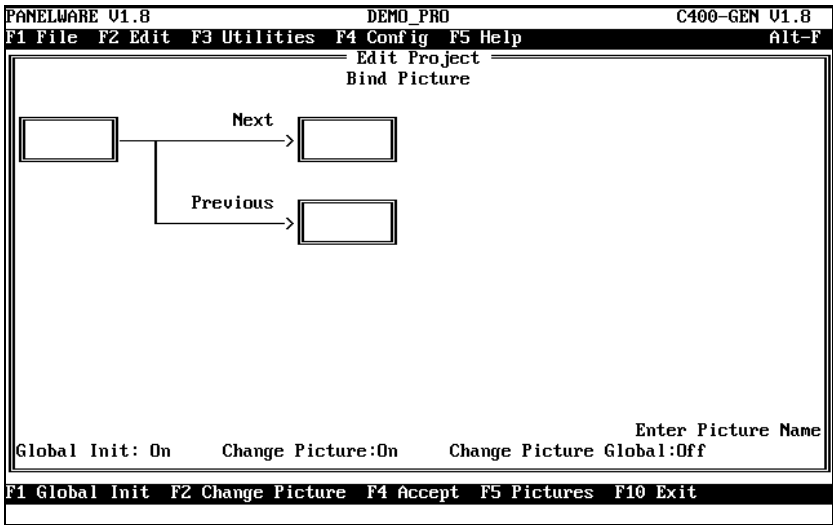
1. Press the **F1 Project Def**. function key and enter the name of the error picture (Note: The function line at the bottom of the screen changes when you do this). Pressing the **F5 Picture** function key displays a selection window with a list of all of the pictures created for this project. Select the ERR_PIC picture with the cursor keys. Confirm the selection by pressing the ↵ key.



2. Enter ***8*** to specify function key F8 for the **F-Key for Error confirmation**.
3. Now press **F4 Accept** to close the project definition. This saves the definition so that it can be used in the future.
4. Next, the error picture must be bound to the project (described in “Binding Process Pictures”), so that no picture change is possible.

Binding Process Pictures

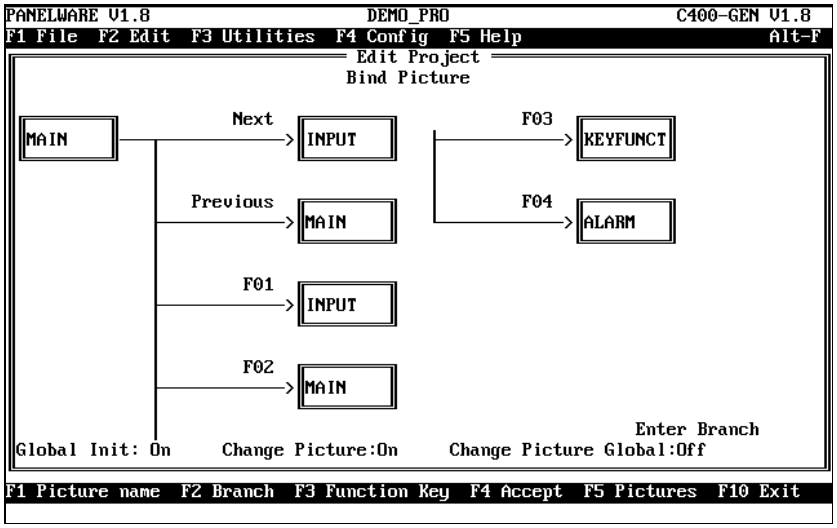
The pictures that will be used to display process information or to enter process data (commands) with the Keyblocks must be bound into the project. Press **F2 Bind Picture** in the project editor. The screen appears:



The name of the picture to be bound into the project (the Base picture) is entered in the rectangle on the left-hand side of the window. Enter the names of the pictures that will be branched to in the other rectangles.

Binding the MAIN Picture:

1. You should be able to switch to all four other pictures from the MAIN picture. The picture changes should be done through function keys F1 – F4. The **Next** and **Previous** keys should not cause a picture change; i.e., they must point to the MAIN picture.
2. Binding the MAIN picture should be done according to the structure shown below:

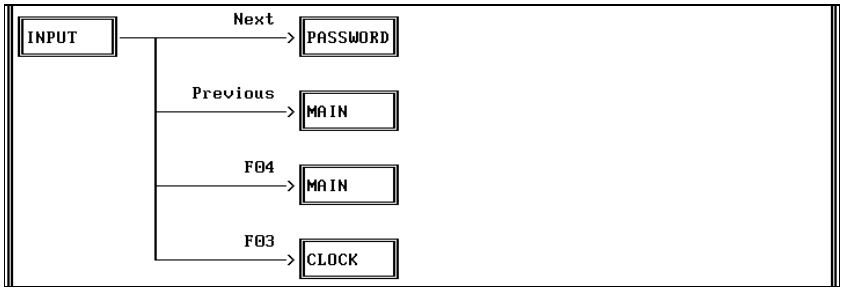


3. In step 2, only those branches that affect the MAIN picture are defined. To define the complete branching structure (so that it corresponds with the description in “Preparing a Concept Before Beginning”), all pictures must be bound into the project in this way.
4. After pressing **F4 Accept**, the MAIN picture is bound to the project and the **Edit Project** window appears again.

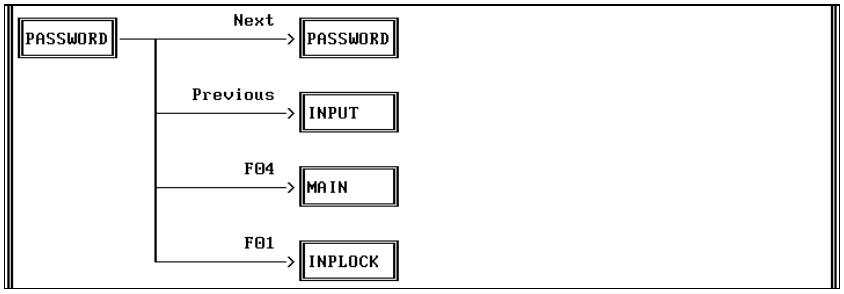
Binding the Remaining Pictures:

The other pictures in the project are bound as follows.

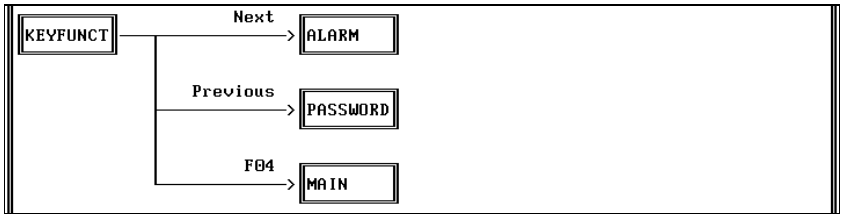
INPUT Picture:



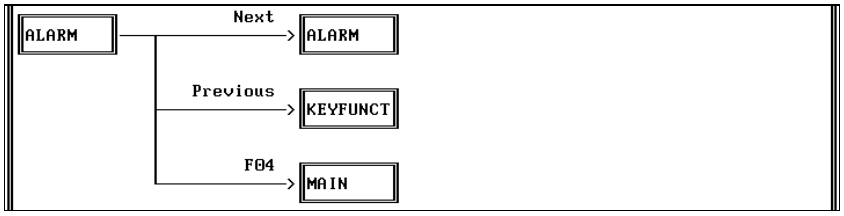
PASSWORD Picture:



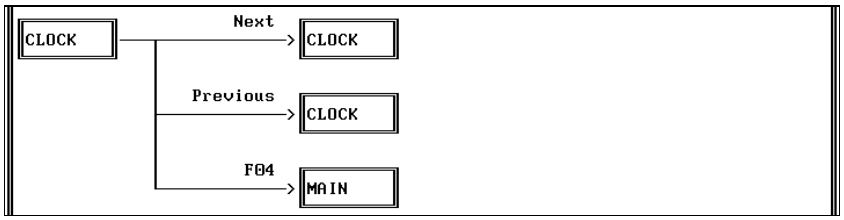
KEYFUNCT Picture:



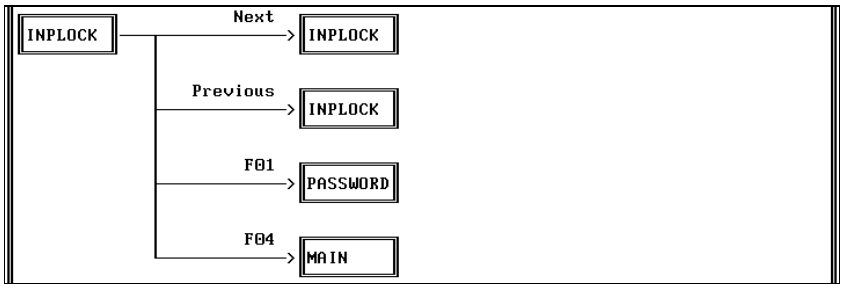
ALARM Picture:



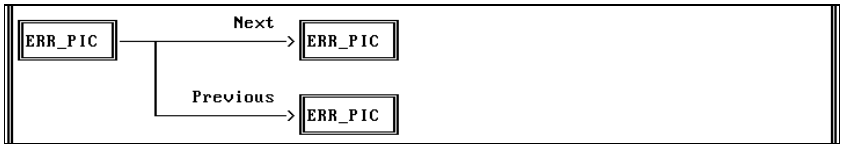
CLOCK Picture:



INPLOCK Picture:

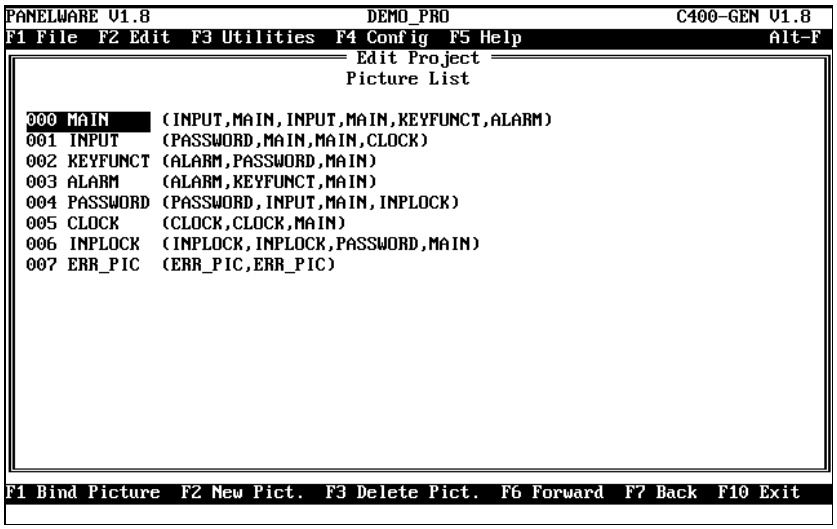


ERR_PIC Picture:

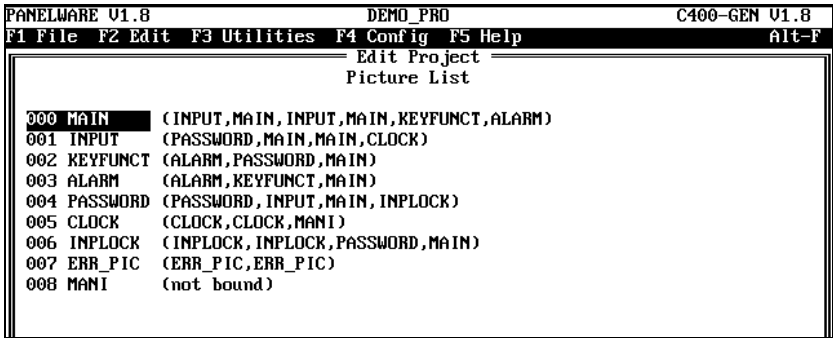


Picture Directory/Startup Picture

Pressing **F3 Picture List**, causes a list of all pictures that are bound to be displayed. Pictures that are not bound are also listed, and are indicated as unbound. The picture directory shown below should be displayed if you have bound your pictures to the project as described.

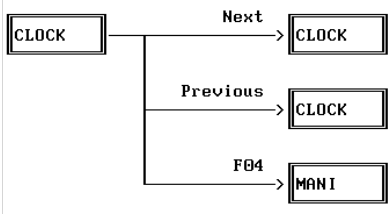


If you have entered an invalid name while binding your pictures, the error is indicated immediately For example, if when binding the picture CLOCK, you had made an error by typing the word ***MAIN*** as ***MANI***, it would be recognized immediately as shown below:



To correct this error, follow these steps:

1. Move the cursor to the last line of the picture directory and delete the picture **007 MANI** by pressing **F3 Delete Pict**.
2. Now move the cursor to picture **005 CLOCK** and either press the ↵ key or **F1 Bind Picture**. The following picture will be displayed:



3. Move the cursor to the rectangle with the misspelled word MANI and change the name to MAIN. Press the **F4 Accept** key to confirm the change.
4. The corrected picture directory should now be displayed.
5. The **Startup** picture is the picture that is displayed on the screen as soon as the Panel is switched on in Run Mode or after a reset. The picture that is in position 0 of the picture directory is always used as the startup picture. If the MAIN picture is not in this position, you should move it to the first position in the list:
   - To do this move the cursor to the MAIN picture.
   - Press **F7 Back** to push the MAIN picture up to the top of the list.
   - Press **F10** to return to the Main menu when you have finished editing the Picture List.

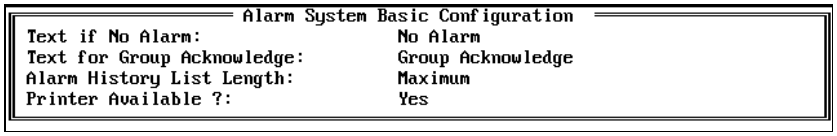
Caution

Make sure that the picture in the first position is never the same as the picture defined as the communication error picture in the project editor.

Further information on the use and the operation of the project editor can be found in the *PANELWARE™ Configuration Software Reference Manual* (GFK-0849).

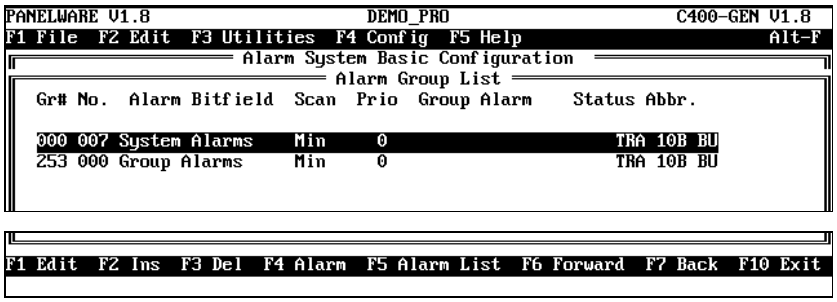
Editing the Alarm System

The alarm system can be accessed via the **Alarm System** option in the **Edit** menu, or by pressing the key combination **Ctrl** + **A**. The alarm system basic configuration screen appears:



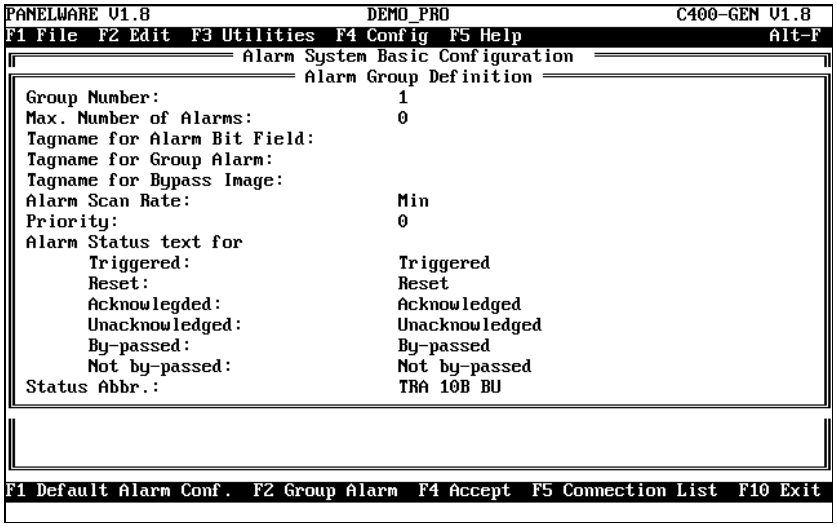
For the demo project, no printer will be supported. To disable the printer, follow these steps:

1. Press **F1 Edit** to begin editing the **Alarm System Basic Configuration**.
2. Move the cursor to the **Printer Available** field, type ***NO***, and press ↵.
3. Press **F4 Accept** to complete the editing step.
4. Now press **F4 Alarm Group List** to call up a directory of alarm groups. By default, this directory contains two predefined groups:

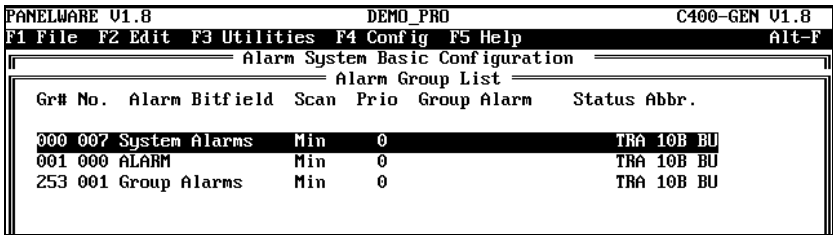


5. In order to display alarms from the PLC, which are stored in the Panel, an alarm group must be inserted. To do this, follow these steps:

   A. Press **F2 Ins**. The **Alarm Group Definition** window appears:



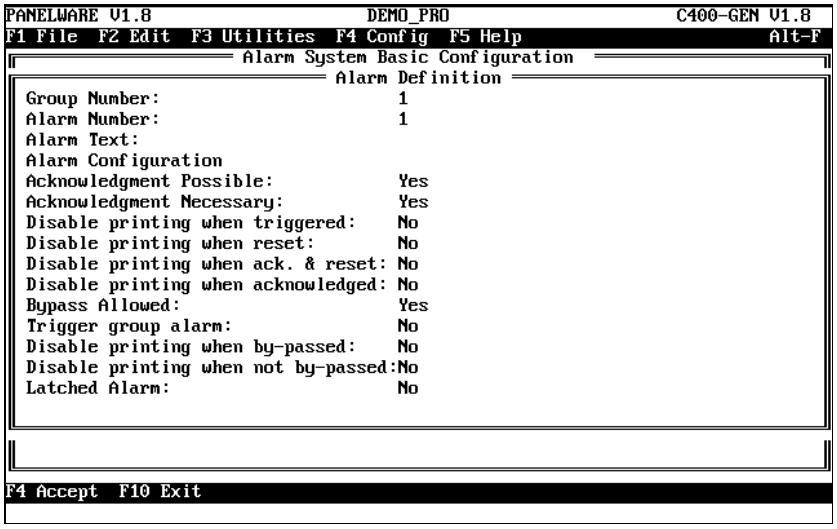
B. Enter the symbolic name ***ALARM*** for the parameter **Tagname for Alarm Bit Field**. Press **F4 Accept** to confirm the entry. The newly defined alarm groups are displayed in the alarm group list:



C. Move the cursor to the line with the new alarm group.

D. Sixteen alarms should be put into this alarm group:

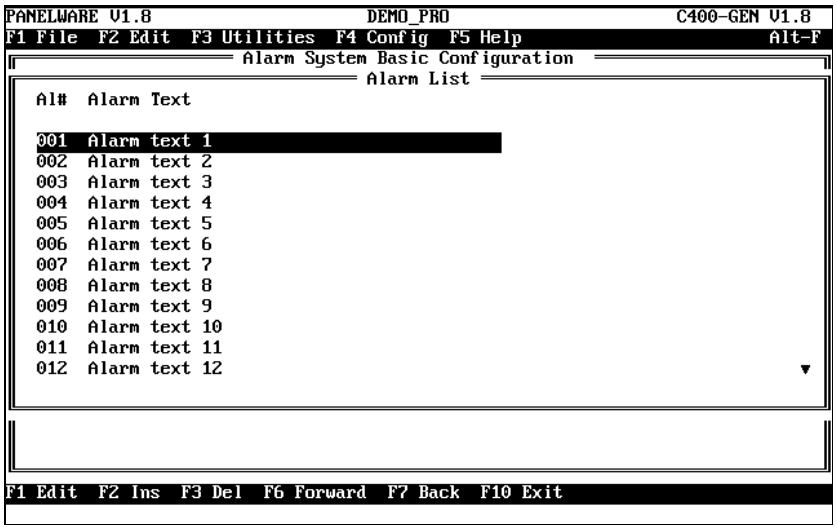
- Press **F4 Alarm**. The **Alarm Definition** window appears:



- For the parameter **Alarm text**, enter the text ***Alarm text 1***.
- Now press **F4 Accept**. The alarm group list is displayed again.
- Execute the last three steps until all 16 alarms have been entered. As alarm text, enter ***Alarm text 2, Alarm text 3 .... Alarm text 16***.
- These alarms correspond to the 16 bits of the alarm field in the PLC.

Bit No.	Alarm Number	Alarm Text
0	1	Alarm text 1
1	2	Alarm text 2
2	3	Alarm text 3
3	4	Alarm text 4
.	.	.
.	.	.
.	.	.

E. Now you can display a list of all alarms in this group by pressing the **F5 Alarm List** key while in the **Alarm Group List** window. (Press **PgeDn** to view the remainder of the **Alarm List** window.)



F. You can change the sequence of the alarms and the definition of each individual alarm in this list by pressing **F1 Edit**.

G. Press **F10 Exit** repeatedly until the main menu appears again.

Activating the Alarm System

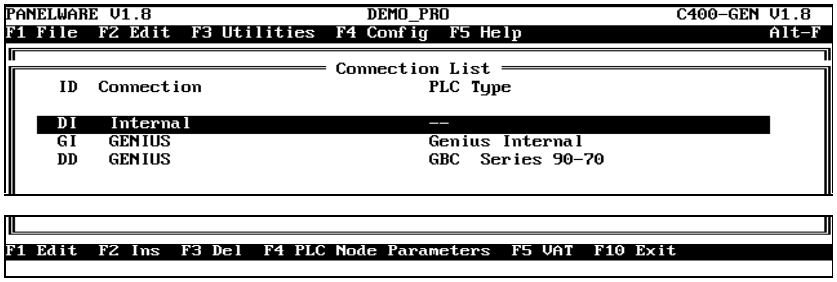
The alarm system still has to be activated in the project definition. To change the project definition, follow these steps:

1. Access the project definition using option **Project** in the **Edit** menu, or by using key combination **Ctrl** + **P**:
2. Press function key **F1 Project Def**.
3. Move the cursor to the line **Enable Alarm System**.
4. Enter ***Y*** and confirm it by pressing ↵.
5. End the project definition with **F4 Accept**.
6. Close the project editor with **F10 Exit**. The main menu appears again.

Editing the Connections

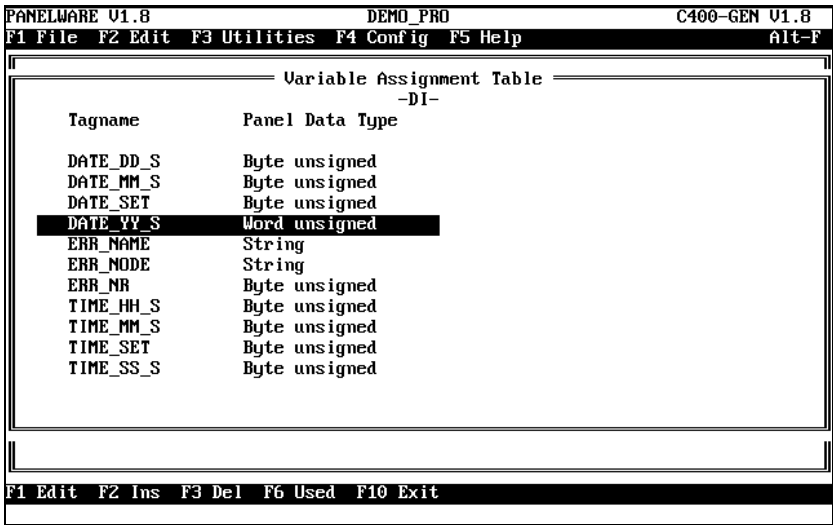
All of the variables used in the project must be assigned to a certain PLC address in the connection editor. General information on operating the connection editor can be found in the *PANELWARE™ Configuration Software Reference Manual* (GFK-0849).

Access the connection list from the main menu, either by selecting the **Connection** option in the **Edit** menu, or by using key combination **Ctrl** + **C**:



Internal Connection

You can display all of the internal variables used in your project. Move the cursor in the connection list to the connection **DI Internal** and press **F5 VAT** or ↵:



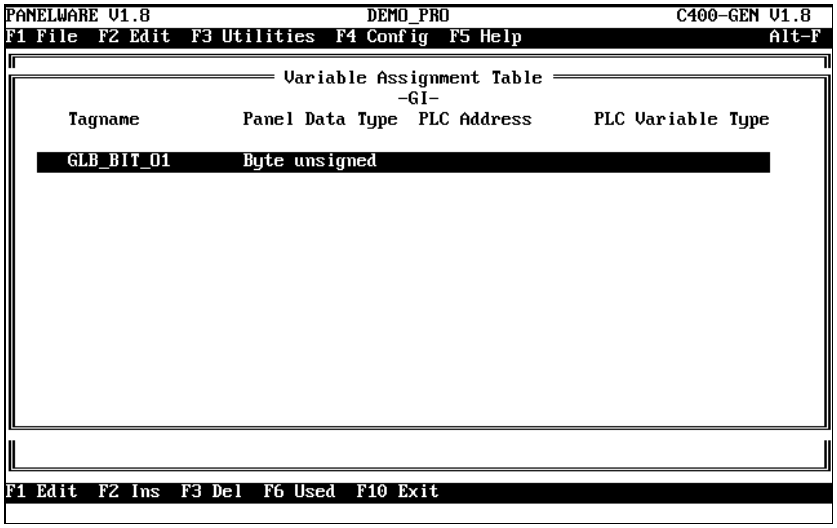
If you have made all entries correctly, your screen should look like the screen shown above. Compare the variable names and the corresponding Panel data types. If the variable assignment table is different from the one above, make the required changes. Possible errors and their corrections are:

- **Wrong Name:** Change the address in the respective picture/field.
- **Wrong Panel Data Type:** You have used a field with the incorrect data type in a picture. Delete the field and its entry in the VAT and then insert the desired field.

Pressing **F10 Exit** or **Esc** closes the variable assignment table for the **DI Internal** connection.

Genius Internal Connection

To display the Genius Internal variables used in your project, move the cursor in the connection list to the connection **GI — GENIUS — Genius Internal** and press **F5 VAT** or ↵:

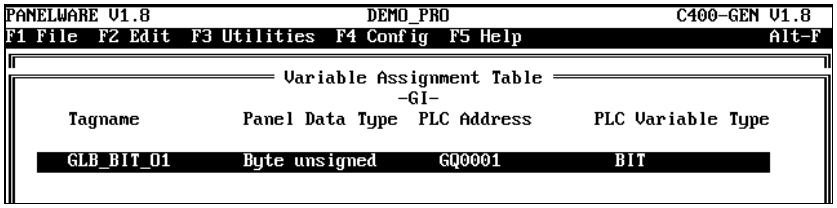


If you have made all entries correctly If you have made all entries correctly, your screen should look like the screen shown above. Compare the variable names and the corresponding Panel data types. If the variable assignment table is different from the one above, make the required changes. Possible errors and their corrections are:

- **Wrong Name:**
  Change the address in the respective picture/field.
- **Wrong Panel Data Type:**
  You have used a field with the incorrect data type in a picture. Delete the field and its entry in the VAT and then insert the desired field.

Every variable must be assigned to a PLC address and a PLC variable type now. A detailed explanation is provided in chapter 5. Assign following PLC addresses to the symbolic names:

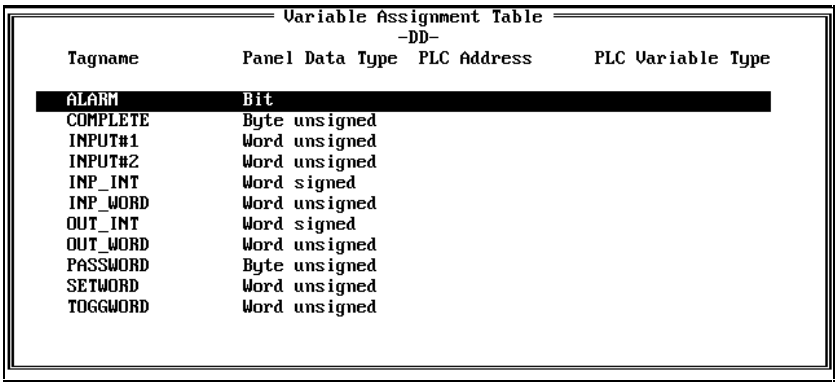
Symbolic Name	Panel Data Type	PLC Address	PLC Variable Type
GLB_BIT_01	Byte unsigned	GQ0001	BIT



By pressing the **F10 Exit** function key, or the **Esc** key, the VAT is closed for the **Genius Internal** connection.

Genius GBC Series 90-70 Connection

All variables used in your project and having the connection **DD Genius** can be displayed. To do this move the cursor to the GENIUS connection in the connection editor and press the function key **F5 VAT** or the ↵ key:



If you have made all entries correctly, your screen should look like the screen shown above. Compare the variable names and the corresponding Panel data types. If the variable assignment table is different from the one above, make the required changes. Possible errors and their corrections are:

- **Wrong Name:**
  Change the address in the respective picture/field.
- **Wrong Panel Data Type:**
  You have used a field with another data type in a picture. Delete the field and its entry in the VAT and then insert the desired field.

Every variable must be assigned to a PLC address and a PLC variable type now. A detailed explanation is provided in chapter 5. Assign the symbolic names to the following PLC addresses:

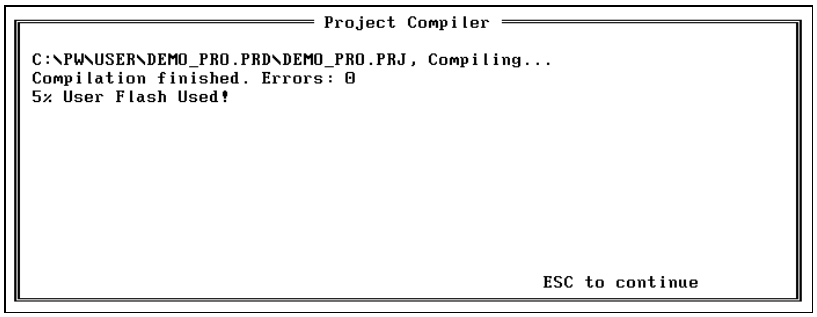
Symbolic Name	Panel Data Type	PLC Address	PLC Variable Type
ALARM	Bit	%M001	BIT
COMPLETE	Byte unsigned	%R0101	INT
INPUT#1	Word unsigned	%R0010	WORD
INPUT#2	Word unsigned	%R0011	WORD
INP_INT	Word signed	%R0002	INT
INP_WORD	Word unsigned	%R0001	WORD
OUT_INT	Word signed	%R0002	INT
OUT_WORD	Word unsigned	%R0001	WORD
PASSWORD	Byte unsigned	%R0100	INT
SETWORD	Word unsigned	%R0005	WORD
TOGGWORD	Word unsigned	%R0006	WORD

By pressing the **F10 Exit** function key or the **Esc** key, the variable assignment table is closed for the **Genius GBC Series 90-70** connection.

Compiling the Project

To download a project to the Panel, it must first be compiled. Only a project that is loaded (project name in the title bar) can be compiled. Start the compilation by accessing the project compiler, either via the **Compile** menu option in the **Utilities** menu, or by pressing the key combination **Ctrl** + **Q**.

The progress of the compilation procedure is shown in the **Project Compiler** window. If the project is successfully compiled (translated), the following message appears:



The amount of memory used in the user bank (FlashPROM in the Panel) is also shown after a successful compilation. See the *PANELWARE™ Hardware Installation User's Manual* (GFK-0848) for more information.

Pressing **Esc** closes the window and returns you to the main menu.

Errors

During the compilation, error messages can appear in the **Project Compiler** window.

If you receive an error message, refer to Appendix C of the *PANELWARE™ Configuration Software Reference Manual* (GFK-0849).

Appendix A

Cabling Information

This appendix describes the required PCS to PLC/PC interface cabling. It includes the following information:

- Genius Communications A-2
  - Selecting a Cable Type A-2
  - Using Other Cable Types A-2
  - Bus Length A-4
  - Baud Rate Selection A-4
  - Connecting Devices to the Bus A-5
- SNP Communications A-5
- Cable Diagrams A-6

Genius Communications

Selecting a Cable Type

The Genius bus is a shielded twisted-pair wire, daisy-chained from block to block and terminated at both ends. Proper cable selection is critical to successful operation of the system. Each bus in the system can be any cable type listed in table A-1. The 89182, 89207, 4794, 9696, and 89855 types are high temperature cables for use in severe environments, and are qualified for use in air plenums. The 9815 type is water resistant, and can be used where direct burial is required. Similar cables of equivalent terminating resistance such as 9207, 89207, and 9815 can be mixed. Do not mix cables of different impedance, regardless of cable run length. The maximum run for mixed cable type equals the shortest length recommended for any of the types used. Other, small-size twisted pair shielded wire of unspecified impedance can be used for short runs of 50 feet or less, using 75 ohm terminations.

The excellent noise reduction of these cable types, and of the Genius communications system, allow the communications bus to be mixed with other signaling systems and 120 volt AC control circuits without added shielding or conduits. Conservative wiring practices, and national and local codes, require physical separation between control circuits and power distribution or motor power. Refer to sections 430 and 725 of the National Electric Code.

Using Other Cable Types

If the cables listed in table A-1 are not available, the cable selected must meet the following guidelines:

1. High quality construction. Most important is uniformity of cross section along the length of the cable. Poor quality cable can cause signal distortion, and increase the possibility of damage during installation.
2. Precision-twisted shielded wire of type EIA RS-422, having a uniform number of twists per unit of length. In a catalog, this type of cable may be listed as twinaxial cable, data cable, or computer cable.
3. Relatively high characteristic impedance; 100 to 150 ohms is best; 75 ohms is the minimum recommended.
4. Low capacitance between wires, typically less than 20pF/foot (60pF/meter). This can be accomplished by inner dielectrics of foamed type, usually polypropylene or polyethylene, having a low dielectric constant. Alternatively, the conductors can be spaced relatively far apart. Lower impedance types have smaller cross-sections, and provide easier wiring for shorter total transmission distances.
5. Shield coverage of 95% or more. Solid foil with an overlapped folded seam and drain wire is best. Braided copper is less desirable; spiral wound foil is least desirable.
6. An outer jacket that provides appropriate protection, such as water, oil, or chemical resistance. While PVC materials can be used in many installations, Teflon, polyethylene, or polypropylene are usually more durable.
7. Electrical characteristics: cable manufacturers' information about pulse rise time and NRZ data rate is useful for comparing cable types. The Genius bit consists of three AC pulses; the equivalent NRZ bit rate is about three times as great. *For assistance in selecting a specific cable type, please consult your local GE Fanuc application engineer.*

Table A - 1. Recommended Cable Types

Cable # and Make	Outer Dia.	Terminating Resistor* -10% to +20% 1/2 Watt	Number of Conductors/AWG	Dielectric Voltage Rating	Ambient Temp. Rating	Maximum Length Cable Run feet/meters at baud rate			
						153.6s	153.6e	76.8	38.4•
(A)9823 (B)9182 (C)4596 (M)M39240	350in 8.89mm	150 ohms	2 / #22	30v	60°C	2000ft 606m	3500ft 1061m	4500ft 1364m	7500ft 2283m
(B)89182	.322in 8.18mm	150 ohms	2 / #22	150v	200°C	2000ft 606m	3500ft 1061m	4500ft 1364m	7500ft 2283m
(B)9841 (M)M3993	.270in 6.86mm	*120 ohms	2 / #24	30v	80°C	1000ft 303m	1500ft 455m	2500ft 758m	3500ft 1061m
(A)9818C (B)9207 (M)M4270	.330in 8.38mm	100 ohms	2 / #20	300v	80°C	1500ft 455m	2500ft 758m	3500ft 1061m	6000ft 1818m
(A)9109 (B)89207 (C)4798 (M)M44270	.282in 7.16mm	100 ohms	2 / #20	150v	200°C	1500ft 455m	2500ft 758m	3500ft 1061m	6000ft 1818m
(A)9818D (B)9815	.330in 8.38mm	100 ohms	2 / #20			1500ft 455m	2500ft 758m	3500ft 1061m	6000ft 1818m
(A)9818 (B)9855 (M)M4230	.315in 8.00mm	100 ohms	4 (two pair) #22	150v	60°C	1200ft 364m	1700ft 516m	3000ft 909m	4500ft 1364m
(A)9110 (B)89696 (B)89855 (M)M64230	.274in 6.96mm	100 ohms	4 (two pair) #22	150v	200°C	1200ft 364m	1700ft 516m	3000ft 909m	4500ft 1364m
(A)9814C) (B)9463 (M)M4154	.243in 6.17mm	75 ohms	2 / #20	150v	60°C	800ft 242m	1500ft 455m	2500ft 758m	3500ft 1061m
(A)5902C (B)9302 (M)M17002	.244in 6.20mm	75 ohms	4 (two pair) #22	300v	80°C	200ft 60m	500ft 152m	1200ft 333m	2500ft 758m

Notes: A = Alpha, B = Belden, C = Consolidated, M = Manhattan

• = Limited to 16 taps at 38.4 Kbaud

Bus Length

The maximum bus length for shielded, twisted-pair cable is 7500 feet. Some cable types are restricted to shorter bus lengths. For example, for buses with a total cable length of 100 feet to 2000 feet Belden 9182 or Alpha 9823 or Belden 89182 can be used. In turn, the bus length determines which baud rate can be selected. If the application requires greater bus length, fiber optics cable and modems can be used, as explained later in this chapter.

If the application requires greater bus length, fiber optics cable and modems can be used; refer to the *Genius I/O System and Communications User's Manual* (GEK-90486-1).

Baud Rate Selection

A Genius I/O or communications bus can operate at one of four baud rates: 153.6 Kbaud standard, 153.6 Kbaud extended, 76.8 Kbaud, or 38.4 Kbaud. Follow these guidelines when selecting the baud rate for a bus:

1. All devices on a bus must operate at the same baud rate (other busses in the system can operate at different baud rates).
2. If there are any older Genius products on the bus (catalog numbers IC660CBDnnn, IC660CBSnnn, IC660CBAnnn, IC660HHM500, or IC660CBB900/901), the bus must be set up to use 153.6 Kbaud standard.
3. If the cable length is between 4500 and 7500 feet, you must select 38.4 Kbaud. This data rate only supports a maximum of 16 device on the bus.
4. If the cable length is between 3500 and 4500 feet, select 76.8 Kbaud.
5. If cable length is between 2000 and 3500 feet, select 153.6 Kbaud extended.
6. If the cable length is less than 2000 feet, either 153.6 Kbaud standard or 153.6 Kbaud extended can be used. The products are set to operate at 153.6 Kbaud standard when shipped from the factory. The use of 153.6 Kbaud extended is recommended, especially if the system will include a dual bus with Bus Switching Modules.

In noisy environments, 153.6 Kbaud extended provides improved noise immunity with little effect on bus scan time. If a system is experiencing excessive blinking of the bus controller's COMM OK light, or if the I/O blocks' I/O Enabled LEDs go off frequently, 153.6 Kbaud extended should be used. The baud rate selected should be indicated on all blocks, especially if different busses in the facility use different baud rates. Before connecting a Hand-held Monitor (HHM) to a functioning bus, check that it has been configured to the correct baud rate. If not, change the HHM baud rate selection, turn off the HHM, connect it to the bus, then turn the HHM on.

Bus Length and Baud Rate for Busses with Phase A Devices

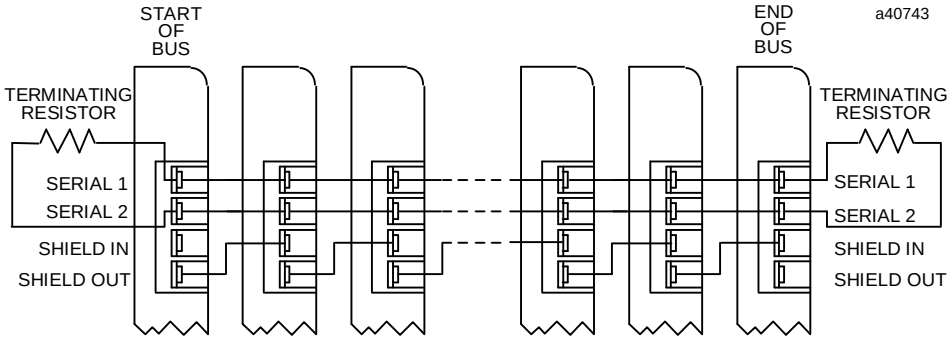
If a bus has any Phase A Genius products (catalog numbers IC660CBDnnn, IC660CBSnnn, IC660CBAnnn, IC660HHM500, or IC660CBB900/901), the bus must use 153.6 Kbaud "standard" and the maximum bus length is 2000 feet. Therefore, only the cable lengths listed under "153.6s" are permitted ("153.6e" refers to 153.6 Kbaud extended, which is not compatible with 153.6 Kbaud standard).

Connecting Devices to the Bus

Devices can be placed in any physical sequence on the bus, however, communications will be most efficient if devices are placed in the same sequence as their Device Numbers (Block Numbers).Each device has four terminals for the serial bus cable (Serial 1, Serial 2, Shield In, and Shield Out). Connect the Serial 1 terminal of each block to the Serial 1 terminals of the previous device and the next device. Connect the Serial 2 terminal of each block to the Serial 2 terminals of the previous device and the next device.

Shield In of each block must be connected to Shield Out of the preceding device. For the first device on the bus, Shield In can be left unconnected. For the last device on the bus, Shield Out can be left unconnected.

When making bus connections, the maximum exposed length of bare wires should be two inches. For added protection, each shield drain wire should be insulated with spaghetti tubing to prevent the Shield In and Shield Out wires from touching each other.



SNP Communications

To configure an SNP interface, refer to Appendix A (“Cabling Information”) in the *PANELWARE™ MMI Application Manual fro GE Fanuc Series 90 Protocol (SNP)* — GFK-0850. The specific information you will need is contained in the specifications and cabling diagrams for an RS-232 interface to IF0 and IF1 of the C200 Controller.

Cable Diagrams

Table A-2 provides an overview of the cabling possibilities for connecting PANELWARE Panels, PLCs, printers and PCs (with PCS installed and running). Table A-3 lists the locations of pin-out diagrams in the PANELWARE documentation.

Table A - 2. Cable Diagrams for Various Configurations

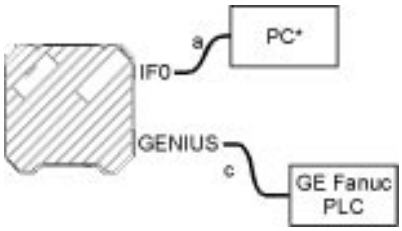
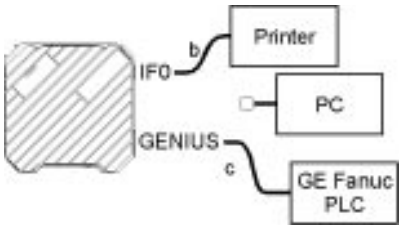
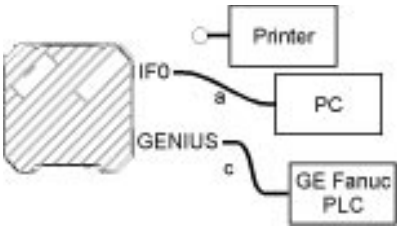
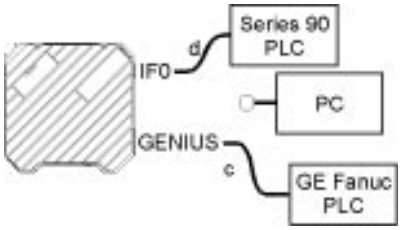
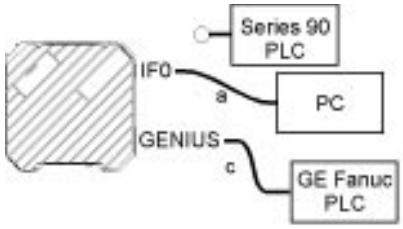
Configuration	Run Mode	Teach Mode
C400 + Series 90 PLC (no printer)	 * The PC does not need to be connected in RUN mode.	
C400 + Series 90 PLC + printer on IF0		
C400 + Series 90 PLC (serial) +GE Fanuc PLC (Genius)		

Table A - 3. Pin-out Diagram Locations in Documentation

Cable (see Table A-1)	Manual and Chapter/Appendix
a (Panel to PC)	*PANELWARE Hardware Installation User's Manual* (GFK-0848) Appendix A Cabling Information (Connection to the PC)
b (Panel to printer)	*PANELWARE Hardware Installation User's Manual* (GFK-0848) Chapter 7 “Printers”
c (Panel to CPU — Genius)	Pages A-2 through A-6, *PANELWARE MMI Application Manual for GE Fanuc Genius Protocol* — GFK-1115 (this manual)
d (Panel to CPU — SNP)	*PANELWARE™ MMI Application Manual for GE Fanuc Series 90 Protocol (SNP)* — GFK-0850

Appendix

B

Errors/Troubleshooting

This appendix provides an overview of possible system errors, their causes, and how to handle them. Actual error messages are displayed, followed by possible causes and corrective actions. The following sections of information are included:

- Errors During Installation..... B-2
- Errors During Program Start B-3
- Errors While Working in PCS B-4
- Error Numbers in Internal USER Variable..... B-6

Errors During Installation

Installation could not be ended properly!
Setup program cannot be called!

Check that the following conditions are met:

- PC must contain an 80286 or higher type processor.
- To install the PCS, the PC must have at least 2 MB hard disk space available.
- PC must have at least 640 KB RAM (500 KB must be available). If enough RAM is not available, remove the necessary memory-resident programs.

Errors During Program Start

PCS cannot be started!

Check that the following conditions are met:

- PC must contain an 80286 or higher type processor.
- PC must have at least 640 KB RAM (500 KB must be available). If enough RAM is not available, remove the necessary memory-resident programs.

PCS Error Message	Fatal Error, PANELWARE requires 1 MB on drive c:

Check that the following condition is met:

- To start the PCS, the PC must have at least 1 MB hard disk space available.

Errors While Working in PCS

When the PCS is running, error messages are either displayed in the bottom line of the screen (the function key line) or in the current window.

Faults running PCS!

Check that the following condition is met:

- FILES and BUFFERS in the CONFIG.SYS file should be set to at least the following values:

  BUFFERS = 10
  FILES = 40

- During installation, the SETUP program makes these settings automatically, but only if you responded positively by pressing ***Y*** during the installation process. If the BUFFERS and FILES values in the CONFIG.SYS file are smaller, change them to the above values before trying to run the PCS again.

Invalid Project Name

This error message appears in the last line if a new project is assigned a name that already exists. Either change the new project's name or delete the existing project with the same name.

`<File name>` *cannot be written*

When entering project names or saving pictures, text groups, or key definitions, filenames must meet the following conditions:

- Maximum length of the filename: 8 characters
- Only standard MS-DOS characters are allowed. Characters such as ".*?,;.:" or the space character are not permitted.

`<File name>` *cannot be read*

This error message appears if a non-existent filename is entered while trying to load a project or picture.

If no filename is entered and [ENTER] is pressed, all existing project or picture names are listed in a selection window. By using the cursor keys to highlight a filename, the desired project/picture can be selected and loaded.

Error! Error picture and first picture cannot be the same!

The compilation of a project is interrupted with this error message if the error picture is defined in the first position of the picture directory. The start-up picture must be listed in the first position of the directory (see the Chapter 2, “Quick Start” section entitled “Binding Pictures in a Project”).

Cannot make connection with panel!
Please check cable and installation!

After calling the *Download* function, this message appears if the connection to the panel cannot be made. Check that the following conditions are met:

- Is the PC connected to the panel?
- Is the panel properly supplied with power?
- Are all cables connected to the proper interfaces?

  -IF0 on the panel

  -COM1 or COM2 on the PC, depending on the PCS configuration (see "PCS Configuration" in chapter 3)
- Is the panel in *Teach Mode*?
- Is the download cable in good shape and properly connected?

Error Numbers in Internal USER Variable

The name of an internal user variable can be defined in the **PLC Node Parameter Definition** window (see chapter 4). These variables are assigned the following error numbers:

Error Number	Definition
24100 ...	GENI Board OK Flag is not set
24101 ...	Device present Flag of the respective station is not set (control switched off or not connected)!
24102 ...	DATAGRAM could not be set (Command Timer possibly set too low)!
24103 ...	Datagram set with error (should never occur)!
24104 ...	The defined PLC Type does not match with the connected slave!
24105 ...	Lockout request not OK. Access to the global data does not function (should never occur).
24106 ...	Write command to READ Only Variable (with received Global Data) !
24107 ...	Connection already established. Two DS_connect_req commands have been sent to the same bus address.
24108 ...	Write command to READ Only Variable (with received Global Data) !
24109 ...	Timeout. The request to the respective station has not been answered (Timeout time possible too short.) Occurs if the requested PV does not exist in that station.
24110 ...	VL amount exceeded. The number of defined VLs (PLC Node Parameter) is too small.
24120 ...	PV Name invalid (Check PV Name in PCS again)
24121 ...	PV Offset not modulo 8. If a BIT variable is assigned to the PLC data type WORD (M, I, ...), the offset must be according to the following formula: (offset - 1) % 8 == 0
24122 ...	PV Offset too high for Global Variable. Only occurs for Global Data, if the offset is larger than is allowed by the "Broadcast control data length".
24123 ...	Incorrect PV PLC data type (Should no longer occur)
24124 ...	The entered PV Offset plus the length of the PC exceeds the allowed limits of the variable type.

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