C H A P T E R 2 1

Printers

This chapter presents the PC 98 requirements and recommendations for printers. Printers and other devices attached to parallel ports should be capable of high-speed, bi-directional data transfers. The design criteria for parallel devices follows the design criteria for parallel ports as described in the "I/O Ports and Devices" chapter in Part 4 of this guide.

The goal of the PC 98 requirements for printers and parallel ports is to ensure the following:

- Maximum speed for transfer of parallel data between the system and the peripheral
- A true Plug and Play experience for users

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Basic Printer Features

This section summarizes the basic PC 98 hardware requirements for printers.

1. IEEE 1394 printer meets PC 98 requirements for IEEE 1394
Required

The IEEE 1394 bus is recommended for support of fast, high-density data transfer. For information about implementing IEEE 1394 for PC 98, see the "IEEE 1394" chapter in Part 3 of this guide.

2. USB printer meets PC 98 requirements for USB devices
Recommended

The USB bus is a requirement for PC 98 systems. It is recommended that USB printers conform to the *Universal Serial Bus Device Class Definition for Printing Devices, Version 1.0* or higher. For information about implementing USB for PC 98, see the "USB" chapter in Part 3 of this guide.

3. IEEE 1284 printer supports compatibility mode, nibble mode, and ECP, compliant with IEEE 1284-I
Required

Parallel peripherals must implement nibble mode and compatibility mode. Nibble mode provides a means of transferring the identification string from the peripheral to the system. Compatibility mode provides backward compatibility with non-Plug and Play systems that do not support more advanced modes.

A parallel device complies with IEEE 1284 if it meets the required criteria documented in the IEEE 1284 specification, *Standard Signaling Method for a Bi-directional Parallel Peripheral Interface for Personal Computers.* For a parallel device that connects to a PC 98 system, the minimum requirement is IEEE 1284 Level I compliance, which implements the compatibility and nibble modes as specified in IEEE 1284 and defines the mechanical and electrical specifications of the peripheral.

An IEEE 1284-I–compliant peripheral uses the standard IEEE 1284-B connector. In all cases, ensure that there is enough space between the connectors and the surrounding enclosure to allow for a mating connector, a connector shell, and a latch assembly.

For more information about the electrical specifications for IEEE 1284-I–compliant peripherals, refer to the IEEE 1284 specification.

For more information, see the following related parallel port requirements defined in the "I/O Ports and Devices" chapter in Part 4 of this guide:

- Support for compatibility, nibble mode, and ECP protocols compliant with IEEE 1284-1994
- Port connectors compliant with IEEE 1284-I, at minimum
- Support for ECP mode compliant with IEEE 1284

4. IEEE 1284 printer meets IEEE 1284-II requirements
Recommended
Peripheral devices capable of handling a high-speed data rate should comply with the mechanical, electrical, and protocol specification of IEEE 1284-II. In particular, such devices should support the protocols of the IEEE 1284-II ECP mode and should use the IEEE 1284-C connector.

5. ECP printer works correctly when ECP mode is turned off
Required
This ensures that the user has correct printing support when ECP mode is not in use.

6. IEEE 1284 hardware supports error notification
Required
The following minimum errors must be reported individually by the hardware:

- Out of paper
- Paper jam
- Load other paper size

PC 98 Printer Design

This section summarizes requirements related to the PC 98 design initiatives in Part 1 of this guide.

Plug and Play for Printers

The items in this section are requirements for Plug and Play capabilities. For Plug and Play requirements related to the printer port on the PC, see the "I/O Ports and Devices" chapter in Part 4 of this guide or the related bus port requirements in Part 3 of this guide.

7. Implement Plug and Play support for all supported buses
Required

Complete Plug and Play support must be implemented for all buses that the device supports. For information about the Plug and Play requirements, see the related bus-class definitions in Part 3 of this guide.

8. Peripheral device meets IEEE 1284 requirements
Required

Recommended: Support CompatibleID key in the device identification string.

These requirements include a Plug and Play device ID as described in the IEEE 1284 specification. For more information, see the "I/O Ports and Devices" chapter in Part 4 of this guide.

Device Drivers and Installation for Printers

This section summarizes device driver requirements for printers. The items in this section are requirements for all PC 98 systems.

9. Printer INF file and installation meet PC 98 requirements
Required

Each device requires a printer INF file for both Windows and Windows NT operating systems. The manufacturer does not need to supply a printer INF file if a standard printer INF file provided with the operating system can be used.

If the manufacturer provides an INF file, it must be complete and free of errors. This INF file must comply with the printer-specific extensions listed in the Windows and Windows NT DDKs.

If the manufacturer supplies an INF file or another file, the requirements for printer INF files and installation include the following:

- All devices and files must pass PC 98 compliance testing
- All configuration settings are stored in the registry
- The correct files specified in the device's INF file must be installed in the correct locations
- Driver installation and removal use Windows-based methods as defined in the Windows and Windows NT DDKs
- Files provided by the vendor must not use the same file names used by files included in Windows operating systems unless specifically agreed upon with Microsoft

For complete details about standard installation requirements for device drivers, see the "Basic PC 98" chapter in Part 2 of this guide.

10. Driver correctly reports device capabilities
Required
For Windows, this means that the driver correctly supports the DEVMODE structure as defined in the Windows and Windows NT DDKs.

11. Driver supports error notification
Required
At a minimum, the device driver must support notifying the user of errors reported by the hardware.

12. Driver supports ICC color matching
Required
Windows and Windows NT support using color profiles that comply with the ICC Profile Format specification. For contact information on device profiles, see the references at the end of this chapter. The ICM APIs and functionality for Windows and Windows NT are described in the Win32 SDK and the Windows NT 5.0 DDK.

For PC 98, color-capable devices such as desktop monitors, printers, scanners, still-image cameras, LCDs, color plasma displays, or other flat-panel devices are required to install one or more ICC profiles for ICM. Providing a monitor color-calibration utility is recommended for generating, editing, and installing ICC profiles. The sRGB profile will be distributed in Windows and Windows NT.

13. Port monitor software meets DDK guidelines
Required
If the device includes bi-directional port monitor software that replaces the default Windows port monitor, then this software must accurately report errors. For information about implementing port monitor software, see the Windows and Windows NT DDKs.

14. Driver supports point-and-print network installation
Required
This means that the user is not required to provide disks or files when installing a new printer of the same type as another printer already on the network.

15. Device available immediately following installation
Required
The user should not have to restart the system immediately after device installation in order to print.

16. Device supports accurate printable regions
Required
The printable regions that can be selected in the user interface must be accurately supported in the actual print output.

17. Driver supports required DDIs
Required
For Windows NT drivers, the device driver interfaces (DDIs) are defined in the Windows NT DDK. Win32-based printer drivers ensure that print commands from Windows NT-based applications are executed correctly on the specified printer or plotter. Because Win32 APIs are not hardware-specific, it is the job of each printer driver to interpret the commands for its specific hardware.

For Windows drivers, this requirement includes correct support of all features advertised for the device, plus required support for Windows features. The DDIs that must be supported are listed in the “Printer Driver Overview” section of the Windows DDK. This includes the following support, in addition to other support defined in the DDK:

- TrueType glyph indexes
- Big fonts (those that require more than 64K to express)
- Enhanced metafile (EMF) spooling
- Bezier curve output
- Services from the Windows device-independent bitmap (DIB) engine

18. Driver based on unidriver
Recommended

Microsoft provides a universal printer driver (unidriver), which is capable of carrying out requests (such as printing text, rendering bitmaps, or advancing a page) on most printer types. To build a driver for a particular printer, a developer builds a minidriver. This minidriver accepts requests from the GDI and then, in most cases, passes the request to the unidriver along with information that describes the capabilities, commands, and resident fonts of the particular printer. For more information, see the Windows NT and Windows DDKs.

Printer References

The following represents some of the references, services, and tools available to help build hardware that is optimized to work with Windows operating systems.

ICC Profile Format Specification, Version 3.4,
International Color Consortium
http://www.color.org

*Standard Signaling Method for a Bi-directional Parallel Peripheral Interface for Personal Computers (*IEEE 1284 specification)
ASK*IEEE
Phone: (800) 949-4333
Fax: (212) 310-4091

Global Engineering Documents
Phone: (800) 854-7179 (US)
(613) 237-4250 (Canada)
(303) 792-2181 (Outside North America)
Fax: (303) 397-2740
ftp://ftp.symbios.com/pub/standards/io/

Universal Serial Bus Device Class Definition for Printing Devices, Version 1.0
Phone: (503) 264-0590
Fax: (503) 693-7975
http://www.usb.org

Windows and Windows NT DDKs and Win32 SDK
MSDN Professional membership

Checklist for Printers

If a recommended feature is implemented, it must meet the PC 98 requirements for that feature as defined in this document.

1. IEEE 1394 printer meets PC 98 requirements for IEEE 1394
Required

2. USB printer meets PC 98 requirements for USB devices
Recommended

3. IEEE 1284 printer supports compatibility mode, nibble mode, and ECP, compliant with IEEE 1284-I
Required

4. IEEE 1284 printer meets IEEE 1284-II requirements
Recommended

5. ECP printer works correctly when ECP mode is turned off
Required

6. IEEE 1284 hardware supports error notification
Required

7. Implement Plug and Play support for all supported buses
Required

8. Peripheral device meets IEEE 1284 requirements
Required

9. Printer INF file and installation meet PC 98 requirements
Required

10. Driver correctly reports device capabilities
Required

11. Driver supports error notification
Required

12. Driver supports ICC color matching
Required

13. Port monitor software meets DDK guidelines
Required

14. Driver supports point-and-print network installation
Required

15. Device available immediately following installation
Required

16. Device supports accurate printable regions
Required

17. Driver supports required DDIs
Required

18. Driver based on unidriver
Recommended