



CATC Universal Protocol Analyzer System
Expert Protocol Analysis

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OVERVIEW

In today's digital economy, consumers – individuals and businesses alike – have a voracious appetite for digital information. To meet this growing demand, manufacturers of digital devices such as personal computers, consumer electronics, cellular phones and personal digital assistants must design products that can communicate with one another.

To make sure that all (and only) the information transmitted arrives at its destination in a timely manner, these devices communicate using special languages called protocols. A communication protocol is a set of detailed rules that govern the behavior of networks of devices connected through copper wire, fiber optic cables or wireless technologies.

Nowadays, to keep pace with market demand for instantaneous information delivery, electronic devices must communicate at an ever-increasing speed, with exceedingly stringent security and quality of service requirements placed on the network.

Communication requirements differ across environments – at home, office, factory floor, public areas and outdoors – and vary by the types of information transmitted: voice, data, or video. They further depend on the distance between parties, physical obstacles and terrains, and other factors.

These multiple environments and communication needs have resulted in a variety of devices with increasing complexity and have led to the evolution of new, increasingly diverse and complex connectivity protocols such as USB, Bluetooth, IEEE1394 (Firewire), PCI Express, SCSI, Serial Attached SCSI (SAS), Serial ATA, Fibre Channel and InfiniBand.

For engineers and technicians developing and deploying these devices, testing and analyzing such protocols is now more important than ever. This allows developers to verify the proper operation and compliance of the devices with the various communication standards. Protocol testing and analysis is done through the use of sophisticated hardware/software products commonly called “Protocol Analyzers”.

Until recently, protocol analyzers have been designed and developed for each specific communication standard. Designing each new protocol analyzer from scratch was an inefficient process, often arduous, expensive, and prone to bugs.

In 2001, leveraging its extensive expertise in communication protocols, CATC attained a conceptual breakthrough in protocol analyzer architecture and launched the **Universal Protocol Analyzer System™ (UPAS™)** - a new and powerful modular system designed to support multiple protocols. UPAS is a general protocol analysis, test and verification system that is customized by plugging different protocol-specific modules into the base unit.

The benefit to the customer is immediate: for any current protocol, the customer gets a stable, upgradeable and more capable platform. Because the UPAS platform can be leveraged across protocols, modules for emerging protocols can be designed and made available to the market in a shorter time – thus improving end-user productivity and time-to-market. The elegant UPAS platform was an instant success. The modular hardware and software architecture is now utilized for a variety of wired and wireless communications protocols.

The following sections list the multiple features and benefits of CATC's Universal Protocol Analyzer System.

WHY UPAS?

Debuted in January 2001, UPAS was the world's first true **Universal** Protocol Analyzer System – a new architecture for fast, efficient and accurate analysis, test and verification of serial communication protocols. In its fourth generation today, it is still the leading product of its kind in terms of usability, scalability, and versatility. The UPAS platform leverages CATC's extensive expertise in communication protocols and its proprietary **BusEngine™** protocol processor technology. The revolutionary BusEngine core incorporates a real-time recording engine, sophisticated triggering and filtering logic, and configurable tools to effectively monitor data traffic.

The Universal Protocol Analyzer System includes a base unit, variety of plug-in modules supporting multiple protocols, and the popular and intuitive **CATC Trace™** expert analysis software. For more information on the CATC Trace software, please view the CATC Trace White Paper http://www.catc.com/support/white_papers/index.html.

At present, CATC offers two versions of the UPAS platform – the UPAS 2500H model, and the state-of-art UPAS 10000 model. These models' specifications are provided below.

Here is how UPAS works:

- The “Tracer”, or analyzer, module (plugged into the left bay) serves as a physical probe to unobtrusively observe and capture bus and protocol traffic. The module passes the captured data to the UPAS **BusEngine** protocol processor for initial real-time analysis, triggering and filtering. Selected data is then recorded in the high-speed UPAS memory. Once a recording session is completed, the recorded data is uploaded from the UPAS memory via a high-speed USB port to a host PC for further analysis by the **CATC Trace** software.
- A second module, termed “Trainer” or “Generator” (plugged into the right bay), generates both legal and illegal protocol traffic, assisting engineers in exercising their new designs, resulting in increased quality and interoperability of their new products.



What makes the UPAS offering so attractive? Consider this:

1. A modular design with many possible extensions:
 - a. CATC already offers modules for seven different serial communication protocols - Bluetooth, Fibre Channel, InfiniBand, PCI Express, Serial ATA, Serial Attached SCSI (SAS) and USB - with additional ones under development.
2. A lower Total Cost of Ownership (TCO):
 - a. The no-hassle module plug-in and straightforward BusEngine field upgrade mechanism gives you the ability to add or upgrade the different modules when – and only when – you need them. The bottom-line implication is clear: you have greater control over your budget, and can maintain a lower TCO – *spend only when you need to, and spend less when you do.*
 - b. The reliable and stable, “battle-tested” platform means minimal, if any, downtime.
3. A higher Return on Investment (ROI):
 - a. Whether your group works with several generations of the same protocol or with multiple protocols – there is no need to purchase an expensive new analyzer for each one of them. Simply get the right plug-in, swap, install the control software if needed, and you are ready to go!
 - b. The rapid R&D cycle of plug-in Tracer/Trainer modules for new protocols means earlier availability in the marketplace and shorter time-to-market for your product – ahead of your competition. The plug-in module you need, will be there when you need it!
 - c. The dual Tracer/Trainer capability allows you to capture and then replay problematic data streams, without the need to randomly generate data streams ad nauseum until the specific problem is re-created, if ever, thus saving you crucial development time.
4. Strong capabilities – more memory, faster bus, easy connectivity:
 - a. Up to 2 GBytes of recording memory to capture protocol data, timing and control information. This high capacity allows for the capture of long recording sessions for in-depth analysis and problem solving.
 - b. Taps non-intrusively between ports communicating at full-duplex speeds of up to 10Gbit/sec.
 - c. A Breakout board installed at the back of the UPAS base provides a user-friendly means to interface with external instrumentation such as oscilloscopes and logic analyzers via a simple DB-25 connector. This connection allows you to analyze the same trace at various levels via multiple test instruments, this by sending and receiving signals, triggering on external events, and correlating protocol and signal behavior.
5. A selection of UPAS models to choose from that meet your budget constraints:
 - a. From UPAS 2500H to the latest UPAS 10000 platform

Last but not least: UPAS is backed by CATC’s venerable reputation for product quality, reliability and durability and excellent customer support.

UPAS SPECIFICATIONS

Package

Dimensions:

UPAS: 12.2 x 12.2 x 3.5 Inches

(31.1 x 31.1 x 8.9 cm)

Plug-in: 4.5 x 6.7 x 1.3 Inches

(11.3 x 17.0 x 3.2 cm)

Connectors:

UPAS AC power connection

External trigger connection

(TRIG IN/OUT, BNC)

PC Connection (USB1.1 and USB2.0,
type "B")

Breakout board with DB-25 Connector

Weight:

UPAS 2500H: 7.5 lbs (3.4 kg)

UPAS 10000: 9.5 lbs (4.3 kg)

Plug-ins range in weight from 0.5 to 1 lb.

Power Requirements

90-254 VAC, 47-63 Hz (Universal Input)

UPAS 2500H: 100W maximum

UPAS 10000: 165W maximum

Environmental Conditions

Operating Range:

UPAS 2500H: 0 to 55° C (32 to 131° F)

UPAS 10000: 0 to 40° C (32 to 104° F)

Storage Range:

-20 to 80° C (-4 to 176° F)

Humidity:

10 to 90% non-condensing

Recording Memory Size

UPAS 2500H: 512 MBytes

UPAS 10000: 2 GBytes

Indicators (LEDs)

Power (PWR): Illuminated when the analyzer is powered on

Status (STATUS): Illuminated when the Tracer is functioning properly

Recording (REC): Illuminated when the Tracer is actively recording traffic data

Triggered (TRG): Illuminated during power-on testing and when the Tracer has detected a valid trigger condition

Uploading (UPLD): Illuminated when UPAS is uploading its recording memory to the Host PC for displaying the CATC Trace

Protocols Currently Analyzed

UPAS 2500H: Bluetooth, InfiniBand, PCI Express, Serial ATA, USB

UPAS 10000: Fibre Channel, InfiniBand, PCI Express, Serial ATA, Serial Attached SCSI (SAS)

Host PC Requirements

Operating System:

Windows 98SE, Windows2000,

Windows ME, Windows XP

USB 1.1 or 2.0 enabled

(Hi-speed USB 2.0 recommended)

SUMMARY

To keep pace with market demand for instantaneous information delivery, electronic devices communicate at an ever-increasing speed, with exceedingly stringent security and quality of service requirements placed on the networks via which they communicate.

Communication and connectivity protocols, which are becoming increasingly diverse and complex, were defined to make sure that all devices communicate properly with one another.

Testing and analyzing such protocols is now a crucial step in the development of electronic devices. It allows engineers to verify the proper operation and compliance of the devices with the various communication standards.

Protocol testing and analysis is done through the use of hardware/software products commonly called "Protocol Analyzers". Modular protocol analyzers are emerging as the architecture of choice for these sophisticated solutions.

The elegant UPAS is a leader among this new generation of protocol analyzers, and is a win-win proposition for both CATC and its customers. The UPAS allows CATC to quickly support additional technologies. And it enables CATC's customers to improve their productivity by allowing them to move quickly from protocol to protocol, removing the overhead associated with learning new tools and thereby accelerating new product introductions.

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