

# Creating & Viewing Spooled Reports in InstantHMI Runtime



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# 1 Overview

InstantHMI has a powerful and flexible reporting capability including spooling and printing (as described in InstantHMI 6.0 Manual, Section 5).

We illustrate here the steps needed in creating Hourly spool reports, archiving the reports Daily, and have the capability to view archived reports using the Spreadsheet Viewer in the Runtime. The following tasks are involved in designing your project to accomplish the stated objective:

- Create spool format files \*.SPL ([Section 4](#))
- Assign spool format files to specific spool number slots ([Section 2.1](#))
- Create Spool Control Special Register tag ([Section 2.2](#))
- Incorporate Spreadsheet Viewer in a runtime screen ([Section 3.1](#))
  - Configure Spreadsheet Viewer
  - Create Column Headings
- Create a Runtime Script to perform the desired spooling action ([Section 3.2](#))
  - Set values in Spool Register for hourly spooling
  - Set values in Spool register for daily archiving

## 2 LaunchPad Setup

### 2.1 LaunchPad → Setup → Reports

When you click on the Reports button, you will see the Available Reports (Printer or Spool, depending on the radio button selection) for the selected project. Use the Assign button to define which spool report template is assigned to a specific spool report slot number in your project. For example, click on 'Report-O2.spl' spool template on the left hand panel to select it, click on slot 1 on the right panel, and then click on Assign button to make the assignment as shown (Figure 2.1).

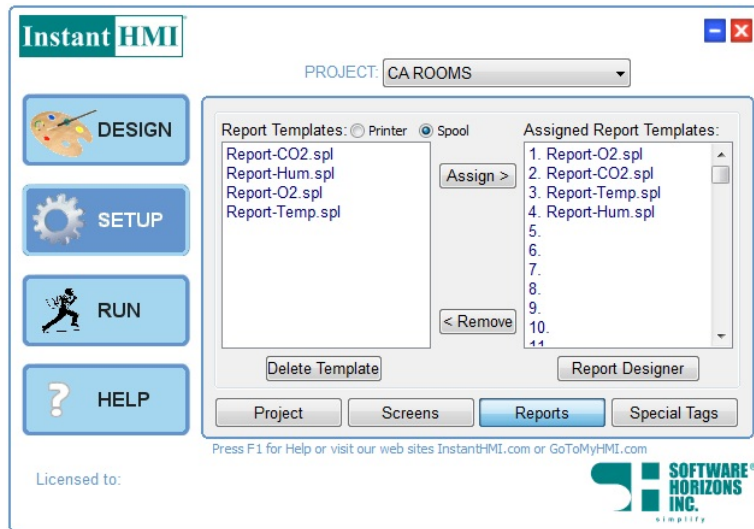


Figure 2.1: Setup → Reports → Printer

To exclude a previously assigned spool report from the project, click to highlight and select the printer report in the 'Assigned Report Templates' panel and then click on the Remove button. To create a new spool report template for the project, click on the **Report Designer** button.

The slot numbers are used at Runtime to associate reports with screens. The spool and printer report templates are used by the runtime engines to produce printer and spool reports. In addition, Special Tags can be setup in the LaunchPad to generate event driven reports and logs.

### 2.2 LaunchPad → Setup → Special Tags

When you click on the Special Tags button, you will see the Tags assigned to serve special tag functions:

- Print Control,
- Spool Control,
- Switch Screen,
- Update Enable, and
- Recipe Enable.

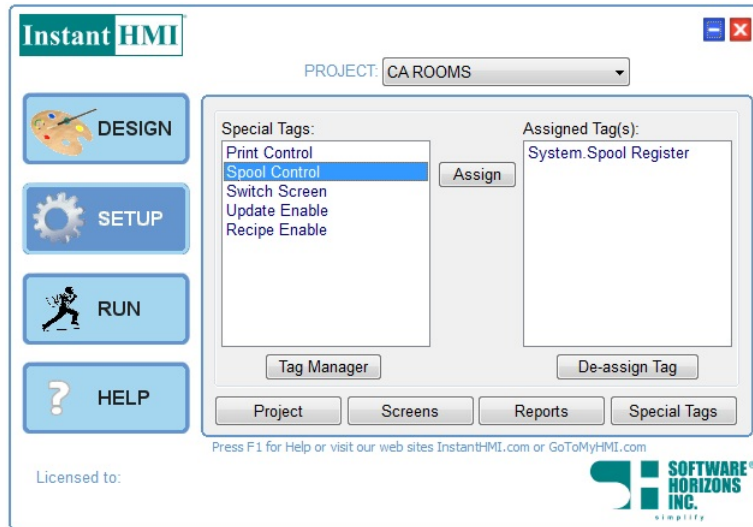


Figure 2.2: Setup → Special Tags (Spool Control)

For example, the tag named 'System Spool Register' is assigned the Spool Control special tag function. To define a special tag, click on the Special Tag function on the left hand panel (Spool Control selected in [Figure 2.2](#)) and then click on 'Assign' button. This will invoke the Tag Manager to select or define associated tag(s) from the project tag database to be used to trigger spool reports included in your project. To exclude a tag from the Assigned Tags list click to highlight and select it, and then click on the De-Assign Tag button. To create a new tag (to be assigned for Spool Control), click on the **Tag Manager** button.

At Runtime, the System Spool Register controls the spooling action. For this example, we have setup hourly and daily spooling action in a Runtime script ([Section 5](#)).

# 3 Screen Designer

## 3.1 Spreadsheet Viewer Object

The Spreadsheet Viewer tool allows you to place a Spreadsheet Viewer object on the screen which allows the viewing of data files generated at Runtime. This object is re-sizable. To access the properties dialog for this object, right click on it and select Component Object Properties. (You may also double-click anywhere on the shaded border area of the object, but not inside any of its components such as the display area, pull-down list, Print button, etc.). In the Properties dialog, select File Type (example: CSV), File Name (example, Spool Reports\\*.S01), and Delimiter (Example: Comma) used in data file to separate fields; these selections help the operator at Runtime to select and view useful data files as needed (\*.S01 in our example). You may also set the Viewer Title, Colors for the Title and Data, Column Headings, Grid for display, and include Print button and/or Config button. The Properties shown in the dialog result in the 'Spreadsheet Viewer' as shown.

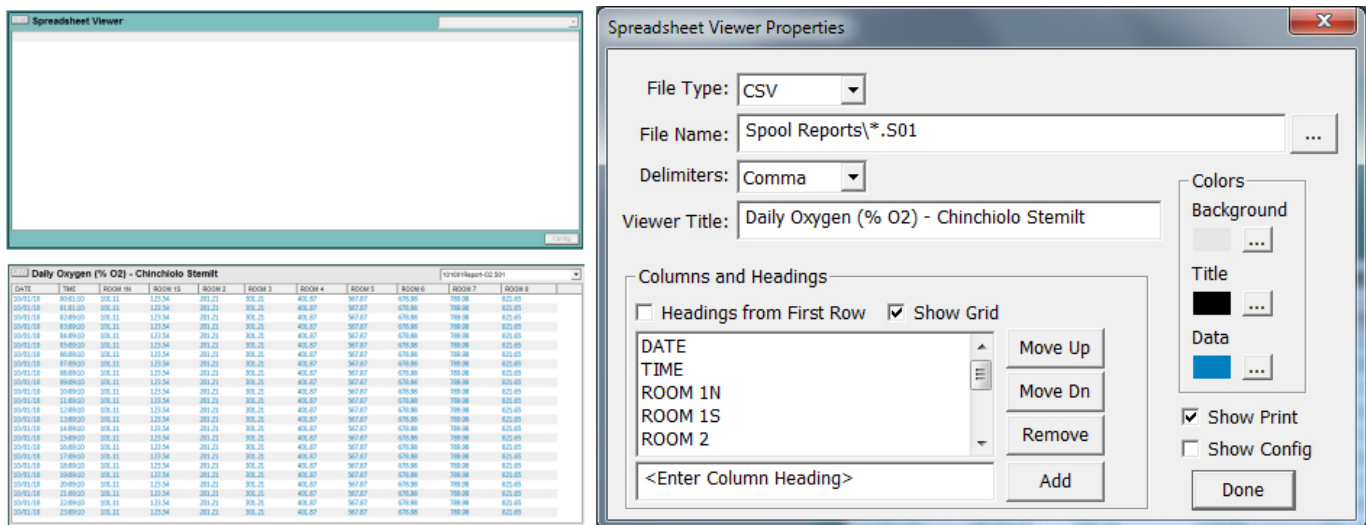


Figure 3.1: Screen Designer - Spreadsheet Viewer

At runtime, the data from the selected file will be displayed in the data display area. From the pull-down menu at the top, the operator can select to view any of the file types pre-selected (\*.S01 in our case) at design time. Further, the **Config** button allows the filtered selection of data based on Date (must be column 1, in the format month/date or month/date/year) and Time (must be column 2, in the format hour:min with or without seconds); the **Print** button will print the visible contents of the viewer.

## 3.2 Runtime Script

You can create and edit scripts from within **Screen Designer**. First create a monitor data item to which you wish to attach a Script. Double-Click on the new data object. The Data Display Object dialog will appear. Select a Script from the pull-down list (if it exists). Click on the Edit button for viewing/editing selected script or to create a new script. A dialog entitled "Select Script File" will appear. Click on the Create Script File check box and enter a new script name. Click OK. The Script field will display the script you selected or created.

Runtime.SCT is a special system script (not attached to any object and always available for your project) that gets executed repeatedly (every second or so). In our spooling example, we use the Runtime script for spooling hourly and archiving daily by appropriate setting of the tag value for the 'System Spool Register'.

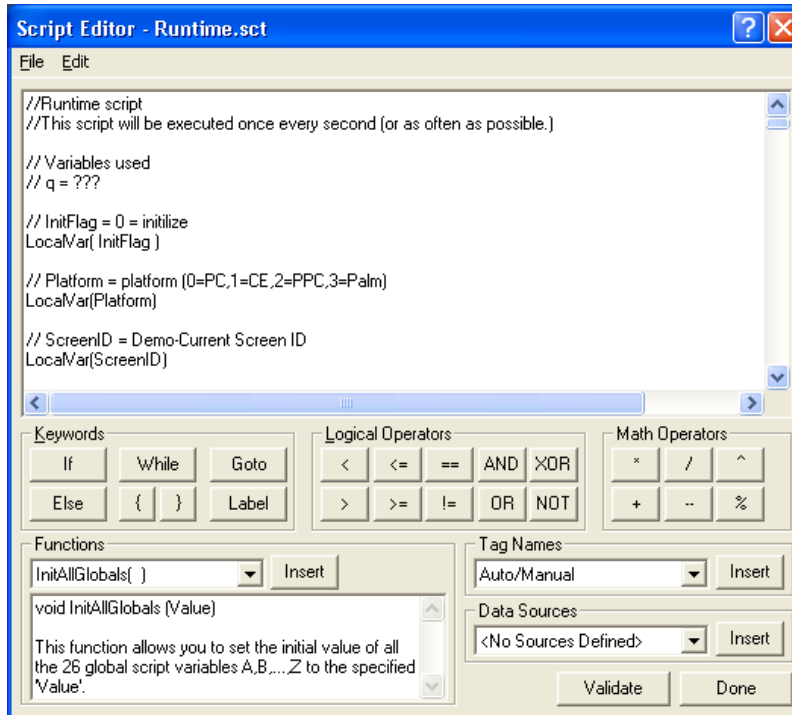


Figure 3.2: Script Editor

```
//Enter Runtime script here
//This script will be executed once every second (or as often as possible.)
```

```
LocalVar( sys.init )
LocalVar( sys.hr )
LocalVar( cur.hr )
LocalVar( spl.trigger )
LocalVar( spl.archive )
LocalVar( archive.now )
LocalVar( spl.o2 )
LocalVar( spl.co2 )
LocalVar( spl.temp )
LocalVar( spl.hum )
LocalVar( spl.cur )
```

```
spl.o2 = 1
spl.co2 = 2
spl.temp = 3
spl.hum = 4
```

```
if( sys.init == 0 )
{
    sys.init = 1
    sys.hr = 0
    spl.trigger = 0
    spl.archive = 0
    archive.now = 0
}
```

```
cur.hr = GetTag( System.Time.Hour )
if( sys.hr != cur.hr )
{
    sys.hr = cur.hr
    spl.trigger = 1
    if( cur.hr == 23 )
    {
        spl.archive = 1
    }
}
```

```
spl.cur = GetTag( System.Spool Register )
if( (spl.trigger == 1) AND (spl.cur == 0) )
{
  SetTag( System.Spool Register, spl.o2 )
  spl.trigger = 2
  goto :END
}

if( (spl.trigger == 2) AND (spl.cur == 0) )
{
  SetTag( System.Spool Register, spl.co2 )
  spl.trigger = 3
  goto :END
}

if( (spl.trigger == 3) AND (spl.cur == 0) )
{
  SetTag( System.Spool Register, spl.temp )
  spl.trigger = 4
  goto :END
}

if( (spl.trigger == 4) AND (spl.cur == 0) )
{
  SetTag( System.Spool Register, spl.hum )
  spl.trigger = 0
  if( spl.archive == 1 )
  {
    archive.now = 1
    spl.archive = 0
  }
  goto :END
}

spl.cur = GetTag( System.Spool Register )
if( (archive.now == 1) AND (spl.cur == 0) )
{
  spl.o2 = 3328 + archive.now
  SetTag( System.Spool Register, spl.o2 )
  archive.now = 2
  goto :END
}

if( (archive.now == 2) AND (spl.cur == 0) )
{
  spl.co2 = 3328 + archive.now
  SetTag( System.Spool Register, spl.co2 )
  archive.now = 3
  goto :END
}

if( (archive.now == 3) AND (spl.cur == 0) )
{
  spl.temp = 3328 + archive.now
  SetTag( System.Spool Register, spl.temp )
  archive.now = 4
  goto :END
}

if( (archive.now == 4) AND (spl.cur == 0) )
{
  spl.hum = 3328 + archive.now
  SetTag( System.Spool Register, spl.hum )
  archive.now = 0
  goto :END
}

:END x = 0
```



# 4 Spool Reports in Report Designer

You may use spool record templates along with the spooling capability to print multiple reports (up to 99) to disk concurrently. You may also merge the spooled reports into a single printer report (as well as another spool report) whose template is under your total control. Spooling feature is available on PC, CE and Pocket PC platforms.

## 4.1 Naming Spool Templates

For user convenience named spool templates are preferable; but to allow access to spool template files from controller registers numbered template files '#.SPL' (# = 1,2,...,99) are more convenient. Here we describe how you may assign any named spool record template file 'SpoolName.SPL' to act as the numbered template file '#.SPL' (# = 1,2,...,99). In LaunchPad, click on Setup → Reports and then click on the radio button 'Spool'. In the available '(Spool) Report Templates' panel select, for example, Report-CO2.spl. In the 'Assigned (Spool) Report Templates' panel click on 2 (for our example) and then click on the 'Assign >' button. Repeat this with each available spool report that is to be used in the project. Click the Remove button to clear (or reset) a specific assignment.

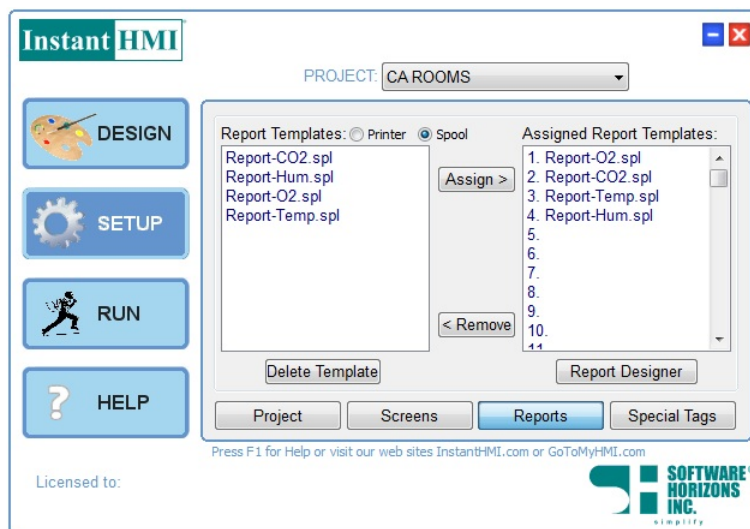


Figure 4.1: Named Spool Template assignments

Note that at runtime, the daily spooled reports will include the spool template file name in addition to the 'YYMMDD' prefix in the name. For example, the spool template file 'Report-CO2.SPL' is assigned slot '2.' and the Spool Register contains the value 3328+2 (i.e., Archive Report-CO2.S02 into file YYMMDDReport-CO2.S02). The Spool Register value 3330 will then cause the spooled report file Report-CO2.S02 to be archived under the name 'YYMMDDReport-CO2.S02 identifying by name the spool template file used in producing the spooled report Report-CO2.S02.

The table shows our example with four .spl files and corresponding assignments and output files.

Spool #	Spool Template File (Comma Separated)	Output Report Files	Archived Report Files
1	Report-O2.SPL	Report-O2.S01	YYMMDDReport-O2.S01
2	Report-CO2.SPL	Report-CO2.S02	YYMMDDReport-CO2.S02
3	Report-Hum.SPL	Report-Hum.S03	YYMMDDReport-Hum.S03
4	Report-Temp.SPL	Report-Temp.S04	YYMMDDReport-Temp.S04

## 4.2 How Does Spooling Work?

Spooling feature in InstantHMI is controlled by a Special Register (the Tag named 'Spool Register' in the Tag Group 'Special Registers' setup in InstantHMI) and is summarized below:

### What is done by the PC/InstantHMI

At design time 'Spool Record template' is setup in the spool template file. At runtime the spool register is read to determine appropriate (event driven) action. The operator may also demand spooling action through the runtime Reports → Spool menu. Current data requested in the spool template file is spooled (stored) in a spool report file.

### What is done by PLC/Ladder Logic or Runtime Script

Trigger the spooling action (in InstantHMI Runtime) as an event by storing the appropriate value in the Spool Register.

### How to set up a Spooling/Data Logging System

Create up to 99 spool template files. Edit the tag 'System.Spool Register' to suit your spool register address and data source. Determine which spooling function you want (example: Archiving - Daily is 3328). Ensure the PLC logic or Runtime script loads the appropriate value into the Spool Register and thus triggers the desired spooling function.

## 4.3 Spool Register Functions

The (16 bit) Spool Register (in our example, 'System.Spool Register') will be interpreted as follows. The low byte (8 bits) in the Spool Register will refer to the spool template file assignment number (1, 2, etc). You may use up to 99 spool template files \*.SPL and corresponding assignments. The High byte (8 bits) in the spool register will provide additional functionality as summarized below.

SPOOL REGISTER FUNCTIONS SUMMARY (Register Value = Spool File Assignment Number + Adder)			
		OPTION	ADDER = 256 X OPTION
SPOOLING	SPOOL INDIVIDUAL	00	0
	SPOOL DELETE	01	256
	SPOOL AGGREGATE	02	512
ARCHIVING	SECONDS	10	2560
	MINUTES	11	2816
	HOURS	12	3072
	DAYS	13	3328
SAVING	SECONDS	20	5120
	MINUTES	21	5376
	HOURS	22	5632
	DAYS	23	5888

Figure 4.2: Spool Register Function Summary

Note: You may view the Spool Report in the LaunchPad (while the runtime is running) as illustrated in Figure 4.3.

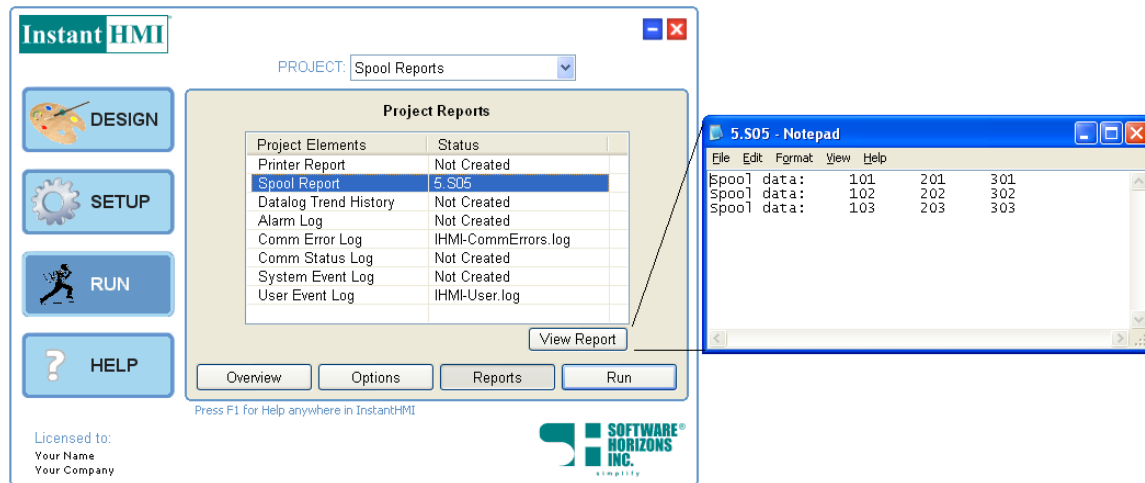


Figure 4.3: Viewing Spooled Report in LaunchPad

## 4.4 Data Logging using Spool Register Functions

You may create up to 99 spool template files \*.SPL to define different data record formats (example: Report-O2.SPL).

Use spool template files to save data in disk files every day, hour, minute, or second. The Spool Register triggers the saving of data by its non-zero content (Spool Function). InstantHMI resets the spool register back to zero after performing the required function. The low byte value (1-99) selects one of the assigned spool template files 1-99 for the data record format. The high byte value (20-23) determines the duration for which data continues to be saved in the same file: one Day, one Hour, one Minute or one Second. The saved file names depend on the year YY, day DD, hour HH, minute mm, second ss, and the spool template file.

### **Example:** Datalog into a spool file every hour and Archive daily

The Spool Register has the value 3330 (with high byte value = 13, and low byte value = 2). It causes a data record according to the data format in Report-CO2.SPL to be saved in a daily file (110405Report-CO2.S02) when the date elements are YY = 11, MM = 04, DD = 05 (that is, 4<sup>th</sup> Apr 2011). Until the time is prior to mid-night on this day, each time the Spool Register contains the value 2, a new data record according to the template in Report-CO2.SPL will be appended to the spool report file Report-CO2.S02.

At mid-night, the Runtime.sct script will set the Spool Register value to 3330, which flushes the Report-CO2.S02 file to the archive file 110405Report-CO2.S02.

## 4.5 Creating Reports at Runtime

### **Using Reports → Print Menu at Runtime**

Use the Reports → Print command to print a report on the printer. The report printed will correspond to the screen displayed on the monitor. That is, if you are looking at screen 2 and use the Print command then report 2.PRT (or the report assigned to printer report slot 2) will be printed. Of course, the format and content of the report is totally flexible and determined by you. Note that using the SPOOL command in conjunction with the PRINT command the operator can produce totally different reports to suit diagnostic or other special needs.

### **Using Reports → Spool Menu at Runtime**

If you click on Report → Spool menu choice when you are looking at screen 2 at runtime the effect is same as setting the spool register Upper Byte = 00, Lower Byte = 2. The Runtime Engine will add a data record according to the template 2.SPL (or the spool report assigned to spool report slot 2) in the spool report file SPOOL.S02.



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