Swecoin Windows Driver

Acknowledgments

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1 OVERVIEW

The TTP Printer Family consists of the following printers.

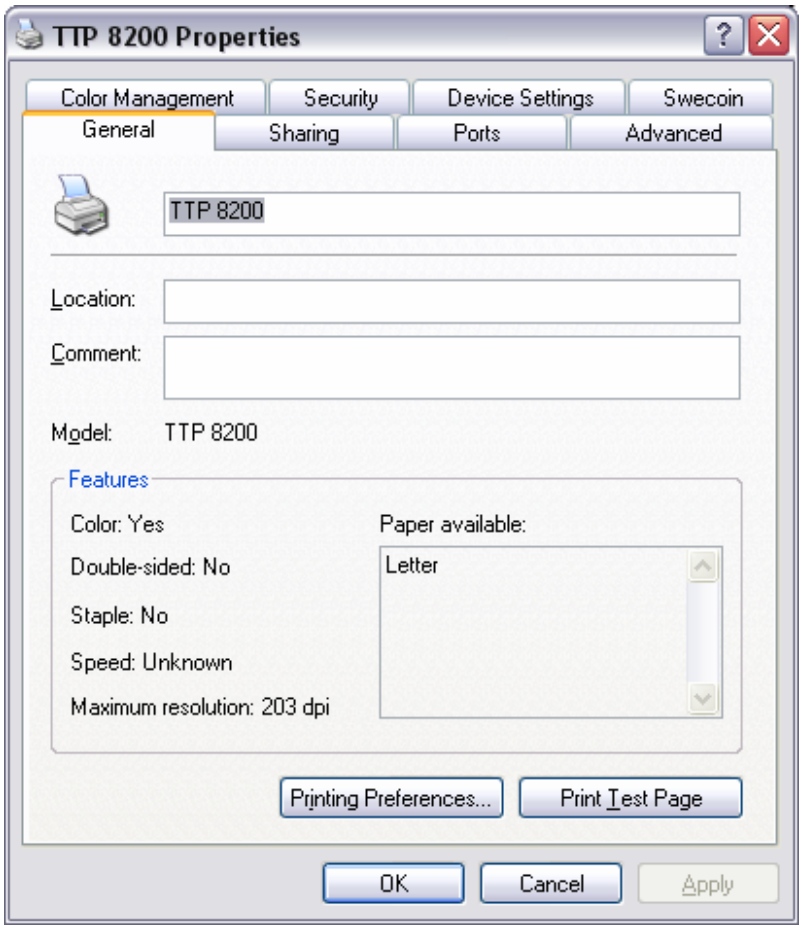
TTP 1000 series

TTP 7000 series

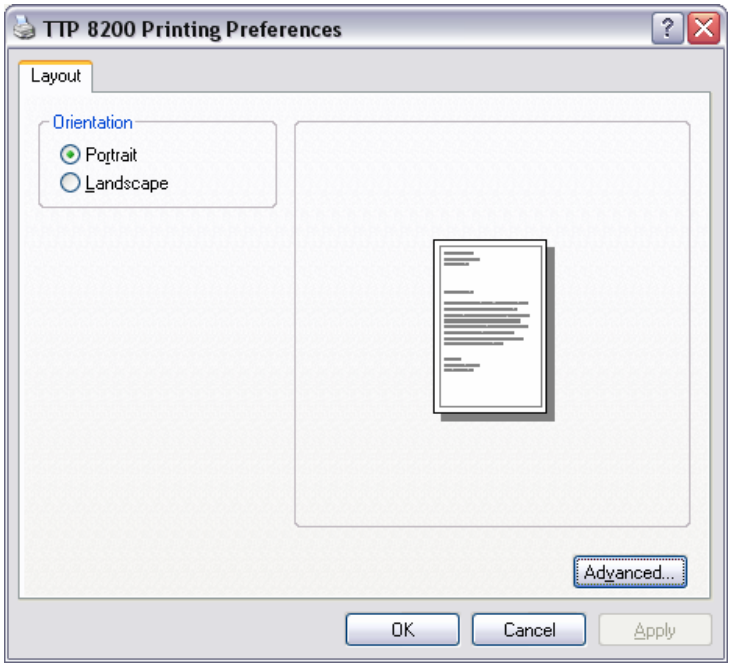
TTP 8000 series

This publication describes the drivers for Windows NT4, 2000 and XP, which are all based on Microsoft Unidriver with special OEM plugins.

2 PRINTING PREFERENCES

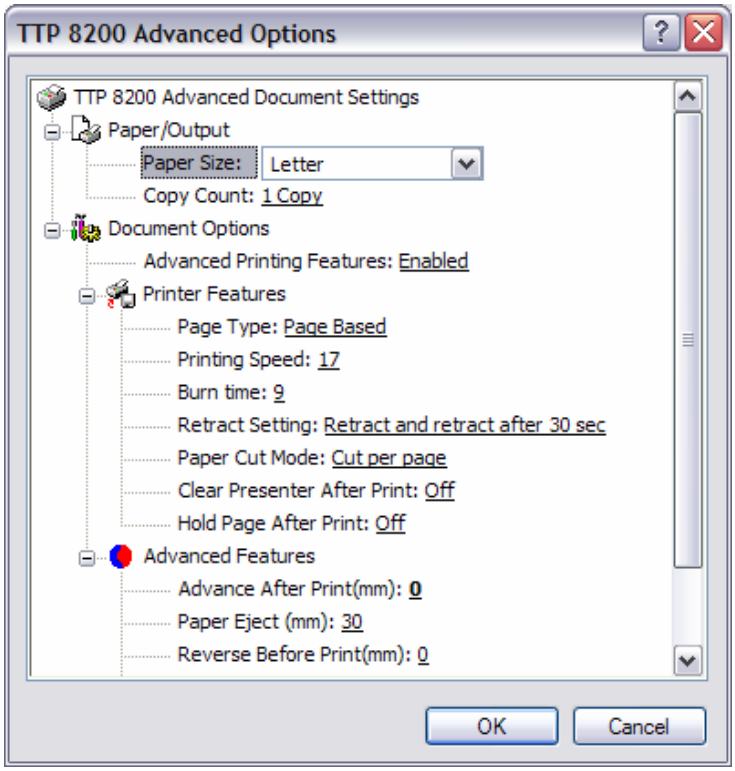


You can reach the Printing Preferences either through the button in the Printer Properties or directly through the right-click printer menu in the Printers Control Panel.

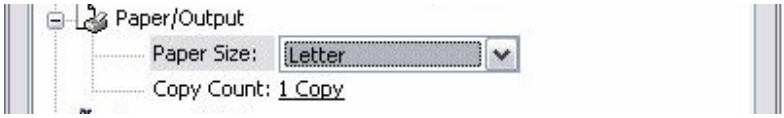


In Printing Preferences you can only select Portrait or Landscape orientation, all other settings are under the “Advanced... button.

The Advanced Options enable you to modify printing behavior and quality.



2.1 Paper/Output



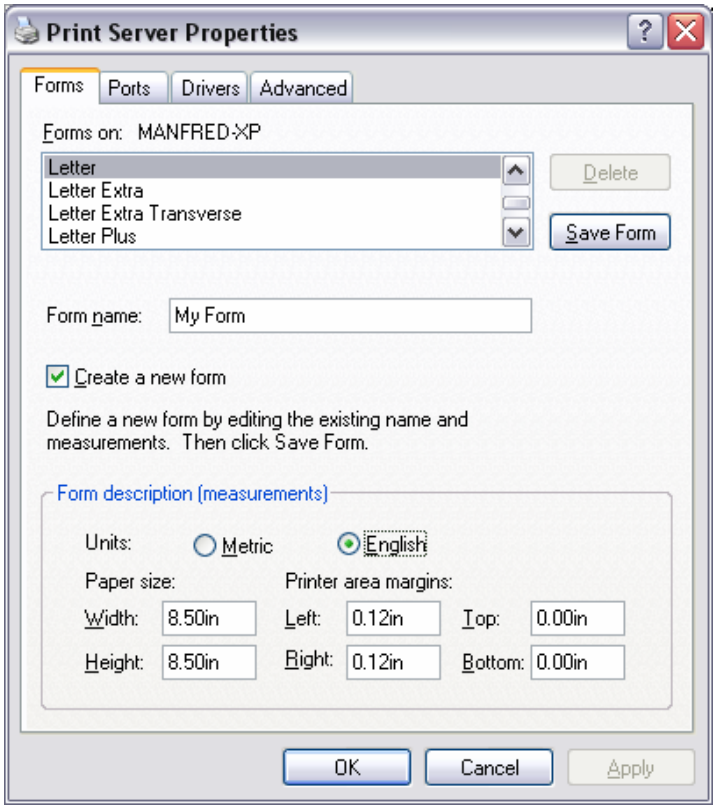
2.1.1 Paper Size

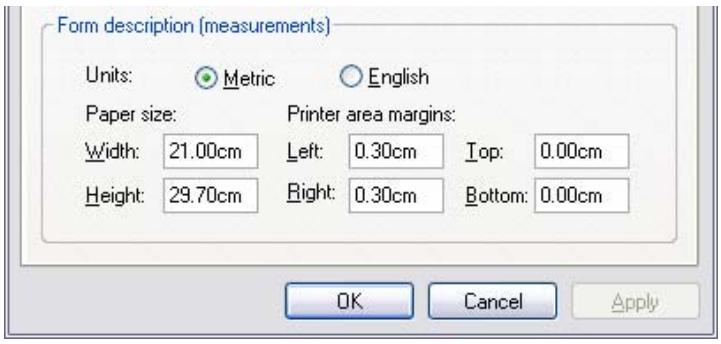
The paper size offers the possibility to adjust the printer default paper size to any one of the forms available as default.

In addition to the available forms you can create new ones in the Server Properties dialog. To get to this dialog, right click on a blank area in the Printers Control Panel and select Server Properties from the menu that appears.

Select the form closest to what you want as your starting point and modify it with your customizations. Give the form a new name (*never* overwrite the original form) and press “Save Form”.

As you can see above, you may modify the height as well as the left and right margins.



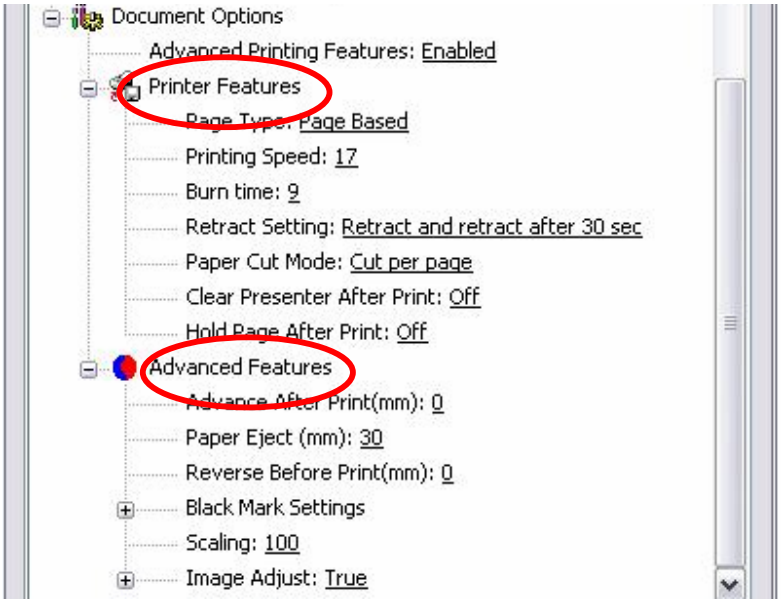


2.1.2 Copy Count

Copy count prints multiple copies of each page sent (the printer can't store and reproduce the page sent to it) so this is handled by the host PC.

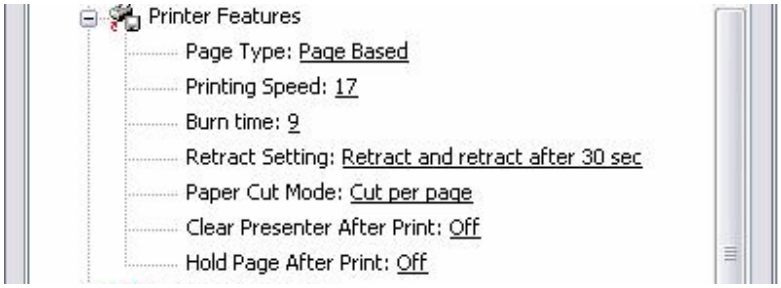
2.2 Document Options

Some of the document options override parameter settings stored in the printer. When the printer is turned off and on the overridden parameters return to their default value. This is normally no problem because the selections you make in Windows are sent to the printer with each page printed. However it is an advantage to have the same parameters both stored in the printer and set up in Windows: For example when loading paper it is good if the loaded paper synchronizes with black marks should you have such paper. This way auto loading of paper will work correctly even if the printer has been turned off.



The Document Options include two printer-specific parts, the Printer Features and the Advanced Features.

2.2.1 Printer Features

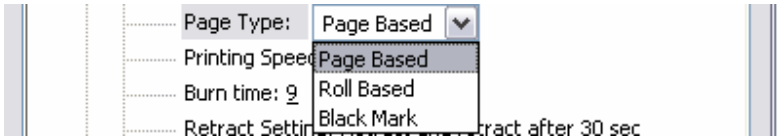


The following table shows the corresponding printer parameters:

Driver Setting	Printer Parameter	Parameter #
Page Type	Document Mode	36
Printing Speed	Max print speed	8
Burn time	Burn time	7
Retract Setting	Waste basket mode	45
Paper Cut Mode	--	--
Clear Presenter After Print	--	--
Hold Page After Print	--	--

Table 2-1 Printer Parameters

PAGE TYPE



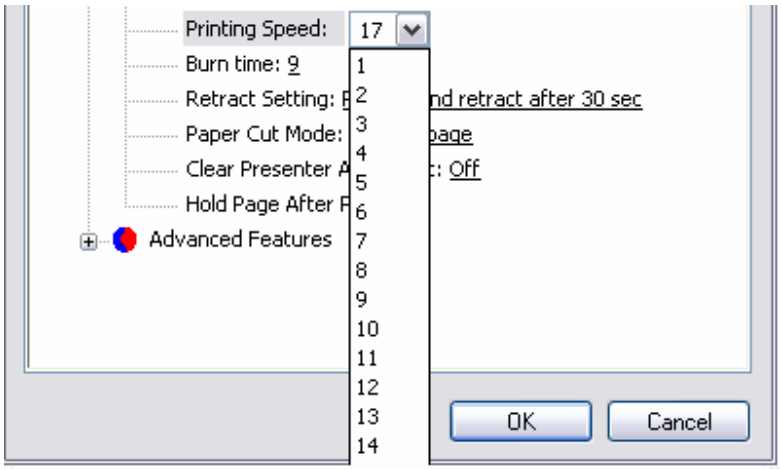
The Page Type allows the control of the cutting position.

Page Based; the printer will always feed as much paper as it needs for the set default Paper Size and then cut the paper at the end of the page.

Roll Based; the printer will cut the page after the last line of text plus any additional paper advancement set in the Advanced Feature section.

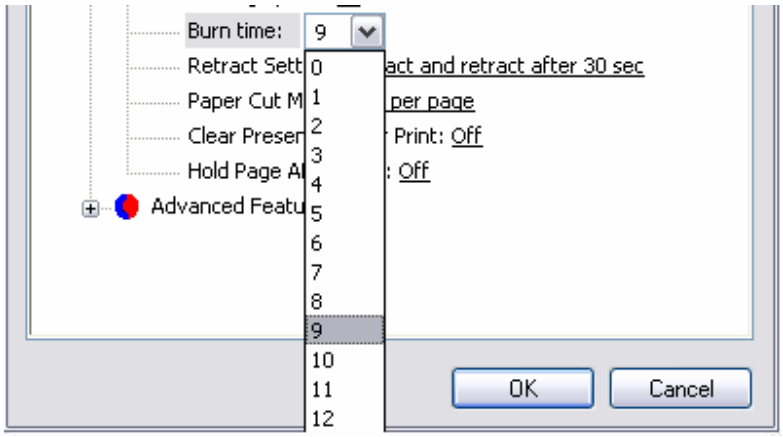
Black Mark; the cut will be controlled through the Black Mark settings and the Black Marks on the backside of the paper. (Also known as registration or sense marks).

PRINTING SPEED



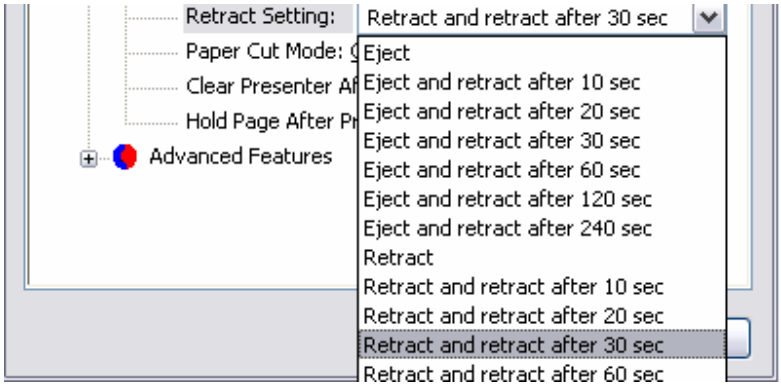
The printing speed setting will change the actual print speed according to the value selected and as referenced in the Installation Manual. You rarely need to change this setting.

PAPER SENSITIVITY



Burn time will change the Burn time setting in the printer according to the value selected and as referenced in the Installation Manual. A higher value gives more dense print, but may also slow down printing.

RETRACT SETTING



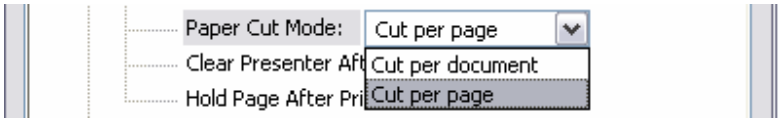
The Retract Setting controls the Waste basket mode in the printer and sets the value of parameter 45 according the Technical Manual. This setting consists of two parts: what occurs when a new page is sent to the printer, and what occurs after a given timeout. For example, the above selection, “Retract and retract after 30 sec”, will retract the page currently in the presenter when a new page arrives. If no new page arrives, any page remaining in the presenter after 30 seconds will be retracted. The options “Eject” and “Retract” do not have any timeout action; the page will be ejected or retracted when a new page arrives to be printed.

What to do with paper in presenter when new page should be printed:	**When the customer does not take the printout:**	**Presenter timeout**	**Setting**
Eject	Do nothing	Disabled	Eject
-”-	Retract	10 s	Eject and retract after 10 sec
-”-	Retract	20 s	… 20 sec
-”-		Etc.	Etc.
Retract	Do nothing	Disabled	Retract
-”-	Retract	10 s	Retract and retract after 10 sec
-”-	Retract	20 s	… 20 sec
-”-		Etc.	Etc.
Hold until taken [1]	Retract	10 sec	Retract and retract after 10 sec, *and* Hold page after print = ON

Table 2-2 Retract and retain settings overview

[1] Holds the rest of the pages in a print job until the presented page is taken by the customer. If a page is not taken before the timeout elapses, the entire print job is deleted from the Windows spooler.

PAPER CUT MODE



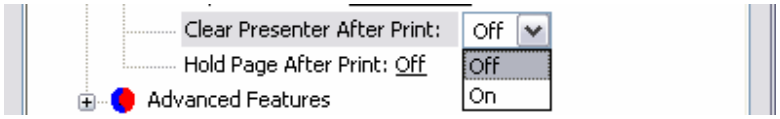
Paper Cut Mode allows control of the way the printer operates after a Page End or Document End. “Cut per Document” will feed as many pages uncut through the presenter as the document includes and cut at the end of the document.

NOTE! – *If you feed long documents you can only loop a maximum of 60 cm (23”) in the presenter and then the printer will start feeding out the complete document while printing. The amount of paper looped is controlled by printer parameter 9, “presenter loop length”. Please see the technical manual for more information. Also, documents larger then 4 m(100”) will be cut after this length in order to assure proper printer functionality.*

“Cut per Page” will cut every page (as defined by the selected page size) of a printed document and present the existing page after the next page has started printing.

NOTE! – *If you print documents with more then one page you need to make sure that the paper can be collected outside the printer. Ensure that the wastebasket setting is set to “Eject…” or else each page of your document will be retracted back into the enclosure when a subsequent page prints.*

CLEAR PRESENTER AFTER PRINT



When set to “On” this function enables a forced full eject after a page is printed and cut. If set to “Off” the page will only be partially ejected, and the retract settings are in effect.

HOLD PAGE AFTER PRINT

This function holds the page in the presenter until the customer takes it even if new pages are to be printed. When he takes a page, the next is printed, and so on.

If he does not take a page, it remains in the presenter until the retract timer elapses, then the presenter is cleared and the rest of that print job is deleted from the printer spooler in Windows.

NOTE 1! – *The “hold page after print” function relies on delicate interaction between the printer and Windows, so bi-directional communication must be on and working before you enable this function.*

NOTE 2! – *“Hold page after print” only works in “Cut per page” mode (because it needs pages to hold).*

2.2.2 Advanced Features

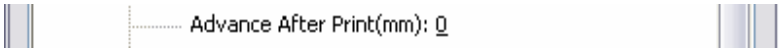
There are six advanced features which control printer behavior and print quality.

The following table shows the corresponding printer parameter:

Driver Function	Printer Command
Advance After Print	Uses ESC J to advance paper
Paper Eject	Advances paper after Cut with ESC FF. Corresponds to printer parameter 47, “Wall compensation”
Reverse Before Print	Uses ESC j to reverse paper
Black Mark Settings	Sets parameters 37 to 42
Scaling	--
Image Adjust	--

Table 2-3 Printer commands and parameter

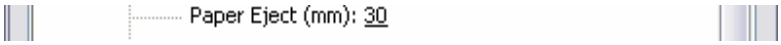
ADVANCE AFTER PRINT



Advance After Print increases the bottom margin. If set to 0, the printer cuts directly after the last text or graphics.

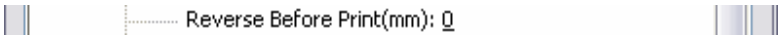
NOTE! – *Should be set to 0 in “Page Mode”, if not, the pages will be longer than the length of the selected form.*

PAPER EJECT



Paper Eject will allow control of the amount of paper fed out of the printer after cutting. This value is an approximate value since the presenter is controlled with a DC motor. Adjust this setting to work with the thickness of your kiosk wall.

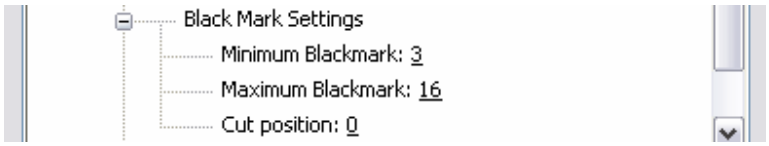
REVERSE BEFORE PRINT



The Reverse Before Print setting allows the user to control the Top Margin of the document. Since the printer has a physical distance between the print head and the cutter of either 14 mm (for TTP 1000 and TTP 7000) or 19 mm (for TTP 8000) you always encounter a Top Margin of 14 mm or 19 mm respectively. This can be minimized with this function.

NOTE! – I*n order to assure printing safety (no paper jams) you have to assure that the paper is not pulled back too far. A minimal Top Margin of 7 mm has to be kept in order to avoid paper jams (i.e., do not set this value to greater than 7mm for TTP 1000 and TTP7000 or 12mm for TTP 8000).*

BLACK MARK SETTINGS



If the Black Mark is selected as the Page Type the driver will send Black Mark commands to the printer. This allows using paper with top-of-form (registration, or sense) marks on the back to be used.

– **MINIMUM BLACKMARK**

Specifies the minimum length of the black mark in mm. Shorter marks are ignored. Use this to filter out preprint and dirt on the back of the paper.

– **MAXIMUM BLACKMARK**

Specifies the length of the black mark in mm. Measure the length of the black mark on your paper and enter that value here.

Marks 5 mm longer than the entered value will be interpreted as paper out.

– **CUT POSITION**

This parameter defines the actual cut position relative to the Black Mark. When using fanfold paper, position the cut about 1 mm after the perforation so that the chance of paper jam is minimized.

Keep in mind that the physical distance between the paper sensor and the cutter is 14mm on the TTP 1000 and TTP7000 and 19mm on the TTP 8000. Any change to the cut position is in addition to the physical distance. For example, if the black mark is 25mm after the desired cut position, set this value to 7 (19mm distance + 6mm additional + 1mm to get past the perforation).

NOTE! – *It is the trailing edge of the black mark that is the reference when you measure.*

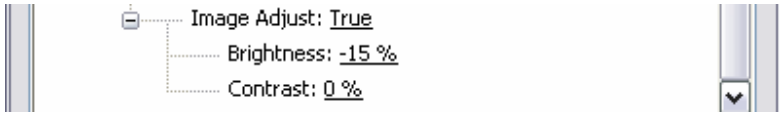
SCALING

Scaling allows resizing the actual print view to fit the paper size. This can be important if Web pages, etc. exceed the printable area of the printer and you want to see all the information on the page.

Also, for the small paper printer you can define larger pages and scale the page down to the actual paper size.

NOTE! – *The paper can be redefined in the Server Properties, where you start with the actual paper form and resize it to the desired size, then save this new form with a new name. See the Server Properties section above (2.1.1).*

IMAGE ADJUST



If the Image Adjust is set to true the driver is using special dithering algorithms in order to modify the page to be printed on the B&W thermal printer.

– **BRIGHTNESS**

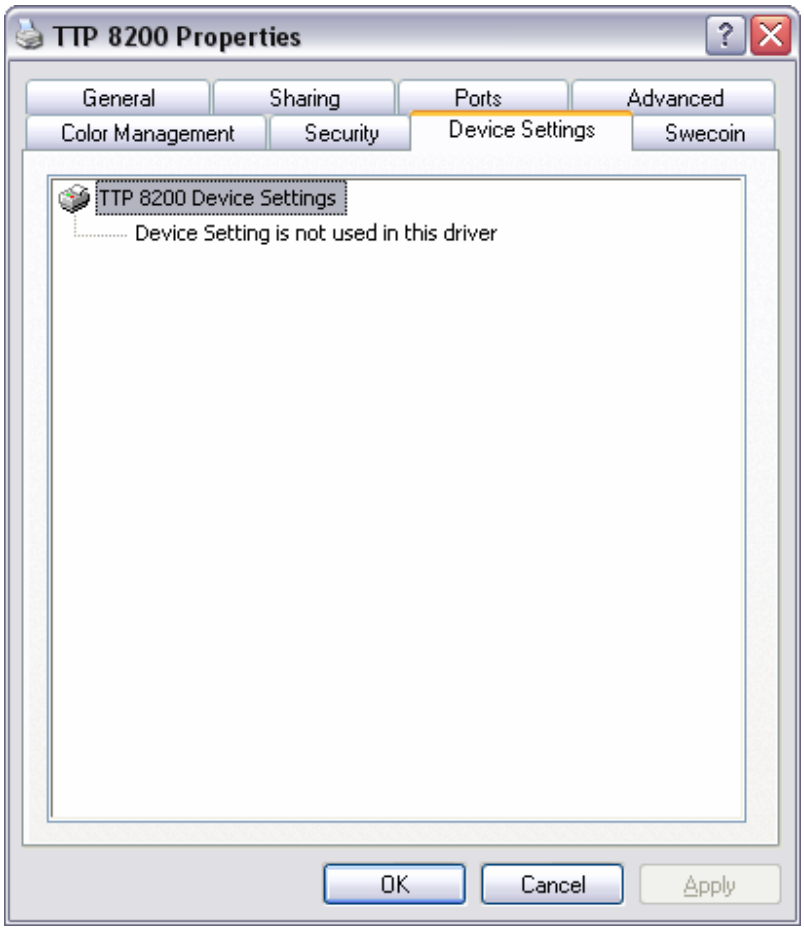
The Brightness setting will change the lightness of the printed page. Decreasing the value will make the picture darker and increasing it will make the picture lighter.

NOTE! – *Setting this to negative values will change white pixels to shades of gray.*

– **CONTRAST**

The Contrast setting will change the contrast (difference between black and white) of the picture.

3 DEVICE SETTINGS



Device settings are not used for the following printers:

TTP 1000, TTP 7000 and TTP 8000.

4 PORTS

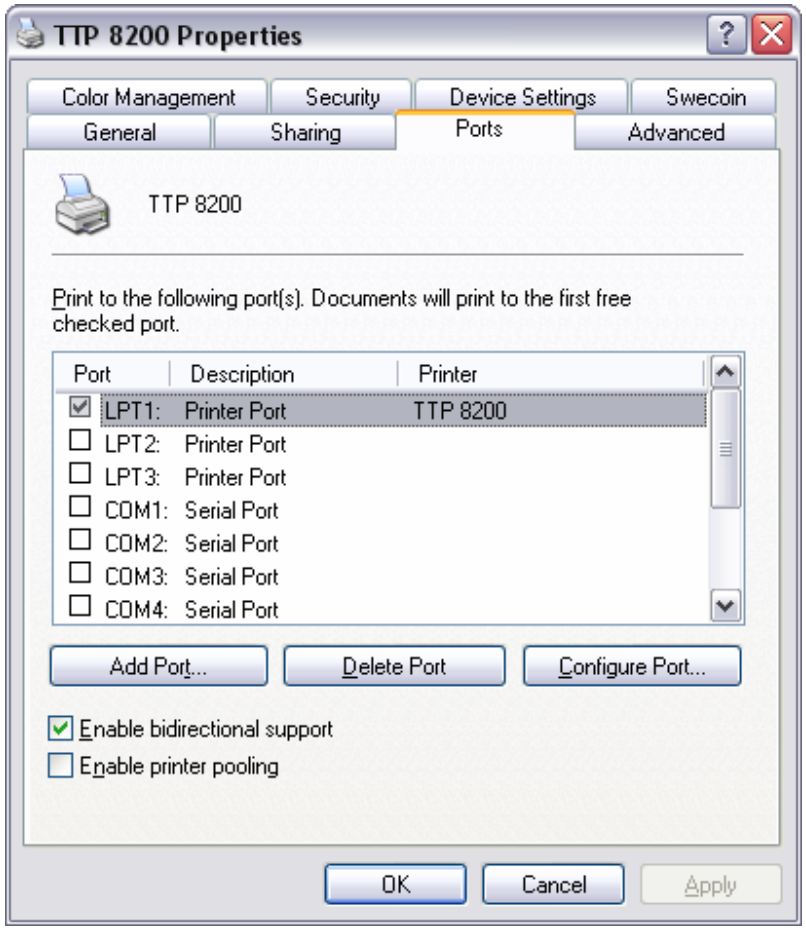
The Ports option is used to setup the IO port used to print to the printer and also to configure the serial IO if used.

The following port types are usually available:
LPT, COM, USB.

LPT (parallel) port is commonly used and doesn't need any setup. The printers TTP 1020, TTP 7020, and TTP 8200 can exchange status information via the parallel port by means of the Language Monitor interface.

COM (RS232 serial) port is generally an option typically used in text applications where no Windows driver is used. The Language Monitor functions are not fully supported when using the RS232 interface.

USB is a fast serial IO. It can be used with TTP 1030, TTP 7030, and TTP 8200. The USB port allows also exchanging status information by means of the Language Monitor interface.



4.1 Enable bidirectional support

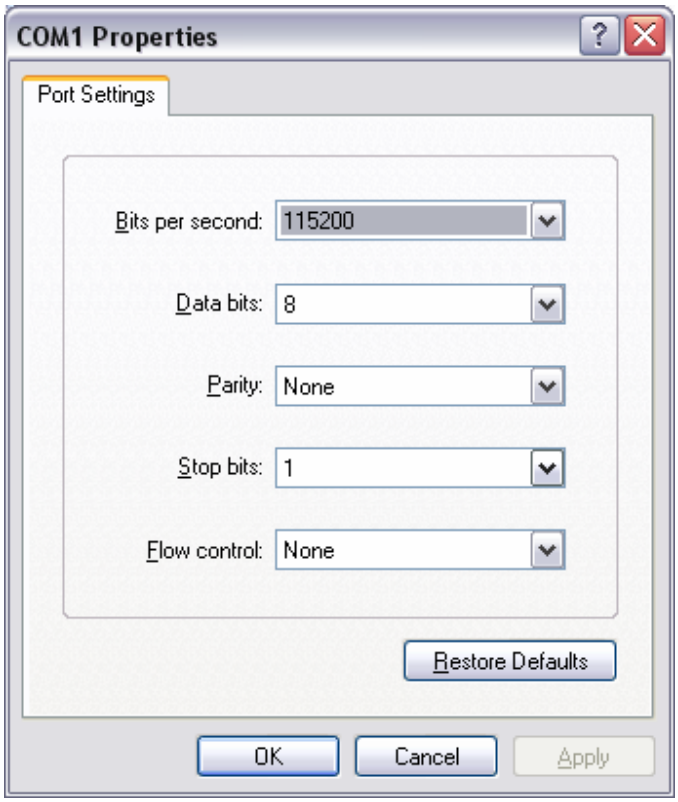
This selection enables use of the Language Monitor.

The Language Monitor is an additional DLL in the Windows driver chain that allows the printer to exchange status information with the PC. In order to use the Language Monitor it is necessary to program it within an application.

NOTE! – *In order for the printer to operate under all error situations the printer parameter 5 "Disable parallel port signaling" has to be set to 1.The Technical Manual describes how to set parameters in the printer, and utility programs for this is available from Swecoin.*

4.2 Port Settings

Port settings are only available if you use the serial COM-port. This port is not commonly used with Windows driver because of it's limited transfer speed.



4.2.1 Bits per second

This setting has to match the Baud rate setting in the printer parameters (1).

4.2.2 Data bits

This setting has to match the Data bits setting in the printer parameters (2).

4.2.3 Parity

This setting has to match the Parity setting in the printer parameters (3).

4.2.4 Stop bits

The printer ignores stop bits.

4.2.5 Flow control

This setting has to match the Flow control setting in the printer parameters (4).

We recommend you to always use Hardware flow control.

NOTE! – *The port settings have to match the settings in the printer based on parameter 1 to 4.*

5 PAPER/QUALITY

All Swecoin thermal printers are direct thermal printers which use special paper with thermal coating on the print side.

You can get a variety of papers from different paper manufacturers for use with the Swecoin printer families. See the Technical Manual or our Web site for more information on paper manufacturers and paper converters.

Thermal paper comes in different grades and qualities. For detailed information contact a paper converter.

The most used paper for our printers is either a 3.5 mil (0.09 mm) non-topcoated or topcoated paper. You can also use heavier or lighter paper with Swecoin printers depending on the printer specification.

6 RESTRICTIONS WHEN USING THE LANGUAGE MONITOR AND ADVANCED DRIVER PROPERTIES

6.1 Using cut per document with page hold

When cut per document is on, there is no cut and eject between pages of a job. The page hold function waits for a page of a job to be taken before continuing. Since there was no cut/eject, the user can't take the page, and the LM freezes. A reboot and a printer power cycle are necessary. Even then, the job may not be able to be deleted.

Solution: Don't allow page hold function to be used with cut per document mode.

6.2 Retract behavior set to "Eject" with page hold

The LM will hold the job pending the retrieval of the page. If the page is not taken, the printer ejects the page after about 1 minute. The next page prints, but the LM hangs. A reboot & printer power cycle are necessary, and even then, the job may not be able to be deleted.

Solution: The LM is not receiving the NAK 16 signal, since there was no official timeout and retract/eject. Do not use these settings together.

6.3 Restarting print job during cut/eject

Restarting a print job while the job is in the cut/eject phase will lock the LM and require a reboot.

Solution: Generally, this should never happen.

6.4 A presenter jam doesn't clear all print jobs

When a presenter jam occurs the Language Monitor will not delete all print jobs in the spooler, only the current print job. All print jobs will be paused. After the error is cleared the spooled jobs will continue printing.

7 BI-DIRECTIONAL COMMUNICATION

7.1 The Language Monitor

The Windows operating system beginning with Windows NT4 had major restrictions with regard to bi-directional communication when using a Windows driver. In Windows 98 you could use a driver and still open the same port to write and read status information to it. After Windows NT4 you need a Language Monitor to do the same thing.

The Language Monitor is part of the Windows driver and is sitting between the Driver UI and the Port Monitor which takes care of the direct communication with the selected port.

The Swecoin Language Monitor has two different interfaces: The LmPrinterIoControl function which is a proprietary (OEM) function and the Windows (API) function GetPrinterData.

7.2 Swecoin function for communication with the printer

The proprietary function LmPrinterIoControl was originally built into the Language Monitor to provide bi-directional support for the first generation of TTP 1000 printers. This function has been modified over the years and is still available for status communication with the TTP 1000, TTP 7000 and TTP 8000 families. Nevertheless the general functionality has been changed to accommodate more stability.

In order to use the LmPrinterIoControl function you need to load the LM library and open the function with the following structure:

```
proc=(BOOL(__stdcall*)(PVOID,DWORD,PVOID,DWORD,PDWORD))
GetProcAddress(hLib, FUNC_NAME);
```

To enable an easier handling of this function we designed an interface function, which is included in the TTP.CPP source file and the TTP.h header file.

These files need to be included into your C/C++ project; then you will be able to call the simpler function getPrinterData defined in TTP.CPP.

The following function calls can be executed:

```
TTPKEY          ttpkey[13] =
{
        { "\x00\x00\x00", 3, 1, REG_BINARY, TEXT("Language Monitor")},
        { "\x1b\x05\x01", 3, 2, REG_BINARY, TEXT("Status General")},
        { "\x1b\x05\x02", 3, 1, REG_BINARY, TEXT("Paper Near End")},
        { "\x1b\x05\x06", 3, 2, REG_BINARY, TEXT("Status Report")},
        { "\x1b\x05\x07", 3, 2, REG_BINARY, TEXT("Program Version")},
        { "\x1b\x05\x09", 3, 6, REG_BINARY, TEXT("Serial Number")},
        { "\x1b\x05\x0a", 3, 1, REG_BINARY, TEXT("Hardware Revision")},
        { "\x1b\x05\x63", 3, 1024, REG_BINARY, TEXT("Device ID")},
        { "\x1b\x05\x50", 4, 4, REG_BINARY, TEXT("Get Parameter")},
        { "\x1b\x3F", 2, 0, REG_BINARY, TEXT("Reset Full")},
        { "\x1b\x40", 2, 0, REG_BINARY, TEXT("Reset Initialize")},
        { "\x00\x00\x01", 3, 4, REG_BINARY, TEXT("Auto Status")},
        { "\x00\x01\x01", 3, 4, REG_BINARY, TEXT("Ext Auto Status")}
};
```

Table 7-1 TTPKEY structure

The call “Language Monitor” has a special function: this result in the status of the spooler, either “Printing” or “Not Printing”, and the call “Auto Status” results in the currently signaled status.

Calls with "Status General", "Paper Near End" and "Status Report" will result in printer-defined status (see the appropriate Technical Manual for more information), as will the other available calls besides the call “Auto Status”. “Auto Status” will result in Windows compatible status information:

If the printer is offline, the status will show the word DEAD in hex bytes in the first and second return byte of ESC ENQ 1 and ESC ENQ 6. (First byte = 0xDE and second byte = 0xAD.)

7.2.1 Windows compatible status with Auto Status

WINDOWS STATUS	*COMPARES TO SWECOIN STATUS*
PRINTER_STATUS_PAPER_JAM	Paper jam (ESC ENQ 1 = 1)
PRINTER_STATUS_ERROR	Temperature error (ESC ENQ 1 = 6)
PRINTER_STATUS_PAPER_PROBLEM	Paper feed problem (ESC ENQ 1 = 5)
PRINTER_STATUS_DOOR_OPEN	Print head lifted (ESC ENQ 1 = 4)
PRINTER_STATUS_PAPER_OUT	Out of paper (ESC ENQ 1 = 3)
PRINTER_STATUS_USER_INTERVENTION	Cutter not home (ESC ENQ 1 = 2)
PRINTER_STATUS_PAPER_NEAR_END	Paper near end (ESC ENQ 6)
PRINTER_STATUS_PAPER_WEEKEND	Weekend paper status (ESC ENQ 6)
PRINTER_STATUS_ERROR	Undefined error

Table 7-2 Windows status

STATUSES DEFINED IN WINSPOOL.H	
#define PRINTER_STATUS_ERROR	0x00000002
#define PRINTER_STATUS_PAPER_JAM	0x00000008
#define PRINTER_STATUS_PAPER_OUT	0x00000010
#define PRINTER_STATUS_PAPER_PROBLEM	0x00000040
#define PRINTER_STATUS_OFFLINE	0x00000080
#define PRINTER_STATUS_USER_INTERVENTION	0x00100000
#define PRINTER_STATUS_DOOR_OPEN	0x00400000

Table 7-3 Status defined in Winspool

STATUSES DEFINED BY SWECOIN	
#define PRINTER_STATUS_PAPER_NEAR_END	0x02000000
#define PRINTER_STATUS_PAPER_WEEKEND	0x04000000
#define PRINTER_STATUS_PAPER_AT_PRESENTER	0x08000000
#define PRINTER_STATUS_EXTERNAL_ERROR	0x10000000

Table 7-4 Status defined by Swecoin

7.2.2 Windows compatible status with Ext Auto Status

Below statuses are Extended Error statuses defined by Swecoin.

#define NAK6	0x00000001
#define NAK7	0x00000002
#define NAK12	0x00000004
#define NAK13	0x00000008
#define NAK14	0x00000010
#define NAK16	0x00000020
#define BUFFEROVERFLOW	0x00000040

Table 7-5 Extended error status

NOTE! – *Any other Windows status can be used in the future!*

7.3 Windows API's for communication with the printer

In order to make bi-directional communication easier and also compatible to more then one printer of the same kind on a specific PC, we implemented the Language Monitor function GetPrinterData. This is a Windows API described in the Windows documentation. To retrieve immediate printer status from the Spooler you can also use the function GetPrinter.

7.3.1 GetPrinterData

The **GetPrinterData** function retrieves configuration data for the specified printer or print server.

Windows 2000/XP: Calling **GetPrinterData** is equivalent to calling the **GetPrinterDataEx** function with the *pKeyName* parameter set to "PrinterDriverData".

DWORD GetPrinterData(

HANDLE *hPrinter*, // handle to printer or print server

LPTSTR *pValueName*, // value name

LPDWORD *pType*, // data type

LPBYTE *pData*, // configuration data buffer

DWORD *nSize*, // size of configuration data buffer

LPDWORD *pcbNeeded* // bytes received or required

);

PARAMETERS

hPrinter

[in] Handle to the printer or print server for which the function retrieves configuration data. Use the **OpenPrinter** or **AddPrinter** function to retrieve a printer handle.

pValueName

[in] Pointer to a null-terminated string that identifies the data to retrieve.

For printers, this string is the name of a registry value under the printer's "PrinterDriverData" key in the registry.

For print servers, this string is one of the predefined strings listed in the following Remarks section.

pType

[out] Pointer to a variable that receives the type of data retrieved. The function returns the type specified in the **SetPrinterData** or **SetPrinterDataEx** call when the data was stored. This parameter can be NULL if you don't need the information.

pData

[out] Pointer to a buffer that receives the configuration data.

nSize

[in] Specifies the size, in bytes, of the buffer pointed to by *pData*.

pcbNeeded

[out] Pointer to a variable that receives the size, in bytes, of the configuration data. If the buffer size specified by *nSize* is too small, the function returns ERROR_MORE_DATA, and *pcbNeeded* indicates the required buffer size.

Windows 95/98/Me: If *nSize* is greater than zero, the behavior is as documented above. If *nSize* is zero, the return value is ERROR_SUCCESS and *pcbNeeded* returns the required buffer size.

RETURN VALUES

If the function succeeds, the return value is ERROR_SUCCESS. If the function fails, the return value is an error value.

REMARKS

GetPrinterData retrieves printer-configuration data set by the **SetPrinterDataEx** or **SetPrinterData** function.

If *hPrinter* is a handle to a print server, *pValueName* can specify one of the following predefined values.

SPLREG_DEFAULT_SPOOL_DIRECTORY
SPLREG_PORT_THREAD_PRIORITY_DEFAULT
SPLREG_PORT_THREAD_PRIORITY
SPLREG_SCHEDULER_THREAD_PRIORITY_DEFAULT
SPLREG_SCHEDULER_THREAD_PRIORITY
SPLREG_BEEP_ENABLED
SPLREG_NET_POPUP
SPLREG_EVENT_LOG
SPLREG_MAJOR_VERSION
SPLREG_MINOR_VERSION
SPLREG_ARCHITECTURE
SPLREG_OS_VERSION
Windows 2000/XP: SPLREG_OS_VERSIONEX
SPLREG_DS_PRESENT (On successful return, *pData* contains 0x0001 if the machine is on a DS domain, 0 otherwise.)
SPLREG_DS_PRESENT_FOR_USER (On successful return, *pData* contains 0x0001 if the user is logged onto a DS domain, 0 otherwise.)
SPLREG_REMOTE_FAX (On successful return, *pData* contains 0x0001 if the FAX service supports remote clients, 0 otherwise.)
SPLREG_NET_POPUP_TO_COMPUTER (On successful return, *pData* contains 1 if job notifications should be sent to the client computer, or 0 if job notifications are to be sent to the user.)
SPLREG_RETRY_POPUP (On successful return, *pData* contains 1 if server is set to retry PopUps for all jobs, or 0 if server does *not* retry PopUps for all jobs.)

In addition, the following values indicate pool printing behavior when an error occurs.

SPLREG_RESTART_JOB_ON_POOL_ERROR (Indicates the time, in seconds, when a job is restarted on another port after an error occurs. This is used with SPLREG_RESTART_JOB_ON_POOL_ENABLED.)
SPLREG_RESTART_JOB_ON_POOL_ENABLED (A nonzero value indicates that SPLREG_RESTART_JOB_ON_POOL_ERROR is enabled.)

The time specified in SPLREG_RESTART_JOB_ON_POOL_ERROR is a minimum time. The actual time can be longer, depending on the following port monitor settings, which are found under HKLM\SYSTEM\CurrentControlSet\Control\Print\Monitors\MonitorName\Ports.

Swecoin has added status functionality in the Language Monitor function GetPrinterDataFromPort which is called by GetPrinterData. This way you can get printer specific data through this Windows function.

The following table gives an overview of the Swecoin specific keys (*pValueName*) used with GetPrinterData..

Printer DsMonitor Key	Explanation	Type
DeviceID	Printer's device ID string	REG_BINARY
ERROR	Printer Error or Status in Windows 16 bit format (see Appendix A)	REG_DWORD
ErrorEvent	Error event name for error event trigger	REG_SZ
EXTERNALERROR	Extended status according to Appendix B	REG_DWORD
Firmware	Firmware version	REG_BINARY
PAGECOUNT	Page counter for cut pages	REG_DWORD
PCB_REV	Printers PCB revision number	REG_BINARY
PCB_SN	Printers PCB serial number	REG_BINARY
StatusEvent	Status event name for status event trigger	REG_SZ

Monitor Key	Explanation	Type
ACK_SLEEP	ACK marker sleep time	REG_DWORD
READ_SLEEP	Sleep time before a read after write	REG_DWORD
READ_THREAD_SLEEP	Read thread sleep time	REG_DWORD
READ_REPEAT	Read repeat count.	REG_DWORD

Table 7-6 GetPrinterData Key values

For more information about the ERROR and EXTERNALERROR status response see the Remark section of the GetPrinter function.

7.3.2 GetPrinter

The **GetPrinter** function retrieves information about a specified printer.

```
BOOL GetPrinter(
  HANDLE hPrinter,    // handle to printer
  DWORD Level,        // information level
  LPBYTE *pPrinter,   // printer information buffer
  DWORD cbBuf,        // size of buffer
  LPDWORD pcbNeeded   // bytes received or required
);
```

PARAMETERS

hPrinter

[in] Handle to the printer for which the function retrieves information. Use the **OpenPrinter** or **AddPrinter** function to retrieve a printer handle.

Level

[in] Specifies the level or type of structure that the function stores into the buffer pointed to by *pPrinter*.

Windows 95/98/Me: This value can be 1, 2, or 5.

Windows NT/2000/XP: This value can be 1, 2, 3, 4, 5, 6, 7, 8 or 9.

pPrinter

[out] Pointer to a buffer that receives a structure containing information about the specified printer. The buffer must be large enough to receive the structure and any strings or other data to which the structure members point. If the buffer is too small, the *pcbNeeded* parameter returns the required buffer size.

The type of structure is determined by the value of *Level*.

Level	Structure
1	A **PRINTER_INFO_1** structure containing general printer information.
2	A **PRINTER_INFO_2** structure containing detailed information about the printer.
3	**Windows NT/2000/XP:** A **PRINTER_INFO_3** structure containing the printer's security information.
4	**Windows NT/2000/XP:** A **PRINTER_INFO_4** structure containing minimal printer information, including the name of the printer, the name of the server, and whether the printer is remote or local.
5	A **PRINTER_INFO_5** structure containing printer information such as printer attributes and time-out settings.
6	**Windows 2000/XP:** A **PRINTER_INFO_6** structure specifying the status value of a printer.
7	**Windows 2000/XP:** A **PRINTER_INFO_7** structure that indicates whether the printer is published in the directory service.
8	**Windows 2000/XP:** A **PRINTER_INFO_8** structure specifying the global default printer settings.
9	**Windows 2000/XP:** A **PRINTER_INFO_9** structure specifying the per-user default printer settings.

cbBuf

[in] Specifies the size, in bytes, of the buffer pointed to by *pPrinter*.

pcbNeeded

[out] Pointer to a variable that the function sets to the size, in bytes, of the printer information. If *cbBuf* is smaller than this value, **GetPrinter** fails, and the value represents the required buffer size. If *cbBuf* is equal to or greater than this value, **GetPrinter** succeeds, and the value represents the number of bytes stored in the buffer.

RETURN VALUES

If the function succeeds, the return value is a nonzero value.

If the function fails, the return value is zero. To get extended error information, call **GetLastError**.

REMARKS

 **Security Alert** The **pDevMode** member in the **PRINTER_INFO_2**, **PRINTER_INFO_8**, and **PRINTER_INFO_9** structures can be NULL. When this happens, the printer is unusable until the driver is reinstalled successfully.

Windows NT/2000/XP: For the **PRINTER_INFO_2** and **PRINTER_INFO_3** structures that contain a pointer to a security descriptor, the function retrieves only those components of the security descriptor that the caller has permission to read. To retrieve particular security descriptor components, you must specify the necessary access rights when you call the **OpenPrinter** function to retrieve a handle to the printer. The following table shows the access rights required to read the various security descriptor components.

Access Right	Security Descriptor Component
READ_CONTROL	Owner Primary group Discretionary access-control list (DACL)
ACCESS_SYSTEM_SECURITY	System access-control list (SACL)

Windows 95/98/Me: the **pSecurityDescriptor** member in the **PRINTER_INFO_2** and **PRINTER_INFO_3** structures is ignored. The design of an application should take this into account.

Windows 2000/XP: If you specify level 7, the **dwAction** member of **PRINTER_INFO_7** returns one of the following values to indicate whether the printer is published in the directory service.

dwAction value	Meaning
DSPRINT_PUBLISH	The printer is published. The **pszObjectGUID** member contains the GUID of the directory services print queue object associated with the printer.
DSPRINT_UNPUBLISH	The printer is not published.
DSPRINT_PENDING	Indicates that the system is attempting to complete a publish or unpublish operation. If a **SetPrinter** call fails to publish or unpublish a printer, the system makes further attempts to complete the operation in the background.

Swecoin added status functionality in the Language Monitor is setting the spooler status with Windows defined status and a few additional status values.

The following tables give an overview of the Windows and Swecoin status responses.

WINDOWS STYLE STATUS RESPONSE

Printer status		Windows status	
Paper Jam	NAK 1	PRINTER_STATUS_PAPER_JAM	0x00000008
Cutter not home	NAK 2	PRINTER_STATUS_USER_INTERVENTION	0x00100000
Out of paper	NAK 3	PRINTER_STATUS_PAPER_OUT	0x00000010
Print head lifted	NAK 4	PRINTER_STATUS_DOOR_OPEN	0x00400000
paper-feed error	NAK 5	PRINTER_STATUS_PAPER_PROBLEM	0x00000040
Temperature error	NAK 6	PRINTER_STATUS_ERROR	0x00000002
Presenter jam	NAK 7	PRINTER_STATUS_ERROR	0x00000002
Index Error	NAK 12	PRINTER_STATUS_ERROR	0x00000002
Checksum error	NAK 13	PRINTER_STATUS_ERROR	0x00000002
Wrong FW	NAK 14	PRINTER_STATUS_ERROR	0x00000002
Retract occurred	NAK 16	PRINTER_STATUS_ERROR	0x00000002
Paper near end	0x00 0x02	PRINTER_STATUS_PAPER_NEAR_END	0x02000000
Weekend sensor	0x00 0x40	PRINTER_STATUS_PAPER_WEEKEND	0x04000000
Paper at presenter	0x00 0x08	PRINTER_STATUS_PAPER_PRESENTER	0x08000000
Buffer overflow	0x10 0x00	PRINTER_STATUS_ERROR	0x00000002
Print data exist	0x40 0x00	PRINTER_STATUS_PROCESSING	0x00004000
External error		PRINTER_STATUS_ERROR	0x00000002

Table 7-7 Windows status response

EXTENDED ERROR STATUS RESPONSE

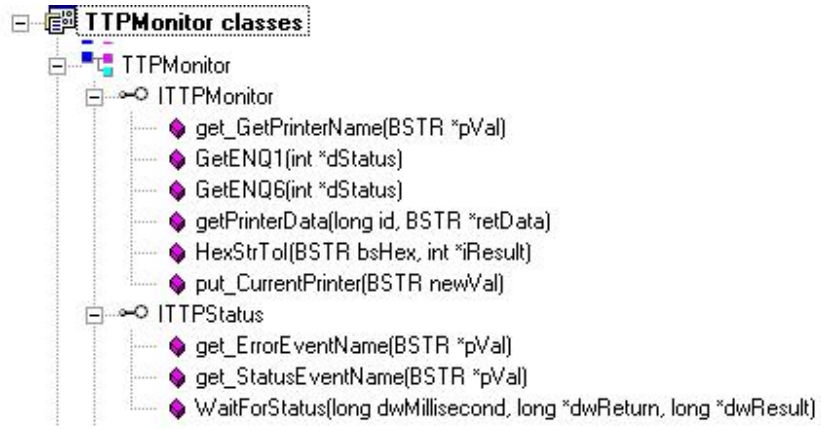
Printer status		Decode with
Temperature error	NAK 6	0x00000001
Presenter jam	NAK 7	0x00000002
Index Error	NAK 12	0x00000004
Checksum error	NAK 13	0x00000008
Wrong FW	NAK 14	0x00000010
Retract occurred	NAK 16	0x00000020
Buffer overflow		0x00000040

Table 7-8 Extended status response

7.4 ATL object for communication with the printer

In order to make implementation of the original LmPrinterIoControl function easier, Swecoin implemented an ATL object TTPMONITOR. This DLL provides a function interface which is easy accessible from many programming languages.

7.4.1 ATL object function and property definition



The SetCurrentPrinter property sets the current printer and loads the LM DLL and initializes the Error and Status events.

get_GetPrinterName will return the set printer name.

getPrinterData returns the status information from the LmPrinterIoControl function.

The parameter id can have one of the following values:

#define	TTPKEY_LANGUAGE_MONITOR	0
#define	TTPKEY_STATUS_GENERAL	1
#define	TTPKEY_PAPER_NEAR_END	2
#define	TTPKEY_STATUS_REPORT	3
#define	TTPKEY_PROGRAM_VERSION	4
#define	TTPKEY_SERIAL_NUMBER	5
#define	TTPKEY_HARDWARE_REVISION	6
#define	TTPKEY_DEVICE_ID	7
#define	TTPKEY_GETPARAMETER	8
#define	TTPKEY_AUTO_STATUS	9
#define	TTPKEY_EXT_AUTO_STATUS	10
#define	TTPKEY_DEVICE_ID_FC	11
#define	TTPKEY_RESET_FULL	12
#define	TTPKEY_RESET_INITIALIZE	13

Table 7-9 getPrinterData ID values

GetENQ1 returns only the printer status ESC ENQ 1 in a WORD, in the form second byte and then first byte.

GetENQ6 returns only the printer status ESC ENQ 6 in a WORD, in the form second byte and then first byte.

GetErrorEventName returns the “Error event name” after the call of SetCurrentPrinter.

GetStatusEventName returns the “Status event name” after the call of SetCurrentPrinter.

HexStrToI implements a conversion function for the getPrinterData function results which are Hex string results. The result of this function is an Integer representation of the Hex string value.

WaitForStatus implements a WaitForMultipleObjects and returns with the result of the Wait function and the status result from the LmPrinterIoControl function call.

7.5 Event notification

In order to enable a program to not have to continuously poll the printer for status Swecoin implemented an Event notification in the Language Monitor.

This notification used together with the WaitForStatus function in the ATL object or the WaitForMultipleObjects Windows function enables applications to react on status changes rather then looking for status periodically.

When the internal polling thread recognizes a status change or error then it will fire an event, either an error or a status event.

The Application or the ATL object (TTPMONITOR) can open an event object to the LM events and initialize a “Wait for event” function. The necessary event names can be extracted from the registry.

When an event occurs, call the LmPrinterIoControl function with “Auto Status” or GetPrinterData and you will get the error or status condition in the DWORD returned.

NOTE! – *To extract registry information you need to:*

Start with the printer name, open the HKEY_LOCAL_MACHINE with the following path "SYSTEM\\CurrentControlSet\\Control\\Print\\Printers\\%s" were %s stands for the printer name.

Extract the string “Printer Driver” from this key.

Open the Printer driver with the following path "HKLM\\SYSTEM\\CurrentControlSet\\Control\\Print\\Environments\\Windows NT x86\\Drivers\\Version-3\\%s" were %s is the extracted printer driver from step 2.

Extract the string “Monitor” from this key

Open the Monitor with the following path "HKLM\\SYSTEM\\CurrentControlSet\\Control\\Print\\Monitors\\%s" were %s is the extracted monitor from step 4.

Extract the string “Driver” (the LM DLL) to be opened for function calls

Extract the Event names with the strings “ErrorEvent” and “StatusEvent” in older drivers or use step 8 to open a new Key in newer drivers (after September 2004).

Open the Printer with the following path "HKLM\\SYSTEM\\CurrentControlSet\\Control\\Print\\Printers\\%s\\DsMonitor" and extract the event names with the strings “ErrorEvent” and “StatusEvent”.

7.6 Registry entries

7.6.1 In the Language Monitor Key

ACK_SLEEP = REG_DWORD 00000064 (100 decimal)

DeleteJob = REG_DWORD 00000001 (1 decimal)

Driver = REG_SZ "10x0MON.DLL" or the equivalent LM for the specific printer

READ_REPEAT = REG_DWORD 00000001 (1 decimal)

READ_SLEEP = REG_DWORD 00000064 (100 decimal)

READ_THREAT_SLEEP = REG_DWORD 000005dc (1500 decimal)

For older drivers (before September 2004) the following two entries are still available.

ErrorEvent = REG_SZ "ErrorEvent1" or the equivalent name for the specific printer

StatusEvent = REG_SZ "StatusEvent1" or the equivalent name for the specific printer

The READ_THREAD_SLEEP controls the auto status inquiry time.

When the LM initializes it starts a read thread which in turn runs until the LM closes down.

During print idle time, the read thread is inquiring the status from the printer and signals a status change to the listening application.

ACK_SLEEP controls the sleep time in case of a page hold inquiry.

The page hold function is not available for all printers and is used together with a driver setting in the 8x00 series driver.

READ_SLEEP controls the sleep time between a status inquiry and the successive read call.

When the LM is inquiring for status the printer needs time to gather the needed information and therefore can't react immediately. Since some printers react faster then others and the speed of the PC system and the used OS are also variables which differ, this key was implemented to fine-tune the application.

READ_REPEAT controls the amount of re-tries on a failed read inside the LM read function.

DeleteJob controls the LM behavior when an error appears. In the case this value is 1 the LM will delete all print jobs and if it is 0 it will hold the job and stop any spooler activities until the error is resolved.

7.6.2 In the Printer Key

In newer drivers (after September 2004) the Error and Status event names have been moved into a separate key (DsMonitor) in the Printers section. This is to allow multiple printers of the same kind to reflect status and error conditions.

DeviceID = REG_SZ	the printer's DeviceID in hex value
ERROR = REG_BINARY	the printer's error status according to Windows status values
EXTERNALERROR = REG_BINARY	the printers error status according to ESC ENQ 1 (Swecoin-specific)
ErrorEvent = REG_SZ	"ErrorEvent1" or the equivalent name for the specific printer
PAGECOUNT = REG_DWORD	current page count
PCB_REV = REG_BINARY	printer's PCB revision
PCB_SN = REG_BINARY	printer's serial number
StatusEvent = REG_SZ	"StatusEvent1" or the equivalent name for the specific printer

ErrorEvent and StatusEvent are the event names used in the LM to signal the current status changes. When you open an event with the listed name you can wait for this event to happen and inquire with the "Auto Status" or "Ext Auto Status" for the status value.

NOTE! – *The difference between "Auto Status" and "Ext Auto Status" is the return value. In case of "Auto Status" you will get a DWORD back that is also stored in the ERROR value in the registry and in case "Ext Auto Status" you will get two DWORD's back where the first is the ERROR and the second the EXTERNALERROR value in the registry which reflects the printers ESC ENQ 1 value.*

NOTE! – *When changes have been made in the registry it is necessary to reboot the PC in order for the changed parameters to take effect.*

8 TABLES OVERVIEW