SEVCON PCpaK

User Manual - Version: 2.00.00 (UK0052)

Document History

Author		Reviewer		Version	Reason for Modification
Initials	Date	Initials	Date		
CEH	27/09/01			1.0.0.21β	Original
CEH	05/10/01			UK0030	Added MillipaK Functionality
PS	06/11/01			UK0030	Changed MillipaK Functionality
PS	7/1/02			UK0049	Added Config ID Functionality
PS	8/2/02			UK0052	Added SEM flash prog and protocol select
PS	24/10/02			UK0052	Renamed PowerpaK SEM programmer
TSN	27/09/05			2.00.00	Revised for formal release

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<u>Introduction</u>

PCpaK allows a PC to communicate with an individual controller or a controller system comprising of more than one controller if they are inter-connected via a communications bus. The software provides many advantages over using the standard calibrator hand set and offers the following features:

- Connection to multiple nodes where the nodes are connected to each other via a common bus.
- Ability to save and load configurations to and from file.
- Rapid download of system configurations.
- Fault and service log analysis, where the controller system supports them.
- Controller status checking.
- View of controller structure.
- "Offline" viewing of previously stored configurations.

Refer to controller product manual for details of controller features and programming options.

<u>Compatibility</u>

We are constantly updating our systems to allow PCpaK to interface to more of our controllers.

Refer to the appropriate Product Manual to determine if your Controller System is compatible with PCpaK or contact SEVCON for a complete list of controllers which support PCpaK.

<u>Important Safety Notice</u>

WARNING: Care must be taken when operating using PCpaK on any system. Changes to personalities can change vehicle performance and operation. If the controller system is fitted to a vehicle ensure no movement is possible before using PCpaK to make any changes.

WARNING: Do not connect your PC to a controller if the controller does not have an adequate ground connected to B-. This is because the ground from the controller follows through the serial port through the PC. You can damage the PC if the controller pulls sufficient current (e.g. when charging capacitors) and no other ground path is available.

<u>Installation</u>

This section describes the steps necessary to install the PCpaK application and the recommended system requirements (memory, disk space, etc.) required to operate it.

<u>System Requirements</u>

System	A 486 machine is required as a minimum. A 266MHz Pentium with 64MB of RAM is recommended.
Operating System	PCpaK will operate on Microsoft Windows 95/98/NT/2000/XP.
Storage	PCpaK is supplied via CD-ROM, therefore a CD-ROM drive is required. PCpaK can be copied to a local hard disk drive or can be executed directly from the CD-ROM. It is recommended that PCpaK is installed on a hard disk, since the Cache function will not work if PCpaK is running from the CD-ROM drive. PCpaK requires approximately 7MB of disk space.
Serial Port	PCpaK requires one free Serial Port capable of operating at 115KBaud.
Screen Resolution	Minimum resolution is 640 x 480 with 16 colours. 800 x 600 resolution is recommended.

Table 1: System Requirements

Software Installation

Follow this procedure to install the PCpaK application on your hard disk:

1. Insert the PCpaK CD-ROM.

2. Run the PCpaK_setup.exe application on the CD.

3. PCpaK will be installed to the hard disk, and will be able to run without the CD. To start the program, select the PCpaK program option, which has been added to the start menu.

4. When the software runs for the first time, you will be asked to enter a configuration ID. You should find this information supplied with PCpaK. Enter the ID provided exactly as it is displayed – it is case sensitive.
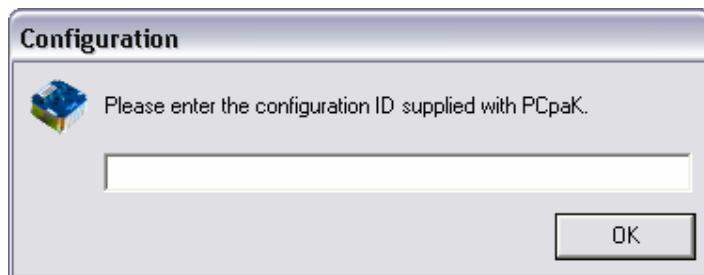
5. Press OK when you have entered the ID. If it is accepted you will be taken to the main PCpaK interface. If it is not accepted, you must enter it again.

The configuration ID only needs to be entered once. Once the ID has been accepted, you do not need to enter it again.

Hardware Requirements

This section explains how to connect up the system hardware to use PCpaK to communicate with a Controller System.

Interface Modules

Connection between the PC and the controller systems must be done via the appropriate interface module. There are two interface modules currently available, RS-232 to CANbus interface and RS-232 to TTL interface. See Figure 1 and Figure 2.
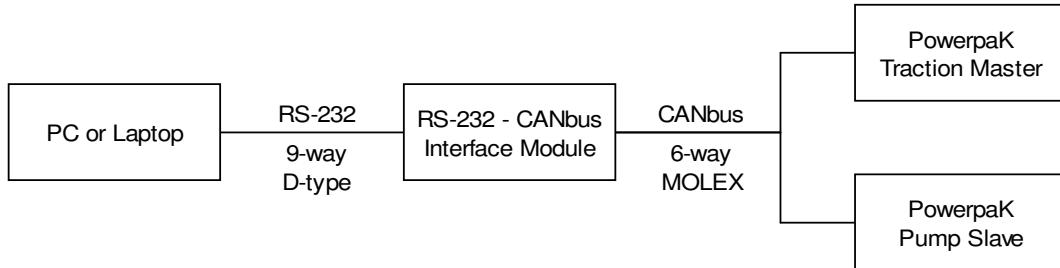
Figure 1: RS-232 to CANbus Interface
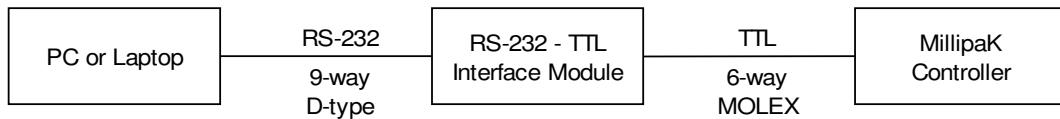
Figure 2: RS-232 to TTL Interface

Table 2 shows which interface module to use for each product range.

Product Range	Interface Module
PowerpaK	RS-232 to CANbus
MillipaK	RS-232 to TTL

Table 2: Interface Modules for each Product Range

Ordering information for these interface modules can be found in the Ordering Information section.

⚠ **WARNING: TO PREVENT POTENTIAL DAMAGE TO YOUR PC ENSURE THE CONTROLLER BATTERY NEGATIVE (B-) AND BATTERY POSITIVE (B+) CONNECTIONS ARE MADE PRIOR TO CONNECTING TO YOUR PC.**

Connection

Once you have the appropriate interface module for your Product Range, you can connect up the system as described below.

Interface Module to PC Connection

All interface modules have one 9-way D-type connector. This should be plugged into a free serial port on your PC or laptop. The 6-way Molex connector should be plugged into the controller as follows:

PowerpaK Controller System to Interface Module Connection

The PowerpaK range of controllers use a serial communications bus called CAN. CAN allows many nodes to be easily connected together.

If your PowerpaK Controller System is setup to run in CANbus mode, then you only need to connect the 6-way Molex connector from your module to any point on the CANbus to be able to access all the nodes. The Interface Module is supplied with 2 Molex connectors, one male, and one female. This is a straight through connection and is intended to be inserted into any point on the CANbus.

Typically, if there is more than one node in a PowerpaK system it will be configured to run in CANbus mode. This can be easily determined by checking if there is a wiring harness connecting all the CANbus outputs on the controllers together. Refer to the appropriate Product Manuals for your PowerpaK system for more information.

MillipaK Controller System to Interface Module Connection

The MillipaK range of controllers does not use CANbus and is not designed to communicate with other nodes. The Serial Port is only used by the Calibrator or PCpaK.

If there is more than one MillipaK Controller on your vehicle, you will need to connect the 6-way Molex connector from the Interface Module to the Serial Port of the controller you want to access information from.

Protocol Selection

The 2 Interface Modules run using different protocols. Protocol selection is made in the PCpaK options screen, which can be found in the tools menu. You must check you are using the correct protocol; otherwise you will not be able to open communications.

Features

This section describes the features provided by PCpaK and gives instructions on how to operate the program.

<u>System Start Up</u>

If PCpaK is to be used simply to view existing Controller System Profile files, (see section on Controller System Profile Files) then no connection to an Interface Module is necessary. However, if PCpaK is to be used to communicate with a Controller System, ensure that the Interface Module is connected to the serial port on the PC or Laptop before starting PCpaK.

The connection to the Controller System is optional at start up; however, the Controller System should be connected to the Interface Module before trying to establish a connection.

To start PCpaK select the PCpaK option from the start menu. When PCpaK starts, the initial window to be displayed is the Main Window. See Figure 3 for Main Window at Start up. From this point, the user can use PCpaK to interrogate and configure Controller Systems.
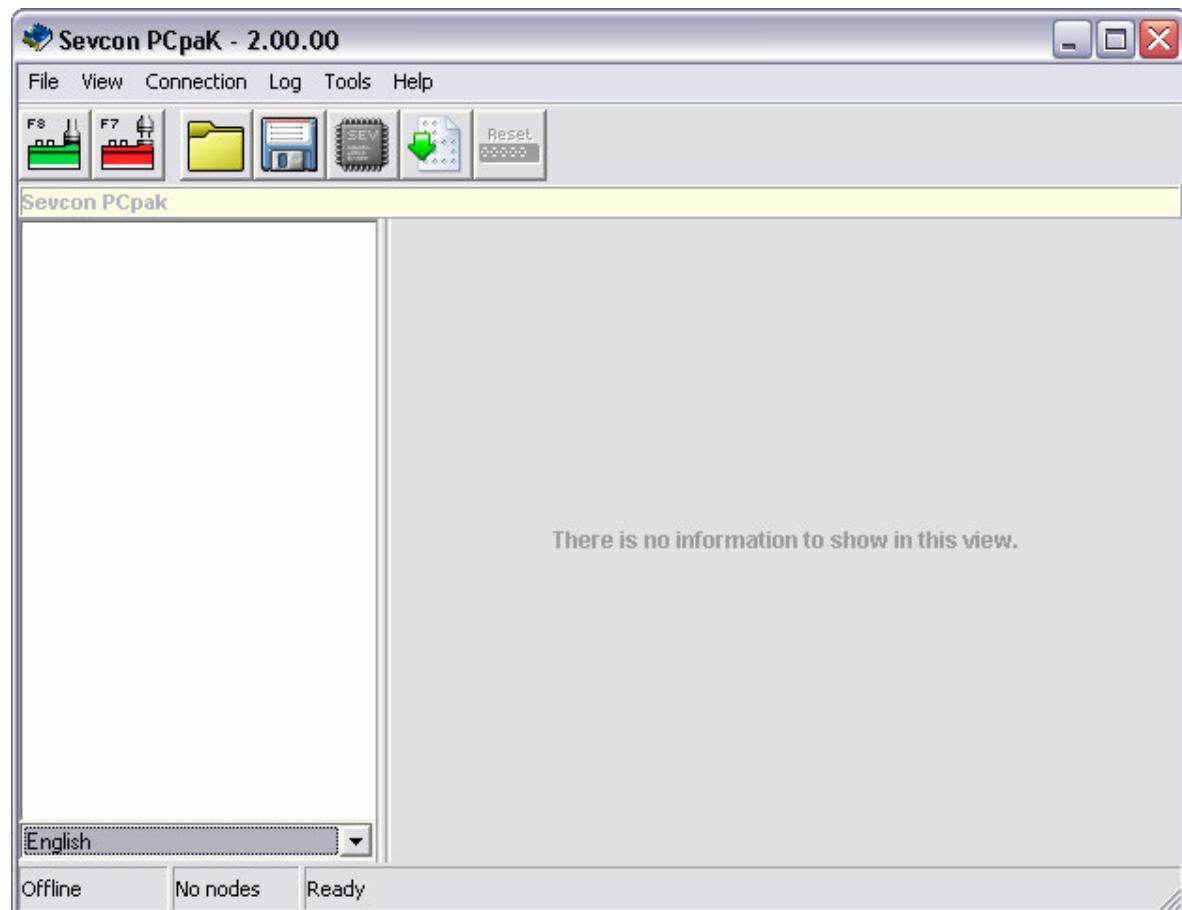
Figure 3: PCpaK Main Window at Start Up.

Main Window

PCpaK has one main window, which is used to display all the information about a connected controller system (if Online) or to display a previously saved Controller System Profile file (if Offline).
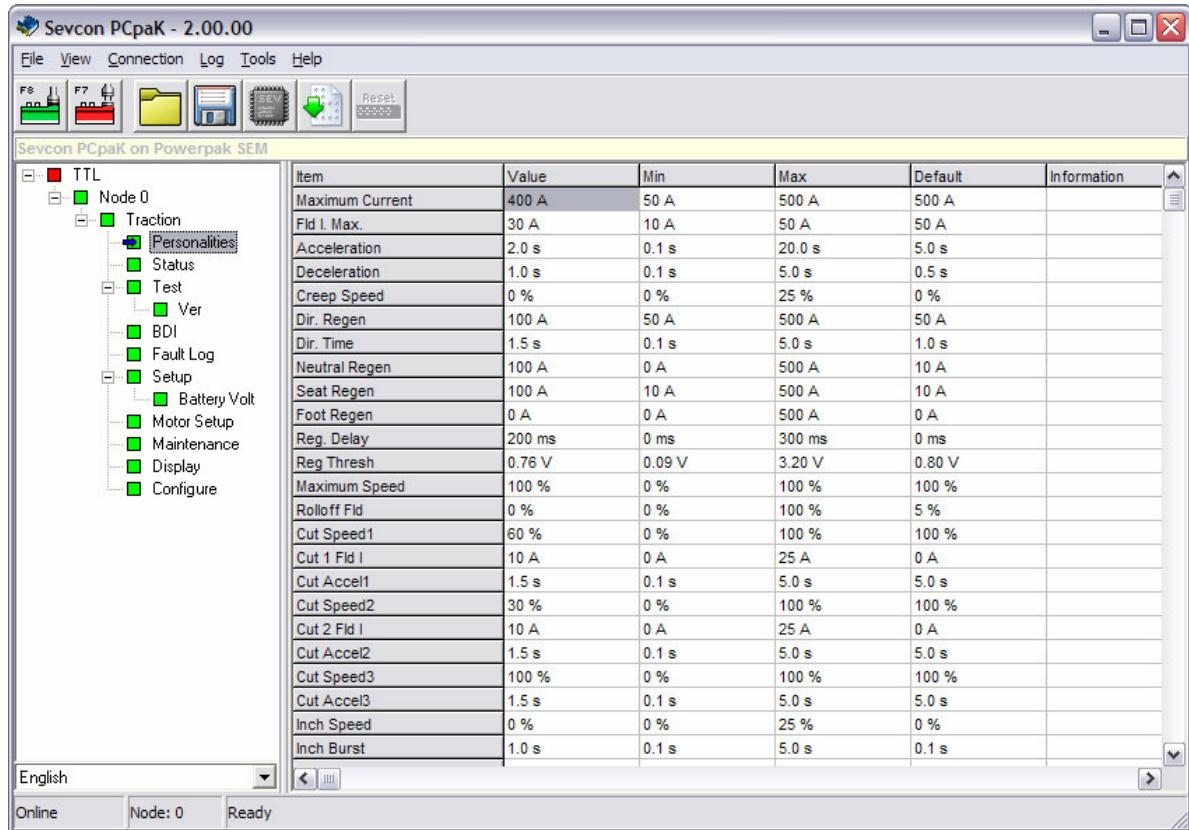
Figure 4: PCpaK Main Window

This window uses a layout similar to Windows Explorer to allow the operator to edit personalities and view controller system information.

The window is split into different panes, as shown in Figure 5. At the top of PCpaK's main window, there is the standard Title Bar, Menu Bar and Toolbar. For further description of the Menu Bar and Toolbar, refer to the PCpaK Menus and PCpaK Toolbar sections respectively.

Title Bar	X
Menu Bar	
Toolbar	

Nodes and Menus	Menu Items
Language Selection	
Status Bar	
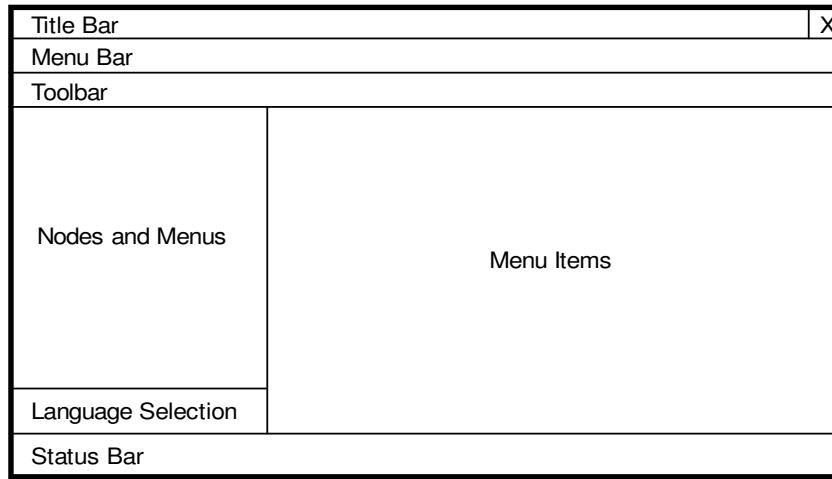
Figure 5: PCpaK Main Window Layout

The centre of the window is the main working area. The left hand pane is a Tree structure used to display all the nodes in the controller system and the available menus for that node. The right hand pane displays all the items for the selected menu. Refer to the Node and Menu Item Panes section.

The bottom of the window contains the Language Selection drop down box and the Status Bar. The Language Selection box is used to select the required language to display the menu information in. The Language Selection box is described in the PCpaK Language Selection section.

The Status Bar is used to show the current status of the system. For example, this shows if PCpaK is connected to a controller (online) or not (offline). The Status Bar is described in the PCpaK Status Bar section.

Node and Menu Item Panes

The two panes in the centre of the Main Window are used to show the Nodes and Node Menus (left hand pane) and the menu items for the selected Node menu (right hand pane). Refer to Figure 4 and Figure 5.

The functions of the two panes are explained in the following sections.

Node and Node Menus (Left Hand-Pane)

The left hand pane uses a Tree structure to show all the Nodes in the system and the available menus for each node. Note that menus may themselves have sub-menus. The Tree structure may be expanded and collapsed as required by clicking on the '+' and '-' items. The Tree structure is always fully expanded when a new connection is established.

Not all menus have data associated with them. Some menus (e.g. traction) are only displayed to show sub menus. If a menu has no data associated with it, then it will be displayed with a red icon. Other menus will appear with a green icon.

From the communications bus, all the nodes in the system are listed in numerical order. In SEVCON systems node numbers are allocated according to the units function. Table 3 shows how node numbers are allocated:

Node Number	Node Function
0	Master or Standalone Traction or Combined Traction and Pump for Aerial Lift systems.
1	Slave Traction on Dual Motor Systems
2	Pump / Power Steer Controller
3 onwards	Reserved

Table 3: Node Number Allocation

Each node shows all of its sub-nodes (e.g. Traction or Pump or, in some cases, both) and each sub-node shows all the menus and sub-menus it has available. On some systems, e.g. Aerial Lift systems or MillipaKs with Pump Soft Start, both the Traction and Pump function can be performed on the same node.

The user can select the Node or sub-Node items or an individual menu in the Tree structure to display further information in the Menu Items pane (right hand pane). See the next section for more information.

Menu Items (Right Hand-Pane)

The right hand pane displays information on a selected node, sub-node or menu using a table format.

Node Items

Selecting a Node item in the left hand pane will display the information shown in Figure 6:
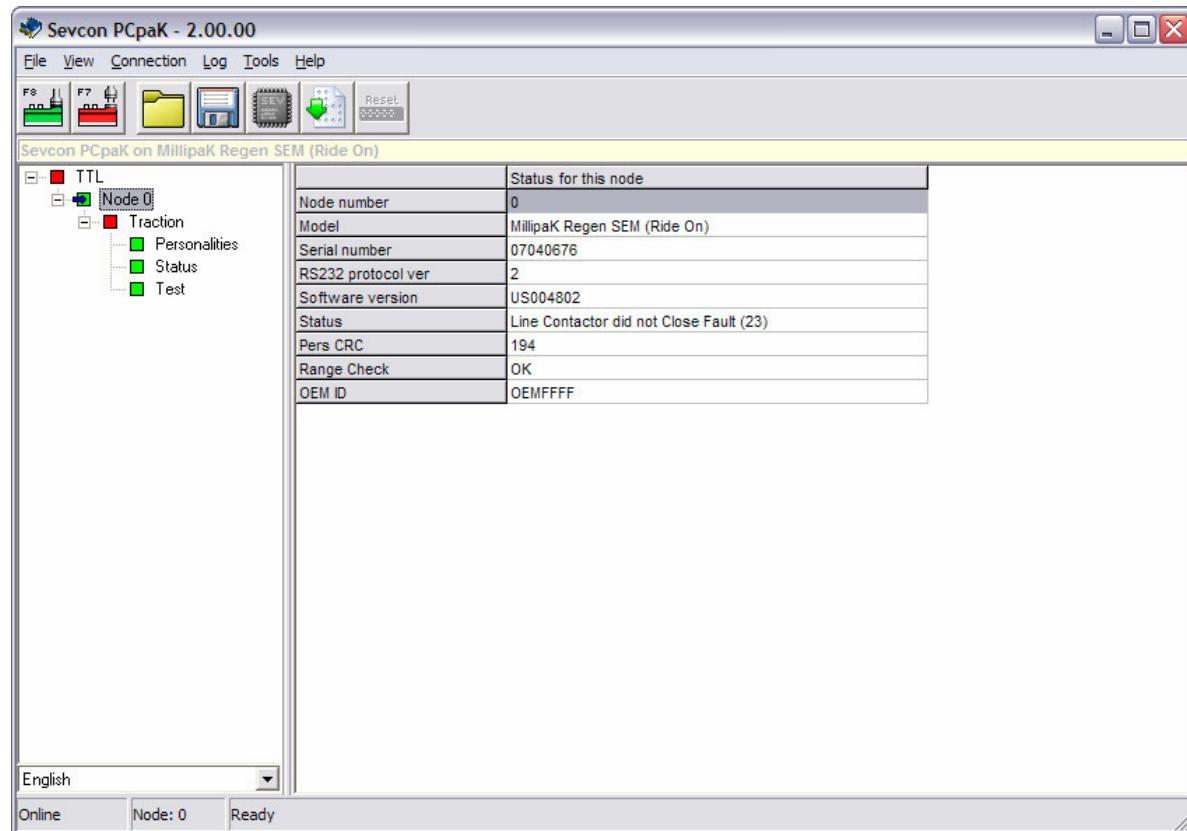
Figure 6: Node Information Screen

The information displayed here is:

- **Node Number**. Node Number for the selected node.

- **Model**. Description of the node, e.g. PowerpaK Traction Series or MillipaK Traction SEM.

- **Serial Number**. Node serial number.

- **Protocol Version**. Version of protocol used to communicate with node.

- **Software Version**. Node software version.

- **Status**. Status of node. This item will show if there is any fault currently active on the node.

- **Pers CRC**. If the node supports this facility, the node personality CRC will be displayed here. Refer to the product manual for more information.

- **Range Check**. If any personalities are out of range, this item will show which one it is.

This information is read only and cannot be changed.

Sub-Node Items

Selecting a sub-Node item in the left hand pane may display the following information in the right hand pane for some PowerpaK units. Note that whether or not this information is displayed depends on the security level of the PCpaK installation and also the controller variant.

- **Configure**. Node software version number and personality checksum.
- **Debug**. Debug information for system development and analysis.
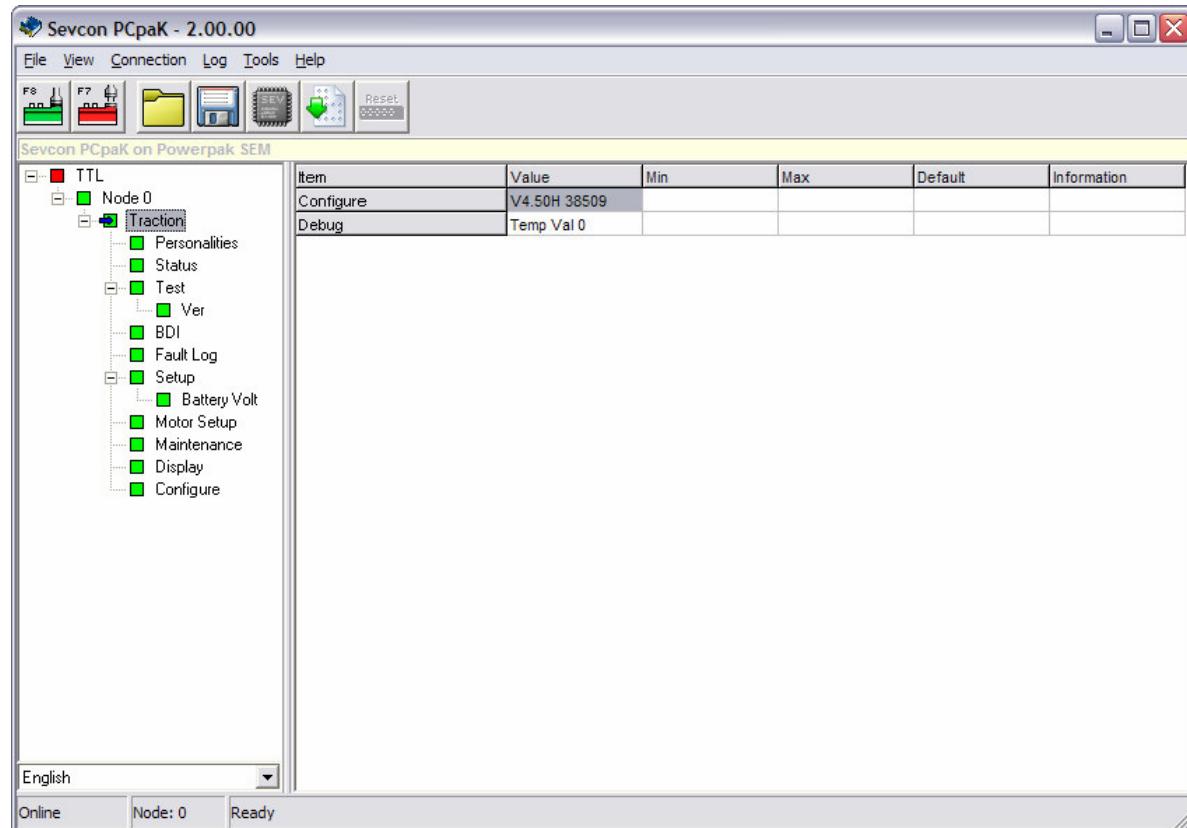
Figure 7: A Sub-Node Menu

This information is read only and cannot be changed. There is no sub-Node information displayed for MillipaK systems.

Menu Items

Selecting a Menu item in the left hand pane will display information in the right hand pane depending on the type of menu which is displayed. The different types of menus available are:

▪ **Configuration**. Menus containing personality or setup information.

▪ **Status**. Menus containing system status information and the service log.

▪ **Test**. Menus containing system test information.

▪ **Faultlog**. Faultlog menus.

▪ **Information**. Any menus which do not fall into one of the above categories.

Note that the information in Status, Test, Faultlog and Information menus will only change if a controller system is connected (i.e. Online). If PCpaK is in Offline mode, the information displayed shows the last values received by PCpaK before it was disconnected.

Configuration Menus:

These menus display personality and setup menu items. See Figure 8.
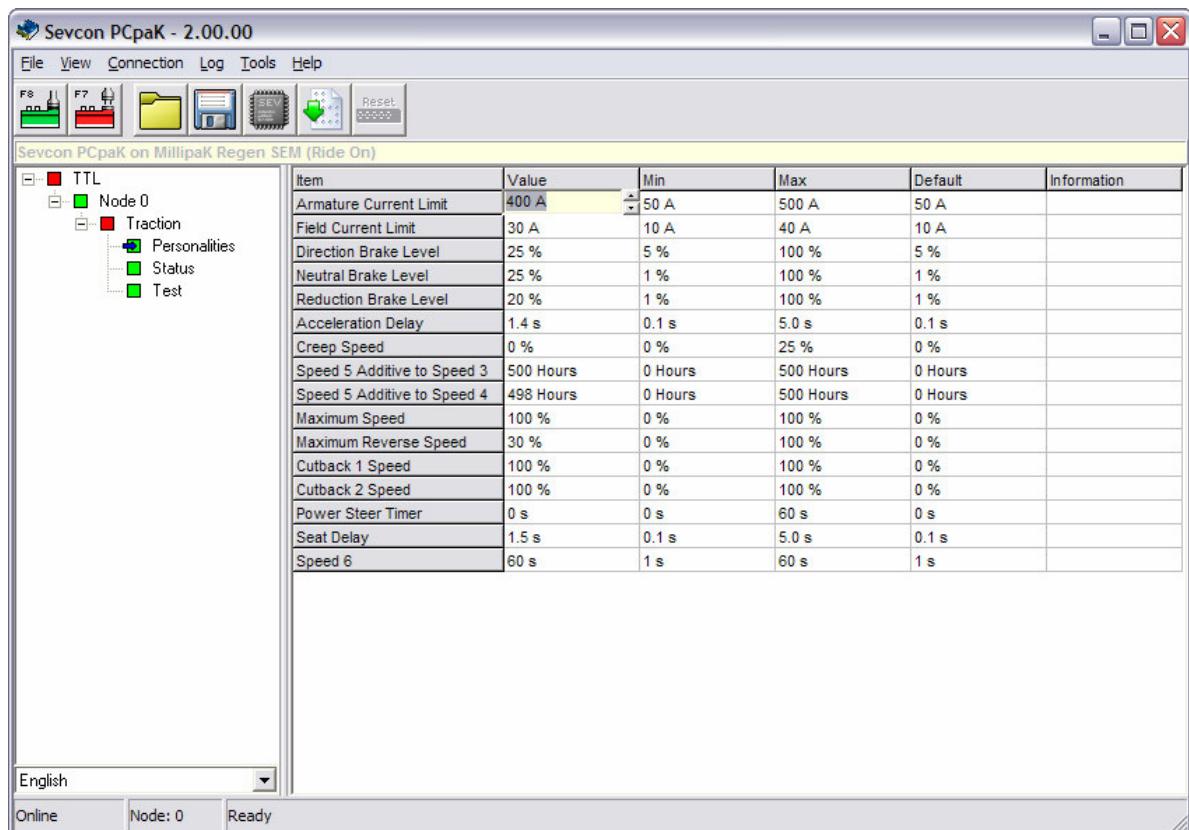
Figure 8: A Configuration Menu

If the security level allows, the user can click on the value to be changed using the mouse and modify the personality information using one of the following methods:

- Two methods are available to change numerical information:
  - Simply type in the new value. Note that values will always be rounded to the nearest allowed number.
  - When a configuration item is selected, '+' and '-' buttons appear at the right hand side of the selected item. These '+' and '-' buttons can be used to increase and decrease the value.
- Items which require the user to select an option provide a drop down list from which the user can make their selection.

The following information is displayed for each menu item in a Configuration menu:

- **Value**. The current value of the configuration item.

- **Min**. The allowed minimum for the configuration. PCpaK will not allow the value to decrease below this value. This field is blank for items which use drop down list boxes.

- **Max**. The allowed maximum for the configuration. PCpaK will not allow the value to increase above this value. This field is blank for items which use drop down list boxes.

- **Default**. If the configuration item is shown as being out of range, this is the default value which will be entered when the range error is first corrected.

- **Information**. This provides further information about the menu item. For example, this indicates if the value is out of range.

Information in Configuration menus can only be changed if a controller system is connected (i.e. online). PCpaK will update the connected controller system with the new configuration item value as soon as the user changes it and it has been validated.

Status Menus:

These display system status menu items. See Figure 9: A Status Menu.

These items are read only. Status menus also display service log information. The following information is displayed for each menu item in a Status menu:

- **Current Value**. The current value of the status item.

- **Highest Value**. If the system supports a Service Log, a log is maintained of the highest value seen for some status information. For example, PowerpaK systems log the highest Battery Voltage. If logged, the highest value seen for the item is displayed in this field.

- **Lowest Value**. If the system supports a Service Log, a log is maintained of the lowest value seen for some status information. For example, PowerpaK systems log the lowest Heatsink Temperature. If logged, the lowest value seen for the item is displayed in this field.

The information in Status menus will only change if a controller system is connected (i.e. online). If PCpaK is in Offline mode, the information displayed shows the last values received by PCpaK before it was disconnected from the controller system.
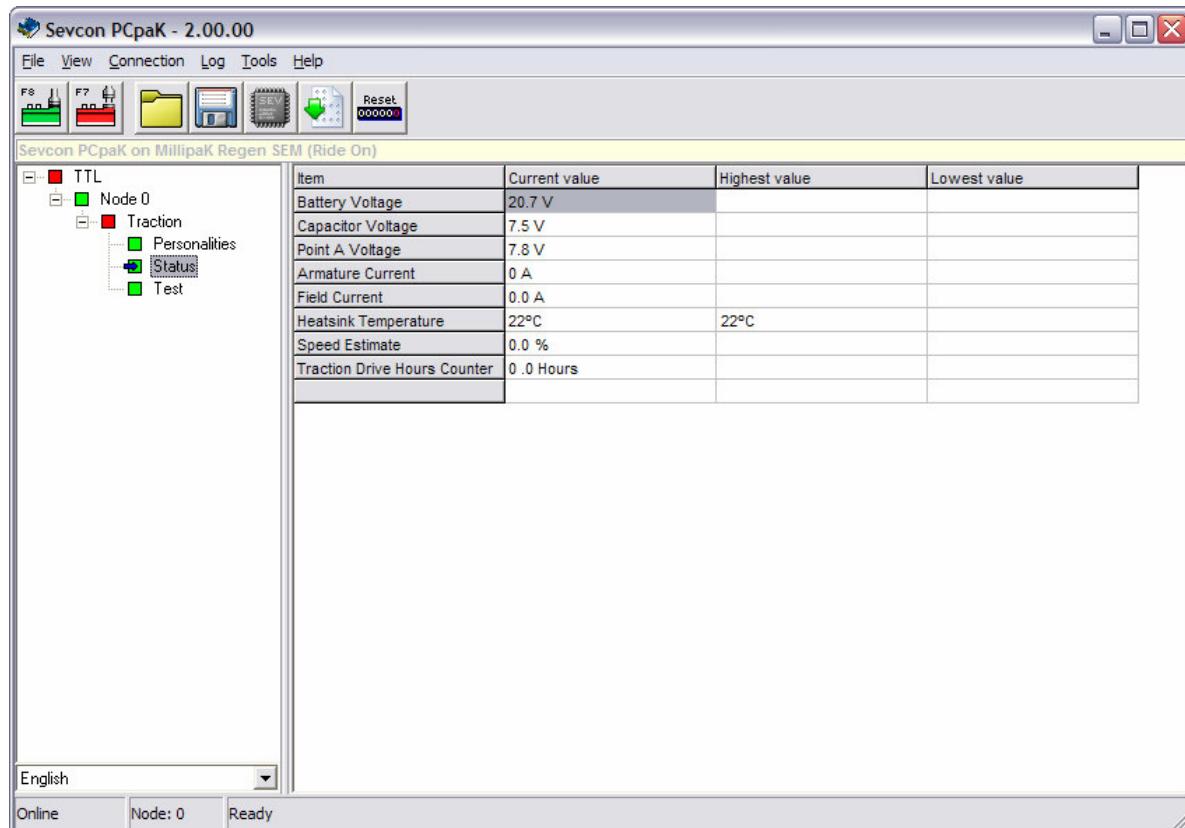
Figure 9: A Status Menu

Test Menus:

These display system test menu items. See Figure 10: A Test Menu.

Test menus are used to allow the user to check the systems inputs and outputs and also to provide information on the unit. These items are read only. Only the current value is displayed for test menu items. The Min, Max, Default and Information columns are not used.

The information in Test menus will only change if a controller system is connected (i.e. online). If PCpaK is in Offline mode, the information displayed shows the last values received by PCpaK before it was disconnected from the controller system.
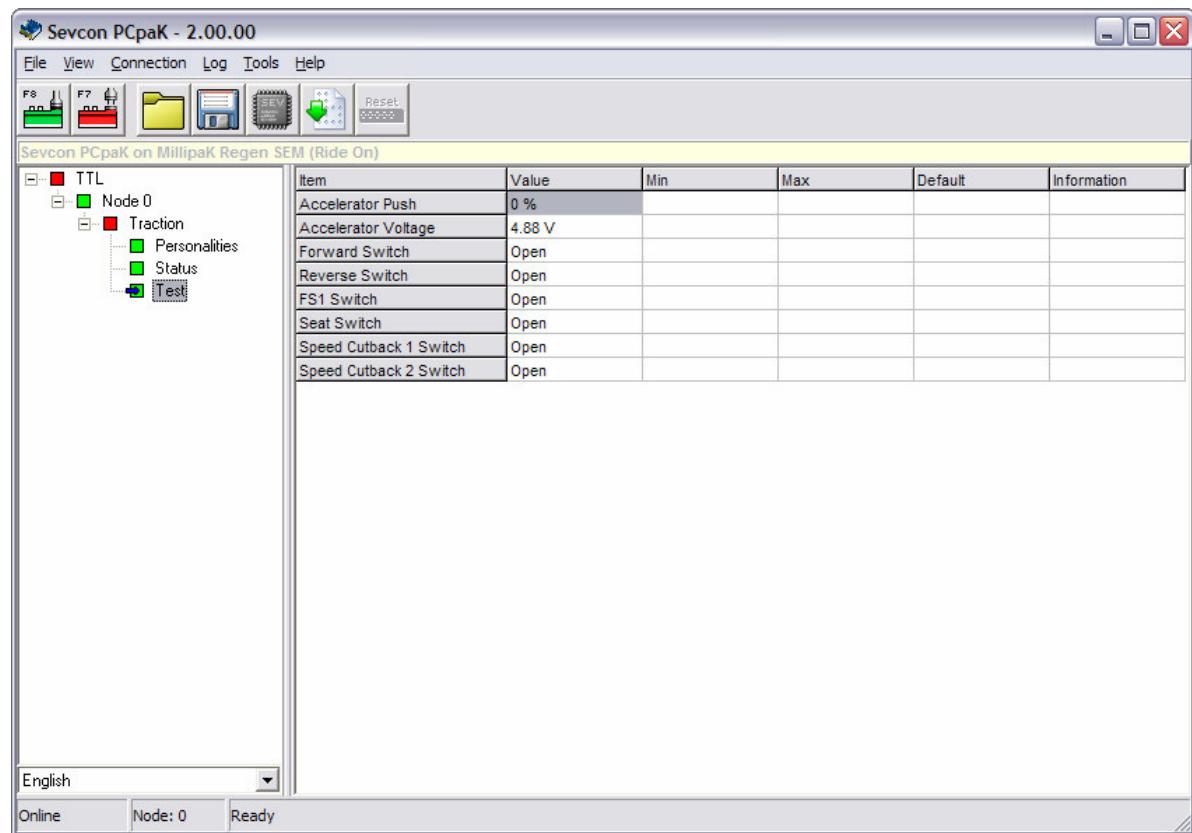

Figure 10: A Test Menu

Faultlog Menus:

These display Faultlog menu items. See Figure 11.
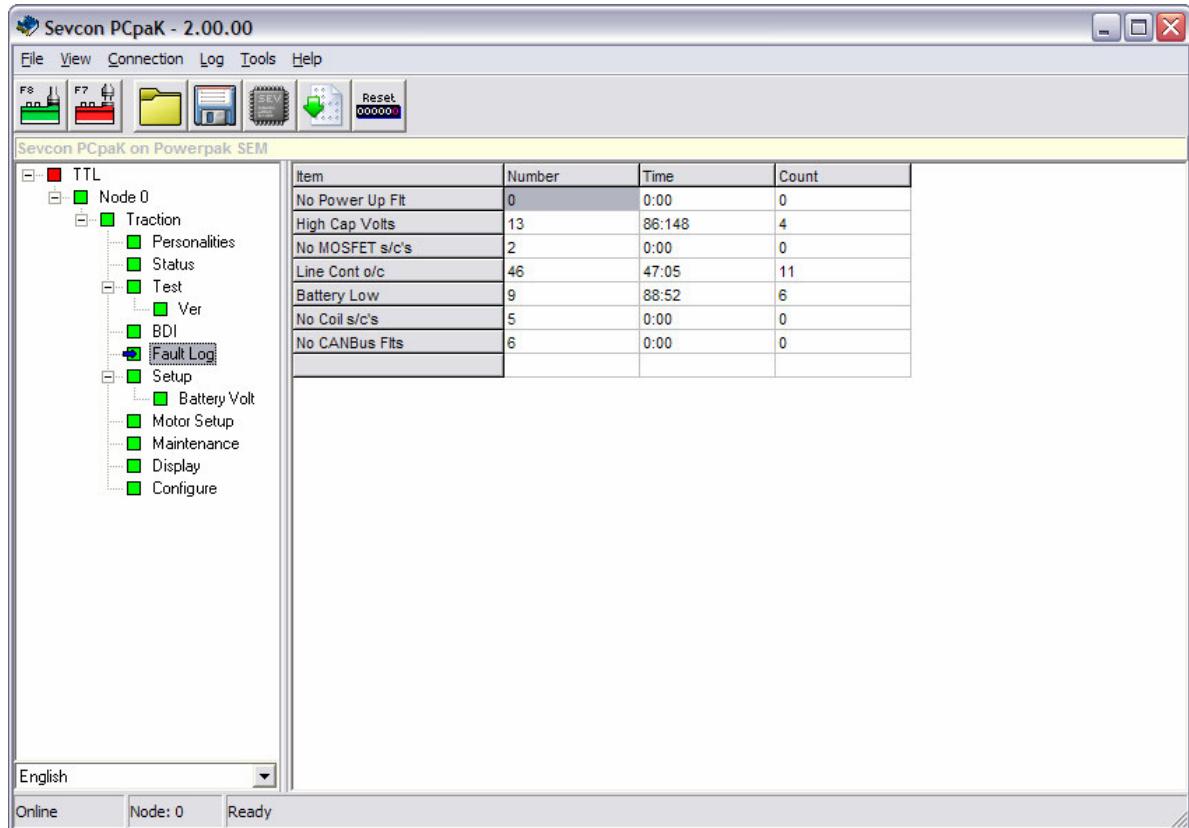
Figure 11: A Faultlog Menu

These items are read only. Only PowerpaK systems support Faultlogs at present. The following information is displayed for each menu item in a PowerpaK Faultlog menu:

- **Item**. The flash fault group. Faults are grouped by flash fault group (e.g. 1FF, 3FF, etc) in the PowerpaK Faultlog.

- **Last Fault Message**. The last fault message displayed on the Calibrator for this flash fault group.

- **Time**. The Keyswitch hours when the last fault was logged.

- **Count**. The number of faults logged in this flash fault since the last Faultlog reset.

Information Menus:

These display general information menu items. See Figure 12.

These items are read only. Only the current value is displayed for information menu items. The Min, Max, Default and Information columns are not used.
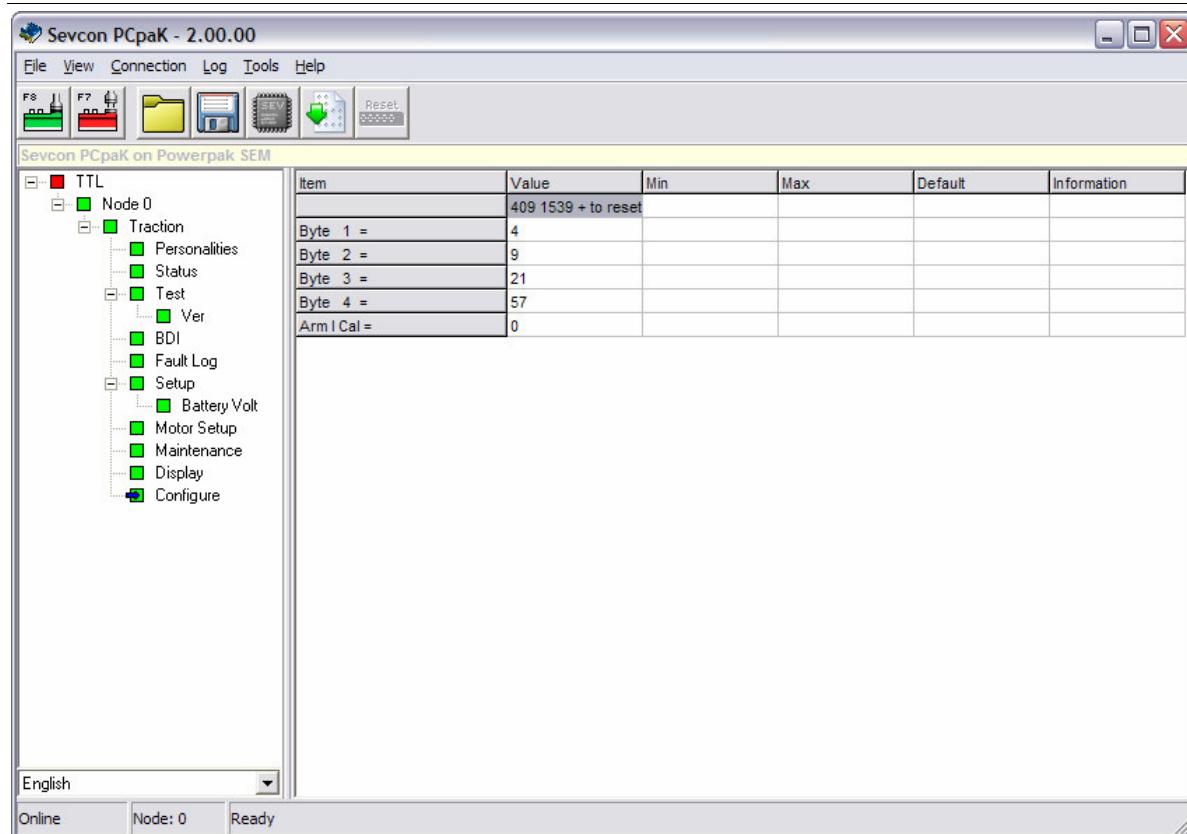
Figure 12: An Information Menu

PCpaK Menus

This section explains the function of each of the Menu options in PCpaK.

File Menu

The File Menu has the following options:

- Open
- Save
- Print
- Exit

Each menu item is explained more fully in the following sections.

Open

This option allows the user to open an existing Controller System Profile file (*.sev). Refer to the Controller System Profile Files section for more information about Controller System Profile files.

A standard windows Open dialog box is displayed to allow the user to select the required file.

If PCpaK is not currently connected to a controller system, the System Profile file is opened as read-only. It is not possible to make any changes, but all the information can be viewed.

If PCpaK is connected to a controller system, PCpaK will attempt to open the System Profile file and update the connected system with the information contained within the Profile.

Before downloading the data, PCpaK will check that data stored in the System Profile is compatible with the connected system. If the data is incompatible, an error will be displayed and the file open is aborted. Once the data in the file has been downloaded, PCpaK will interrogate the Controller System to read all the dynamic data. (i.e. Voltages, Currents, Faultlog information, etc).

WARNING: If PCpaK is connected to a Controller System when a Controller System Profile File is opened, it will automatically attempt to download the data in the file to the Controller System. If this is not required, ensure that the Controller System is disconnected before the Controller System Profile File is opened.

Save

This option allows the user to save the information from the connected controller system to a Controller System Profile file (*.sev). Refer to the Controller System Profile Files section for more information about Controller System Profile files.

A standard Windows Save dialog box is displayed to allow the user to name and save the System Profile.

If PCpaK is not connected to a controller system, then this option is not available.

Print

This option allows the user to print the displayed System Profile to a printer. Figure 13 shows the Print Dialog Box.
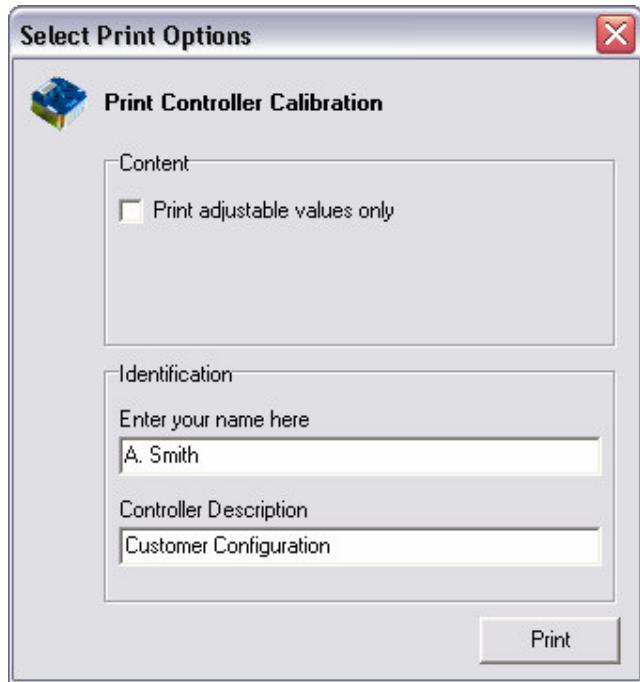
Figure 13: Print Dialog Box

The Print Dialog Box allows the user to specify what is to be printed and also to include some information about the User and the Controller System description onto the printed sheets.

If the Print Adjustable Values Only check box is not checked, PCpaK will:

▪ Print all the information about the connected controller system, if Online, or

▪ Print all the information in the Controller System Profile file, if Offline.

The printout will include all configuration information (personalities, setup items, etc) and the information in the Status, Test, Faultlog and other Information menus.

If the Print Adjustable Values Only box is checked, PCpaK will only print the values of configuration items (personalities, setup items, etc).

PCpaK always prints to the default printer.

Exit

This option allows the user to exit PCpaK.

Edit Menu

This menu option is not yet available.

View Menu

The View Menu has the following options:

- Update Dynamic Data
- Show / Hide Communication Status

Each menu item is explained more fully in the following sections.

Update Dynamic Data

This option allows the user to force a refresh of all the data currently displayed. Function key 'F5' can be used to access this function.

Show / Hide Communication Status

The Communication Status dialog box (see Figure 14) shows when PCpaK is downloading and uploading data to and from the controller system. This option can be used to hide or show this dialog box.
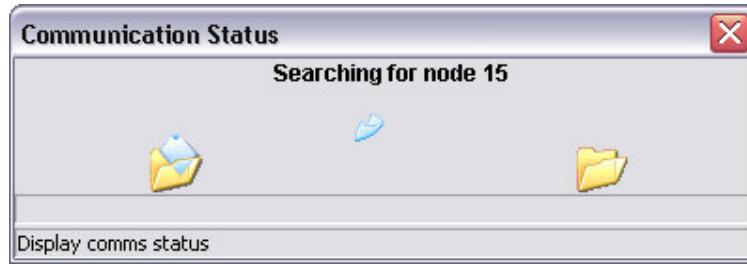
Figure 14: Communication Status Dialog Box.

Function key 'F12' can also be used to show / hide the Communications Status dialog box.

Connection Menu

The Connection Menu has the following options:

- Open Connection.
- Close Connection.

Each menu item is explained more fully in the following sections.

Open Connection

This option allows the user to connect PCpaK to a controller system. Function key 'F8' can also be used to open a connection.

PCpaK will attempt to connect using the COM Port specified in the Options dialog box. Refer to the Options section. Whilst the connection is established, PCpaK will display the Communication Status dialog box. Refer to the Show / Hide Communication Status section.

The first step is to try to detect what controllers are present. On a multi-node system, where the controllers are all connected via a common communications bus, PCpaK will attempt to detect all the controllers on the bus. PCpaK will try to connect three times before aborting and displaying an error message to the user.

If one or more controllers are found, PCpaK will upload all the information it requires and displays the information in the Main Window.

Close Connection

This option allows the user to disconnect PCpaK from the Controller System. Function key 'F7' can also be used to close the connection.

Log Menu

The Log Menu has the following options:

▪   Clear Log

This menu item is explained more fully in the following section.

Clear Log

This option only becomes available if the current item selected in the main window is a log which can be reset. For example, on the PowerpaK range of controllers, resettable logs are the Fault Log and Service Log. Refer to the product manual for the controller for a list of what logs are available and which can be reset.

When the user has highlighted a resettable log and selects the Clear Log option, PCpaK sends a command to the Controller System to reset the chosen log.

Tools Menu

The Tools Menu has the following options:

▪ Rapid Download.

▪ Flash Programming:

▪ Options.

Each menu item is explained more fully in the following sections.

Rapid Download

This option allows the user to download personality information to a controller system without having to go through the connection procedure described in the previous section, Open Connection. This feature is particularly useful when setting up a number of controller systems with the same configuration.

The feature uses a Wizard to setup and perform the rapid download function. The steps are:

1. **Choose Source and Destination Parameters**. In this step, select the Controller System Profile file which contains the system personalities to download. Click on Next when ready. See Figure 15.
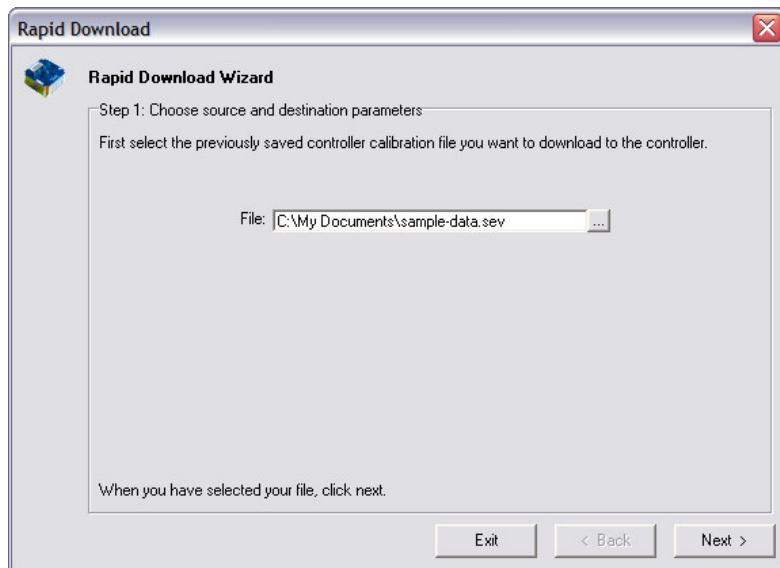

Figure 15: Rapid Download Wizard - Step 1.

2. **Check Node Compatibility**. On Multi-Node systems, it is possible to individually select or de-select which nodes are to be updated. For example, on a Traction and Pump system it is possible to request that both the nodes are updated or only the Traction Node or Pump Node is updated.

In some exceptional circumstances, the user may have a system where the Destination Nodes of the target Controller System are different to the Source Nodes defined in the Controller System Profile file. PCpaK allows the user to map a source node to a different destination node or to ignore a node altogether. The Dest Node column is used to change the destination node. Setting the Dest Node to Ignore will exclude that node from the Rapid Download updated. It is recommended that only advanced Users change destination nodes. In most circumstances, the destination node should be identical to the source node.

By default, PCpaK will assume all nodes in the Controller System Profile file are to be included in the Rapid Download and the destination node is the same as the source node.

After setting up the nodes as required, click Next. See Figure 16.
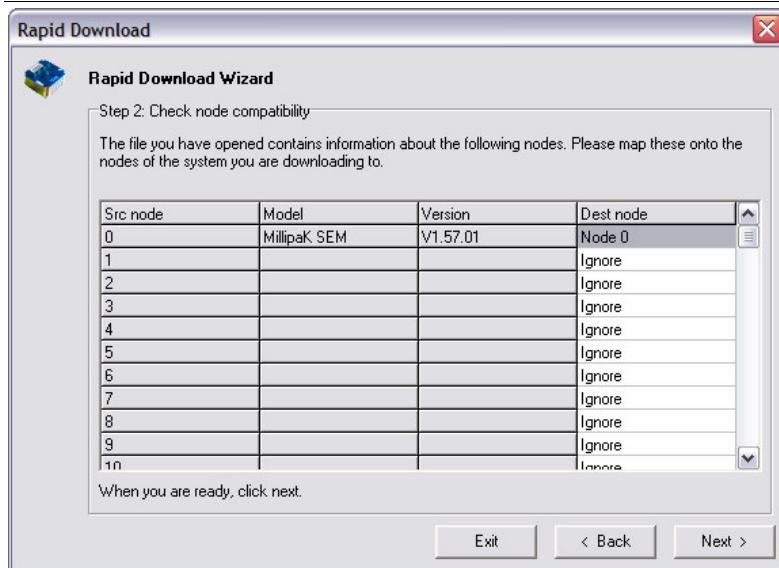
Figure 16: Rapid Download Wizard - Step 2.

3. **Download to Controllers**. The system now has all the information it requires. Ensure that the Controller System is connected to the PC and is powered up ready for the download. Click on the Download button to download the information to the controllers. PCpaK will automatically connect to the controllers, download the information, and then disconnect from the controllers. Once this is complete, the user may plug their Interface Module into a new controller system and repeat the download simply by clicking on Download again. This may be performed as often as is necessary. The user may also if they wish choose to have the fault or service logs reset after a rapid download operation. These logs will only be reset if rapid download completes successfully. See Figure 17.
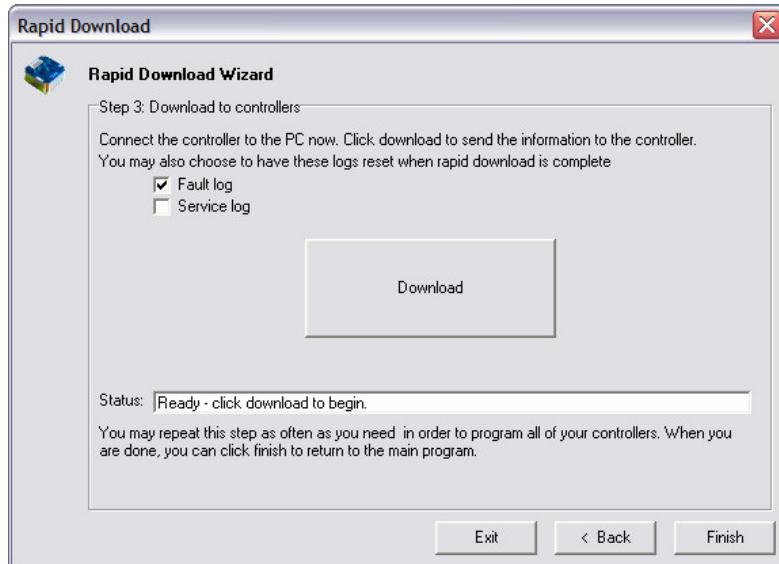
Figure 17: Rapid Download Wizard - Step 3.

4. **Finish**. Once all the controller systems have been updated, click on Finish to return to the main menu.

Options

This option allows the user to configure PCpaK for their installation. When this menu item is selected the following dialog box is displayed.
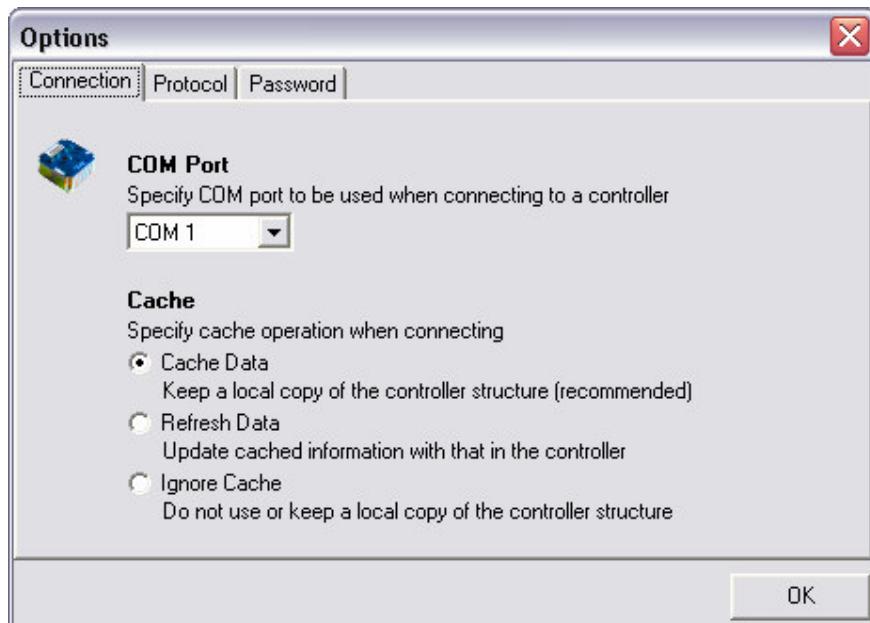
Figure 18: Options Dialog Box

This dialog is split into two sections:

▪ COM Port and

▪ Cache

See the sections, COM Port and Cache, below, for more information.

COM Port:

In this section, the operator can select the COM port. (e.g. COM1, COM2, etc).

Cache:

The first time PCpaK connects to a new controller system it must upload a lot of information regarding menu structure, display formats, etc. This information is used to build up a map of the controller system's menu structure.

For a specific controller type (e.g. PowerpaK Traction Series) and software version (e.g. V4.06) the menu structure will never change. It is hard coded into the system's memory. Therefore, once PCpaK has uploaded the structure information it does not need to upload it again.

This section allows the user to specify if this structure information should be stored (or cached) for future reference. The user has three options:

- Cache Data

- Refresh Data

- Ignore Cache

If Cache Data is selected, PCpaK will check to see if it has uploaded data from this type of system before. If it has, PCpaK only needs to upload dynamic data, such as personality values, status information, etc. The menu structure information is already stored in a Cache file. This can greatly improve the speed of the upload. If PCpaK has not uploaded data from this type of system before it uploads all the information it requires, including structure information, and creates a cache file for future reference.

If Refresh Data is selected, PCpaK will upload all the information from the controller system and will create a fresh cache file, even if a file already exists. The old file is over-written.

If Ignore Cache is selected, PCpaK will always upload all the information from the controller system, whether or not a Cache file exists for this setup. Also, a new Cache file is not created.

Protocol
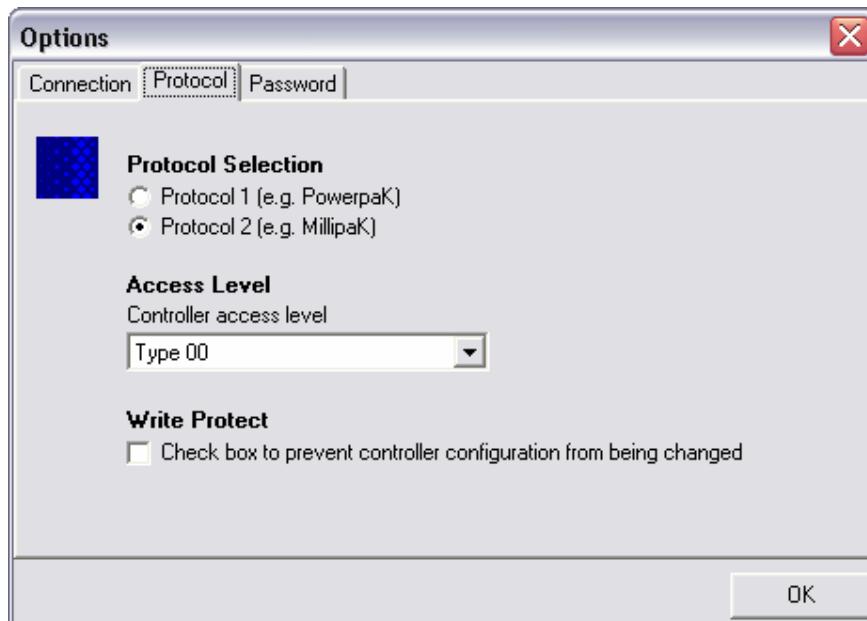
Protocol selection allows PCpaK to communicate with a range of controllers.

- Protocol 1 should be selected when using the RS232-CAN Interface Module when connecting to CAN based controllers, such as PowerpaK or MicropaK.

- Protocol 2 should be selected when using the RS232-TTL Interface Module when connecting to TTL based controllers, such as MillipaK.

Access Level allows you to choose the level of access to the controller menu structure. "Type 00" gives access to standard controller menus and allows configuration of controller features. Other types may be available, depending on your installation, to allow access to service and engineering functions.

The write protect button may be ticked to prevent accidental modification of any setup or personality values. It does however allow you to use rapid download, and to load a configuration from file.

If you use PCpaK to write pre-set configurations to controllers, and want to be sure you don't accidentally change any settings, then we recommend this option is set.

Password Protection

The password protection option allows you to protect the options screen and prevent users from modifying the configuration of PCpaK. This is particularly useful if you want to restrict the access users have to controller functionality.

To set a password, check the "enable protection" box, and enter your chosen password into the text box. You need to enter the password twice for confirmation. When the password is set you will see a confirmation message. The next time you access the options dialog you will be prompted for the password.

To remove password protection, clear the "enable protection" checkbox.

OK

Click the OK button to save settings. Clicking the OK button also saves the main window position so it will return next time the program starts.

Help Menu

The Help Menu has only the following option:

* About

This displays a dialog box which gives information about this release of the PCpaK program. See Figure 19.

The about dialog box displays the current version of PCpaK and the type of installation.

Figure 19: About Dialog Box

PCpaK Toolbar

This section describes the PCpaK Toolbar in more detail. See Figure 20. Each item in the toolbar is a short cut for an existing menu item. The toolbar items are listed below and their corresponding menu item in the PCpaK Menus section is shown. Refer to the appropriate menu item section for more information.

Figure 20: PCpaK Toolbar

There are three items in the Toolbar. The Toolbar items from left to right are:

- **Open Connection**. Refer to the Open Connection section. Shortcut key – f8.

- **Close Connection**. Refer to the Close Connection section. Shortcut key – f7.

- **Open File**. Opens a previously saved *.sev personality profile for loading into a controller or for viewing offline.

- **Save Snapshot**. Saves the current personality profile into a *.sev file.

- **Flash Program**. Initiates flash programming dialog box depending on the controller protocol selected (Protocol 1 for PowerpaK and MicropaK, and Protocol 2 for MillipaK).

- **Load Settings**. Initiates Rapid Download dialog box (if offline), or opens a previously saved personality profile (if connected).

- **Clear Log**. Refer to the Clear Log section.

PCpaK Language Selection

PCpaK allows the user to select one of several languages in which to display all PCpaK menus, dialog boxes and the controller system information. To change language selection, simply select the required language from the Language Selection drop down list on the Main Window. PCpaK will then update all displayed text appropriately for the new language.

New languages can easily be added without the need for changes to PCpaK. The language files are stored as text files in the Languages sub-directory. There is one file per language. When it starts up, PCpaK scans this directory and builds a list of the available language files. New languages can be added simply by ensuring the required language file exists in this directory.

Contact SEVCON for a list of all supported languages.

If PCpaK detects an error in any language file other than the English one, then the text displayed will default to the appropriate entry in the English Language file. If PCpaK detects an error in the English language file, then PCpaK will do one of the following:

- It will show the text as displayed on the Calibrator for controller system information on PowerpaK systems or,
- An Error Message will be displayed.

This is displayed at the very bottom of the Main Window. See Figure 21.

| Offline | No nodes | Ready |

Figure 21: PCpaK Status Bar

The status bar gives the following information (from left to right).

- **Connection Status**. This is the first item in the Status Bar. PCpaK will show 'Offline' if there is no controller system connected or 'Online' if there is a controller system connected.

- **Node Pointer**. This indicates which node PCpaK is communicating with. If PCpaK is offline then this will display 'No Nodes', otherwise it displays the node number of the active node.

- **PCpaK Status Indication**. This provides information about the current status of the PCpaK application. PCpaK will display one of the status codes listed in Table 4.

Status Message	Description
Ready	Normal operation.
MillipaK Flash Program Utility	Flash Programming utility is active.
Rapid download	Rapid Download utility is active.
Saving controller snapshot	Saving information on connected Controller System to Controller System Profile file.
Printing	Printing information on connected Controller System, if Online, or displayed Controller System Profile file, if Offline.
Clearing service log	Waiting for confirmation from Controller System that the Service Log has been cleared.
Clearing fault log	Waiting for confirmation from Controller System that the Fault Log has been cleared.
Closing communications	Disconnecting from Controller System.
Writing cached data back to controller	If the user has changed a personality, then immediately tried to disconnect from the Controller System, PCpaK will maintain the connection until the personality is successfully written. This message is displayed during this time.
Opening communications	Attempting to connect to Controller System.

Table 4: Status Messages

Controller System Profile Files

The files used by PCpaK are called Controller System Profile Files. These files contain all the information PCpaK requires about any Controller System.

When the user connects to a Controller System, PCpaK uploads all the information it requires from the Controller System and displays it in the Main Window. This information includes configuration items, such as personalities, and other information, such as status or test information.

If the user selects the Save command from the File menu, a 'snapshot' of the current system is saved to a System Profile file. This 'snapshot' contains all the information PCpaK has about the system. This will include current personality values, status and test information, fault and service log information, etc. This file can then be viewed later using PCpaK. This can be a useful tool for recording the status of a system during development or whilst servicing a vehicle.

However, this 'snapshot' can also be used for a second purpose. The personalities are stored in the file along with the other system information. These personalities can be extracted by PCpaK and can be used to configure other identical systems. For example, for the Rapid Download, PCpaK takes a System Profile file, extracts the personality information and downloads this to the Controller System.

System Profile files can be used to either store a 'snapshot' of the current system for future reference, or it can be used as a repository for a standard system configuration which can be downloaded to other systems at a later date.

<u>Flash Programming</u>

Some Sevcon products are flash programmable, meaning that the software in the controller can be upgraded to support new features or enhance the existing control system. Enhanced versions of PCpaK allow the user to flash program a controller with new software by connecting the controller to the PC using the Interface Module as normal.

If the controller is flash programmable then you can upgrade the software by connecting it to PCpaK and selecting the flash programmer from the tools menu. If you do not see any flash programmer options from the tools menu then you must contact Sevcon for an upgrade. Flash programmer utilities are only available in enhanced versions of PCpaK.

The following sections explain how to flash new software into your controller.

MillipaK

Connection

The MillipaK can be flash programmed using the standard RS232-TTL Interface Module. However, you must also connect the MillipaK Flash Programming Harness in-line to the 16-way Molex connection on the controller. The vehicle light wiring that would normally be connected to the 16-way Molex connection should now go through the harness. The controller needs to be keyed on to be flash programmed.

Program Interface
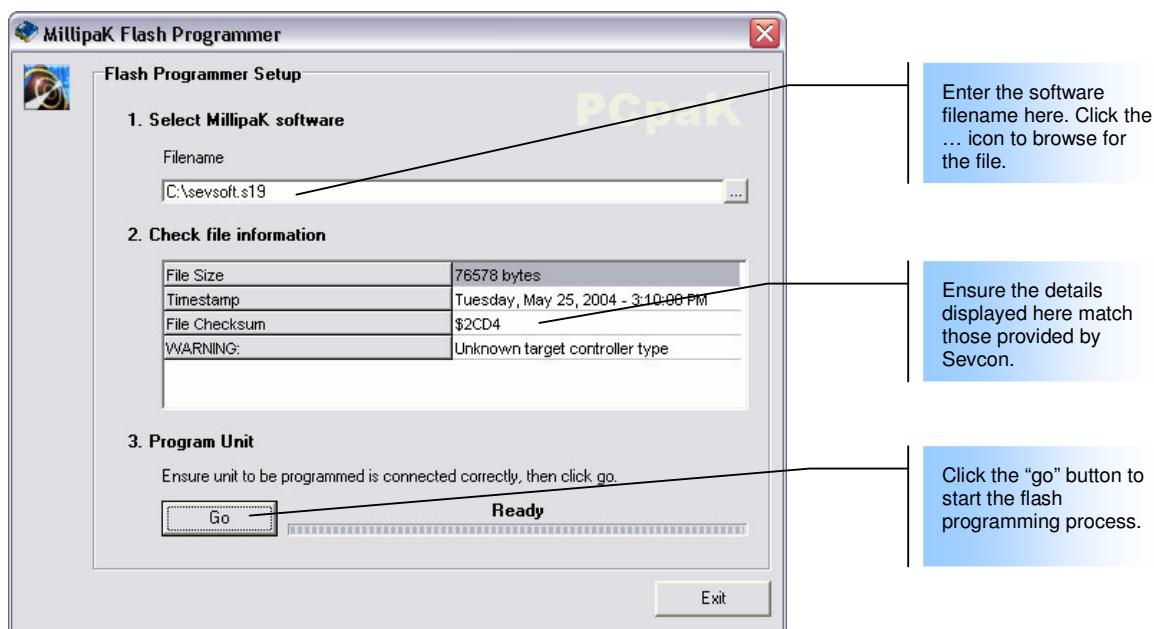
To start the flash programmer, select Flash Programmer from the tools menu in PCpaK.

Start by entering the filename of the software in the filename field. This file will be in .s19 format. You may browse for the file by clicking the … icon. When you have selected a file, you can check the file information to verify the software integrity. The file size and timestamp allow you to verify you have the correct file, and the checksum can be used to check the software file is not corrupt. Sevcon publish file checksums with each version of software. The target controller type informs the user what controller the software is for.

Clicking the go button starts the flash programming process.

Flash programming is done in two stages:

- Stage 1 involves booting the controller and erasing the existing software from the controller. You can monitor the progress of this stage on screen. Once the erase is complete the controller must be restarted. PCpaK will prompt you to cycle the key switch when this happens.

- At the start of stage 2 the controller contains no software. PCpaK will reboot the controller and begin to download the new user software. Once this stage is complete the software will be ready to run.

PowerpaK/MicropaK

Connection

Some PowerpaK/MicropaK controllers are flash programmable using the standard RS232-CAN Interface Module. To flash program a controller, you must connect the PowerpaK flash programming harness to socket A on the controller, and connect the Interface Module to the harness. When the harness is connected to the controller, the controller will be ready to accept new software from PCpaK. The controller must be keyed on to be flash programmed.

Program Interface
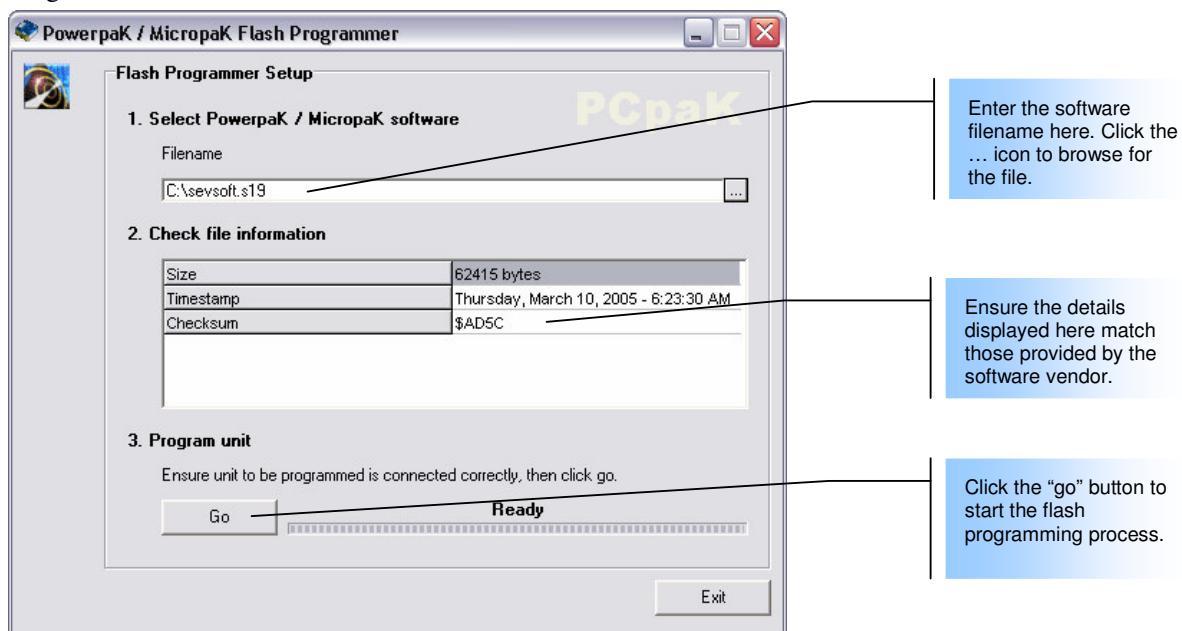
To start the PowerpaK/MicropaK flash programmer, select PowerpaK/MicropaK flash programmer from the tools menu.

Enter the name of the software file, or click the … icon to browse. PowerpaK and MicropaK software is supplied in binary format (.bin file). Once the file name has been entered the file information will be displayed. This information should be checked against the information provided by the Sevcon.

PowerpaK and MicropaK flash programming, unlike MillipaK flash programming, can be done in one stage. To start flash programming, ensure the controller is keyed on. The LED on the Interface Module should be on steady. Click the "go" button to start flash programming.

The status of the system will be displayed. When flash programming is complete you should remove the flash programming harness. The controller should now be running the new software.

Notes about Flash Programming

- When a flash programming harness is connected to a controller, all control functions will be unavailable and drive is inhibited. This is normal operation.

- You should always use the file information displayed by PCpaK to ensure you are sending the correct information to the controller. Sevcon publish checksum and file information for each version of software produced for flash programmable controllers. If there are any differences in the checksum then this indicates file corruption and the controller may not function correctly.

- Once a controller has been programmed with new software, it may require new personalities. This is indicated by the presence of a pers fault or a CRC fault when the new software is first run. To rectify this problem, use PCpaK to check which personalities or set-up items are at fault and reset them to their correct values. This mechanism protects controllers from using invalid personality values.

- Software versions can be checked before and after flash programming using either the calibrator, or the node information screen of PCpaK.

Fault Messages

Table 5 outlines the major error conditions that can arise in the program, as well as steps that can be taken to rectify the problem.

Error		Cause	Recommended Action
1	Unknown Error	An event occurred from which the system is unable to recover.	
100	Not Connected	An event occurred which requires a controller to be connected.	Connect to a controller (press F8 to open the connection dialog) and retry the operation.
101	Sendrec In Use	The system is trying to process more than one command at a time.	Wait for the first command to complete, and then continue.
102	COM port in use	Only one Windows process can "own" a COM port at a time.	Check other processes are not trying to use the same COM port as PCpaK (e.g. modems, mouse, etc). Try another COM port.
103	Bad COM port	The COM port you have specified cannot be accessed by Windows.	Select a different COM port.
104	Node unavailable	The system is attempting to communicate with a controller, but the controller is not responding.	Check the controllers are connected properly. Check both controllers are compatible with PCpaK.
105	Exception Raised	An exception was raised by the communication system.	Check the exception message.
106	No Controller	No controllers are connected, or the controllers are not compatible with PCpaK.	Check the connection. Ensure the controllers are compatible with PCpaK.
109	Malformed Data Packet	The PC did not receive data in the correct format.	Check the connection.
201	Cannot read EEPROM	The system cannot read the EEPROM on the controller.	Check the connection. Try reading the settings with a calibrator.
202	Cannot write EEPROM	The system cannot write to the EEPROM on the controller.	Check the connection. Try writing settings with a calibrator.

	Error	Cause	Recommended Action
300	Comms are closed	The system needs the communications to be open to continue.	Open communications and try again.
301	Comms are open	The system needs the communications to be closed to continue.	Close communications and try again.
203	Bad Response	The system is not receiving valid data from the controller while trying to connect.	Try using refresh cache and opening the connection again. If the problem persists, inform Sevcon of the controller model and software version.
303	Cannot Read Data	Data cannot be read from the controller.	Check the connection.
304	Cannot Write Data	Data is read only.	Ensure you are changing the correct personalities.
305	Data Out Of Range	The data being written to the controller is out of range.	Ensure the data you are entering is within the specified ranges.
306	Write Verify Fail	Data that was written to the controller cannot be read back.	The system must be able to read back information for verification purposes. Check the connection. Try the operation using a calibrator.
400	No Data To Save	You are attempting to save data when offline, or no nodes in the system.	Ensure a connection is open, and try again.
401	Could Not Open File	The system cannot open the file you have specified.	Check the disks access permissions.
402	Could Not Read File	The system cannot read from the file you have specified.	Check the disks access permissions.
403	Could Not Write File	The system cannot write to the file you have specified.	Check the disks access permissions.
404	No Filename	You have not specified a filename.	Ensure you have specified valid filenames where required.
405	Communications are Open	The system requires communications to be closed for it to continue.	Open a connection.

	Error	Cause	Recommended Action
406	Communications are Closed	The system requires communications to be open for it to continue.	Close the connection.
407	Bad Data In File	The file you have specified does not contain valid data.	Ensure you have selected the correct file.
408	File Doesn't Exist	No file exists with the filename you have specified.	Ensure you have entered the correct filename.
409	Bad CRC check	When data is written to the controller, the CRC value is checked to ensure it was written correctly. If the value on the controller differs from the value recorded in the file, then this error occurs.	Manually check the personalities were correctly written. You may wish to save a new file that contains the correct CRC value for future use.
410	Bad Profile	Data being loaded onto a controller must come from a controller of the same type and with the same software version. If the profiles do not match then this error will occur.	Check you have selected the correct file, and have the correct controller connected.
500	No cache	A cache does not exist for the controller you have connected.	The system will create a cache for you.
501	Invalid cache	The cache for the controller contains invalid data.	The system will refresh the cache for you.

Table 5: Fault Codes, Descriptions and Recommended Action.

Ordering Information

To order PCpaK and / or its associated hardware, use one of the part numbers specified in Table 6.

Part Number	Contains	Description
661/30088	PCpaK CD-ROM RS-232 to CANbus Interface Module	PCpaK CD-ROM and interface module to communicate with PowerpaK / MicropaK / PowerpAC Controller Systems.
661/30089	PCpaK CD-ROM RS-232 to TTL Interface Module	PCpaK CD-ROM and interface module to communicate with MillipaK Controller Systems.
184/21869	MillipaK Flash Program Enable Harness	Some MillipaK Controller variants require Battery Voltage to be applied to pin 16 on their customer connector to put the controller into Program Mode. Refer to the controller product manual for more information.

Table 6: PCpaK Part Numbers

Software Updates

Software upgrades can be requested by contacting SEVCON. Refer to Contact Details.

Contact Details

Sevcon Limited

Kingsway

Gateshead, NE11 0QA

England

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Fax: +44 191 482 4223

Email: sales@sevcon.com

Sevcon SA

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95100 Argenteuil

France

Tel: +33 1 34 10 95 45

Fax: +33 1 34 10 61 38

Email: ggsevcon@world-net.net

Sevcon Asia Limited

4FL, Eun-Hae Building

463-1, Sahng-dong

Wonmee-Gu, Bucheon City

Kyunggi-Do

420-030, Korea

Tel: +82 32 215 5070

Fax: +82 32 215 8027

Email: sevcon.asia@sevcon.com

Sevcon Japan

1-22-10-303

Setagaya Daita

Setagaya-Ku

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Tel: +81 3 5430 8001

Fax: +81 3 5430 4001

Email: sevcon.japan@sevcon.com

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Southborough, MA 01772

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Tel: +1 508 281 5500

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Email: sales.us@sevcon.com

Website: www.sevcon.com