
Chapter 16 Digital Still Image Peripherals

IMPORTANT: The requirements in this guide provide instructions for designing PC systems that will result in an optimal user experience with typical Windows-based applications running under either the Microsoft Windows Millennium Edition or Windows 2000 Professional or later operating systems. These design requirements are not the basic system requirements for running any version of Windows operating systems.

This chapter presents the PC 2001 requirements for digital still image peripherals, including but not limited to digital cameras and scanning devices such as sheet-fed, flatbed, handheld, and film scanners.

Unless this chapter defines a specific requirement or exception, all requirements for digital still image peripherals apply as presented in Chapter 3, “PC System,” and Chapter 6, “Buses and Interfaces.”

Digital Still Image Devices Basic Requirements

This section summarizes the basic PC 2001 hardware requirements for scanners and digital cameras.

IMAG–0309. Digital still camera uses PC 2001 compatible port connection with USB or IEEE 1394 connection

PC 2001 must use either USB or IEEE 1394 port connections for digital still cameras. Other port connections may be present on the device, if these port connections meet PC 2001 requirements.

IMAG–0310. Driver supports sRGB output or an ICC profile is provided

The device must default either to creating sRGB output or using a vendor-supplied ICC profile.

Windows Me and Windows 2000 support using color profiles that comply with the *Specification ICC.1:1998-09 File Format for Color Profiles*. The ICM APIs and functionality for Windows Me and Windows 2000 are defined in the Microsoft Platform SDK, the Windows Me DDK, and the Windows 2000 DDK. For more information, see the Color Management and Windows Operating Systems Web page, listed in “Digital Still Image Peripherals References.”

For color-capable devices that do not default to sRGB output, the vendor must install and associate one or more ICC profiles for ICM. Devices that are sRGB compliant do not need to provide an ICC profile. The sRGB profile is distributed in Windows Me and Windows 2000 and will be in subsequent releases of these operating systems.

The requirements for sRGB are defined in *IEC 61966-2-1 Multimedia systems and equipment – Colour measurement and management – Part 2-1: Colour management – Default RGB colour space – sRGB*.

IMAG-0311. USB device meets USB imaging device class specifications

All USB hardware must comply with the requirements defined in Chapter 6, “Buses and Interfaces,” which includes the USB specifications for specific device types.

Compliance with the following two specifications from the USB Imaging Class Device Working Group requires explanation, as follows:

- The *USB Still Image Capture Device Definition Specification* applies to both digital still cameras and scanners. Compliance becomes a requirement for PC 2001 within 90 days of when the revision number of the specification reaches version 1.0.
- The *USB Imaging Class Specification* will contain requirements for still images produced by scanners. The USB digital still camera specification is based on the draft for *PIMA 15740:2000 Photography – Electronic still picture imaging – Picture Transfer Protocol (PTP) for Digital Still Photography Devices*.

IMAG-0312. Still image devices meet minimum throughput requirements

Still image devices must download images to the PC and make them available through WIA to applications at no less than the following rates:

- Fast IR at 80 Kpixels/s
- USB at 120 Kpixels/s
- IEEE 1394 at 200 Kpixels/s

For more information on WIA, see the Windows Image Acquisition Web page, listed in “Digital Still Image Peripherals References.”

IMAG-0313. Digital camera uses PC-compatible file system for removable storage

For devices that include removable flash memory, the memory must use one of the following PC-compatible file systems:

- Media integrates an ATA controller.

- Device file system installs via the Windows 2000 Professional Installable File System.
- Device ships with a Windows Media Device Manager (WMDM) pluggable service provider.

IMAG–0314. Digital camera stores images in JPEG-compressed file format

A digital still camera must provide the user with the option to store images in a JPEG-compressed format.

IMAG–0315. Still image devices deliver accurate image information

Imaging devices must resolve at least 1/4 line per claimed pixel resolution in both the horizontal and the vertical direction to ensure greater image capture accuracy. This requirement applies to the device's best quality setting.

Plug and Play for Digital Still Image Devices

The items in this section are requirements for Plug and Play capabilities. For Plug and Play requirements related to parallel ports, see the *Legacy Plug and Play Guidelines*.

IMAG–0316. USB camera firmware supports PIMA 15740 protocol

PIMA 15740 defines a common protocol for all digital still cameras, ensuring PC connectivity using a generic driver provided with the Windows operating system. This protocol is supported by imaging industry leaders. PIMA 15740 provides interoperability of digital still cameras, including PC and peer-to-peer connectivity.

For information, see the draft for PIMA 15740.

Note: A USB camera does not need to supply a WIA driver if the camera firmware supports PIMA 15740.

Device Drivers and Installation for Digital Still Image Devices

This section summarizes the device driver requirements for scanners and digital still image devices.

IMAG–0317. Driver support implements the WIA driver architecture

Still image devices must provide drivers based on WIA that expose camera properties and enable camera functionality. The services provided by WIA provide hardware abstraction, installation wizards, and event polling.

WIA is both an API and a DDI for Windows operating systems. WIA provides a mechanism to enumerate available image acquisition devices, both local and remote.

WIA architecture is defined in the “Still Image Drivers” section of the Windows 2000 DDK. For related information, see the Windows Image Acquisition Web page, listed in “Digital Still Image Peripherals References.”

Note: The IR bus interface is exempt from this requirement.

IMAG–0318. Digital still cameras that stream video require WDM Stream class drivers

Cameras capable of streaming video while tethered to the PC must provide a WDM minidriver based on WDM stream class support.

WDM stream class support is defined in the “Kernel-mode Drivers for Still Image Devices” section of the Windows 2000 DDK.

IMAG–0319. If TWAIN datasources are provided, device driver supports TWAIN 1.7

For devices with a TWAIN datasource, the device driver must support the *TWAIN Specification, Version 1.7*, ensuring that the device can run without a hardware-specific user interface and download n number of images at a single time.

IMAG–0321. Scanners with an IEEE 1394 interface uses SBP2Port

SBP2Port.sys is the IEEE 1394 transport driver in the Windows Me and Windows 2000 operating systems. It provides transport services for SCSI-like commands over IEEE 1394. Scanners must use SBP2Port to communicate over IEEE 1394 if converting the device from a SCSI or SCSI-like interface.

Implementation details for bus-specific transfer protocols are defined in the “Storage Driver Architecture” section of the Windows 2000 DDK.

Digital Still Image Peripherals References

Following are the references, services, and tools cited in this chapter that are available to help build hardware that works optimally with Windows operating systems.

Color Management and Windows Operating Systems Web page

<http://www.microsoft.com/hwdev/color/>

IEC 61966-2-1 Multimedia systems and equipment – Colour measurement and management – Part 2-1: Colour management – Default RGB colour space – sRGB

<http://www.iec.ch>

Legacy Plug and Play Guidelines

<http://www.pcdesguide.org/LegacyPnP/>

PIMA 15740:2000 Photography – Electronic still picture imaging – Picture Transfer Protocol (PTP) for Digital Still Photography Devices

http://www.pima.net/standards/it10/IT10_POW.htm#15740

Plug and Play specifications

<http://www.microsoft.com/hwdev/respec/pnpspecs.htm>

Specification ICC.1:1998-09 File Format for Color Profiles

International Color Consortium (ICC)

<http://www.color.org>

TWAIN Specification, Version 1.7

<http://www.twain.org/docs/>

Universal Serial Bus Specification, Revision 1.1

<http://www.usb.org/developers/docs.html>

USB Still Image Capture Device Definition Specification

USB Imaging Class Specification

<http://www.usb.org/developers/docs.html>

http://www.usb.org/developers/devclass_docs.html#approved

Windows Image Acquisition Web page

<http://www.microsoft.com/hwdev/wia/>

Windows 98 DDK, Windows Me DDK, Windows 2000 DDK, and Microsoft Platform SDK

<http://msdn.microsoft.com/library/default.asp>

Checklist for Digital Still Image Peripherals

- IMAG-0309. Digital still camera uses PC 2001 compatible port connection with USB or IEEE 1394 connection
- IMAG-0310. Driver supports sRGB output or an ICC profile is provided
- IMAG-0311. USB device meets USB imaging device class specifications
- IMAG-0312. Still image devices meet minimum throughput requirements
- IMAG-0313. Digital camera uses PC-compatible file system for removable storage
- IMAG-0314. Digital camera stores images in JPEG-compressed file format
- IMAG-0315. Still image devices deliver accurate image information
- IMAG-0316. USB camera firmware supports PIMA 15740 protocol
- IMAG-0317. Driver support implements the WIA driver architecture
- IMAG-0318. Digital still cameras that stream video require WDM Stream class drivers
- IMAG-0319. If TWAIN datasources are provided, device driver supports TWAIN 1.7
- IMAG-0321. Scanners with an IEEE 1394 interface uses SBP2Port