SmartLogger 3.3
User's Guide

February 2003

Contents:

1. Introduction

The SmartLogger™ product has been developed especially for replacement of event and alarm printers in the process industry, but can be used for many other purposes as well. It is designed to handle data from all kinds of text based data sources.
Compared to other event loggers, the SmartLogger has the advantage that events are validated and stored in a database, which makes it a perfect foundation for subsequent analysis.
In addition to this, the SmartLogger delivers a comprehensive set of tools for configuration, supervision and data analysis. Tools that saves engineering hours in complex configurations.

1.1 Conventions & definitions

	Important note
Alias	Database alias specifying database parameters like path and database driver.
BDE	Borland Database Engine. A set of DLLs and support files that allow programs to access databases.
Control	The term 'control' is used when describing the user interface. A 'control' is a common name for edit boxes, push buttons and other items on a dialog.
Event	A common name in the process industry for an occurrence which is reported to the operator and/or a printer. An event in the SmartLogger terminology means a sequence of characters normally sent to the printer followed by a carriage return.
Field	A field corresponds to a column in a database table.
LPR	Line Printing Remote.
LPD	Line Printer Daemon. The LPD is a printer server that can receive print requests for several printers via TCP/IP network.
MDI	Multiple Documents Interface.
NM	Notification Module.
PDF	(Adobe) Portable Document Format. This is the format

	used for the online User's Guide.
Record	A record is one row of data (one event) in a database table.
RD	Redundancy Module.
RT	Remote Transfer.
SM	Status Module.
SMS	Short Message Service.
SQL	Structured Query Language. Standard language for accessing databases.
US	Utility Server. Server module for remote access of SmartLogger status and remote event subscription.
Template	Describes the structure of the destination table and how data are to be decoded. Templates are designed with the SmartBuilder™ program.
WD	Watchdog.

1.2 Product overview

The SmartLogger product suite consists of the following programs:

SmartLogger™: Main program that handles the basic event logging and data handling for up to 4 serial or TCP/IP ports concurrently.

SmartClient™: Client application used for viewing and analysing log tables generated by the SmartLogger/SmartTranslator.

SmartBuilder™: Program used for building and maintaining the templates used by SmartLogger/SmartTranslator.

SmartSim™: Event simulator that can be used for test and demonstration purposes by sending events via a serial or TCP/IP connection. The simulator is freeware.

SmartTranslator™: Program for translating plain text files into SmartLogger database tables.

SmartStatus™: Program for remote supervision and control of the SmartLogger/SmartTranslator programs.

SmartGuard™: NT Service program for supervising and automatically starting/re-starting SmartLogger/SmartTranslator in Windows NT environments.

The listed programs are bundled in the following packages:

- **SmartClient package.** Contains a stand-alone SmartClient.
- **SmartLogger package.** Contains SmartLogger, SmartClient, SmartBuilder and SmartSim.
- **SmartTranslator package.** Contains SmartTranslator and SmartBuilder.
- **SmartStatus package.** Contains a stand-alone SmartStatus.
- **SmartGuard package.** Contains a SmartGuard Service program and the SmartGuard Setup program for off-line configuration.

1.3 Templates

A template in the SmartLogger philosophy defines:

- How incoming events are to be decoded and split up.
- The table structure of the destination table.

The SmartLogger is shipped with a number of standard templates. One of the templates is designed for demo configurations, where SmartSim is used as data source.
Please refer to the SmartLogger Release Description for a complete list of all standard templates included in this program release.

You may have to build your own templates, in order to adapt the SmartLogger to your demands and requirements. This topic is described in the SmartBuilder User's Guide.

A template defines how incoming events are to be decoded and split up. It also specifies the table structure of the destination table.

2. Installation and Set-up

2.1 System requirements

Computer: A 100% IBM PC compatible computer with a Pentium III 400 MHz processor and 128 MB RAM.

Operating system: Windows 98/NT/2000/XP.

Although Windows 98 is supported, it is highly recommended to use Windows NT/2000/XP, as Windows 98 is not designed for programs that must be running continuously.

Disk space: 20 MB free space for system files and additional space for log tables.

Video: SVGA or higher resolution monitor.

2.2 Installation

1. Place the SmartLogger CD in the CD-ROM drive.
2. If autorun is activated on the PC, the installation menu will automatically be shown. If it does not start, run "?:\Setup.htm" (substitute '?' with your CD drive letter)
3. Select the appropriate installation kit from the menu and follow the instructions on the screen.

2.2.1 Dongle option

If the dongle option is used as copy protection, the dongle driver for the appropriate operating system must be installed.
To install, please select the appropriate driver from the installation menu.

2.2.2 Online User's Guide

The online User's Guide is available from the menu item *Help* | *User's Guide* in all programs except SmartSim. To view this User's Guide, you must have Adobe® Acrobat® reader 4.0 or higher installed on your system. If it is not installed, you can install it by selecting it from the installation menu.

Adobe® Acrobat® reader is copyright of Adobe Systems Incorporated.

2.3 Windows set-up

The following Windows settings should be observed in order to make the SmartLogger perform properly.

Screen resolution
The SmartLogger supports all resolutions from 800x600 and higher, but has been optimised for 1024x768 with large fonts.

Windows Common Controls
The applications use some of the newer MS Windows Common Controls. If you experience any problems with the graphics on the menu or toolbuttons, the Common Controls might need to be updated. The official Microsoft update program for the Common Controls (version 5.00.xxxx) can be installed from the installation menu.

2.4 Registration

It is very important to register the SmartLogger product, as an unregistered SmartLogger only works within a limited period.

As long as the product is unregistered the following dialog will appear at start-up:

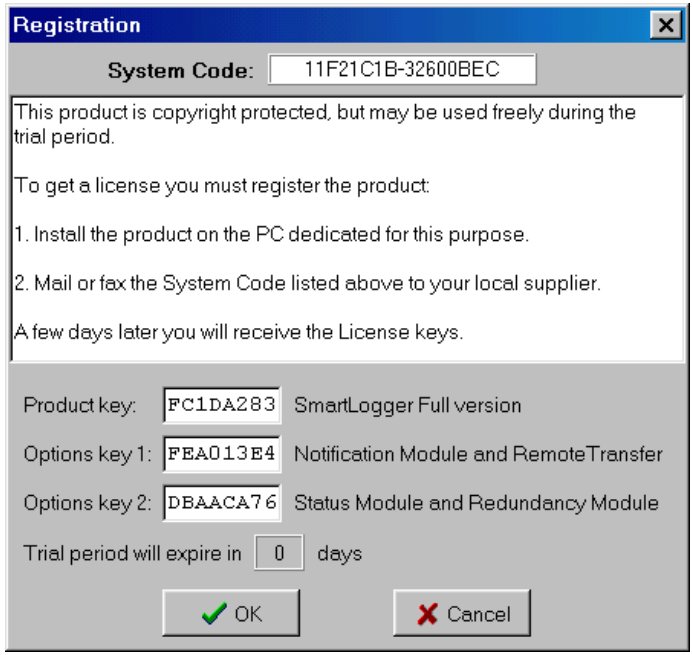


Figure 2-1

The SmartLogger supports two types of copy protection:

Softkey protection

To register the SmartLogger with a softkey protection, please follow these instructions:

1. Install the product on the PC dedicated to the event logging.
2. Mail or fax the System Code shown in the registration dialog to your local supplier.

A few days later you will receive a License key, which has to be entered in the 'Product Key' field in the Registration dialog.

If you have purchased any add-on's like Remote Transfer, Status Module or Notification Module, their registration keys will have to be entered in the 'Options key 1' or 'Options key 2' field.

The System Code is hardware dependent. It is therefore *very* important to register the product for the PC intended for the event logging.

When a program is registered, the Registration dialog can no longer be called up from the menu.
If you have to register Add-on's later on, you can use <Ctrl>-R to call up the Registration dialog again.

Dongle protection
If the dongle option has been ordered, then a dongle is delivered together with the SmartLogger product. To install the dongle, please follow these instructions.

1. Install the appropriate driver as described in section 2.2.1.
2. Power down the PC.
3. Attach the dongle to the parallel port.
4. Power on the PC.
5. Start the SmartLogger and the SmartClient.

The registration will then be performed automatically.

3. Quick Start

This section describes step by step the basic operations required when configuring the SmartLogger for the first time.

If you intend to configure the SmartLogger for demo purposes in connection with the SmartSim event simulator, you can skip step 1 and go directly to step 2.

Step 1: Building a template
The template is essential for the event logging and is therefore the first thing you must define. If you can not use any of the templates included in the SmartLogger package, you must build your own according to your requirements and your data source. Please refer to the SmartBuilder User's Guide for more information.

Step 2: Configuring a port
When the template is ready, you must set up a port for your data source. How to do this is described in section 4.2 "Port Setup". In this quick start example, you should configure port 1 for event logging.

Step 3: Activating the port
The activation of the port is done from the Port Status dialog, which can be opened by clicking on the status icon on the toolbar. In this case it will be the icon with a '1' in a red box. The Port Status dialog is described in section 4.4 "Port Status".

Step 4: Verifying event logging
You can verify that the event logging is active either by looking at the statistic counters in the Port Status or by opening an Online View. The Online View function is described the section 4.5 "Online View".

Step 5: Viewing stored events
The validated events are stored in a database table, which can be viewed with SmartClient as described in the SmartClient User's Guide.

4. Basic operations

4.1 Menu overview

Menu	Item	Description
File	Text File Import...	Opens the Text File import dialog.
	Exit	Program exit.
View	Online▸	Used to access online views. A pop up menu containing all active ports is shown.
	Arrange Online views	If checked then Online views are arranged automatically.
	Port Status...	Opens the Port Status.
	Remote Transfer…[1)]	Opens the Remote Transfer status view.
	Watchdog Outputs...	Opens the Watchdog status view.
	System Log...	Opens the System Log.
Config	Ports...	Opens the port configuration dialog.
	Color Mapping...	Opens the Color Mapping dialog
	Remote Transfer… [1)]	Opens the configuration dialog with the RT page selected.
	Watchdog...	Opens the configuration dialog with the WD page selected.
Tools	Alias Manager...	Opens the Alias Manager tool.
	Backup...	Opens the Backup utility dialog.
	Notification Module…[2)]	Opens the Notification module.
	Utility Server…[3)]	Opens the Utility Server.
	Options...	Opens the Options dialog.
Help	User's Guide	Shows this User's Guide in PDF format.
	Registration...[4)]	Opens the registration dialog.
	About...	Shows credits and release version.

1) Only visible if the Remote Transfer add-on is registered.
2) Only visible if the Notification Module add-on is registered.

3) Only available if the Status Module **or** the Notification module add-on is registered.
4) Only visible if the SmartLogger is unregistered. If the SmartLogger is registered, this dialog can be viewed by pressing <Ctrl>-R.

4.2 Port Setup

In order to log events, a port must be configured for this purpose. The port configuration dialog is opened from the menu item *Config* | *Ports...*

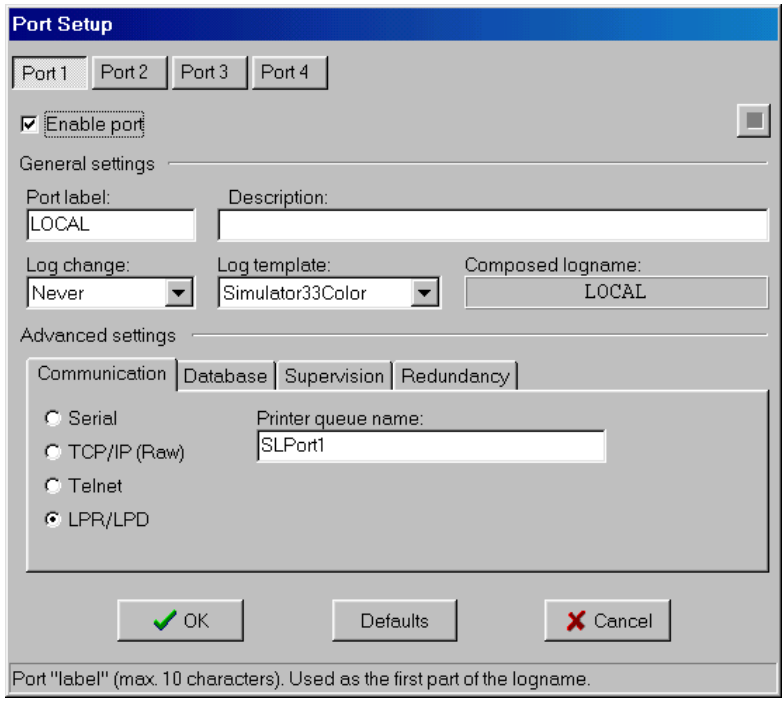


Figure 4-1

General settings	
Enable port	Enables / disables the port for configuration and event logging.

Stop button	If the port is activated, it can be stopped by pressing this button.
General settings	
Port label [1)]	Label to identify the port. Is also used to generate unique log names[2)].
Description	Descriptive text for the port.
Log change [2)]	Specifies how often a new log table is created. The log change setting also affects the log name.
Log template	Specifies the template used for the port. Must be configured in advance with SmartBuilder.
Composed Log name [2)]	Shows the composed name based upon the port label and the log change settings. The log name is composed by SmartLogger, and can not be modified by the user.
Advanced settings	Refer to separate descriptions below.

1) The label is limited to 10 characters. Valid characters are 0-9, A-Z, '-' and '_'. It is not allowed to have two configured ports with the same label.
2) For more information about log change and the composition of log names, please refer to appendix 12.2 "Log change philosophy".

4.2.1 Advanced settings - Communication

Serial port type settings

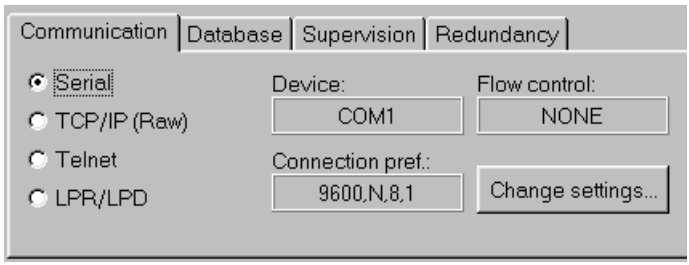


Figure 4-2

Serial settings	
Device	Shows the selected device. Only devices actually available in the system can be specified.
Flow control	NONE or XON/XOFF
Connection pref.	Shows the currently selected connection preferences: baud rate, parity, data bit, stop bit.
Change settings...	Press this button to change the serial settings.

TCP/IP port type settings

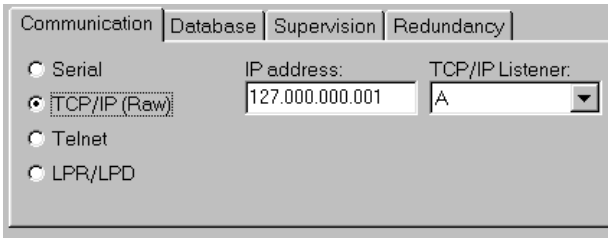


Figure 4-3

TCP/IP settings	
IP address	Identifies the remote host sending the events.
TCP/IP Listener [1)]	Specifies the listener associated with this port. Multiple ports can share the same listener as long as the remote data sources use different IP addresses.

1) Please refer to section 5.2.2 "TCP/IP Listeners" for a detailed description of available TCP/IP listeners.

Telnet port type settings

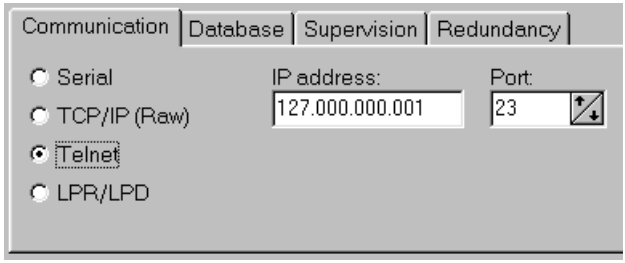


Figure 4-4

Telnet settings	
IP address	Identifies the remote server hosting the telnet server.
Port	Specifies the socket port to be used for communication. Telnet servers usually use port 23.

LPR/LPD port type settings

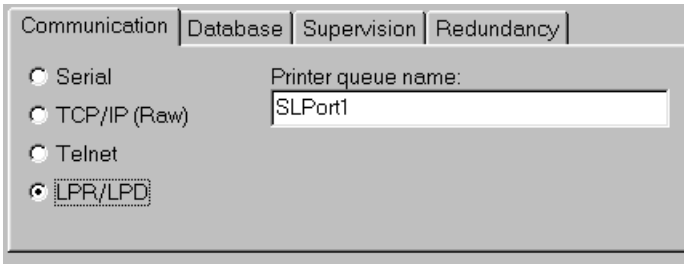


Figure 4-5

LPR/LPD settings	
Printer queue name:	The printer name identifies the printer queue that is associated with the current port. I.e. in this case, the SmartLogger Line Printer Daemon will make sure that all print requests for "SLPORT1" will be redirected to this port.

Although the SmartLogger only has one Line Printer Daemon activated, it can handle requests to several ports. Just make sure that each port has its own "Printer name" configured.

4.2.2 Advanced settings - Database

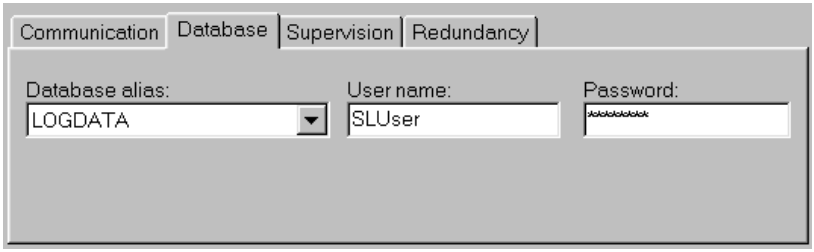


Figure 4-6

Advanced settings - Database	
Database alias	Destination for log tables. Default alias LOGDATA should be used for standard configurations. Refer to section 6.2 "Database Alias Manager" for a description of aliases.
User name	Specifies the database user to be used in case of database access limitations.
Password	Specifies the database password to be used in case of database access limitations.

4.2.3 Advanced settings - Supervision

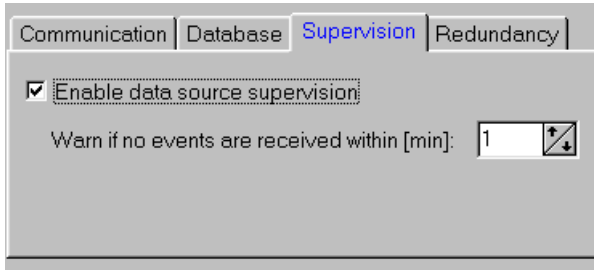


Figure 4-7

Advanced settings - Supervision	
Enable supervision	If checked, data source supervision is active. Refer to section 7.2 "Data source supervision".
Warning if...	If no data is received within the specified time period, a warning is raised.

4.2.4 Advanced settings - Redundancy

Note that this feature is only available if the Redundancy Module Add-on has been purchased. For more information about the Redundancy Module please see section 10 "Redundancy Module Add-on.

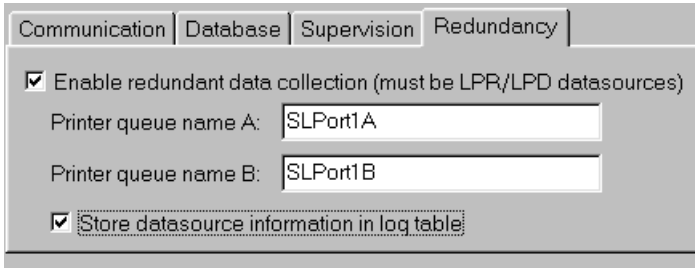


Figure 4-8

Advanced settings - Redundancy	
Enable redundant...	If checked, redundant event collection for this port is enabled
Printer queue	Specifies the printer queue name for data-

name A:	source A. All print requests sent to this queue are treated as events from source A.
Printer queue name B:	Specifies the printer queue name for data-source B. All print requests sent to this queue are treated as events from source B.
Store data-source info...	If enabled then extra information is stored in a separate field in the database. For more information see section 10.2.3 "Redundant information in tables".

4.3 Port activation

When a new port is configured and enabled, you will be prompted to activate the port. If you choose not to start the port now, the corresponding status icon on the toolbar will remain red until the event logging has been activated manually from the Port Status or until the SmartLogger program has been restarted.

At program start-up the SmartLogger automatically activates event logging for all configured ports.

4.4 Port Status

For each configured port miscellaneous status information is available. The overall status for all ports is shown on the toolbar on the main form, while a detailed status can be obtained from the Port Status.

To enter the detailed Port Status:

- Press the corresponding status button on the toolbar OR
- Select the menu item *View* | *Port Status ...*

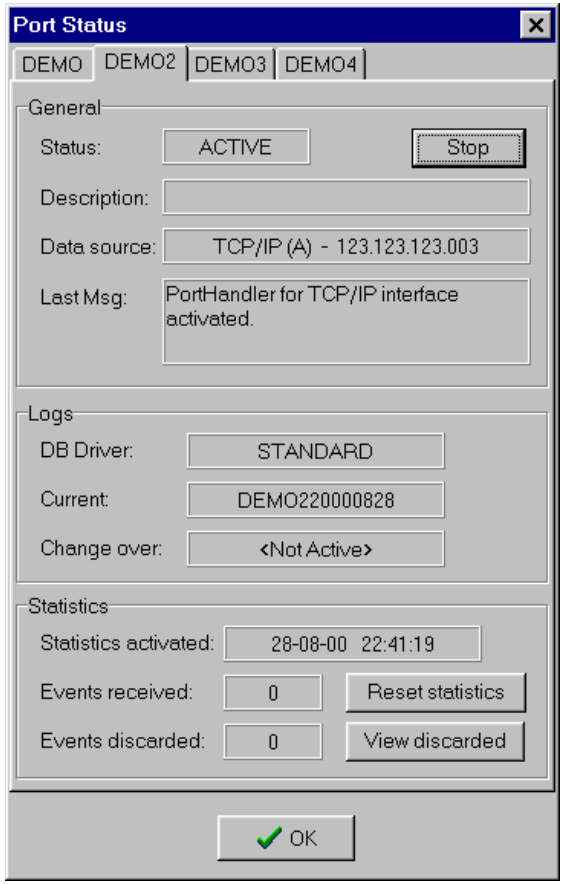


Figure 4-9

General	
Status	General port status, ACTIVE, WARNING, STOPPED or ERROR.
Description	Port description.
Data Source	Source type and either serial port, telnet or IP address / listener used.
Last Msg.	The last message that has been reported by the port supervision. All messages can be found in the System Log as described in section 5.1

	"System Log"
Stop/Start button	Used to manually start and stop the event logging for a port.
Logs	
DB driver	Shows the database driver used for data logging.
Current	Name of the log table that is currently being used
Change over	Name of the change over log table if the change over period is active. Please refer to section 12.2 "Log change philosophy" for a description of the change over feature.
Statistics	
Statistics activated	Date and time for last reset of the statistic counters. The statistics are automatically reset when the SmartLogger is restarted.
Events received	Number of events received since last reset.
Events discarded	Number of events discarded since last reset.
Reset button	Resets the statistic counters.
View button	Opens the log file containing the discarded events (if any).

If you intend to disable a port completely, it is not enough to stop the logging from the Port Status. The port must also be disabled in the "Config | Ports" dialog – otherwise it will be activated next time the SmartLogger is restarted.

4.4.1 Status icons on toolbar

At the main form's toolbar a number of status icons/buttons are shown. The colour of the status icons indicates the overall status for the corresponding port or module.

Figure 4-10

Icon	Description	Click action
1..4	Online View 1 to 4	Opens the Online View.
	Arrange	Arranges all visible Online Views.
	Configure ports	Opens the Configure ports dialog.
1..4	Port 1 to 4.	Opens the Port Status dialog.
W	Watchdog	Opens the Watchdog output view.
R	Remote Transfer [1)]	Opens the RT status view.
U	Utility Server	Opens the US window.
N	Notification Module [1)]	Opens the NM window.
T	TCP listener	Opens the System log view.
	Acknowledge	Acknowledges all warnings.
	System log	Opens the System log view.
	Color Setup	Opens the Color setup dialog.
	Options	Opens the Options dialog.
	User's Guide	Launches the User's Guide.

1) Add-on module.

Status indications:

Green:	Port or module is configured and started.
Yellow:	Port or module is configured and started, but a warning has occurred.
Red:	Port or module is configured, but stopped.
Faded out:	Port or module is not configured.

If one or more ports/modules have the warning flag set, an 'acknowledge' button will appear next to the status icons. When pressed, all warnings are reset and the button will disappear again. The 'acknowledge' button is shown as a green checkmark.

A yellow or red circle indicates that something unexpected

has happened to the port or module. Details can be found in the Port Status or in the System Log.

4.5 Online View

The Online View is the only place, where it is possible to view the incoming events as plain text. The Online View has a capacity of 2000 events and will always show the last 2000 events received. To view more than the latest 2000 events, the SmartClient has to be used. Please refer to the SmartClient User's Guide for more information.

The Online View can be opened from the menu: *View* | *Online* | *<port label>*.

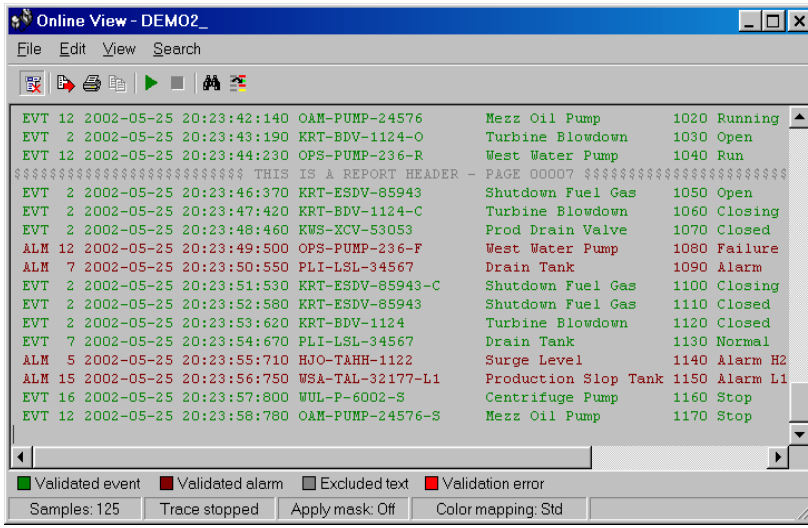


Figure 4-11

In order to perform an action, like search or copy, on the content of the Online View, the trace must be stopped. Stopping the trace does not affect the event logging for the port; it only stops updating of the Online View.

The Online View tool bar:

Figure 4-12

Icon	Description	Click action
	Show/Hide menu	Toggles the menu on/off.
	Dump	Dumps the entire content of the Online View to disk.
	Print	Prints the entire content of the Online View.
	Copy	Copies the selected text to the clipboard.
	Start Trace	Starts the online trace of events.
	Stop Trace	Stops the online trace of events.
	Search	Opens the search dialog.
	Color mapping	Toggles the color mapping feature on/off.

The Online View menu offers the following functionality:

File | Dump
It is possible to dump the entire content of the Online View to a file. This can be done from the menu item *File* | *Dump*.

File | Print
It is possible to print the entire content of the Online View. This can be done from either the print button on the toolbar or from the menu item *File* | *Print*.

Edit | Copy
If you intend to use some or all of the events from the Online View in another program, like Word or Excel, you can do so by using the Windows clipboard. Select the desired lines and copy them using the menu item *Edit* | *Copy*.

Edit | Start/Stop trace
The trace (update of the window) can be started/stopped from the menu or from the speed buttons on the toolbar.
The trace has to be stopped, if you want to perform any kind of action, like search or copy, on the content of the Online View.
When the trace is stopped, the incoming events are still buffered to prevent "event holes" in the Online View.
When the trace is started again, you may not able to operate the Online View for a short period of time, while the Online View is updating.

Edit | Use Color Mapping
This menu item toggles the use of color mapping. For more information about the different color mapping modes, see section 5.4 "Color Mapping".

Edit | Apply Mask
If the events shown in the Online View contains a lot of irrelevant characters, like spaces, the Apply Mask switch can be used to filter out these characters. If the mask is applied, only characters that have a corresponding 'Mask Id' or '#' in the used template will be shown.

An example:

Event as it arrives on the port:
```
     99-02-12 12:00:01    KFB-MOTOR-123      OPEN
```

Event mask in used template:
```
.....YY#MM#DD#hh#mm#ss..##AAAAAAAAAAAAAA...##BBBB
```

Event shown after applying the mask:
```
99-02-12 12:00:01  KFB-MOTOR-123   OPEN
```

For more information about the event mask, refer to SmartBuilder User's Guide.

View | Colour legend
Hides or shows the colour legend panel located at the bottom of the window.

View | Show Excluded events
If this menu item is checked then excluded events are shown in the Online View. The exclude definition is specified in the SmartLogger template used for the current port and can be modified with the SmartBuilder program. The exclude function is usually used to exclude garbage lines like print headers and footers.

Search | Find
For a quick search through the entire content of the Online View use the Search utility. The Search dialog can be activated from the menu item *Search* | *Find...* or by pressing CTRL-F.
Search options like 'Whole word' and 'Match case' are supported. Before you can perform a search, you have to stop the trace.

Search | Search Again
Performs another search based on the same search criteria.

5. Maintenance

5.1 System Log

The System log keeps track of all configuration changes and incidents, which may be of interest to an operator or system responsible. The messages are classified in the following severity levels:

Information	Standard messages indicating that the application has been started, port configuration has been changed etc.
Warning	Appears when the SmartLogger has detected an error in a module, in data validation or other incidents that later on may lead to serious data loss.
Alert	A serious warning, like disk is running full, that requires action.
Error	Serious error has occurred. The particular module or port has been stopped.

The system log can be viewed from the menu item *View* | *System Log*

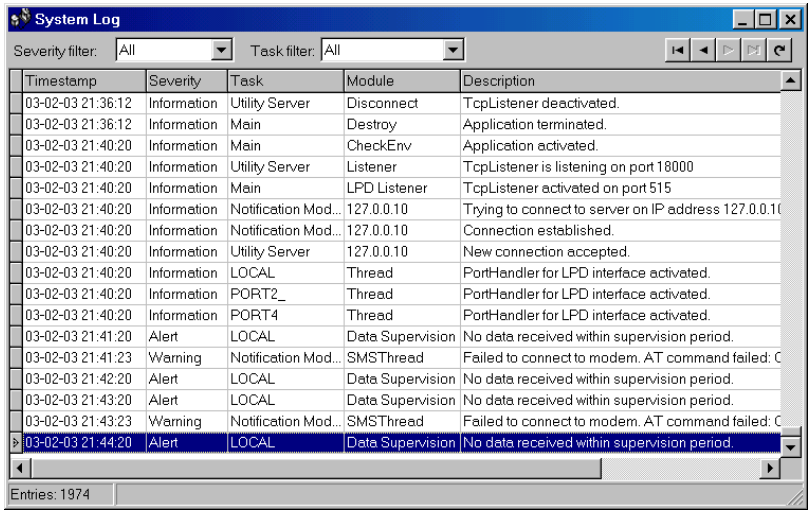


Figure 5-1

The two filter controls can be used to quickly locate the requested information.
Severity filter options: All, Information, Warning, Alert and Error.
Task filter options: Different SmartLogger modules.

Popup menu
When right-clicking on the System Log grid the following pop menu items are shown:

Copy to Clipboard.	Copies the selected records to the clipboard.
Export all to…	Exports all records to Text, Excel, HTML or XML format.
Export selected to…	Exports selected records to Text, Excel, HTML or XML format.

5.2 Options

The Options dialog can be activated from the menu item *Tools* | *Options...* and contains four categories of optional settings: Supervision, TCP/IP Listeners, System and Source.

5.2.1 Supervision

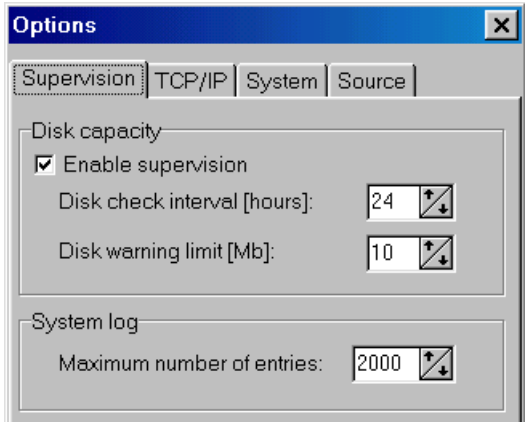


Figure 5-2

Disk capacity	
Enable supervision [1)]	If checked, disk space supervision is active. The disk capacity check raises an alert, if the free space on the destination disk(s) is running low.
Check interval	Time in hours between each disk space supervision check.
Warning limit	Minimum MB free disk space that is accepted.
System log	
Maximum number…	The system log database is limited to the number of entries specified.

1) The disk capacity supervision does **not** support database servers or disks located on remote computers.

5.2.2 TCP/IP Listeners

TCP/IP listeners are used for handling TCP/IP connection requests from the data sources and to direct the connection to the correct SmartLogger port.
Normally only one listener is needed as it can handle connections from multiple data sources as long as they come from different IP addresses. In the case that several data sources come from the same IP address, additional listeners (one for each data source) must be enabled.

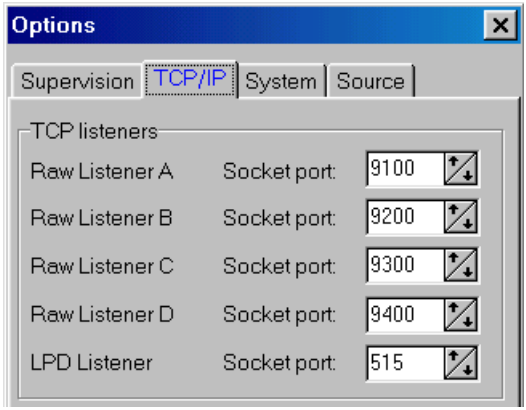


Figure 5-3

TCP listener	
Listener A..D	Enables or disables listener A..D. Multiple listeners are only needed if several data sources from the same IP have to be connected.
LPD Listener	Listener used for SmartLogger Line Printer Daemon. Default socket port number is 515.
Socket port	Identifies the TCP/IP port for the corresponding listener, where the SmartLogger will listen for connection requests from remote hosts[1)].

1) If the SmartLogger is set up to simulate a HP JetDirect printer, the port number normally has to be set to 9100. To emulate printers from other vendors, please contact your vendor for the correct port number.

5.2.3 System

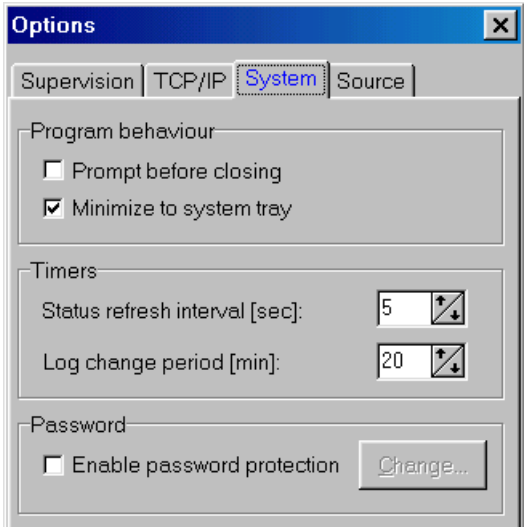


Figure 5-4

Program behaviour	
Prompt before closing	If checked, you will always be warned when trying to exit the SmartLogger. The only exception is if Windows itself is shutting down.
Minimize to system tray	If checked, the SmartLogger is minimized to the system tray instead of the application bar.
Timers	
Status refresh interval	Time in seconds between each refresh of the statistics counters on the Port Status information view.
Log change period	Refer to description below.
Password	
Enable password...	Refer to description below.
Change button	Opens a dialog for changing the password.

Log change period

The 'Log change period' determines the period after a log change where events from the previous day are still accepted. This feature ensures that events from a data source without time synchronisation are not lost during day shift period.

The change over period is only relevant if the used template decodes the date/time from the event. Please refer to Appendix 12.2 "Log change philosophy" for a detailed description of the log change philosophy.

Password protection

When the password protection is enabled, then all configuration dialogs and program exit are password protected. Although the program exit is protected, the SmartLogger will not prompt for a password in the case of a computer shutdown.

5.2.4 Source

The character-stripping feature can be used to ignore special characters, like occasional form feeds, from a data source.

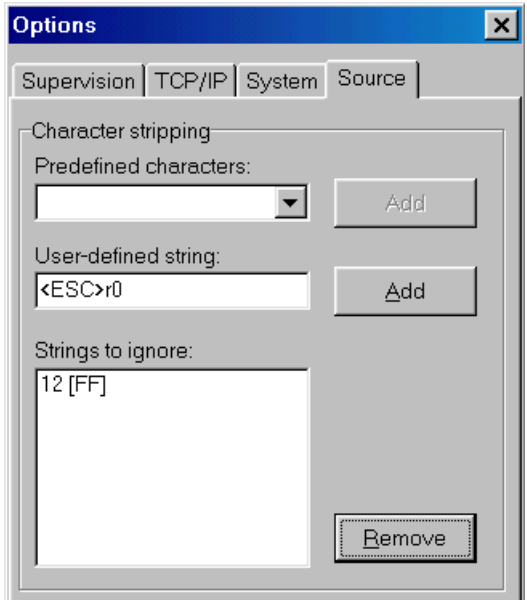


Figure 5-5

Character stripping	
Predefined characters	Contains a list of predefined special characters that can be added to the "ignore" list.
User-defined string:	Special text combinations like printer escape codes can be entered here and added to the "ignore" list. Special characters must be enclosed in < >. If a sample containing special characters is pasted into the edit box, the special characters are converted automatically.
Strings to ignore	Lists all predefined characters and strings to be ignored.

The character-stripping feature is common for all active ports.

5.3 Table Backup

The SmartLogger is equipped with a backup tool that is adapted to the SmartLogger set-up. From the backup dialog you have access to

all log tables generated by the SmartLogger, and the possibility to copy all or some to a desired destination.
The backup dialog is opened from the menu item *Tools* | *Backup...*

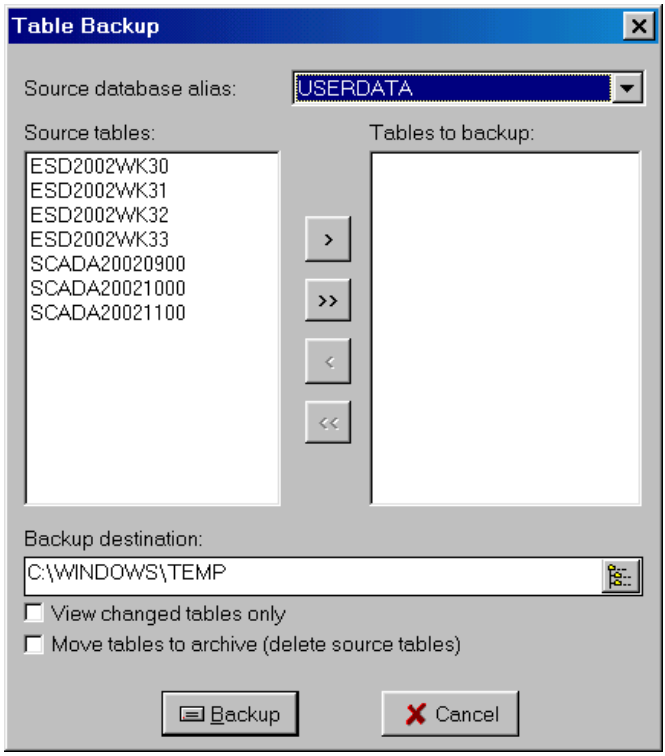


Figure 5-6

Table Backup	
Database Alias	Specifies the source alias. Only aliases currently used by the SmartLogger is shown.
Source Tables	Shows all available tables[1)] for selected alias.
Backup destination	Specifies the destination path. To change the path, use the small browse button to the right of the control.
Tables to copy	Shows the selected tables[1)] that are to be backed up.
View	If set, only tables that have been changed since

changed....	last backup are listed in the Source tables window.
Move tables....	If set, tables are deleted after successful backup[1)].

1. If the alias points to a database type where the tables are located in the same file, only this database file is shown. It is then only possible to backup the entire database, not individual tables.
   It is also not allowed to move such a database, since some of its tables may be in use by the SmartLogger.

The backup utility is file based, which means that it can not be used for database servers. To backup tables stored in a database server, please refer to the manuals from the database vendor.

5.4 Color Mapping

The SmartLogger supports two types of color mapping: Standard and advanced color mapping. In both modes the color mapping is performed according to the template settings and the event validation status.
The SmartLogger uses the following event categories:

Validated event:	Events that are validated correctly, but do not match the *Alarm mask* pattern specified in the template.
Validated alarm:	Events that are validated correctly and match the *Alarm mask* pattern specified in the template.
Excluded event:	Events that match the text pattern specified in the *Exclude mask* in the template will be treated as an excluded event.
Validation error:	Events that did not pass the event validation.

The colors used for color mapping is configured from the menu item *Config* | *Color Mapping...*

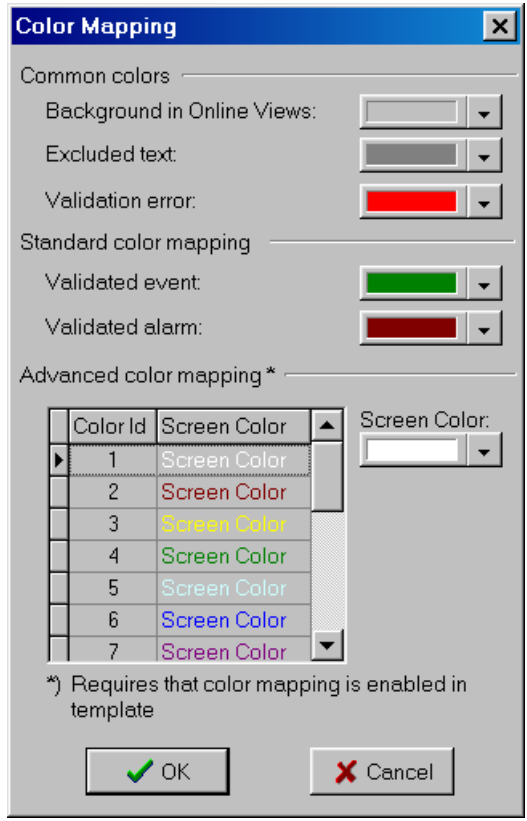


Figure 5-7

Common colors	
Background color in...	Background color to be used in Online Views if color mapping is used.
Excluded text	Color for events that are excluded.
Validation error	Color for events that do not pass the validation.
Standard color mapping	
Validated event	Color for validated events.
Validated alarm	Color for validated alarms.

Advanced color mapping	
Color grid	The color grid shows the current color mapping. To modify a color, select the wanted *Color Id* and change the color with the color picker to the right of the grid.

5.4.1 Standard Color Mapping

When using standard color mapping it is possible to associate individual colors for the background and the event categories listed in the previous section.

5.4.2 Advanced Color Mapping

When using advanced color mapping it is possible to associate field values in the range from 1 to 16 to a user-defined color. These values are called Color Id's.
Values not within the 1-16 range are just ignored.
The field to be used for the color mapping must be specified in the Template used for the port. For more information on how to set the color field, please see the "SmartBuilder User's Guide".

6. Utilities

6.1 Text File Import

The text file import can be used to convert text files to tables using the same principles that the SmartLogger uses for event logging. This utility is especially useful for converting old text logs to SmartLogger database tables.

The utility is opened from the menu item *File* | *Text File Import...*

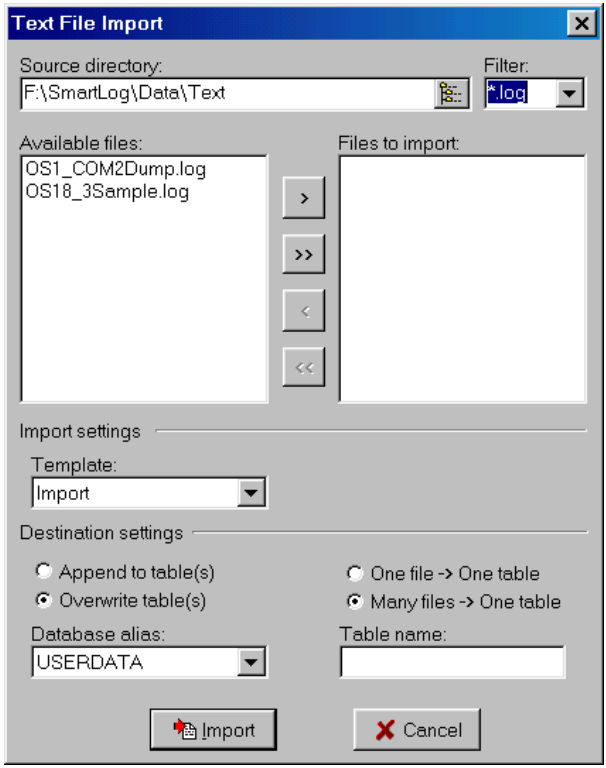


Figure 6-1

Text File Import	
Source directory	Specifies the source directory for the text files.
Filter	Source file filter. When changed, the 'Available files' and 'Files to import' list boxes are reset.
Available Files	Files available for import. Only files matching the filter are shown in the Available Files list box.
Files to import	Files selected for import.
Import settings	
Template	Specifies the template to be used for conversion.
Destination settings	
Database alias.	Specifies the destination database.
Append to / Overwrite…	Specifies whether to append records or to overwrite existing tables. If appending then the table structure of the destination table must be identical to the structure defined in the selected template
One file -> One table	If selected, each text file is converted to one table with the same name as the text file (without the file extension).
Many files -> One table	If selected, all text files are converted and merged to the same table.
Table name	Specifies the destination table name. Is only available when *'Many files -> One table'* is selected.

When a text file import is initiated, the following status window is shown:

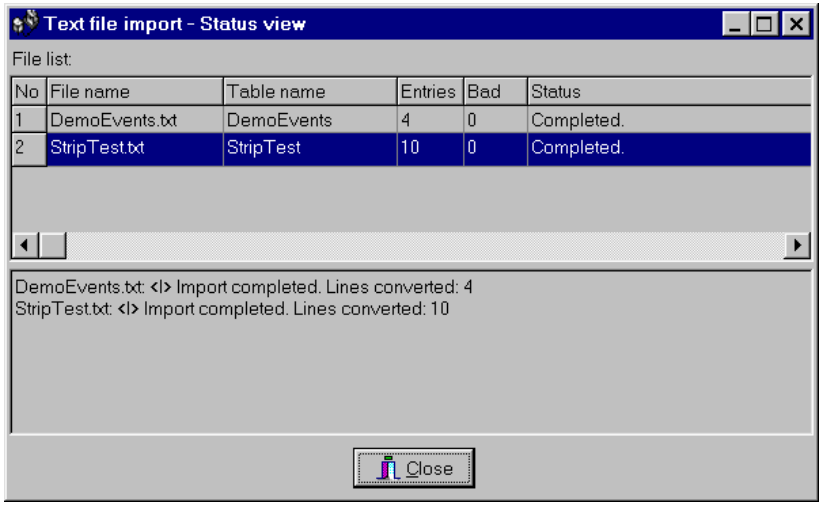


Figure 6-2

File list	
File name	Name of the source file.
Table name	Name of the destination table.
Entries	Number of lines read from the source file.
Bad	Number of lines that could not be converted.
Status	Status for the import for the corresponding source file. Can be Pending, Executing, Completed, Stopped or Skipped.
Message view	
Messages	Show miscellaneous messages related to the import for each source file.

6.2 Database Alias Manager

A database alias is needed in order to access a database. It defines the database driver, connection parameters and the destination path / database type.
The Alias Manager can be used to add, modify and delete aliases, with the restriction that only the basic settings, like database driver, destination path/database, default user etc. can be changed.

Normally the user only needs to access the basic settings, as the Alias Manager automatically configures all advanced settings.

If it is required to access the more advanced alias settings, the BDE Administrator tool has to be used. The BDE Administrator can be started by selecting *Settings* | *Control Panel* | *BDE Administrator* from the Windows start menu.

The Alias Manager dialog is opened from the menu item *Tools* | *Alias Manager...* and it is divided into two sections.
The upper part, as shown in Figure 6-3, is common for all database types.
The lower part contains individual settings for a specific database driver and is described later in this section.

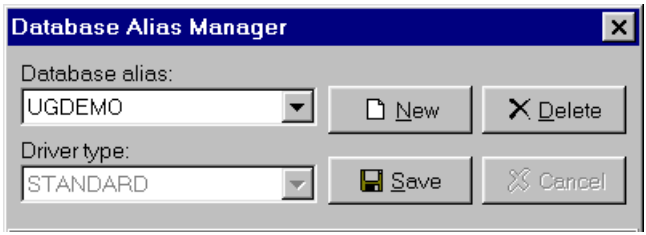


Figure 6-3

Alias Manager controls	
Database alias	Lists all aliases supported by the Alias Manager.
Driver type	Lists all database drivers available.

It is recommended always to use the STANDARD (Paradox) driver unless it is explicitly required to use another database driver.

6.2.1 Database driver settings

Paradox 7 (STANDARD driver)

Figure 6-4

Paradox 7 settings	
Database path	Defines the location (directory) where the tables are stored.

MS Access 97 (MSACCESS driver)

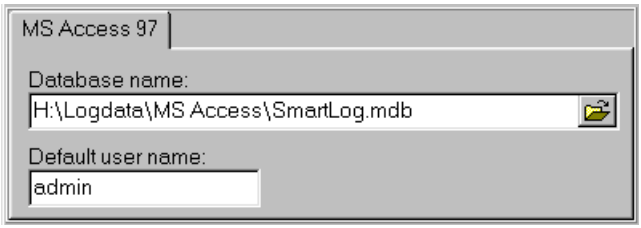


Figure 6-5

***MS Access 97* settings**	
Database name	Defines the location of the database file (*.mdb file).
Default user name	The default user name that is used, if automatic database login is disabled.

Oracle 8 (ORACLE driver)

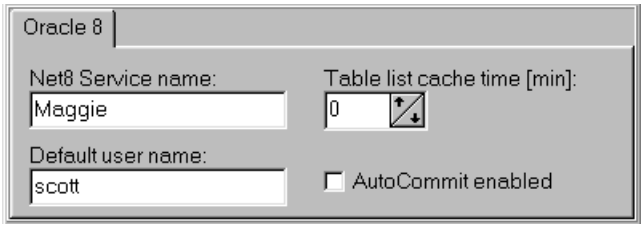


Figure 6-6

***Oracle 8* settings**	
Net8 Service name	Defines the Oracle Net8 service name. Must be defined in advance by using the appropriate Oracle tool.
Default user name	The default user name that is used, if automatic database login is disabled.
AutoCommit enabled	If enabled, the BDE automatically commit records to the table after each post. If disabled, the application decides when to commit the records. Please note that this setting is only relevant for applications that actually write to an Oracle database like SmartLogger or SmartTranslator.
Table open list, cache time [1)]	Defines how long the table list is cached in memory. A new table list is not fetched from the database server before the cache time expires.

1) This setting can have "three" values:

-1 The table list is cached as long as the program is running. This should only be used for static databases, where no tables are added, after the program is started.

0 The table list is never cached. This will increase network traffic, as the table list is fetched directly from the database server every time it is requested.

>0 The table list is cached the number of minutes specified.

MS SQL Server 7 (MSSQL driver)

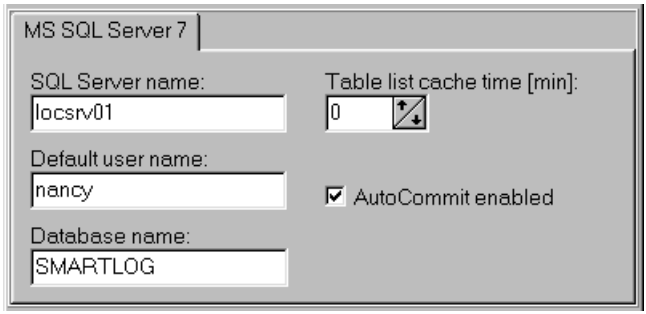


Figure 6-7

***MS SQL Server 7* settings**	
SQL Server name	The registered name of the SQL Server where the database is running. Using the MS SQL Server Enterprise Manager, this registration can be performed.
Default user name	The default user name that is used, if automatic database login is disabled.
Database name	The name of the database containing the SmartLogger tables.
Table open list, cache time [1)]	Defines how long the table list is cached in memory. A new table list is not fetched from the database server before the cache time expires.
AutoCommit enabled	If enabled, the BDE automatically commit records to the table after each post. If disabled, the application decides when to commit the records. Please note that this setting is only relevant for applications that actually ***writes*** to the database, like SmartLogger or SmartTranslator.

1) This setting can have one of three values:

-1	The table list is cached as long as the program is running. This should only be used for static databases, where no tables are added, after the program is started.
0	The table list is never cached. This will increase network traffic, as the table list is fetched directly from the database server every time it is requested.
>0	The table list is cached the number of minutes specified.

6.2.2 Standard alias operations

Create an alias
The following describes the procedure for creating a new standard alias.

1. Press the "New" button.
2. Type in the name for the new alias
3. Set driver type to "STANDARD".
4. Select the database path using the controls browse button.
5. Save the alias.

Modify an alias
To modify an alias, select the desired alias and change the settings applicable to that driver type.
To store the changes, press the save button.
If the settings are disabled, it is because the alias is currently in use and can therefore not be modified. This can also be verified by looking above the database alias where a red text with "(Active)" appears.
If the database driver has to be changed, you will have to create a new alias and delete the old one.

Delete an alias
To delete an alias, select the alias and press the delete button.
If the delete button is disabled, it is because the alias is in use and can therefore not be deleted.

Aliases that are currently in use can not be modified or deleted.

6.2.3 Remote aliases

It is possible to let aliases point to locations on other computers in a network and thereby accessing databases located on remote computers. This feature is especially useful in configurations where multiple users (SmartClients) must access the same event tables generated by the SmartLogger/SmartTranslator.
The procedure for creating a remote alias is the same as for creating a local one. Just use the browse button to specify a network path instead of a local path.

When using remote aliases with Paradox databases the following must also be ensured:

- The client computer must have full access to the network destination. I.e. the directory specified in the destination path must not be write protected.
- All BDE programs (SmartLogger, SmartClient) must use the same NET DIR path. This setting can be changed/verified from Control Panel | BDE Administrator | Configuration tab sheet | Drivers | Native | Paradox.

7. Supervision

It is possible to let the SmartLogger supervise vital parts of the program. This section lists the different supervision options that are available.

7.1 Watchdog

The Watchdog is used to report vital errors to an external supervising system. It requires a digital I/O board, which has to be purchased separately.
The watchdog supports the National Instruments NI-DAQ driver interface, which supports most of the available I/O boards from National Instrument.

Although the NI-DAQ driver supports many different I/O boards, it is recommended to use the I/O board PCI-6503.

Configuration
To install and configure the I/O board, please refer to the documentation from the board vendor.

To configure the Watchdog module, select the menu item *Config* | *Watchdog...*

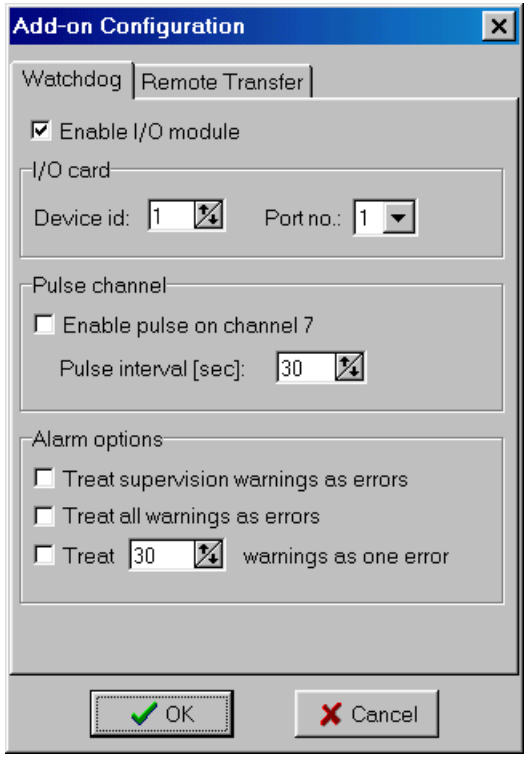


Figure 7-1

Watchdog	
Enable	Enables or disables the Watchdog module.
I/O card	
Device id	Defines which I/O board to use. Please refer to board vendor documentation for more information.
Port no.	Some I/O boards support multiple ports (or bytes). These are typical referred to as Port 0, Port 1 etc. or PA, PB etc. Setting the Port number to 1 is equal to PB.
Pulse channel	
Enable pulse...	Enables or disables pulse on channel 7.
Pulse interval	Defines the pulse interval in seconds.

Alarm options	
Treat sup. warnings...	If checked, all warnings related to disk and data source supervision are treated as errors.
Treat all warnings...	If checked, all warnings are treated as errors.
Treat XX warnings as...	If checked, then an error is generated after the specified number of warnings. Note that the warning count is individual for each port.

A watchdog output will normally be ON (high) if the corresponding port or module is enabled and active. If one of the "Treat ... warnings as errors" options is enabled, then a corresponding warning will set the watchdog output OFF (low) until the warning has been acknowledged.

For most installations it is recommended to *enable* the alarm option "Treat supervision warnings as errors" and to *disable* "Treat all warnings as errors". This combination will make sure that the most serious errors and warnings are reported without generation a lot of unnecessary alarms.

Channel layout
Depending on the board, a number of I/O bytes may be available. The SmartLogger only uses one byte for watchdog outputs, which for National Instruments boards normally is named PB (Port no. 1). The eight channels (bits) in the PB byte is used as described in the following table:

Ch.	Description
0	Port 1 status.
1	Port 2 status.
2	Port 3 status.
3	Port 4 status.
4	TCP/IP Listener status.
5	Remote Transfer status.
6	Common flag. ON if channel 0 to 5 are ON (no errors) / not used.
7	Pulse channel. Will pulse if enabled and common flag is ON.

Depending on the requirements, one or more channels can be connected to an external supervision unit.

> If only one channel is to be used for external supervision, it is recommended to use the pulse channel. This ensures that a program shutdown, where the outputs will be frozen, is also detected.

Status information

It is possible to see the current status of the watchdog outputs by selecting the menu item *View* | *Watchdog ...* or by pressing the watchdog status icon.

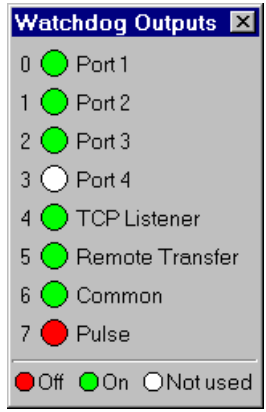


Figure 7-2

The channels 0 to 5 indicate the current status for the corresponding port or module, while channel 6 is the output of al used channels AND'ed together.

The watchdog status information can be viewed disregarding an I/O board is available or not.

7.2 Data source supervision

Data source supervision can be enabled and configured individually for each port from the "Port Setup" dialog as described in section 4.2. When enabled a warning is raised, if a port has not received any data within the specified time period.
If the port in question is a serial port, and the port is configured for XON/XOFF handshake, then the SmartLogger will send an XON character to ensure that a lost XON character does not cause the 'silence'. This can happen if the serial cable is not connected between the data source and the SmartLogger, when a port is started.

7.3 Disk space supervision

The disk space supervision is common for all configured ports and can be enabled and configured from the "Options" dialog as described in section 5.2.

8. Utility Server

The Utility Server handles all data access - both local and remote - towards the SmartLogger data sources and will only be available if either the Notification Module add-on or the Status Module add-on is enabled.

8.1 Main view

The Utility Server main view can be shown by clicking on the 'U' icon on the toolbar or by selecting the menu item *Tools* | *Utility Server…*

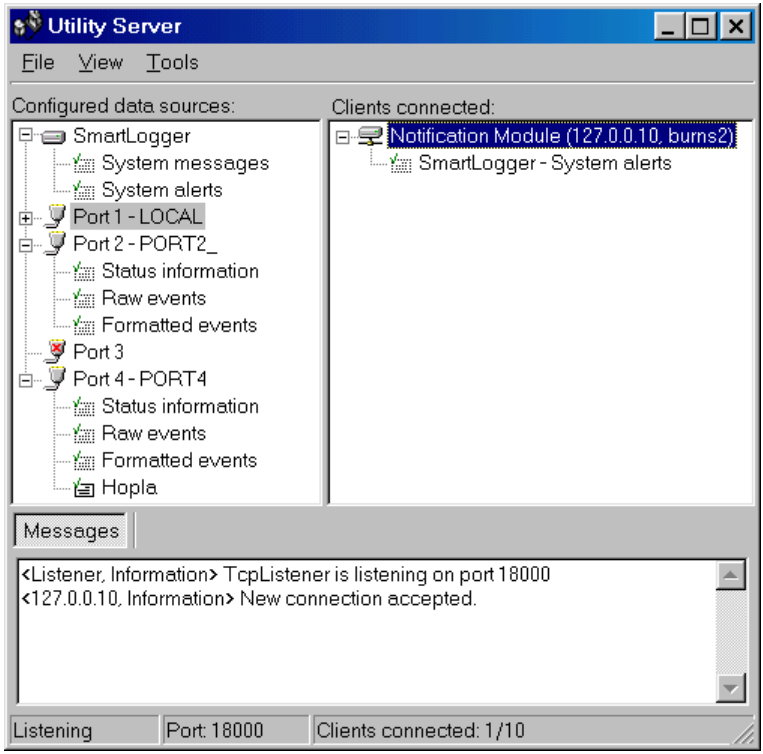


Figure 8-1

The main view is divided into three panes:

Configured data sources

The 'Configured data sources' tree view contains all available data sources related to the SmartLogger itself and all configured ports. The SmartLogger will as default have the following filters available:

System Messages: For subscription to system messages.

System Alerts: System Alerts is a subset of System Messages covering messages with the severity "Error" and "Alert". This makes it possible for remote clients to subscribe to errors and serious warnings.

Each active port will as default have the following three standard filters available:

Status information: Makes it possible for remote status clients (like SmartStatus applications) to subscribe to port status information, system messages etc.

Raw events: This data source will supply any remote subscriber with the raw events as those shown in the Online View.

Formatted events: Subscribers to this data source will receive all events as a comma-separated text. The number of text fields in the comma-separated text depends on the template used for the actual port.

A port with a connected filter is called a **data source**.

In addition to this, it is possible to create new data sources by attaching user-defined filters to active ports (filters are described in section 8.2 "New filter").
A filter can be used to limit the number events in order to let subscribers supervise or store important or special events only, like:

- All alarms from section 12
- All inhibited events from the ESD system
- All tagnames containing the text 'XCV'

- All operator actions that has ACK in the description

Clients connected
This pane shows a list of all remote and local clients currently connected to the Utility Server. For each client a list of subscribed data sources is provided.
Please note that the Notification Module add-on is considered as a local client to the Utility Server and will therefore also be listed in the 'Clients connected' view.

Messages
The message pane contains all messages related to the Utility Server module. The information here will be more detailed compared to the information stored in SmartLogger's common system log, as only important messages and errors are stored in the system log.

8.2 New filter

To create and add a new filter to a port, simply select the wanted port and choose the menu item *File* | *New Filter…*

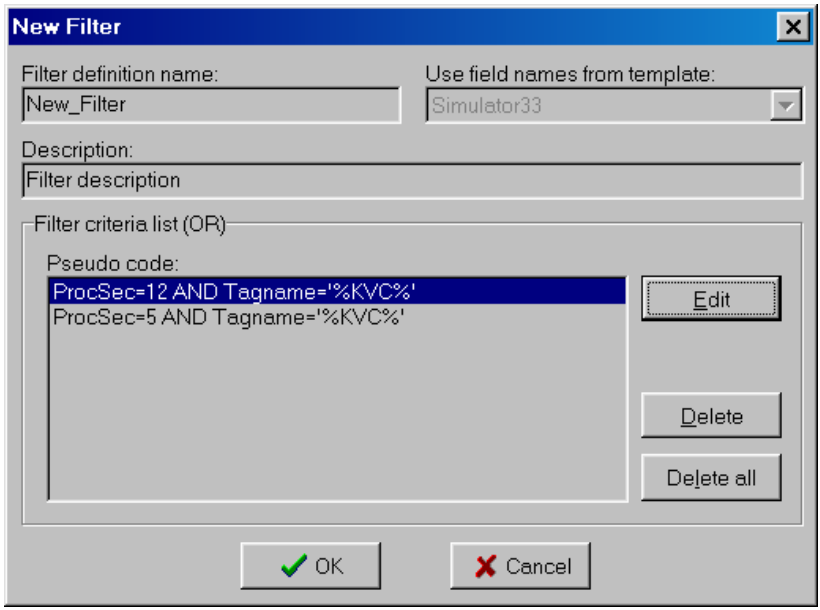


Figure 8-2

New Filter	
Filter definition name:	Name of the filter definition, which is identical to the name of the physical file where the filter is stored.
Use field names from…	This entry is fixed to the template that is configured for the selected port. The template is only used to gain access to a list of field names when building the filter criteria's.
Description:	A descriptive text.
Filter criteria list	
Pseudo code:	This text box shows the filter criteria's in 'translated' pseudo code. Each text line is OR'd together when the filter criteria's are applied. To edit the criteria definitions, press the Edit button. The Criteria Editor is described in section 8.6.

After creating a new filter it will automatically be attached to the selected port and activated.

8.3 Add existing filter

The same filter can be added to several ports. To add a previously created filter to a port, select the port and choose the menu item *File | Add Existing Filter…*

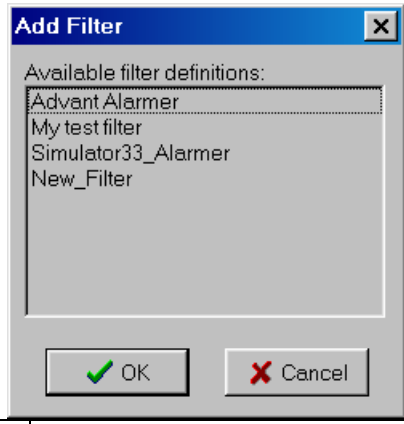


Figure 8-3

The field names used in the selected filter definition must be available for the chosen port. Otherwise a warning is raised when the OK button is pressed

8.4 Modify filter

It is possible to modify a filter already attached to a port, by choosing the menu item *File* | *Modify Filter…* or the corresponding pop-up menu item.
The dialog shown is the same as when creating a New filter, except that the filter name cannot be modified.
Please note that only the user-defined filters can be modified.

8.5 Filter maintenance

The Filter Maintenance tool combines the filter functions described in the previous sections in a single tool. From here it is possible to create, modify and delete filters - with the difference that it is the physical filter definition file that is affected only. In other words, If a new filter is created with the Filter Maintenance tool, then it must be attached manually to a port afterwards.

The Filter Maintenance tool can be opened by choosing the menu item *Tools* | *Filter Maintenance...*

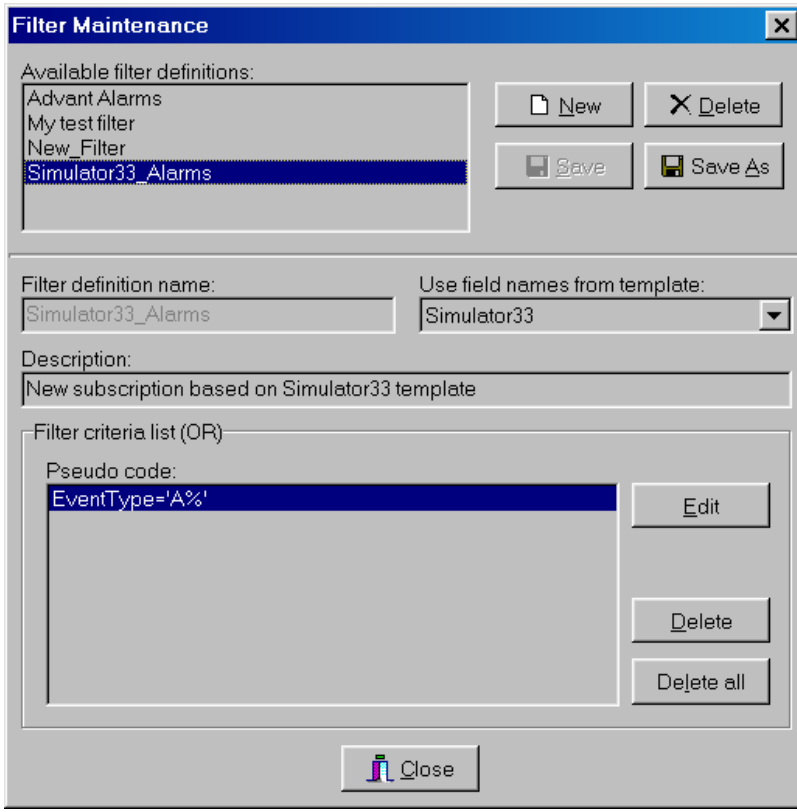


Figure 8-4

Filter maintenance	
Available filter definitions:	Shows a list of available filters. To choose a filter for maintenance, simply click on the filter in the listbox.
Filter parameters	
Filter definition name:	Name of the filter definition.
Use field names from…	The template reference is used to get a list of field names in order to be able to build the filter criteria's.
Description:	A descriptive text.

Filter criteria list	
Pseudo code:	This text box shows the filter criteria's in 'translated' pseudo code. Each line equals one criteria and all criteria's are OR'ed together in the final filter handling. To modify the criteria's, press the Edit button. The Criteria Editor is described in section 8.6.

The template reference is only used to get a list of field names in order to be able to build the filter criteria's.

8.6 Criteria Editor

The Criteria Editor is a powerful tool for building any kind of simple or complex criteria for use in filters.

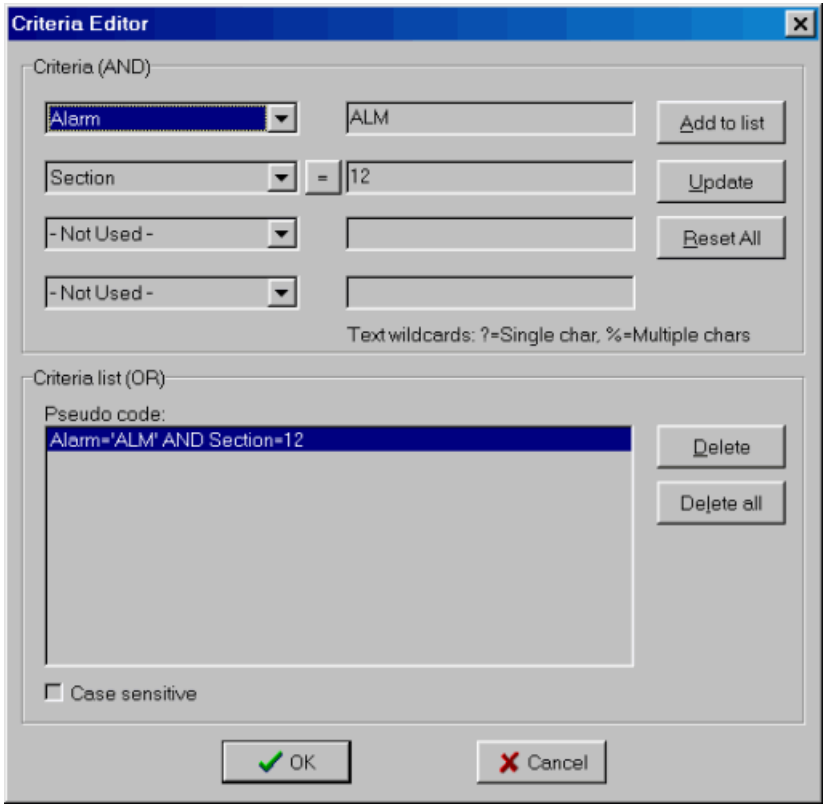


Figure 8-5

Criteria Editor	
Criteria (AND)	One AND criteria is composed by up to 4 field criteria's AND'ed together. An AND criteria can be added to the criteria list by pressing the 'Add to list' button.
Criteria list (OR)	The criteria list (OR) show the filter criteria's in 'translated' pseudo code. Each line equals one criteria and each criteria are OR'ed together in the final filter handling.
'Criteria' buttons	If a field is a numeric field, a small 'criteria' button will be visible between the field name and

	the edit box. This button can be used to specify a range of numerical values. When it is pushed, it toggles between '=', '<', '>' and '<>'.
Case sensitive	If checked, only text that exactly matches the query criteria is accepted, i.e. "Pump Control" does not match "PUMP CONTROL".

8.6.1 Criteria examples

Exact match
If you want to filter all records where the Tagname field contains the exact string 'HAS-OV-12222', you simply enter:

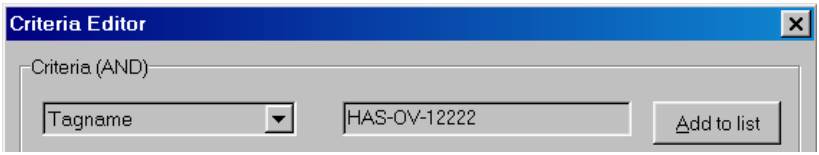


Figure 8-6

Combined AND criteria
If you, in addition to the Tagname criteria, only want to filter records from Section 12 then you additionally enter:

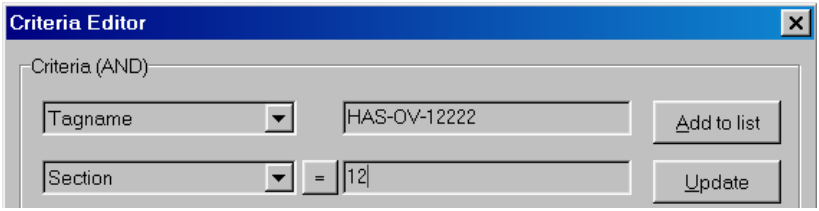


Figure 8-7

Using multiple character wildcards
If you, in addition to the criteria's above, only want to filter records where Description contains 'Flare', then you must enter:

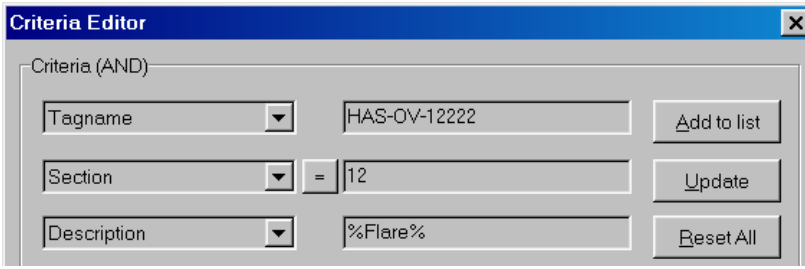


Figure 8-8

It is also possible to use multiple wildcards in a single criterion. If you, for example, want to extract all records, where Tagname starts with "KKS" and contains the characters "ZSC", the criteria should be "KKS%ZSC%".

Wildcards are valid for character fields only.

Adding multiple criteria's (OR)
To add another criteria to this criteria list, click on the "Add to list" button. In the following example we have specified that we want to filter all Tagnames starting with KVC from section 5, 8 and 12.

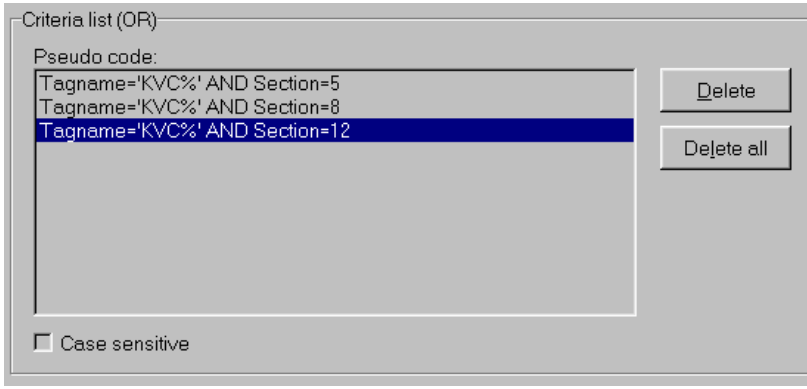


Figure 8-9

In a logical structure the above example will look like this:

```
IF ( Tagname = "KVC%" AND Section = 5) OR
   ( Tagname = "KVC%" AND Section = 8) OR
   ( Tagname = "KVC%" AND Section = 12)
```

8.7 Utility Server options

The options dialog can be accessed from the Utility Server menu item *Tools* | *Options…*

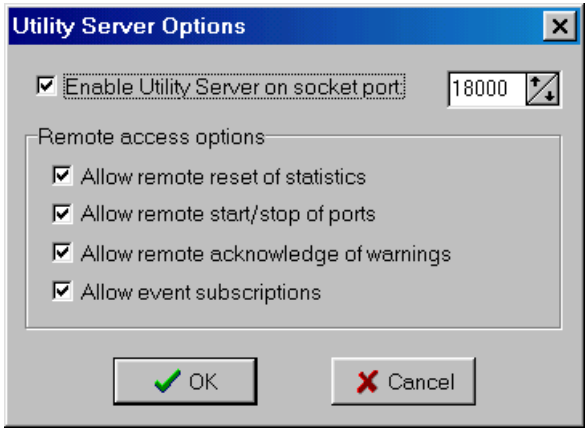


Figure 8-10

Utility Server Options	
Enable Utility Server…	If checked, remote applications and local modules like the Notification Module are allowed to connect to the SmartLogger.
Socket port:	Socket port used for TCP/IP listener.
Remote access options	
Allow remote reset…	If enabled, remote status clients can reset statistical counters.
Allow remote start/stop…	If enabled, remote status clients can start and stop ports.
Allow remote acknowledge...	If enabled, remote status clients can acknowledge warnings.
Allow event subscriptions	If enabled local/remote clients can subscribe on event data sources. Must be enabled if Notification Module is enabled.

8.8 Status Module add-on

The Status Module add-on allows remote SmartStatus clients to connect to the Utility Server for remote access and supervision of the SmartLogger.

For more information about the features available with the Status Module add-on, please refer to the SmartStatus User's Guide.

9. Notification Module Add-on

Add-ons are not included in the SmartLogger product as standard. The Add-ons must be purchased and registered separately. The following descriptions therefore only apply, if you have installed this add-on on your system.

The Notification Module can be used to subscribe to SmartLogger data sources and then report or forward any received events as an "Email", "SMS" or a "SMS via mail" notification.
Email and SMS via mail notifications require access to a mail (SMTP) server, while the SMS notification requires a GSM modem to be attached to the computer.
The Notification Module will receive events via the SmartLogger Utility Server and is treated as an independent Utility Server client.
In order to perform notification on special event patterns, like all "*Pressure high events from process section 12*", a SmartLogger data source must be created in advance. How to create and set-up SmartLogger data sources is described in section 8 "Utility Server".

9.1 Main view

The Notification Module main view can be shown by clicking on the 'N' icon on the toolbar or by selecting the menu item *Tools* | *Notification Module…*

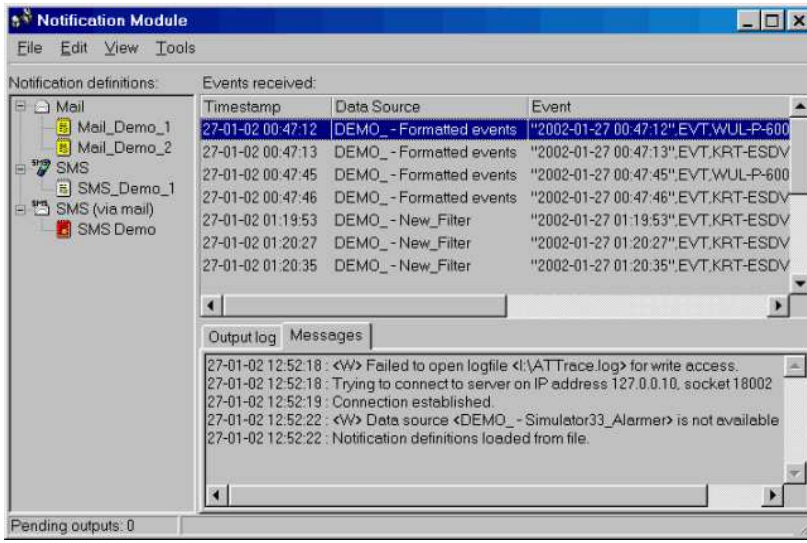


Figure 9-1

The main view is divided into three panes:

Notification definitions
The 'Notification definitions' tree view contains a list of all configured notifications. The current status for each notification is shown by the colour of the icon:

White: The notification is active.
Yellow: The notification is disabled.
Red: The notification has an error and is inactive.

Events received
This pane shows all events received from the Utility Server. Each event is identified by the data source name and will generate one or more notification outputs depending on how many notifications that are subscribing the data source.
The following information is listed in the data grid:

Field name	Description
Timestamp	Date and time showing when the event was received by Notification Module. Not to be confused with the timestamp in the event.
Data Source	Name of the data source supplying the event in the format: <Port label> - <Filter name>
Event	The actual event received in comma separated text format.

Output log and messages

The pane in the lower right section contains two tabs - one for showing all messages related to the Notification Module and one for a historical view of all generated output.
The following information is listed in the output log data grid:

Field name	Description
Id	A unique number identifying the output. This number is used as reference for all messages related to this output.
Timestamp	Date and time showing when the output was stored in the output log.
Type	Output type: Mail, SMS or SMS (via mail).
To	Name of the recipient.
Status	Current status for the output: Pending, Sending, Sent, Error or Cancelled[1)].
Message	The composed message sent to the recipient.
Data source	Name of the data source originally supplying the information for the output.

1) An output can be set to "Cancelled", if the user has chosen "Cancel all pending outputs" from the menu or if the SmartLogger was shut down while there were pending outputs.

9.2 Notification menu

Menu	Item	Description
File	Add Notification…	Adds a new notification. Refer to section 9.3 "Add Notification" for more information.
	Modify Notification…	Shows the same dialog as for adding a new notification, with the exception that the notification name cannot be changed.
	Rename Notification	Makes it possible to rename the currently selected notification in the tree view.
	Delete Notification	Deletes the currently selected notification in the tree view.
	Close	Closes the Notification Module main view.
Edit	Disable Notification	Disables an active notification.
	Enable Notification	Tries to activate a disabled, or error marked, notification.
	Clear "Events received" grid.	Clears the 'Events received' grid.
	Cancel all pending outputs	Cancels all pending outputs. Outputs already in sending mode will ignore this cancellation.
View	Get modem information	When selected the configured modem will be queried for relevant information. The response is shown in the Messages view.
	Communication Trace	If checked, then SMTP and serial trace messages are shown in the Messages view.
Tools	Address book...	Opens the Windows Address Book tool.
	Options...	Opens the Notification Module options dialog.

9.3 Add Notification

To add a new notification select the desired notification type in the tree view and choose the menu item *File* | *Add Notification…*

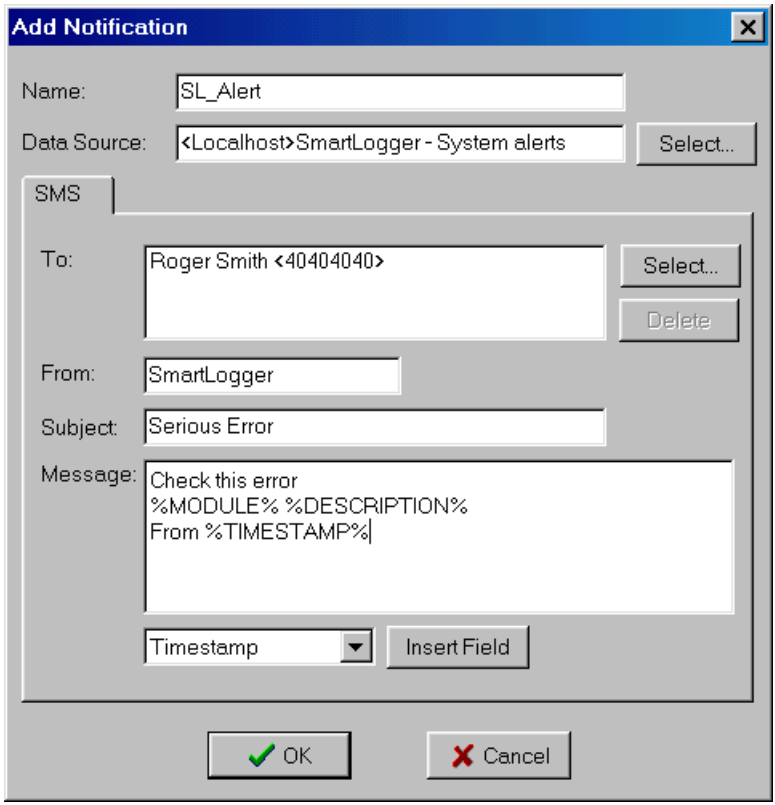


Figure 9-2

Add Notification	
Name:	Name of the notification.
Data Source:	Identifies the data source selected for this Notification. Each event received from this data source will generate one notification per recipient specified. To change the data source, press the associated "Select" button and the

	Data Source browser dialog will be shown.
Mail properties[1)]	
To:	Contains the list of recipients for this notification. To select new recipients, press the associated "Select" button.
From:[2)]	Identifies the sender of the Notification.
Subject:[2)]	A descriptive subject for this notification. Can be used to categorise the notifications for the recipients, like for example "Section 5 alarm", "Produced water alarm" etc.
Message:	The message body. To insert fields from the event into the message, select the wanted field and press the "Insert" button. Inserted fields will be displayed as %<FIELDNAME>%.

1) Depending on the Notification type selected, this may change to "SMS" or "SMS (via mail)"

2) In SMS notifications the "From" and "Subject" entries will be part of the SMS message, like: "From; Subject; Message text".

For SMS messages the total length of the message, including "From" and "Subject" text, can not exceed 160 characters. Any additional characters will be cut off.

9.3.1 Data Source browser

When selecting a data source for a notification, the following dialog will be shown:

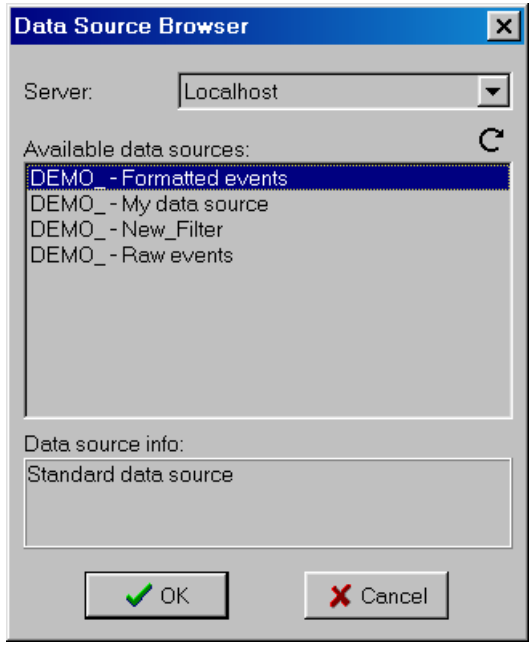


Figure 9-3

Data Source browser	
Server:	Only "Localhost" is supported in this version.
Available data sources:	Shows a list of data sources available on the selected server. To refresh the list, press the small circular arrow above the list box.
Data source info:	Shows a descriptive text for the selected data source - if specified when building the data source.

9.3.2 Notification types

The Notification Module supports the following notification types:

E-mail
Notifies the recipient via e-mail and requires access to a mail (SMTP) server. This type is only preferable, when a notification do not require immediate action.

SMS via GSM
Notifies the recipient via a GSM cell phone and requires a GSM modem to be attached to the computer. This type is recommended when a notification requires immediate action.

SMS via mail
Notifies the recipient via a GSM cell phone and requires access to a mail (SMTP) server. The delivery time for the SMS may vary a lot (could be hours) as free SMS services have very low priority by many phone operators.

9.4 Notification options

The options dialog can be accessed from the Notification Module menu item *Tools* | *Options…*

SMS options:

Figure 9-4

Modem connection	
Device	Shows the selected device. Only devices actually available in the system can be specified.
Flow control	NONE or XON/XOFF
Connection pref.	Shows the currently selected connection preferences: baud rate, parity, data bit, stop bit.
Change	Press this button to change the serial settings.
Communication options	
Number of attempts…	Specifies the number of send attempts to be executed before a SMS message is reported as failed.
Character delay:	Some mobile devices are sensitive to fast communication. If a modem connection often report communication errors, increasing this parameter might help. Recommended settings for selected Nokia devices: Nokia 22: 0 msec Nokia 6210: 80 msec
Log modem comm…	If checked, all modem communication is logged to the specified file.

Mail options:

Figure 9-5

SMTP server	
Address:	The internet address for the SMTP server to be used for mail notifications.
Port:	Port to be used for connection. Should normally be set to 25.
Mail options	
Reply address:	Specifies the reply address that will be used if recipients of mail notifications uses the reply function in their mail program. Not to be confused with the "From" parameter in the notification configuration, which is the name that is displayed in the mail header.

9.5 Address Book

The Notification Module uses the standard Windows Address Book (WAB) API, which is included as standard on most Windows installations today.

The SmartLogger Address Book can be accessed from the Notification Module menu item *Tools* | *Address Book…*

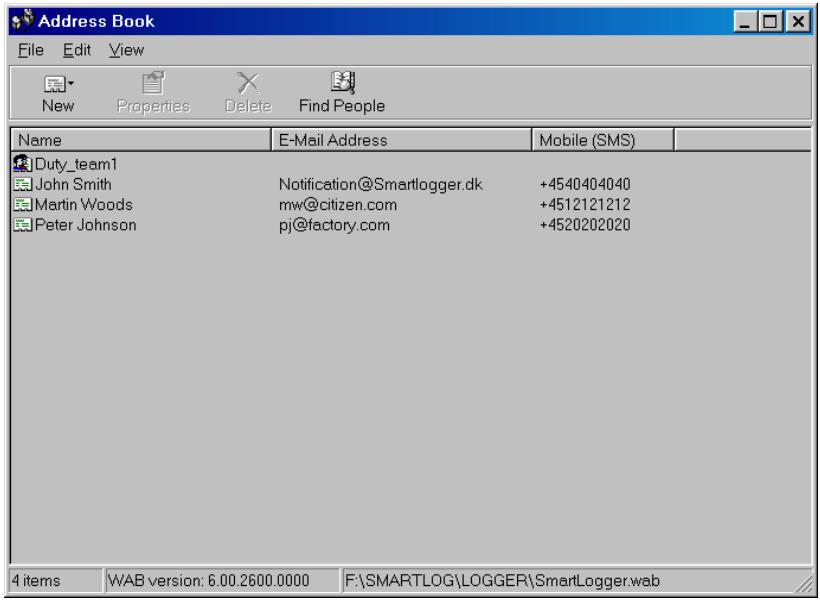


Figure 9-6

In order for the Notification Module to work properly, the following must be specified for each entry in the address book:

Name: First/Middle/Last name can be specified under the "Name" tab.

E-Mail: Can be specified under the "Name" tab-sheet. Required for "Mail" notifications.

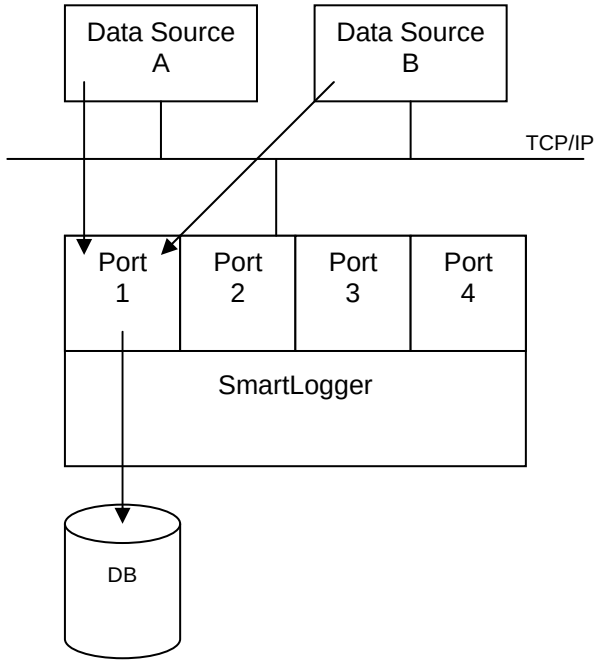
Mobile: Can be specified under the "Home" tab-sheet. Required for "SMS" and "SMS (via mail)" notifications.

10. Redundancy Module Add-on

Add-ons are not included in the SmartLogger product as standard. The Add-ons must be purchased and registered separately.
The following descriptions therefore only apply, if you have registered the Redundancy Module add-on on your system.

10.1 Redundancy concept

The redundancy module is intended for configurations were safe data collection is vital for subsequent event analysis. The concept is based on event collection from two identical data sources and storage in a single log where doublets are removed.
The filtering is based on unique database indexes, which makes sure that identical events cannot be stored in the database. This also has the benefit that delayed events from either of the data sources have no impact on the data storage.



The unique table index is defined in the SmartLogger template and must be a primary index. This means that fields used for the index must be located at the beginning of the table structure.

The template and the index can be modified with SmartBuilder application.

It is very important that index contain enough fields to makes each event unique within the specified fields. Otherwise events may be lost due to index violation.

Configuration of redundant event collection is done from the "Redundancy" tab-sheet on the Port Configuration dialog. For more information see section 4.2.4 "Advanced settings - Redundancy".

10.2 Additional information

Some of the SmartLogger modules contain additional information for ports configured for redundant event collection.

10.2.1 Port status

On the port status dialog it is possible to see the names of the configured print queues and event statistics per data source:

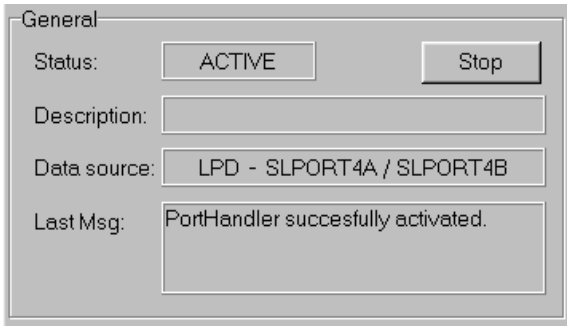


Figure 10-1

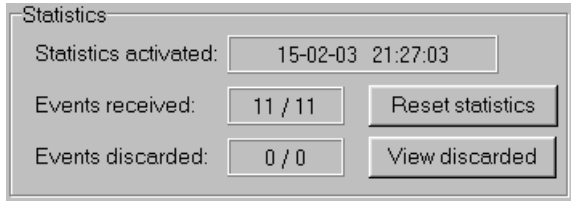


Figure 10-2

10.2.2 Online View

For redundant ports the Online View is divided into two text areas containing events from data source A and data source B.

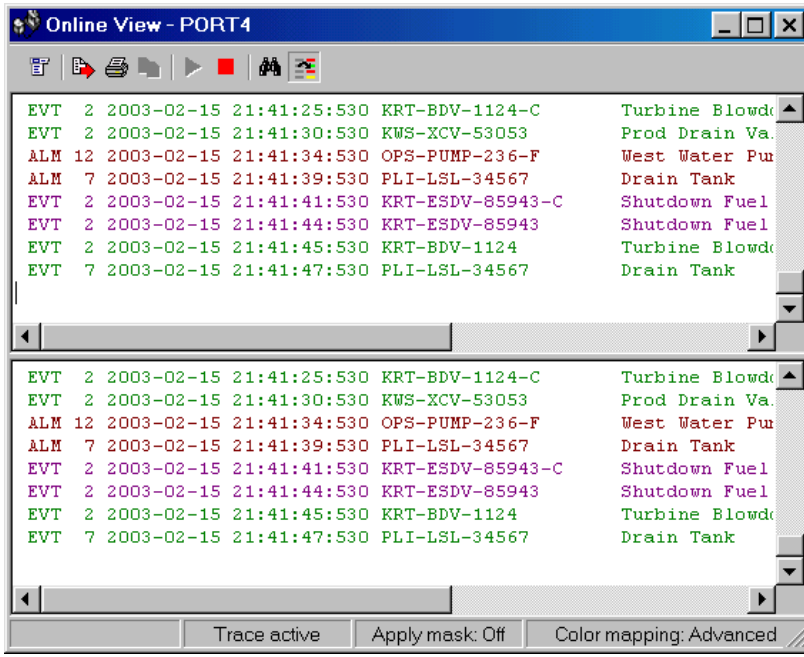


Figure 10-3

All toolbar and menu functions like print, copy to clipboard etc. works on the currently selected text area. To select a text area, simply click somewhere on the text area.

10.2.3 Redundant information in tables

Tables used for redundant event collection are created with an extra field "RedundantInfo" that shows the origin of the event.

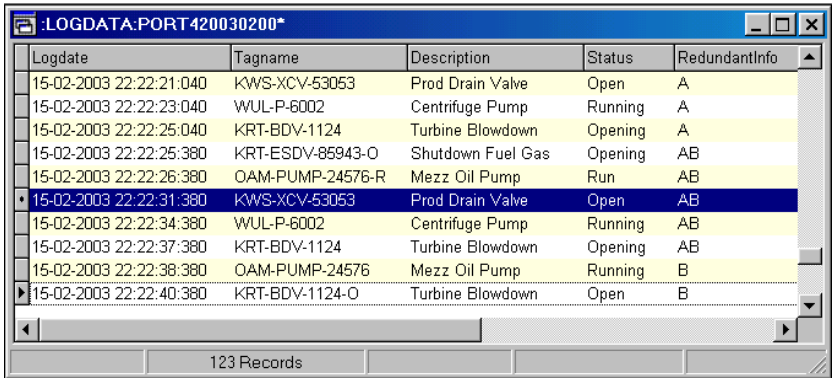


Figure 10-4

Possible combinations:

A The event was only received from data source A - or not yet received from data source B.

B The event was only received from data source B - or not yet received from data source A.

AB The event was received first from data source A and then from data source B.

BA The event was received first from data source B and then from data source A.

The redundant information is only stored in the table if the feature is enabled when configuring the port.

For heavily loaded systems it is recommended *not* to store redundant information in tables as it require extra resources to lookup previously stored events.

11. Remote Transfer Add-on

Add-ons are not included in the SmartLogger product as standard. The Add-ons must be purchased and registered separately. The following descriptions therefore only apply, if you have installed the add-ons on your system.

11.1 Remote Transfer

The Remote Transfer add-on is used to transfer raw events to a remote host via a TCP/IP network. The function works independently of other port related configurations like log change, template and database settings. A port configured for remote transfer, transfers all events to the host in the same sequence as the port receives them from the data source.

Please refer to the Release Description for a list of supported transmission protocols.

Configuration

The Remote Transfer add-on is configured from the menu item *Config* | *Remote Transfer...*

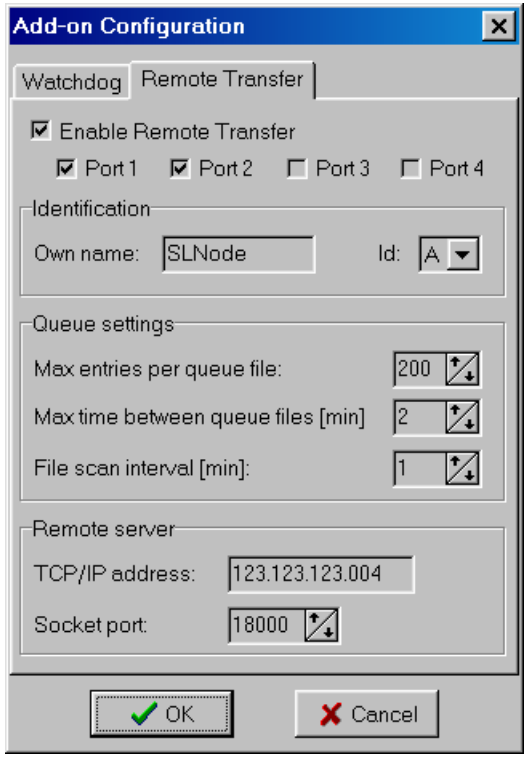


Figure 11-1

Remote Transfer	
Enable Remote Trans.	Enables/disables the Remote Transfer add-on.
Port 1..4 checkboxes	Used to enabled or disable individual ports for Remote Transfer.
Identification	
Own name	Used by transmission protocol to identify the SmartLogger node.
Id	Used by transmission protocol to identify SmartLogger node in redundant systems.
Queue settings	
Max entries per queue file	Defines the number of events allowed in each queue file. If exceeded, a new queue file is

	created.
Max. time between ...	Maximum delay between each queue file in minutes. If exceeded, a new queue file is created.
File scan interval	Defines the time in minutes between each scan for files to transmit.
Remote server	
TCP/IP address	Defines the IP address for the remote server.
Socket port	Socket to be used for transmission.

Please note that the SmartLogger has to be restarted before any RT change takes effect.

For a detailed description of the RT queue behaviour, please refer to appendix 12.4.1 "Remote Transfer queue".

Status information

To see the status for the remote transfer:

- Press the corresponding status button on the toolbar OR
- Select the menu item *View* | *Remote Transfer ...*

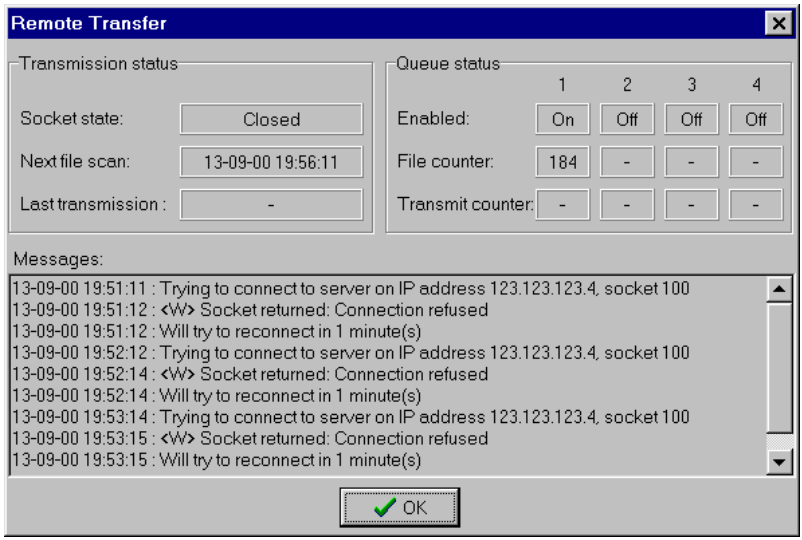


Figure 11-2

Transmission status	
Socket state	Shows the current state for the communication socket. Possible states are: Connecting, Connected, Closed or Error.
Last transmission	Timestamp for the last transmitted queue file.
Next file scan	Shows the time when the RT module will look for completed queue files to transfer.
Queue status	
Enabled	On: Port is configured and enabled for RT. Off: Port is configured, but not enabled for RT. N/A: Port is not configured.
File counter	Shows the id (1..999) for the last *completed* queue file.
Transmit counter	Shows the id (1..999) for the last *transmitted* queue file.

The message window shows the latest 200 messages. Messages related to the communication flow starts with a direction marker:

-> Messages send to the remote server
<- Messages received from the remote server

For a detailed description of the communication flow please refer to section 12.4.2 "Remote Transfer messages".

12. Appendix

12.1 Data handling

One of the key issues for the SmartLogger is that data are validated and stored in a database table.
When performing any kind of data validation, there is a chance, that some of the data may fail in the validation procedure.
How the SmartLogger handles this topic, is described in the following sections.

12.1.1 Data validation

Before an event is validated and stored in the database it has been put through a number of filter and validation steps. The following describes the validation sequence.

Step 1: Binary filter
The first step is a binary filter that ensures that corrupted data are not accepted. A typical situation, where this filter is useful, is when the serial settings for the data source and the SmartLogger are not identical.

Step 2: Line filter
Some data sources sometimes produce empty lines. To avoid warning messages the SmartLogger ignore empty lines.

Step 3: Exclude mask
It is possible to define an *exclude mask* in the SmartLogger template. All events with a text pattern like the *Exclude mask* will be ignored by the SmartLogger.

Step 4: Event validation
The final step is the actual event validation where date, time and integer components are validated. The validation is performed according to the event mask defined in the template. Validated events are stored in the database table while events that do not observe the template specification are stored in a discarded log (text file).

12.1.2 Timestamp handling

Depending on the timestamp settings in the template, the SmartLogger handles event timestamps differently:

Local timestamp
All events are stamped with the current local PC time as they are processed.

External timestamp
Timestamps are decoded from the event according to the specified event mask in the template.

Local intelligent date
If the local intelligent date feature is selected, then the date value is calculated according to the following formulas (pseudo code):

```
Date = LocalDate
if ((HourLocal + 8) < HourEvent)
    Date = Date - 1;
if ((HourEvent + 8) < HourLocal)
    Date = Date + 1;
```

where:
HourLocal = Current hour value from local PC
HourEvent = Hour value decoded from event

Adapted values
There is one case where the SmartLogger will store an event even though it could not decode all values correctly:
If the date is decoded correctly, but the time conversion fail, then the SmartLogger will store the event with the local PC time as time parameter. For each adaptation made a warning is raised.

12.1.3 Data storage

Figure 12-1 shows the two possible destinations for incoming data. Data are either stored in a table log or, if discarded, in a text log.

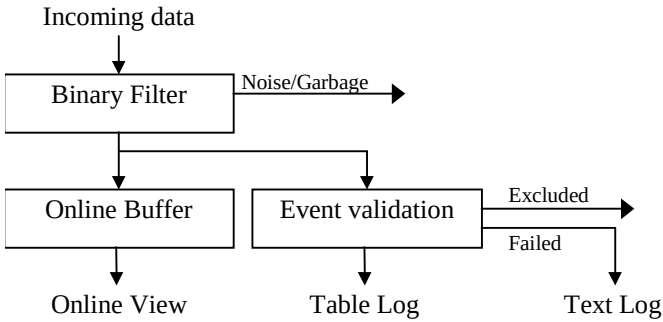


Figure 12-1

The text log contains the raw data and a time stamp for each discarded text line:

```
<Date> <Time> | <Discarded event text>
```

The discarded files are named <LABEL>.txt and are located in a directory named 'Discarded'. If, for example, a port were configured with the label “TEST”, then the corresponding text log file would be:

```
<InstallPath>\Discarded\TEST.txt
```

Do not try to open the file with the discarded events with an advanced word processor, like MS Word, Most word processors will place a write protection on the file, which will cause the SmartLogger to fail when trying to write discarded events to the file.

12.2 Log change philosophy

The log change feature ensures that log tables do not grow inexpedient large. A port can be set up to perform a log change every DAY, every WEEK, every MONTH or every YEAR.

The composed log name depends on the specified change type as shown in the following example, where the today's date is 1999-08-27.

Change type	Composed log name
DAILY	TEST19990827
WEEKLY	TEST1999W34
MONTHLY	TEST19990800
YEARLY	TEST19990000

As incoming events may not arrive in consecutive order, the SmartLogger operates with a term called "Log change period".

The following describes how the Log change period is handled for a port configured to DAILY log change:

- The log change period starts when an event with a newer date than the current destination log is received.
  Example: The current log is named TEST19981117. If an event with timestamp 1998-11-18 is received at 00:02:31 then the log change period is started at 00:02:31.
- During the log change period two destination logs are active at the same time. Events are stored in the log that corresponds to event's time stamp.
- The log change period ends when the log change timer expires. The timer can be changed from the Settings dialog as described in section 5.2 "Options".

Events with time stamps older than the current destination log will be discarded. If, for example, the current log is TEST19981117 then events with time stamps 1998-11-16 and older be discarded.

12.2.1 Forced log change

In two cases the SmartLogger will execute a log change instantly, disregarding that the change period timer has not expired. These are:

1. If events from a new day are received during a log change, then the current log change is completed instantly and a new log change period is started.

2. When the SmartLogger is started, the current date is used as default for composing table names. If events from the previous day are received before any events from the current day, then a log change to previous day is performed instantly. This ensures that events from previous day are not discarded, if the SmartLogger for some reason has been stopped during midnight and an event queue has been built up at the data source.

12.3 Handshake handling

For serial ports it is possible to enable software handshaking (XON/XOFF). The handshake is programmed as described in the following:

XOFF (ASCII 19) is transmitted when

- A serial port is stopped.
- The input buffer is 80% full.

XON (ASCII 17) is transmitted when

- A serial port is started.
- Data source supervision timer expires.
- The input buffer gets below 20% full after an XOFF has been transmitted due to a buffer full situation.

12.4 Remote Transfer details

The following sections describe the behaviour of the Remote Transfer add-on in details.

12.4.1 Remote Transfer queue

The RT Queue is a directory where the SmartLogger stores all queue files and queue counters related to the Remote Transfer add-on. The queue ensures that no events are lost due to transmission errors or temporary network errors. All events received by the SmartLogger are stored in the queue immediately, and no events are removed from the queue unless the remote server has confirmed the transfer.

The RT queue has a capacity of 999 queue files, which give a maximum storage capacity of approximately 400.000 events or 66 hours - depending on the RT settings 'Max entries per queue file' and 'Max time between queue files'.

Each SmartLogger port has its own set of queue files:

RT1.ini	Contains information about queue counters.
~RT1.log	Queue file under construction.
RT1N001.log	Queue file ready to be transmitted.
RT1N002.log	Queue file ready to be transmitted.
RT1Nxxx.log	Queue file ready to be transmitted.

The listed files apply to port 1. For files associated with other ports replace RT1 with the corresponding port number.

12.4.2 Remote Transfer messages

The Remote Transfer communication is based on the following message types:

Information message (SmartLogger -> Host)
Contains miscellaneous information about the SmartLogger set-up and each configured port. Is transmitted every time a connection is established i.e. at start-up and after a connection has been lost. Must be confirmed by host.

Status message (SmartLogger -> Host)
Contains current status for all configured ports. Is transmitted every time status has changed. May be transmitted with up to one-minute delay, as the Remote Transfer module only scans for status changes every minute or when another message is transmitted.

Data message (SmartLogger -> Host)
Contains all events stored in one queue file. Is transmitted when required.
When confirmed by host the corresponding queue file is deleted.

Heartbeat message (Host -> SmartLogger)
Heartbeat message used to verify connection at idle periods.

Confirmation message (Host -> SmartLogger)
Confirmation for successful received information or data message.

12.5 File locations

The following table shows a list of files and file types maintained by the SmartLogger application.

File type	Default location
SmartLogger.ini	<Install_path>
Systemlog.db	<Install_path>
Templates (*.tpl)	<Install_path>\Templates[1)]
Discarded events (*.txt)	<Install_path>\Discarded
Filter definitions (*.flt)	<Install_path>\Filters
Log tables (*.db)	<Install_path>\Logdata[2)]
RT queue files (*.log)	<Install_path>\RTQueue[3)]
Notification.ini	<Install_path>[4)]
SMSProviders.db	<Install_path>[4)]
NM Data files (*.bin)	<Install_path>\TraceLogs[4)]
Trace logs (*.log)	<Install_path>\TraceLogs

1) Shared directory. Location is stored in Windows registry and is shared by all Smart* applications.

2) The location of log tables is determined by the database alias. As standard a database alias named LOGDATA pointing at the specified location is created.

3) Only valid if the Remote Transfer option is enabled.

4) Only valid if the Notification Module option is enabled.