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CATC USB *Tracer Trainer*™

Now Featuring Hi-Speed USB Interface

USB Bus and Protocol Analyzer System

CATC's USBTracer Trainer is a bus and protocol analyzer that accurately and efficiently debugs, tests and verifies USB semiconductors, devices, and systems. It's Hi-Speed USB host interface speeds upload transfers as much as 40x faster and Native OTG support automatically detects, decodes, and displays HNP, SRP and OTG VBus pulsing. USBTracer Trainer also employs an Intelliframe mode in traffic generation to actively search for a response from the device under test and issue the next appropriate packets, thus enabling "intelligent" framing.

Featuring the CATC Trace graphical user interface, USBTracer Trainer is the de-facto standard for documenting the USB protocol. It simplifies the overall debug process by using collapsible, color-coded schemes to represent the USB Packet, Transfer and Transaction layers. The USBTracer Trainer builds upon CATC's experience and knowledge of the needs of the USB development and test communities. The result is a USB bus and protocol analyzer with unprecedented functionality, unparalleled flexibility, and uncompromising user friendliness.



FEATURES	BENEFITS
• CATC Trace display	De-facto industry standard speeds up interpretation and debug of USB traffic
• Hi-Speed USB Host Interface	Upload Trace files to the host PC up to 40x faster
• Native OTG Support	Record and analyze HNP and SRP occurrences while also capturing VBus pulsing
• Trace Navigator	Define areas of interest and "shrink" viewable Trace to areas of most importance
• Advanced Triggering	Isolate important traffic, specific errors or data patterns including Chirps, Full Speeds J & K
• Hardware Filtering	Faster analysis by removing non essential fields from the trace
• Intelligent Reporting	Quickly identify and track error rates, abnormal bus or timing conditions
• Sophisticated Viewing	View Packet, Transaction and Transfer layers of the USB protocol
• Dual Recording Channels	Simultaneously record any of the three USB speeds (1.5Mbps, 12Mbps, 480Mbps) on each of the two channels
• Real-Time Statistics	View bus traffic in a graphical or tabular display as it occurs even if a Trace is not being recorded
• Modular Design	Expandable with purchase of additional plugins
• 512 MByte recording capacity	Capture long time windows for analysis and problem solving
• Downloadable trace viewer software	Share and annotate trace recordings within a development team
• Automation Control	Allows users to write proprietary programs and remotely control the CATC Trace

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CATC

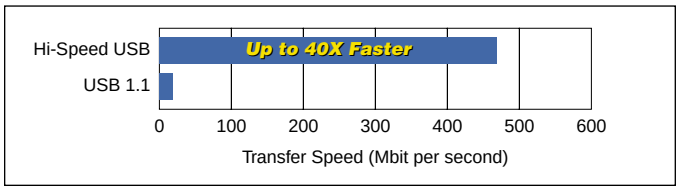
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USBTracer Trainer Analyzer Hardware

The USB*Tracer Trainer* is a set of plug-in modules that install into the CATC Universal Protocol Analyzer System (UPAS) 2500H. Developers can use the UPAS platform as a general protocol analysis, test and verification system by plugging different protocol-specific modules into the chassis.

USB*Tracer Trainer* now features a Hi-Speed USB port for uploading USB traffic to the host PC. This provides dramatically faster workflow by transferring recorded data at up to 480Mbit per second. Software running on the PC is used to control the analyzer's recording options via the same USB port.

The USB*Tracer* Analyzer uses hardware triggering to capture real-time events and hardware filtering to preserve memory and pinpoint data of interest. Additionally, with its comprehensive error detection and analysis, users are ensured to catch protocol error violations.



USB*Trainer* is a USB Traffic Generator module capable of producing low, full or high-speed traffic and combined root port USB message packets. It serves as a flexible USB host for USB devices, hubs and silicon, and operates in both single-burst and continuous transmission modes.

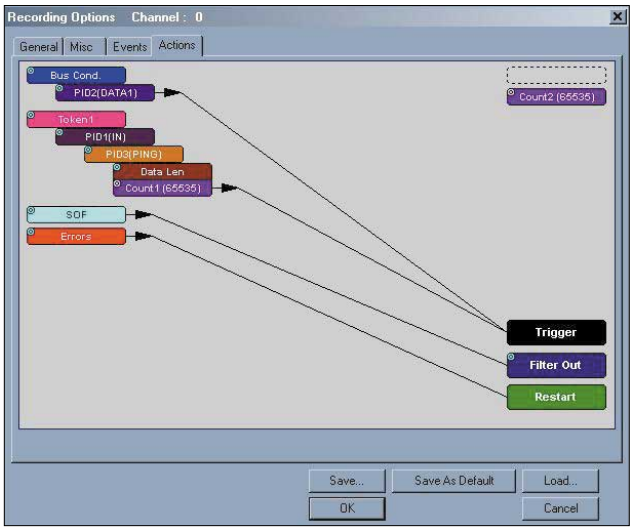
The heart of the new USB*Tracer Trainer* Analyzer System is the revolutionary CATC BusEngine™. This state-of-the-art technology core incorporates a real-time recording engine and configurable tools to effectively monitor USB traffic. All BusEngine logic is fully field-upgradeable.

Event Triggering

For efficient development of USB systems, it is critical that users are able to extract important information from a crowded stream of bus traffic, and accurately identify and selectively record information that is of most interest. The Events and Action fields for trigger set-up is intuitive and graphical, thus making pre-recording set-up time efficient.

USB*Tracer Trainer* provides real-time hardware triggering on the critical components of USB. Users can customer configure and control order of events selected for triggering. The count and sequence options define the rules for data recording sessions. There are two Counters, Filter Out/In and a Restart option that causes sequencing and counting to start again. Any sequence can include up to 7 events of any type.

Users can adjust the depth of the recording memory – up to 512 Mbytes – and determine where in the recording the trigger is located.



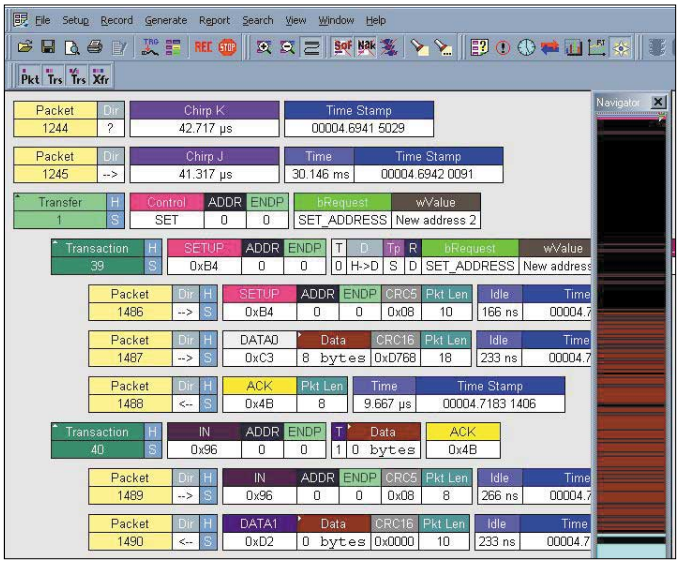
Construct seven levels of sequential trigger events

The CATC Trace™

USB*Tracer Trainer* leverages the CATC Trace display system, which trains the eye to understand more information faster. The CATC Trace uses colors and graphics to represent trace elements in the context of the USB protocol. Sequences are shown on separate rows with every field labeled and color coded. Errors are identified and highlighted in red.

The command level can be expanded and collapsed to the three layers of the USB protocol: Packet, Transaction and Transfer layers. For more efficient and deeper analysis, users can view Block Transfers at each layer, view raw data bits and real-time bus utilization.

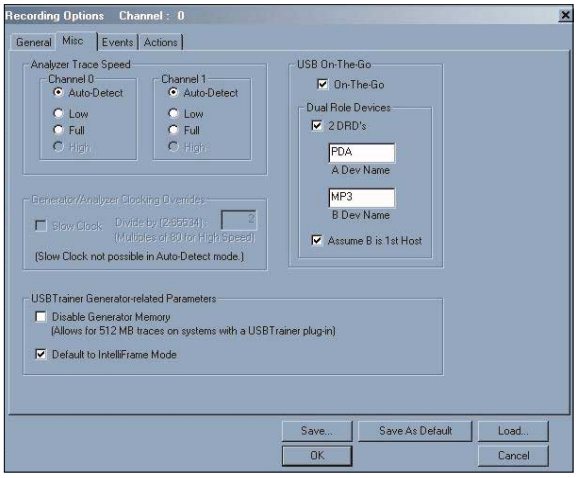
The CATC Trace detects and alerts the user to every potential violation at all levels of the protocol layering, from running disparity to the proper sequencing of the handshaking. The proper formation of each command is checked for validity and compliance to the specification, including the recalculation and checking of CRCs. It also supports vendor specific and user-defined decoding to ease USB development for developers looking to implement proprietary commands.



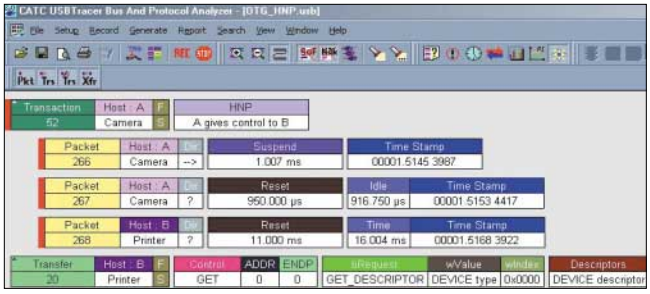
The CATC Trace uses collapsible headers to simplify USB development.

On The Go Support

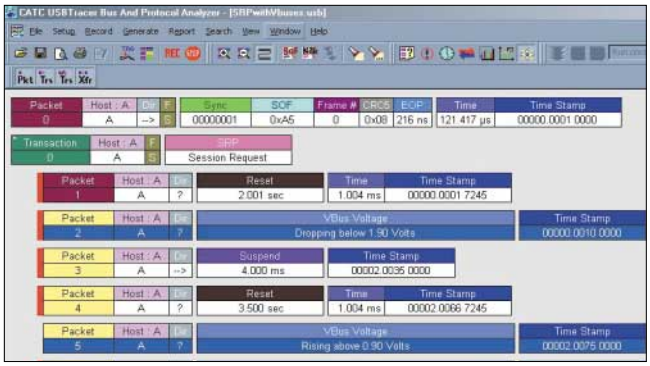
The USB*Tracer Trainer* supports the OTG (On-The-Go) specification that allows a product to be both host and peripheral (device) and be able to switch roles on command. The analyzer identifies both the HNP(Host Negotiation Protocol) and SRP (Session Request Protocol) occurrences, searches for Host A or B, and identifies timing anomalies during HNP and SRP protocols.



The USB*Tracer* enables friendly naming of A & B devices to serve as host ID distinction to differentiate re-used address and endpoints in a dual role device environment.



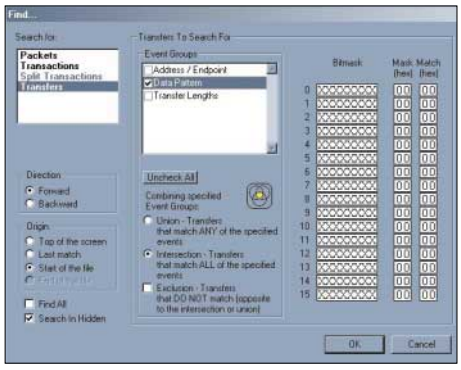
An HNP session is a period in which devices exchange data and a new session has been defined, where host/ peripheral duties have been exchanged.



The CATC Trace captures, records and analyzes OTG VBus pulsing during SRP occurrences.

Powerful Search Tools

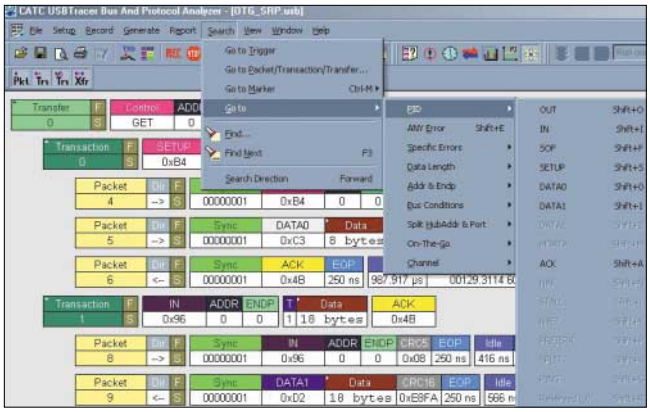
The CATC Trace's ability to extract critical information quickly and intuitively from a crowded stream of bus traffic is unparalleled.



Isolate specific packets in a large trace file through the CATC Trace's Find function.

Accurately identify and isolate very specific packets is valuable to the users and is vital to speeding debug and development time.

Powerful Search and Find options allow users to quickly get to specific packets, errors and any data type within a trace file. With filter and hide commands, the CATC Trace removes irrelevant data from the Trace for efficient viewing.



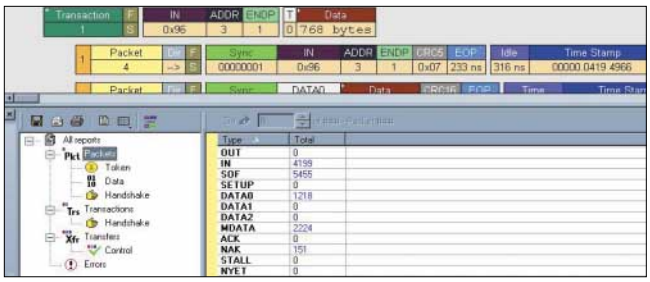
Find critical information fast with CATC Trace's QuickSearch

Reporting and Statistics

USB*Tracer Trainer* provides many mechanisms to measure and report on USB traffic.

The CATC Trace's Traffic Summary function reports throughput, timing, error rates and other statistical data on any traces. For example, using the Bandwidth calculator, a user is able to select any two points in a Trace at Packet, Transfer or Transaction layer, and automatically calculate the time difference between the data points.

Using the Traffic Summary window, users can evaluate statistical reports at a glance or navigate to individual fields. A user may select Tokens, Data or Handshake at the Packet level, Handshakes at the Transaction level, and Control at the Transfer level. Pinpoint the specific packet location with a single keystroke. Error searches are also included in the summary report.



USB*Tracer* provides valuable traffic summary information for elements of all views

USBTracer and USBTrainer Specifications

Package

Dimensions:

UPAS	12.2 x 12.2 x 3.5 inches (31.1 x 31.1 x 8.9cm)
USB*Tracer* & USB*Trainer* Plug-ins	4.5 x 6.7 x 1.3 inches (each) (11.3 x 17.0 x 3.2 cm)

Connectors:

UPAS	AC power connection External Trigger connection (TRIG IN/OUT, BNC) Host connection (USB, type "B") USB connection (USB, type "A")
USB*Tracer* Plug-in	Dual Recording Channels (USB, types "A" and "B")
USB*Trainer* Plug-in	Dual Generating Channels (USB, type "A")

Weight:

UPAS	7.5 lb. (3.4 kg)
USBT*racer* & USB*Trainer* Plug-ins	1.0 lb. (0.5 kg) each

Power Requirements

90-254 VAC, 47-63 Hz (universal input), 100W maximum

Environmental Conditions

Operating Range:	0 to 55° C (32 to 131° F)
Storage Range:	-20 to 80° C (-4 to 176° F)
Humidity	10 to 90% non-condensing

Probing Characteristics

USB*Tracer* Module Connection	USB "A" and "B" receptacles Standard cables
USB*Trainer* Module Connection	USB "A" receptacles Standard cables

Switches

Power:	On/Off
USB*Tracer* Manual Trigger	When pressed, forces trigger event
USB*Trainer* Start/ Stop	When pressed, initiates or terminates traffic generation

Indicators (LEDs)

UPAS

Power (PWR)	Illuminated when the UPAS is powered on
Status (STATUS)	Illuminated when the analyzer is functioning properly

USB*Tracer* Module

Recording (REC)	Illuminated when the analyzer is actively recording data
Triggered (TRG)	Illuminated during power-on testing and when the analyzer has detected a valid trigger condition
Uploading (UPLD)	Illuminated when the analyzer is uploading its recording memory to the Host PC for displaying the CATC Trace

USB*Trainer* Module

High Speed (H.S.)	Illuminated when the generator is generating high-speed traffic
Classic Speed (Classic)	Illuminated when the generator is generating low-speed or full-speed traffic
Intelliframe (Intelliframe)	Illuminated when the generator is operating in Intelliframe mode

Generating Memory Size

USB*Tracer*	512 Mbytes for trace capturing, timing and control information
USB*Trainer*	256 Mbytes for trace traffic pattern buffering

Host Compatibility

Works with any PC equipped with a functioning USB port and running Microsoft Windows 98/98SE, Windows 2000, Windows Me and Windows XP operating systems

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