



ICESPY SYSTEM 5: PC SOFTWARE Features and Specifications

Overview

The PC software is a component of an IceSpy *System5*. A typical *System5* comprises of a number of SCOUTs (each with one internal temperature sensor), SCOUT_{PLUS} (each with one internal temperature sensor and provision for a second external sensor), one or more BASE or BASE_{PLUS} units and PC with special PC application software. Optional ECHO repeater units and external sensors are also available.

The special IceSpy *System5* PC Software is a set of five independent applications, linked by a common database, the *Engine*, which together provide complete control over accessing and control of data collected from IceSpy Sensors.

The database '*Engine*', which stores the data, is a special version of Microsoft SQL server, provides no user interface: all access is via the IceSpy *System5* applications.

Although the suite of applications contains a host of features for advanced users it maintains an easy-to-use interface for less experienced personnel or those that simply require a straightforward data recording system.

A special version of the set of applications, known as the '*21CFR Professional* version' is available with a higher degree of control over authorised access, is suitable for incorporation into a validated system conforming to 21CFR part 11. Features unique to this versions are marked separately below.

The set of applications linked to the database *Engine* can be summarised as follows:

- '*System5 Logger*' which automatically collects data from IceSpy SCOUT and SCOUT_{PLUS} units, via any number of IceSpy BASE or BASE_{PLUS} units (attached to PC by cable, network or modem). This program runs 'in the background' on a PC and should be active at all times if possible (although if switched off overnight, data will be downloaded automatically when the program restarts). Once started, there is usually no need for users to control this program in any way. This application runs on the same machine as the database engine, and there must be only one such machine in any local area network.
- '*System5 Control*', a Windows Service that ensures '*System5 Logger*' continues running at all times, whoever is logged on.
- '*System5 View*' which displays historical and real-time data in tabular or graphical form. *View* also enables the user to display current alarm status and signal strengths. *View* can be located on the machine hosting the SQL server and/or on other PCs on the network.
- '*System5 Adjust*' which allows you to change alarms conditions, names and zones for the IceSpy Sensors that are part of the installed system. *Adjust* is started from the *View* program when required or can be run independently. This can be located on any PC on the network, probably installed alongside *View*.
- '*System5 Webview*' which enables data from separate BASE units to be viewed with a standard web browser without installing the other *System5* applications.

Definitions

- **Sensors** refers to SCOUT, SCOUT_{PLUS} or older IceSpy sensors (MR-T, RL-TT etc)
- **BASE** refers to BASE or BASE_{PLUS}
- +++ features unique to the Professional 21CFR-11 version

SYSTEM5 LOGGER

Overview

- The purpose of Spy5Log is to continuously monitor any IceSpy interfaces attached to the PC, and to download data from them automatically at intervals sufficient to maintain continuous sets of recorded data. Continuous operation of the application is protected (in case of user cancellation) by 'Sys5Control' Windows Service

Functions

- Creation of IceSpy-specific database on first run
- Continuously monitor data from SCOUT units, via BASE and ECHO units.
- Download data from BASE automatically at intervals sufficient to maintain continuous sets of recorded data.
- Additional download of SCOUT units on request, in order to complete any missing data caused by "out of radio range"
- Broadcasts from Base units will transmit ID string to occur at least once per minute. ID string includes serial number of Base. These broadcasts enable Base units to be 'found' automatically with no user intervention or setup.
- Download of lists of sensors being recorded in Base units and automatic creation of corresponding tables in database
- Newly-found Sensors placed into Zone 0 by default
- Automatic upload of changes to sensor lists as required by authorised users and determined via Sys5Adjust
- Automatic upload of changes to sensor types, zones and alarm settings, and Base settings as required by authorised users and determined via Sys5Adjust
- Individual sensors can have settings changed (via Sys5Adjust) without restarting recording or upsetting other sensors in any way.
- Automatic downloading of recorded data from Sensors whose data is being collected by any attached Base unit(s), to ensure continuous data records in database for later viewing by Sys5View
- Automatic sending of alarm indications via internet connection or modem:
 - Relaying of critical (remote) alarms (by email or text message) to different personnel for each zone, according to parameters set via Sys5Adjust
 - Relaying to secondary personnel if no response from first
 - Cancellation of critical (remote) alarms, once acknowledged from Sys5View application
 - No alarms are caused by sensors in zone 0
 - Automatic creation of audit trail for alarm events
 - See 'System5 Adjust' for more details of alarm parameters
- Provision for data in Scout units to be manually downloaded on request from Sys5View (via flagged request in database) using special mode of Base (this method bypasses any data stored in the memory of the Base and is used to 'fill-in' any data gaps caused by temporary poor radio reception to a Base.
- Continuous operation:
 - Automatic startup on reboot of PC via Sys5Control (no user required to be 'logged on')
 - Protection from system 'crashes' via Sys5Control
 - No 'modal' dialogs appearing (e.g. error messages) which require input from users before recommencing of essential operation
- In conjunction with Sys5Calc, will calculate and store values of 'virtual' sensors for display and analysis purposes – for example, Mean Kinetic Temperature, Pasterisation rates.

Data

The vast majority of the data used by Sys5Log is a set of working copies of the tables in the database, held in application memory for speed of access. Any non-transient data which has been changed is written to the database as soon as practical. Differences (and additions) compared with the database tables are as follows:

- There are separate tables of sensors for each Base unit in the table of Bases (The database has a single table of all sensors). This enables the application to be efficient in determining downloads of data.
- Transfer of data between application and connected Base units using XML format

Interfaces

- Basic desktop interface on PC providing:
 - Current read status of sensors
 - Ability to manually add IP addresses of Base units not found via UDP (e.g. different subnets) (System administrator only)

- Ability to clear all data from chose Base units (System administrator only)
- Option to re-scan data ports for new Bases
- Scrolling list view summarising all successful data transactions via interfaces, and error messages
- Automatic detection of UDP broadcasts from any connected Base network modules in same network subnet
- Automatic detection of serial broadcasts (USB or RS232) from any directly connected Base serial modules
- Modem required in PC for download of data from Base units connected via modem, and for transmission of alarm messages via telephone system – standard landline modem or GSM modem
- Internet connection required (via network) for transmission of email alarms (no provision for dial-up internet service providers)

SYSTEM5 CONTROL

Overview

A very simple Windows Service whose sole purpose is to ensure that Sys5Log continues running on a machine (PC) in the event of the application 'crashing' or the PC being rebooted, whichever user is 'logged on' (including no user being logged on).

Functions

- Installed as a standard Windows Service with automatic startup
- Checks (once per minute) that Sys5Log is currently running on the same machine
- If Sys5Log is not running, starts it running

SYSTEM5 DATABASE

Overview

The SQL database is the heart of all the System5 applications, being a repository for all important (non-transient) data. All other elements of the system interact with this database either directly or indirectly.

Functions

- MSDE200 (Release A) database engine installed with option of Windows authentication or SQL authentication (+++ version, Windows authentication only)
- 'IceSpy5' database tables are created automatically, on first use of Sys5Log.
- Tables created and maintained by the system: Sensors, Types, Bases, Zones, Annotations, Data .
(+++only) Audit trails tables for changes to Sensors, Bases and Zones. Type, Annotation and Data tables cannot have their contents changed and simply grow in size.
- Structured to allow querying and extraction of data in XML format to enable viewing of data via web browser.
- Facilities for backup and restore provided by standard Microsoft SQL functions
- Additional facilities provided (via Spy5View) to archive subsections of data (e.g. certain days of records) for export (and subsequent import) in XML format. Checksum control prevents falsification of data by this means.
- Access to data by standard SQL query (not +++ version) (publication of access information available on request)

SYSTEM5 VIEW

Overview

Sys5View is a user-friendly 'front-end' for viewing of data from the System5 database. Visual design is based on previous versions of IceSpy (e.g. 4.3) to retain some familiarity for existing users of IceSpy systems. Main data views are chart (graphical) presentations and a column-based text listing. Additional windows provide summary data for each Sensor and for alarm statuses. All views are designed to display Sensors in one Zone at a time.

Functions

- Sets of data displayed on a Zone basis. Data can be arranged into named zones (using Sys5Adjust) for ease of inspection. Single mouse-click switches between graphs / lists for each zone, or zones can be automatically scrolled
- View can be changed to show one day or one-minute readings, 10 days of 10-minute readings or 60 days of hourly readings
- Default display is 10-minute readings of latest data (i.e. last 10 days). Viewing preference stored to 'stick' between sessions.
- After initial use, on opening the application the user will always see his preferred layout of the latest data (without manually reading a logger or opening a file).
- Can show shorter or longer periods as and when required by menu/button options
- Provision to select a date from on-screen calendar, for viewing earlier data (where data is available in database)
- Data displayed in five alternative formats:
 - Chart view (all sensors in zone shown on same chart)
 - Zoom functions to expand sections of chart
 - Chart view (separate small charts for each sensor)
 - Includes current values of sensors
 - Alarm status of each sensor indicated by colour and flashing
 - Text listing of all recorded data against time records
 - Summary of Sensor details:
 - Names
 - Alarm Levels
 - Statistical data (max, min, average readings for period shown)
 - Data storage type
 - Indication of current radio signal strength from sensor
 - Summary of alarm events:
 - Alarm start time
 - Alarm end time and duration
 - Value and time of 'worst' part of alarm event
 - Alarm acknowledgement details
- Printing facilities for charts, text listing and summary data.
- Annotations can be added to data based on sensor name and date / time. These will be reproduced on printed outputs.
- A double mouse-click on a sensor in the summary view activates the Sys5Adjust application
- Option of new alarm alerts via message window and / or audible signals
- Data
- All automatically recorded data (e.g. temperatures) generated and stored by Sys5Log in database
- All user-definable data (e.g. Sensor parameters) changed via Sys5Adjust and stored in database
- Data export to text file, graphics file, CSV file (for Excel) and PDF file (+++21CFR version - PDF only)
- Data export and import (+++ version, export only) of industry-standard XML files to aid technical support or 3rd party applications
- +++ Data output to printer or PDF file includes electronic signature information. PDF is write-protected.

SYSTEM5 ADJUST

Overview

Sys5Adjust is a user-friendly 'front-end' for changing of settings in the System5 database. Changes to settings are allowed only by authorised users (users themselves are also set up via this application when System Administrator is logged on). Changes to settings of Sensors, Zones and Bases are provided for. No values of automatically recorded information (e.g. temperature values from Sensors) can be adjusted by any user. (Admin can currently change anything via 3rd-party SQL interface)

The application works at two levels: a simple dialog for changing the common settings of a single Sensor, and a full-page dialog which enables all changes.

Audit trails are provided for all changes to settings. (Only Sensor changes at present, Base and Zone changes not displayed yet).

Functions

- Simple dialog for changing common Sensor settings for one Sensor at a time (name, high alarm, low alarm, alarm delay time, colour indication on screen / printed outputs): accessed from Sys5View for convenience
- Full dialog for changing settings of all sensors in database, accessed from the simple dialog or direct from desktop 'shortcut'
- Adjustable parameters for each sensor (as indicated in 'data' below)
- Adjustable parameters for each Zone (as indicated in 'data' below)
- Adjustable parameters for each Base (as indicated in 'data' below)
- Provision for deletion of 'old' sensors which have lost all data or are no longer required.
- Any changes in settings automatically linked to Sys5Log via flags in database, such that Sys5Log can upload changes to Base units as required.
- Individual sensors can have all settings changed without restarting recording or upsetting other sensors in any way.
- Setting up of system users at administrator, adjuster or viewer levels. Adjustable parameters for each user as indicated below
- Screen display (and printout) of audit trail for all changes to Sensors, Zones and Bases

Data

- Adjustable parameters for each sensor include:
 - descriptive name.
 - alarm levels (low and high)
 - alarm delay time
 - zone allocation (any combination of zones for each Sensor)
 - storage type (maximum, minimum, average values to be stored for each reading)
 - colour indication on screen / printed outputs
 - alarm options (critical alarm in any zone, repeat alarm, missing data alarm, signal when alarm clear)
 - Max and Min graph scaling
- Adjustable parameters for each Zone include:
 - alarm destinations and alarm routing information
 - alarm-off periods (48 half-hour periods per week)
 - descriptive name
- Adjustable parameters for each Base include:
 - descriptive name
 - maximum number of channels to be recorded (64, 32, 16 or 8)
 - Netmask, Gateway, address of viewer for Web Server
 - (Modem-connected units only) Frequency of downloads to PC, auto-answer setting, access number of PC to download to, number of Base to call out to
 - Which sensors control the 4-20mA outputs (if fitted)
 - Alarm parameters:
 - Audible alarm on/off
 - Flag for sending of alarm when mains power fails
 - Flag for sending of alarm when all radio signals are lost
 - Flag for sending of repeat (snooze) alarms
 - Delay period for initiating alarms

- Delay period for repeating of alarms to other personnel
- Adjustable parameters for each User include:
 - Windows or SQL database login (authentication)
 - Password for (SQL login)
 - Access level (administrator, adjuster or viewer)
 - Up to 5 passwords (PINs) for cancelling of local alarms via user interface
- +++ Data output to printer or PDF file includes electronic signature information. PDF is write-protected

Alarms and Zones

- Provision of localised alarms to alert operators when out-of-range exceptions occur.
 - See individual specifications for SCOUT and BASE for definitions of alarm functions provided for these
 - Provision for acknowledgement of local alarms at BASE or at PC
 - Acknowledgement of local alarm will not affect remote alarms initiated by same Sensor
- Provision of remote ('critical') alarms to alert managers when out-of-range exceptions occur:
- Separate alarm destinations (personnel with responsibilities for dealing with alarm events) can be associated with individual zones.
- By including Sensors in more than one Zone, several alarm destinations can be set for each sensor
- For each zone, there is an option for alarms to be shut off for definable days/hours during the week (Sunday – Saturday) in increments of 30 minutes allowing different alarm destinations for different times of the day/week.
- Alternative destinations can be contacted automatically, in turn, until there is a response (acknowledgement).
- Provision for acknowledgement of remote alarms via *Spy5View* or *Spy5WebView*.
- Alarms can be initiated either from BASE units (if they have been fitted with suitable hardware e.g.modem), or from the *Logger* application, or both.
- Alarm destinations can be mobile phone numbers (for text messages) or email addresses.
- Sensors in 'zone zero' will never send alarms. These sensors have undefined setups and are awaiting allocation and definition of parameters