Table of Contents

1. Introduction .................................................................................................................... 4
2. Installation ..................................................................................................................... 5
3. Using Proteus IPE ......................................................................................................... 7
   3.1 Starting Proteus IPE ............................................................................................... 7
   3.2 Main Control Screen .............................................................................................. 8
      3.2.1 Motor Status Section .................................................................................... 9
      3.2.2 Motor Control Section .................................................................................. 10
      3.2.3 Digital IO Control Section .......................................................................... 11
      3.2.4 Program Status Section .............................................................................. 11
      3.2.5 Program Control Section ............................................................................ 12
   3.3 Terminal Screen ..................................................................................................... 13
3.4 Setup Screen ............................................................................................................ 14
3.5 Storing and Loading the programs and variables from non-volatile memory .......... 16
3.6 Working with Motion Programs .............................................................................. 17
   3.6.1 Uploading Motion Program ........................................................................... 17
   3.6.2 Downloading Motion Program ...................................................................... 19
   3.6.3 Quick Running, Stopping, and Aborting motion programs ............................ 19
   3.6.4 Editing and Printing Motion Program .......................................................... 20
   3.6.5 Saving and Opening Motion Program .......................................................... 20
3.7 Online Help .............................................................................................................. 21
1. Introduction

Proteus IPE (Interactive Programming Environment) is a user-friendly Windows program for programming, configuring and debugging Proteus SA controller. Main features of the Proteus IPE are:

- Windows 98, 2000, XP compatible
- USB communication
- Multiple Document Interface for managing multiple programs simultaneously
- Graphical Controller Setup and Configuration Management
- On-line Language Help
2. Installation

Run the Proteus IPE Setup program:

From the opening screen click the button for No-Questions-Asked Installation
Read the License Agreement and click **Yes, I do** button.

All necessary files and programs will be installed and you should see the following screen indicating successful installation:
3. Using Proteus IPE

3.1 Starting Proteus IPE

Run the Proteus IPE program by selecting the following icon:

Following main screen will open:
### 3.2 Main Control Screen

Open the main control screen by selecting **Tools/Control** from the menu or clicking the following button:

Following control screen will open:

There are five main sections:

- **Motor Status Section** – All the motor positions/speed and switch status are shown.
- **Motor Control Section** – Move motions can be controlled here.
- **Digital IO Control Section** – Digital Inputs and Outputs are shown here.
- **Program Status Section** – Status of four motion programs are shown here.
- **Program Control Section** – Program control is done here. Program also can be viewed.
3.2.1 Motor Status Section

In this section, Pulse Positions, Encoder Positions, Pulse Speed, Motor Status, and Limit/Home/Alarm input status is shown.

The Pulse Speed unit is in pulses/second.

Motor status can be one of the following:

- Idle – motor is not moving.
- Accelerating – motor is ramping up
- Constant – motor is running at constant speed
- Decelerating – motor is ramping down
- Error Alarm – Alarm switch was triggered
- Error Limit – Limit switch was triggered.

The limit switch polarity can be set from the hardware jumper. See the hardware manual on how to set the limit switch polarity.

The home and alarm switch polarity can be set from the Setup screen described later.

You can change the current pulse position or encoder position by double clicking the position text box which will show the following dialog box:

Here you can enter the new position and hit OK to set the new position.
3.2.2 Motor Control Section

In the motor control section, you can move the motor individually or in linear interpolation.

Move parameters are:
- **Hspd** – High target speed. Unit is in pulses/second.
- **Lspd** – Low start and end speed. Unit is in pulses/second.
- **Accel** – Acceleration and deceleration. Unit is in milliseconds.
- **X, Y, Z, U** – target positions

You can select which motors to move by checking the checkbox. For multiple motors selected, linear interpolation is used to move the selected motors. Linear interpolation ensures starting and stop of the selected motors.

There are several move controls:
- **Abs** – absolute move. Selected motors will move the absolute target position
- **Datum** – datum move. Selected motors will move to absolute 0 position.
- **Inc-** and **Inc+** - incremental move. Selected motors will move incrementally from the current position.
- **Home-** and **Home+** - Perform home search action. Home search is done using the limit switches and home switch. See HOME command in the Proteus SA language manual for details of the home search operation.
- **Mclear** – clear motor error. When the motor hits the alarm or limit, the motor goes into error state. Until this error is cleared, no moves can be done.
- **Stop** – stops the motors. This will immediately stop the selected motors.
- **Abort** – stops all the motors and programs. This will immediately stop all the motors as well as stop all the motion programs running.
3.2.3 Digital IO Control Section

This section shows the status of the 12 digital inputs and 12 digital outputs and 4 enable outputs.

You can toggle the digital outputs and enable outputs by clicking on the individual pictures.

Polarity of the inputs and outputs can be set from the Setup screen described later.

3.2.4 Program Status Section

Program status section shows the current status of the 4 motion programs as well as the current line number of the motion programs.

Program Status can be one of the following:

- Idle – program is idle and not running
- Paused – program is paused
- Running – program is running
- Error – program is in error. PEMSG is used to see the program error message.
3.2.5 Program Control Section

In this section, you can control the motion program:

- Run – run the selected motion program from the beginning
- Stop – stop the selected motion program from running
- Pause – pause the selected motion program.
- Continue – continue the paused motion program.
- Pclear – clears the motion program in error. Once motion program is in error, you cannot run until the error is cleared.
- Emsg – See the program error message.
- View – View/Edit/Download selected motion program.

When you hit view button following dialog box pops up with the content of motion program:

Here you can edit and download the motion program. Download is allowed only if the program is idle.
3.3 Terminal Screen

Open the terminal screen by selecting **Tools/Terminal** from the menu or clicking the following button:

Following screen will display:

On the bottom text line, you can manually enter Interactive Commands and see the reply on the text box above. (See Proteus SA Command Language Manual for details)
3.4 Setup Screen

Open the terminal screen by selecting **Tools/Setup** from the menu or clicking the following button:

Following dialog box will show:

All the configuration shown above corresponds to I variables. See Proteus SA Command Language manual for more details of the I variables.
The serial number on the top shows the serial number of the controller:

| Serial Number: | AR20XP6V |

From the setup screen, you can configure the following setup options of the controller:

- The Automatic Program at Power Up - enables/disable automatic program running after power up.
- Home switch polarity
- Alarm switch polarity
- Alarm/Limit switch noise filter – use this in case there is noise in the alarm and limit switch lines.
- One/Two clock operation – For one clock operation, pulse and dir signals are used. For two clock operation, CW and CCW signals are used.
- Program Time slice – only use this to prioritize certain programs. For most operation leave as 0.
- IP Address – Set IP address for TCP/IP operation.
- Homing speed mode – select low speed, high speed, or ramp speed option for homing operation.
- Digital output boot up state – when the controller is powered up, digital outputs are set to this state.
- Digital Output/Input/Enable output polarity.
3.5 Storing and Loading the programs and variables from non-volatile memory

Newly downloaded motion programs or configurations are stored in the controller memory. If you want to permanently store them to the controller so that they are loaded after power down/up, you can use the Tools/Store from the menu. Following items are stored in the memory:

- 4 motion programs
- V variables
- I variables
- IP Address

When you select Tools/Store to EEPROM from the menu, you will get a prompt to ask if you want to store the motion programs and variables to the storage:

![STORE PROTEUS DATA](image)

Answer Yes to store to the permanent storage.

You can also load the programs and variables from the EEPROM by selecting Tools/Load from EEPROM from the menu. Following question will be asked:

![LOAD PROTEUS DATA](image)

Answer Yes to load the programs and variables. All current motion programs and variables and setup information in the controller memory will be overwritten with the ones loaded from the EEPROM.
3.6 Working with Motion Programs

Proteus SA supports up to 4 motion programs. These four motion programs are run in multitasking mode.

Using Proteus IPE, you can easily work with the motion programs by opening, editing, downloading, and uploading.

3.6.1 Uploading Motion Program

To upload a motion program from the controller open a new motion program editor by selecting File/New from the menu or by clicking:

![Motion Program Editor]

You will see a new motion program editor:
Select which motion program to upload by selecting one of the buttons:

After selecting which motion program to upload, hit upload button:

The motion program will then be uploaded from the controller to the motion editor:

```
::** BEGIN PROG 1 **::
Sample program for linear interpolated motion
HSPD10000
LSPD1000
ACCEL300
WHILE 1
   X0 Y0
   X10000 Y2000
   X-2000 Z4000
   Z0 Y0
ENDWHILE
END
::** END PROG 1 (11:129)**::
```

Here you can view and edit the uploaded motion program.
3.6.2 Downloading Motion Program

To download a motion program, first open a motion program editor. Either open an existing motion program from a file, upload from the controller and edit, or type in a new motion program in the editor.

```
| *** BEGIN PROG 1 *** |
| Sample program for linear interpolated motion |
| HSPD10000 |
| LSPD1000 |
| ACCEL300 |
| WHILE 1 |
| X0 Y0 |
| X10000 Y2000 |
| X-2000 Z4000 |
| Z0 Y0 |
| ENDFWHILE |
| END |
| *** END PROG 1 (11:129) *** |
```

Select the motion program number to download to:

```
1 2 3 4
```

Click the download button:

```
<download button>
```

3.6.3 Quick Running, Stopping, and Aborting motion programs

Without going into Control screen, you can quickly RUN, STOP, ABORT the motion program from program screen by clicking from the following buttons:

```
<control buttons>
```
3.6.4 Editing and Printing Motion Program

Motion editor is a common text editor which supports Windows text edit functions: Copy, Cut, Paste:

You can print the currently open motion program using the print button:

3.6.5 Saving and Opening Motion Program

Proteus IPE uses common Windows File Save and Open functions to save and open motion programs. All the motion programs have *.prg file format.

To open an existing motion program:

To save a motion program:
3.7 Online Help

Proteus IPE has online language help file. To open the online language help file, select the following button:

Following Windows Help will open

![Windows Help Screenshot]

This help file contains all the Proteus SA language that is currently supported.