Software for easy implementation of image processing

SIMATIC Visionscape

The SIMATIC Visionscape product series consists of software and hardware for industrial image processing. The hardware consists of a series of PCI boards for constructing a PC-based system. The powerful SIMATIC Visionscape software with an extensive collection of proven image processing tools and the graphic user interface support the simple and quick implementation of applications.

SIMATIC Spectation

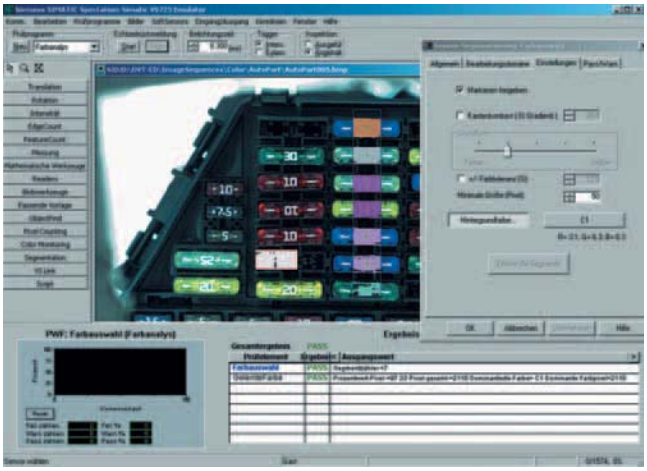
The vision sensors of the VS720 series are configured easily and conveniently with SIMATIC Spectation. A number of ready-made testing and recognition functions are already integrated. Test programs can be created, tested and loaded onto the camera – online or offline, on a programming device or PC, under Windows ME, 2000 and XP.

SIMATIC HMI Controls

Images from SIMATIC VS720 intelligent cameras can be displayed and edited easily on HMI systems using HMI Controls VS720.

SIMATIC Spectation

Overview



The vision sensors of the VS720 series are configured easily and conveniently with SIMATIC Spectation. A number of ready-made testing and recognition functions are already integrated. Test programs can be created, tested and loaded onto a vision sensor - online or offline, on a programming device or PC, under Windows 2000 and XP. Even more of these test programs can be stored on the camera and can be called up via interfaces as required. Optimizing the parameters and training for patterns can be done online and offline using an emulator. Several vision sensors can be configured via Industrial Ethernet using a programming device or PC.

Function

- Simple development of inspection programs for solving inspection tasks - selection from an existing range of inspection tools
- User-friendly handling of parameters
- Fast placement of test elements on the frame section under consideration using drag & drop
- Integrated offline configuration (emulator) using process images saved previously

Existing inspection tools

- Presence check
- Position detection
- Pattern comparison
- Position and orientation detection
- Measurement of dimensions, clearances and angles
- 1D/2D code reading
- Plain text reading and comparison (OCR/OCV)
- Inspection of color quality
- Inspection of color corruption
- Color differentiation (65000-16.7 million colors)
- Inspection of color luminosity
- Inspection of pattern recognition (color, size, coordinates)

Selection and Ordering data

		Order No.
SIMATIC Spectation V2.7.8 and VS-Link configuring software For creating user programs for SIMATIC VS 72x and configuring the VS Link; executable under Windows 2000/XP or higher; English/German; single license on CD-ROM	C	**6GF8007-3AA27-8AA0**

C: Subject to export regulations: AL = N and ECCN = EAR99S

Overview

The SIMATIC Visionscape product line consists of software and hardware for industrial machine vision. The hardware consists of a range of PCI boards for PC-based systems (see under "Vision systems", page 5/92).

SIMATIC Visionscape Software substantially speeds up the development and deployment of machine vision application by offering a powerful graphical user interface (GUI) and a broad collection of proven vision processing tools.

The Software supports all SIMATIC Visionscape boards, a scalable line of high performance vision processors to cost-effective frame grabbers (see under "Vision systems", page 5/82), as well as the intelligent camera SIMATIC HawkEye 1600T (see page 5/83).

A unique advantage of this product offering is that all boards and the intelligent camera HawkEye 1600T are configured using the same development and deployment environment as well as the same extensive set of vision tools. The end result, an application configured for one system can run unmodified and without recompilation on any other, thus allowing users to easily scale as well as select the right price/performance point for each application, not to mention the leverage of user training and know-how required only for a single environment.

Benefits

The SIMATIC Visionscape software with its graphical user interface and its patented architecture provides many advantages:

- Common software environment for fast application development & deployment for all SIMATIC Visionscape boards and the intelligent camera HawkEye 1600T
- Completely tested on SIMATIC PCs including those with Intel Core Duo Processors (see readme file for recommended configurations)
- Powerful graphical user interface and step program architecture for easy drag-and-drop application development
- Extensive collection of vision processing tools for image processing and analysis, calibrated dimensional measurements, automatic identification and application-specific processing tasks (such as BGA inspection)
- Scripting language for tool integration
- Open ActiveX control based software component architecture for custom application-specific GUI development
- Application-specific configurations & tools for the pharmaceutical, packaging, semiconductor and electronics industries

Application

SIMATIC Visionscape machine vision systems are used in all industries in which industrial machine vision is applied:

- Automotive assembly (especially in final assembly, components and body shop)
- Packaging inspection in pharmaceutical, food & beverage, luxury goods industries
- Electronic and Electrical assembly
- Semiconductor packaging (backend production)
- Medical device inspection
- General manufacturing assembly and inspection

Other applications include traceability applications involving verification and reading one dimensional bar code and data matrix symbologies.

Design

Software included in hardware packages

SIMATIC Visionscape Software Version 3.7 is contained in:

- SIMATIC Visionscape 0300 Framegrabber package: 6GF3080-0VS31-0FP0
- SIMATIC Visionscape 0740 Framegrabber package: 6GF3080-0VS74-0FP0
- SIMATIC Visionscape 0800 Framegrabber package: 6GF3080-0VS81-0FP0
- All SIMATIC HawkEye 1600T packages: 6GF3060-0VS16-xSCy

SIMATIC Visionscape Software Version 2.5.5 is contained in:

- SIMATIC Visionscape 4300 Vision Processor package: 6GF3080-0VS31-0VP0
- SIMATIC Visionscape 4740 Vision Processor package: 6GF3080-0VS74-0VP0

All software versions can be installed together on one PC but only one can be activated for use at a time. A version manager utility is provided to specify the active version.

Software CD separately available

The SIMATIC Visionscape SW Version 3.7 CD is separately available as 6GF3080-0VS00-0SW1.

License key required

SIMATIC Visionscape SW requires one of the following license keys at or in the PC where the software is installed:

- Installed SIMATIC Visionscape Framegrabber (key is activated)
- Connected (via Ethernet) SIMATIC HawkEye 1600T Intelligent Camera (key is activated)
- USB Dongle: 6GF3080-0VS00-2KS0
- Parallel Port Dongle: 6GF3080-0VS00-1KS0

Intellifind Object Finder Tool

Additionally the Intellifind Object Finder Tool requires a separate dongle (only for PC-based systems, separate options are available for the SIMATIC HawkEye 1600T Intelligent Camera):

- USB Dongle: 6GF3080-0VS00-2KF0
- Parallel Port Dongle: 6GF3080-0VS00-1KF0

SIMATIC Visionscape Software

Function

SIMATIC Visionscape Software provides all the elements required to develop and deploy machine vision applications in an industrial environment.

The engineering user interface FrontRunner enables the user to quickly and easily create vision application of different levels of complexity that can be downloaded to any of the Visionscape boards as well as to the intelligent camera HawkEye 1600T depending on specific application needs.

In the standard runtime interface AppRunner the user can start/stop the application, collect and review fail images, as well as present other diagnostic information, thus providing the user with complete system status.

In addition a complete set of ActiveX components allows the creation of custom user interfaces and even the programmatic creation of vision applications on the fly.

User levels are almost as varied as the applications that can benefit from a Visionscape solution as such, the configuration environment can be tailored to different user types to allow for the maximum productivity.

- Application engineers and system integrators to quickly develop and deploy complex vision applications without any conventional programming by dragging and dropping standard tools into jobs configured as a sequence of processing steps
- Application developers, machine builders and OEMs to create customized applications with custom graphical user interfaces fully integrated with their machine controller interface
- Installers and factory floor operators to select, set-up, and try-out preprogrammed applications and start, stop and monitor such applications on the factory floor

Comprehensive collection of intelligent tools

The broad collection of vision processing tools delivered with the SIMATIC Visionscape software includes:

- Image processing tools
  Image arithmetic, image rotation and warping, binary & gray scale morphology, edge enhancement, other image filtering, etc.
- Image analysis tools
  Flaw detection, histogram analysis, blob analysis, edge detection & fitting, vector edge detection and fitting, template & pattern recognition, object location & orientation detection, etc.
- Calibrated dimensional measurements
  Variety of preconfigured measurements such as line intersection, point to point distance, point-to-line normal, etc.
- Automatic identification tools
  Data Matrix and other 2D and 1D bar code reading, Optical Character Recognition (OCR), etc.
- Application specific high-level tools
  Optical Character Verification (OCV) for print/mark inspection, Ball Grid Array (BGA) inspection, etc.
- Custom tools
  User-defined expressions & math, custom measurements and custom scripted vision processing tools (e.g. C++ algorithms)

Integration

Integration in SIMATIC PCs

The SIMATIC Visionscape Software and boards is and will be completely tested on the existing SIMATIC PCs. As the offering of SIMATIC PCs is constantly extended and updated with newer technology we have to test the SIMATIC Visionscape product line on these new PCs as well.

The readme file (see “Further Information”) contains always the latest supported SIMATIC PCs as well as the recommended configurations.

Visionscape can also run on other vendors' PCs. But only configurations with SIMATIC PCs are extensively tested and therefore ensured to run without problems.

Supported cameras

When used with a PC-based board the software can be configured to interface with all kind of machine vision cameras, which can range from unsophisticated interlaced analog cameras with standard resolution, over progressive scan analog cameras with higher resolution, up to high resolution, high-speed digital CameraLink cameras and even line scan cameras.

This flexibility is implemented by the choice of Visionscape board (see “Vision systems”, page 5/82) and a camera specific definition file, called CamDef file. Thus, almost all analog cameras and CameraLink Base level cameras can be connected to a Visionscape system.

As Visionscape cannot be tested with all existing cameras there is only a standard set of cameras with which Visionscape was extensively tested that can cover most of the applications. The tested set of cameras per board is described in the readme file (see “Further Information”) as well is the board hardware documentation.

But in cases where other cameras are required already existing camera definition files can be used or new ones can be created. Those new camera definition files will be created and tested by Siemens, they cannot be created by the customer itself.

If you need a new camera supported please contact your local Vision Promoter or Vision Specialist. We will require in most cases the camera and its documentation to be sent to us. A service fee might apply.

Connectivity

Visionscape systems are typically configured as stand alone, integrated or embedded systems in an industrial environment. Interfaces will typically consist of discrete I/O connections to trigger sensors, lighting controllers, and to PLCs or reject actuators. For further information about I/O connections and additionally required accessories please see the section “Integration” of the specific Visionscape boards under “Vision systems”.

The system can be configured to actuate on receipt of a serial command received by means of a RS232 or a Ethernet TCP/IP connection.

Results data can be delivered by means of RS232 serial or Ethernet TCP/IP connection. The Visionscape system can be configured as a server or client on a TCP/IP network.

Technical specifications

Type	Visionscape Software
Hardware requirements	
• Processor	Pentium 4 with 2.4 GHz or higher
• Main memory	> 256 MB
• Display	VGA 64 K or True Color
Software requirements	
• Operating system	• Microsoft Windows 2000 SP4 or higher • Microsoft Windows XP SP2 or higher

Selection and Ordering data

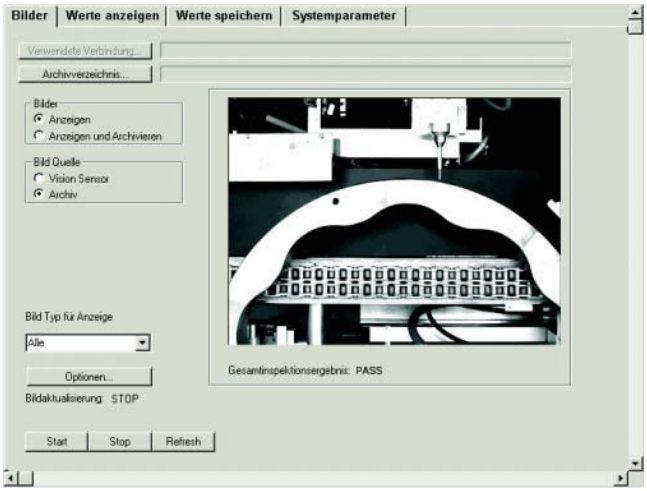
		Order No.
SIMATIC Visionscape Software Version 3.7 CD including complete online documentation. Requires one of the following license keys at or in the PC where the software is installed: Installed SIMATIC Visionscape Framegrabber (key is activated) Connected (via Ethernet) SIMATIC HawkEye 1600T Intelligent Camera (key is activated) USB Dongle: 6GF3080-0VS00-2KS0 or Parallel Port Dongle: 6GF3080-0VS00-1KS0	C	**6GF3080-0VS00-0SW1**
Accessories		
Hardware-Dongles		
Hardware key to enable SIMATIC Visionscape Software on PC without installed Visionscape board or connected HawkEye 1600T intelligent camera		
• USB dongle	A	**6GF3080-0VS00-2KS0**
• Parallel (DB25 feedthrough) dongle	A	**6GF3080-0VS00-1KS0**
Hardware key to enable the Intellifind Object Locator Tool		
• Intellifind USB dongle	A	**6GF3080-0VS00-2KF0**
• Intellifind Parallel (DB25 feedthrough) dongle	A	**6GF3080-0VS00-1KF0**

A: Subject to export regulations: AL = N and ECCN = EAR99H
C: Subject to export regulations: AL = N and ECCN = EAR99S

For lenses and other accessories:
See under "Accessories for image processing systems", page 5/120.

SIMATIC HMI Controls

Overview



- Central operation and monitoring by one or more VS720 intelligent cameras during operation
- Image processing is linked to HMI functions of SIMATIC HMI
- Visualization and saving of live images
- Displaying and saving of inspection results
- Error diagnostics during operation or subsequently
- Operation of the VS720 intelligent cameras in the Industrial Ethernet network

Application

HMI Controls can be used in WinCC flexible, ProTool/Pro and WinCC. After installation, they are available as functions in WinCC flexible, ProTool/Pro and WinCC. Handling corresponds to the familiar HMI functions.

HMI Controls VS720 are suitable for the following SIMATIC HMI platforms:

- ProTool/Pro configuring software Engineering and Runtime on the standard PC
- Scada System WinCC Engineering and Runtime on the standard PC
- WinCC flexible Engineering and Runtime configuring software on the standard PC
- Multipanels:
  - MP270B, display size 10", for touch control
  - MP370, display size 12"/15", for touch control

HMI controls are available for the following VS720 intelligent cameras:

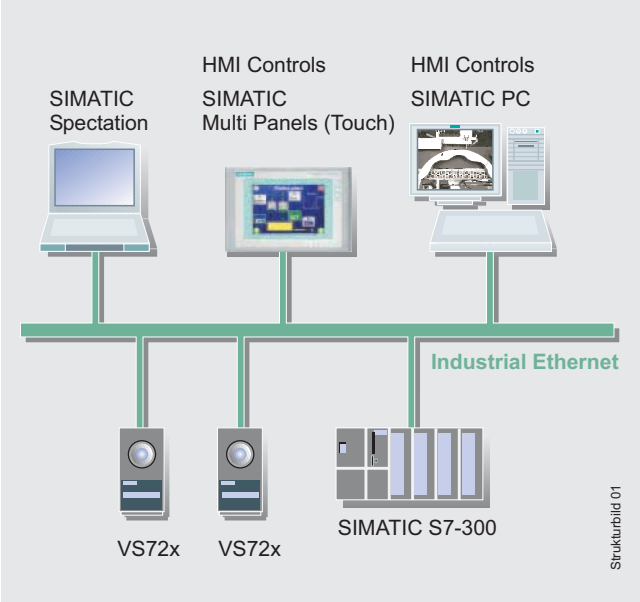
- VS721,
- VS722,
- VS723,
- VS723-S,
- VS723-2,
- VS724,
- VS724-S,
- VS725
- VS725-S

The following image types delivered by VS720 intelligent cameras are supported:

- Monochrome / color images

Resolutions: 640 x 480, 1024 x 768, 1280 x 1024 pixels

Design



The HMI Controls VS720 are an add-on to the HMI tools WinCC flexible, ProTool/Pro and WinCC. They can be installed and linked into an existing WinCC flexible ProTool/Pro / WinCC application and used in the same manner as an HMI function.

They are loaded with the HMI project into the runtime component of WinCC flexible, ProTool/Pro / WinCC and can be used alongside and equivalent to the HMI functions. The HMI Controls VS720 receive their data over Industrial Ethernet by communicating with up to four VS720 intelligent cameras, with reference to one HMI device (standard PC or MPx70).

HMI Controls VS720 include a runtime license that allows them to be integrated onto a target system or HMI device.

Function

Image analysis

- Live image display with criterion selection: Pass, fail, stop on fail, full frame, subimage, setting of transmission mode, image compression and overlay (display of the overlays of the SoftSensors).
- Image storage on PC-based HMI system with the functions: Ring buffer, stop ring buffer on fail, image storage in linear sequence
- Stored images can be viewed offline with the Spectation emulator.

Inspection results

- Easy selection of up to 20 SoftSensor values (parameters, measured values, ...) with Spectation browser function.
- Tabular display of these values with symbolic identification during runtime of the camera by the HMI Controls.
- Archiving of SoftSensor values as a CSV file when a PC-based HMI system is used (e.g. evaluation with the Office application Excel)
- Archiving of the SoftSensor values in a permanent data area (with fixed start and end values) or in a ring buffer.
- Tabular display of archived values with symbolic identification from the archive.

Operating the SoftSensors

- Send commands and control signals to the camera: Start/stop inspection, trigger for activating inspection, initiation of digital relearning for enabled SoftSensors.
- Convenient operation of the camera during runtime: display of the active test program, display of stored test programs, changing the active test program, display and change of exposure time, statistics of the inspection time.

Selection and Ordering data

		Order No.
HMI Controls VS720		
For operation and monitoring with the VS720 intelligent cameras, German/English. For Windows 2000/XP Single runtime license on CD-ROM		
• for ProTool/Pro and WinCC runtime platforms: MP270B/MP370, ProTool/Pro and WinCC on PC	C	**6GF8 007-4AA10-0AA0**
• for WinCC flexible runtime platforms: MP270B/MP370, WinCC flexible on PC	H	**6GF8007-4AA10-0AB0**

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H: Subject to export regulations: AL = N and ECCN = 5D992B1