

VP Link Hardware Interface for Safety Systems

VP Link usually drives simulated process values to an off-line controller using various software mechanisms. However, for safety applications, it may be required to connect directly at the real input / outputs level of the system.

Hence, Cape Software Inc. developed the Hardware Interface Driver, which enables VP Link users to feed real time process feedbacks by driving real, hardwired field signals, using of the shelf I/O modules.

This solution is extensively used by our partners in the Safety Systems industry.

This approach is shown in the illustration below:

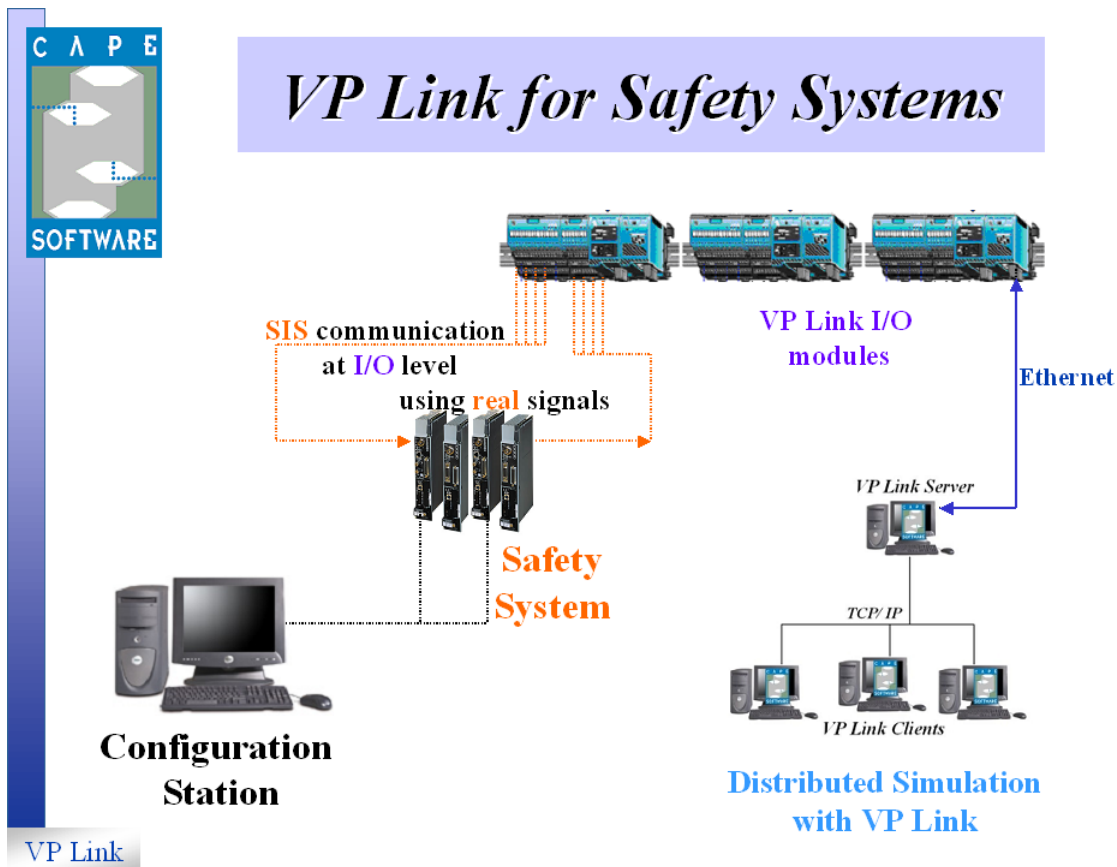


Figure 1: VP Link simulation environment for SIS using I/O interface

As shown in Figure 1, VPLink uses an Ethernet connection to drive the I/O modules. The SIS then reads/ sends real I/O inputs from/to the modules. The flexible server/client architecture allows for multiple users to collaborate and share the simulation.

How does this solution improve my validation procedure?

Higher quality tests...

Our approach is to simulate 100% of the I/O present in your system. We typically use an automated extraction utility that will detect all configured I/O and will generate a VP Link database file that you can directly import in VP Link. Thus, you will have a VP Link tag for each I/O present in your system. Each tag can be manipulated in real time from the graphic client to allow for fully interactive testing. A logging capability is also included in VP Link, to automatically document both testing procedures and control system response.

Practical testing interface...

Various built-in algorithms facilitate real-world testing by automatically calculating process feedbacks, allowing testing personnel to focus on the testing procedures rather on the simulation. In addition, scenarios can be easily configured to reset the Virtual Process to pre-defined states, at the click of a button.

More integrated tests...

By interfacing at the I/O levels, the scope of the test is widened from a pure functional test to a more comprehensive test, which includes all I/O boards, wiring and all associated hardware.

Faster tests = cost effective solution...

All our customers agree that they effectively reduced their testing time simply by replacing their hardware panel by VP Link, its software metaphor. Fully configurable graphic interface, drag and drop configuration and intuitive modeling engine allows for a customized testing environment for every project.

Cross-platform ability...

The I/O driver will provide real time field signals to the boards of any I/O control system, as it generates standard electric stimulations. Thus, its practicality can be leveraged on any project that involves testing a control system at the I/O level. When interfacing at the I/O level is not critical, a VP Link software driver can be used as easily.

Hardware Requirements:

Our hardware interface solution requires mostly Off the Shelf hardware components. In fact, the I/O hardware consists of I/O modules that are connected on a DIN rail to an Ethernet base controller, which VP Link utilizes to read /write values to the connected I/O modules.

Modules are attached to a DIN rail, on a per-project configuration.

I/O Modules:

Five basic I/O modules are used to simulate real inputs using the VP Link hardware interface:

- T1F-16DA-2 to write up to 16 analog inputs to the safety system
- T1F-16AD-1 to read up to 16 analog inputs from the safety system
- T1K-16NA1 to read up to 16 discrete points from the safety system(AC)
- T1K-16ND3 to read up to 16 discrete points from the safety system(DC)
- T1K-16TR to write up to 16 discrete points to the safety system

Up to three din rails may be daisy chained together with expansion cables (part # T1K-10CBL).

Ethernet module:

Each Ethernet base module can control up to 14 I/O modules. The VP Link driver application communicates with each hardware module that is connected to it. If more than 16 I/O modules are required to simulate one SIS, multiple I/O systems (each with an Ethernet module) can be used.

Recommended Ethernet module is:

- T1H-EBC

Power Supplies:

Power supplies requirements are determined by the type and number of I/O modules present on a single DIN rail, as specified in section 3 of the *Automation Direct* manual (T1K-INST-M).

Recommend power supplies modules are:

- T1K-01DC for DC 12/24 VDC
- T1K-01AC for 120/240 VAC

Signal Conditioning Boards:

Cape Software has developed signal conditioning boards for the hardware signals that drive the SIS Analog Input (AI) and Thermocouple (TC) points.

This board is used to simulate true 4-20 mA transmitters' signals to the safety system. The reference for this signal conditioning board is: **TSF-16AI-I**. These boards have to be ordered directly to Cape Software Inc.

This device uses an input buffer amplifier on each channel to preserve accuracy that would otherwise be degraded by input wiring resistance. It can therefore accurately represent signals coming from various types of thermocouples such as J, K, N, R, S, T, B and E

The reference for this signal conditioning board is: **TSF-16TC**. These boards have to be ordered directly to Cape Software Inc.

Software Requirements:

A single VP Link license is required to fully leverage the I/O hardware interface developed by Cape Software Inc. The core application, the VP Link simulation server, is the environment in which the process model executes, based upon changing outputs from the control system. The server will exchange the new process variables to its driver(s) which, in turn, ensure the values are properly written to the I/O modules. Graphic clients connect remotely to the simulation server to provide testing personnel with a highly customizable interface to facilitate forcing/ monitoring simulated field values.

Therefore, the software components required for the VP Link hardware I/O solution are:

- VP Link server license
- VP Link HIO driver
- One (or more) graphic clients

Thanks for your interest in VP Link,