

# P3

## VF/DSL CABLE QUALIFIER

### CableSHARK P3

NETWORK TESTING



The Fast Way to  
Locate & Repair Faults  
in the Local Loop

Consultronics Products Group

[www.EXFO.com](http://www.EXFO.com)

Telecommunications Test and Measurement

# EXFO

EXPERTISE REACHING OUT

# Introducing the Enhanced CableSHARK P3™

## Get Your Customers On-Line - Fast!

Whether you've been rolling out DSL services for years or you are just getting started, you will find the CableSHARK P3 absolutely vital in getting the job done right. Many local loops support DSL with no trouble at all but when they don't, it's time to bring out the CableSHARK P3 to hunt down and eliminate loop problems. What's more the CableSHARK P3 has a complete suite of Voice Frequency (VF) subscriber line tests making it the only analyzer you need.

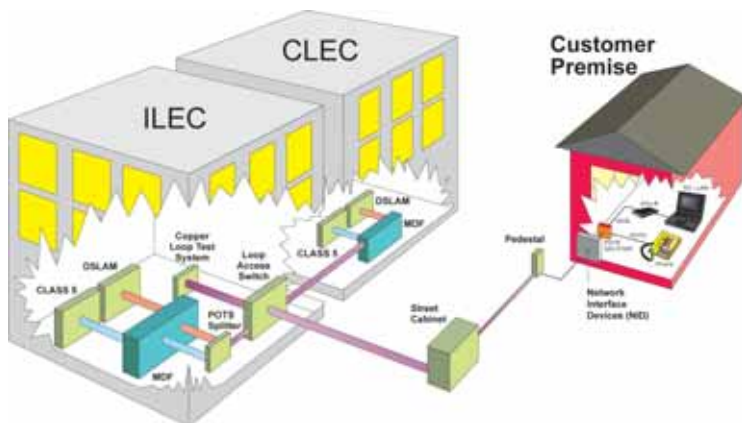
## Take a Bite out of Loop Problems with the CableSHARK P3

Consultronics has been providing test equipment to the DSL industry from day one. That's why the CableSHARK P3 includes every broadband measurement needed to qualify and troubleshoot the local loop for DSL applications. With the CableSHARK P3, broadband isn't an afterthought, an option, or a factory add-on, it is the main application.



## Excellent for All Local Loop Access Testing

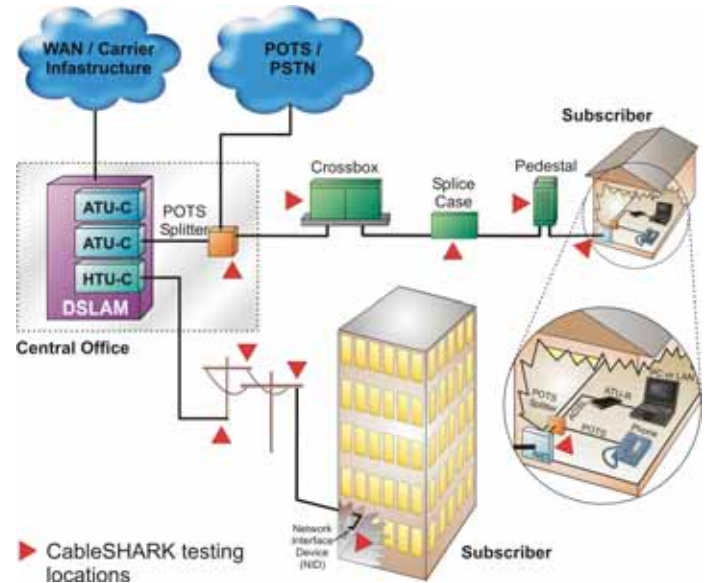
With the CableSHARK P3's 6 MHz bandwidth, it can test a local loop for just about any service it will carry. It's great for ADSL2+, ADSL2, ADSL, G.Lite, VDSL, G.SHDSL, HDSL, HDSL2, T1, DDS, PRI ISDN, and BRI ISDN. Service-specific auto-tests, reference cursors, specific noise filters and specialized loop evaluation algorithms make loop qualification simple.



Test from CO to Subscriber

## A Must for DSL Service Providers (Telcos) and Contractors

Cable maintenance technicians and cable splicers agree; the CableSHARK P3 is the ideal local-loop troubleshooting tool. Telco and contractor personnel use them every day to identify the reason why a DSL and/or VF circuit didn't succeed. Cable repair crews use them to precisely locate and eliminate loop faults. Management loves them because they eliminate the guesswork in hunting down loop faults that might otherwise tie up valuable staff and company resources.



Verify Points Along Your Network with Ease

## Get Ready for Video Over Copper

For many telco's the roll out of ADSL has gone quite smoothly. Preparing the loop plant for video over copper services is another story. The CableSHARK P3 determines the DSL rates that a loop will support. If the rates are too low to support video services, the CableSHARK P3 will allow the technician to know if repairs can bring the loop up to spec. It even confirms the new DSL rates as repairs are made.

## 26 Measurements

### A Complete Suite of Measurements

The CableSHARK P3 is the one tool that cable repair crews need. It combines these 26 measurements in one test set:

- A.C. Voltage (T-R, T-G, R-G)
- D.C. Voltage (T-R, T-G, R-G)
- Loop Capacitance as well as T-G, R-G Capacitance
- Shorts Meter
- Loop Resistance as well as T-G, R-G Resistance
- Opens Meter
- Loop Current Measurement
- Stress/Leakage testing with Programmable Soak Time
- Single-Ended Insertion Loss Measurement/Frequency Response to 6 MHz
- Single-Ended DMT Rate Prediction for full-rate ADSL, ADSL2, ADSL2+, & G.Lite
- ADSL Auto-Testing with Pass/Fail indication and user modifiable thresholds
- Single-Ended SHDSL Rate Prediction for G.SHDSL
- G.SHDSL Auto-Testing with Pass/Fail indication and user modifiable thresholds
- Power Spectral Density (PSD) Noise with Spectrum Analysis to 6 MHz
- Spectral Detective - Live circuit Spectrum Analysis (with IEEE 743-1995 E, F & G filters)
- Noise - Metallic (NM) and Power Influence (PI) Measurements with various Filters
- Impulse noise - Voice Frequency & High Speed Wideband
- Power Influence - Harmonic Analysis (50 Hz / 60 Hz to 9th harmonic)
- Fully automatic graphical and numeric Time Domain Reflectometer (TDR)
- Manual mode graphical and numeric TDR
- 4-wire graphical and numeric TDR
- Graphical Bridge Tap Detection and Locating
- Load Coil Detection
- Swept Frequency Longitudinal Balance Measurement with graphic display
- VF Longitudinal Balance
- 2-Wire "Live" Crosstalk Measurement with Automatic Disturber Identification
- 4-Wire Crosstalk Measurement (pair to pair using a high power Swept Tone Insertion)
- Ground Resistance (Station Ground) for CO ground suitability
- Resistance Fault Location (RFL)
- K-Test
- End-to-End DMT Rate Prediction for full-rate ADSL and G.Lite
- End-to-End Insertion Loss/Frequency Response
- Full-Featured VF Testing Suite
- Voice Frequency (VF) Auto testing with Pass/Fail indication and user modifiable thresholds
- FDR

**CableSHARK P3 comes with an impressive list of standard features:**

- Internal rechargeable NiMH battery
- High-Resolution Graphic 640 x 480 (VGA) Pixel LCD Display with Backlight (colour display optional)
- Additional storage of results to USB memory (optional accessory)
- Free of charge lifetime software updates using the RS232C serial interface, USB interface or Ethernet Interface
- Easy to use Graphical User Interface (GUI) - simplifies testing
- Remote control via RS232C or Ethernet using PC

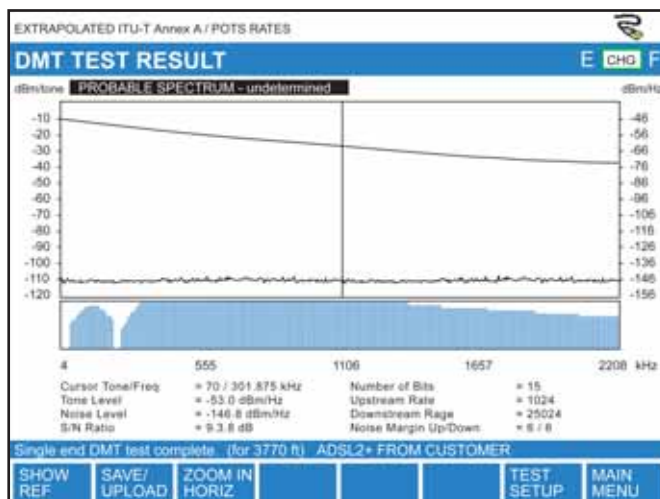
# Qualify the Local Loop for DSL & Predict Maximum Achievable Bit Rates

## Full Testing: Single-Ended with No Responder

Consultronics has done it! The CableSHARK P3 can fully test a loop without a responder or second test set at the other end. It's truly a one-person Single Ended Line Test (SELT) analyzer. All that is required is an open circuit at the far end. In just a few seconds, the CableSHARK P3 sends out hundreds of test tones to "probe" the loop. It then measures the noise and the crosstalk caused by disturbers in the bundle using its built-in FFT analyzer. The results of these tests and others are combined to not only determine the insertion loss of the loop, but also the upstream and downstream DSL rates that the loop can support. Consultronics has a Patent on Double-ended "Discrete Multitone Modulation" (DMT) rate prediction and a Patent pending for Single-ended "Discrete Multitone Modulation" (DMT) rate prediction.

## ADSL2+/ADSL2/ADSL Data Rate Prediction

Service Providers that are rolling out ADSL2+ services will really enjoy the CableSHARK P3's DMT Test for ADSL2+ Data Rate Prediction. This "modemless" test uses the exact frequencies of DMT carriers to measure the insertion loss, noise, and the number of bits that can be carried per bin in order to determine the maximum achievable bit rates a local loop can support. The DMT test is modem independent and is offered in End-to-End (Patented) and Single-Ended (Patent-Pending) test configurations. The CableSHARK P3's DMT test can ensure that the cable plant is ready for ADSL2+ or just ADSL.



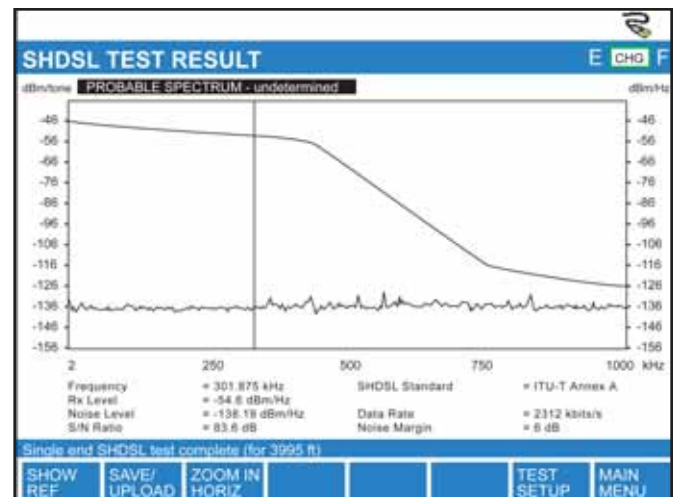
ADSL2+ Data Rate Prediction

## ADSL2+ Auto-Test with Pass/Fail Indication

This convenient single-ended test quickly evaluates a cable to determine whether or not it is acceptable for ADSL2+ services based on predefined Pass/Fail criteria. The ADSL Auto-Test performs a DMM test, Longitudinal Balance, Load Coil test, Capacitive Imbalance, DMT test, and a TDR test.

## Automatic DSLAM / Modem Detection & Test

If the CableSHARK P3 detects a DSLAM or modem at the other end of the line, it informs the technician that they are present and uses the signals of these devices to make an end-to-end test. If there is no equipment at the other end, the CableSHARK P3 performs its automatic single ended test. Either way the technician gets the test results they seek. Unlike other test sets that claim to have this feature, the CableSHARK P3 gives an accurate prediction of the exact rates of the upstream and downstream channels, not just a rough "range" of rates.



SHDSL Data Rate Prediction

## SHDSL Data Rate Prediction

SHDSL is symmetrical - offering 2.3 Mbps over 2 wires in both directions. The CableSHARK P3 offers an automatic single ended test that predicts the SHDSL rate that can be supported on the loop being tested.

## SHDSL Auto-Test with Pass/Fail Indication

The SHDSL Auto-Test will perform a DMM test, Longitudinal Balance, Load Coil test, Capacitive Imbalance, SHDSL Bit Rate test, and a TDR test. In moments, the CableSHARK's SHDSL Auto test evaluates a cable to determine if it is acceptable for SHDSL based on pre-defined Pass/Fail criteria.

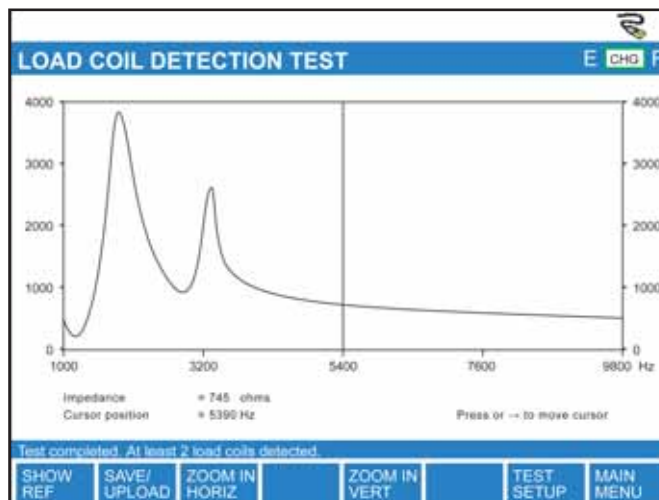


# Locate Load Coils, Bridge Taps and Faults with Our Best-in-Class TDR

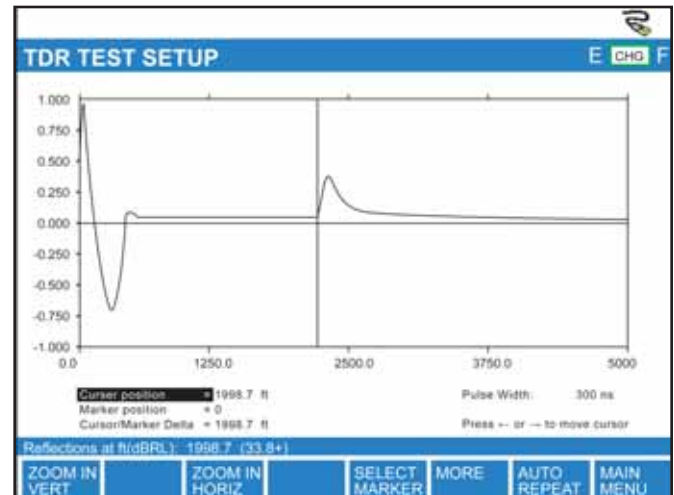
The CableSHARK P3 has a full-featured, automatic, high-resolution graphical TDR built-in that easily locates opens, shorts, bridge taps, splices, bridge taps and loop faults. Unlike other DSL loop qualification test sets, the CableSHARK P3's TDR is comparable to the best TDRs on the market. It automatically determines the length of the loop being tested, automatically places a moveable cursor at that point, and indicates the number of, and distance to each fault. How good is the CableSHARK TDR? Techs have been able to "see" the end of loops with the CableSHARK P3 that their traditional TDRs simply couldn't find.

## Eliminate or Replace Load Coils

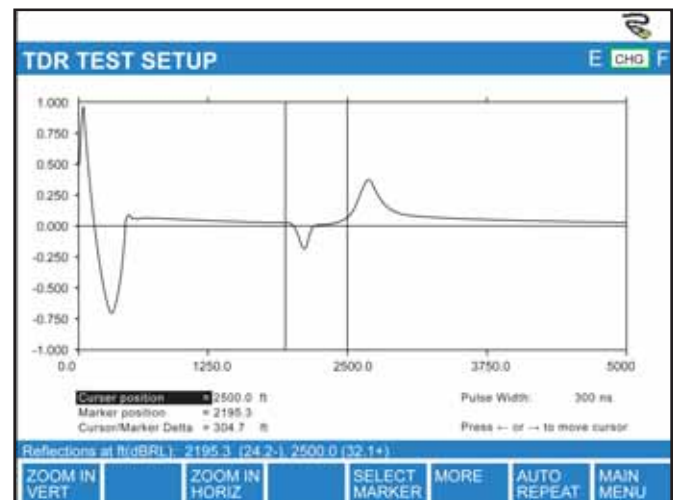
Load coils were applied to long loops in order to flatten the frequency response of cable in the voice band. Unfortunately, legacy load coils kill the high frequencies of DSL signals. From one end of the loop, the CableSHARK P3's Load Coil Detection Test not only identifies the presence of load coils, but also automatically indicates how many are in the local loop. Field tests have proven that the CableSHARK P3 can locate load coils that other test sets miss. Should the Load Coil Detection Test indicate the presence of Load Coil(s), the powerful TDR Test can be used to locate the coil(s) with astounding accuracy. Once load coils are located they can be removed or replaced with modern coils that pass DSL frequencies.



*Easily Detect the Number of Load Coils Deployed*



*Best TDR in the Industry*



*Detect the Distance to the BT and the Length of the BT*

## Locate and Determine the Location, and Length of Bridge Taps

Bridge taps, laterals and end sections degrade DSL performance due to interference caused by reflections from the end of the tap. The reflected signals are both attenuated and delayed in time. In addition, bridge taps add capacitance to the loop. The shorter the bridge tap and the closer it is to either DSL Modem or DSLAM (CO or CPE), the more detrimental it is to the service.

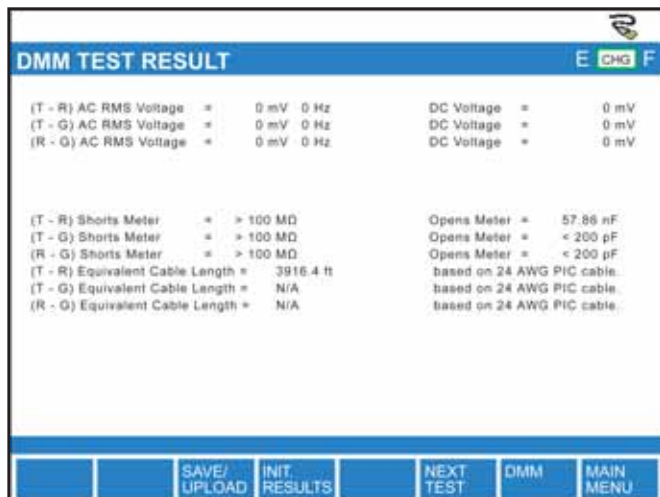
As the outside plant has evolved, cable splices and cable-pair swaps, combined with poor documentation, have made locating and removing bridge taps time-consuming and costly - until now. The CableSHARK P3 is an invaluable tool for determining the existence of, location, and length of bridge taps. Your technicians will appreciate the flexibility of the Manual-TDR Test and the convenience of the Auto-TDR Test to locate bridge taps quickly.

## Find Opens & Shorts

The CableSHARK P3 has an “Opens” and “Shorts” meter to locate these problematic faults. In addition the CableSHARK P3’s powerful TDR is even more accurate for pinpointing faults.

A short arises when the sheath insulating two conductors is damaged, allowing the two wires to come into contact with each other. Sheath damage may occur from wear, improper splicing, or improper digging. When a TDR Test is performed, the almost zero-impedance presented by the short does not dissipate the energy or the TDR pulse. The original pulse will be reflected back with the same amplitude, but with opposite polarity.

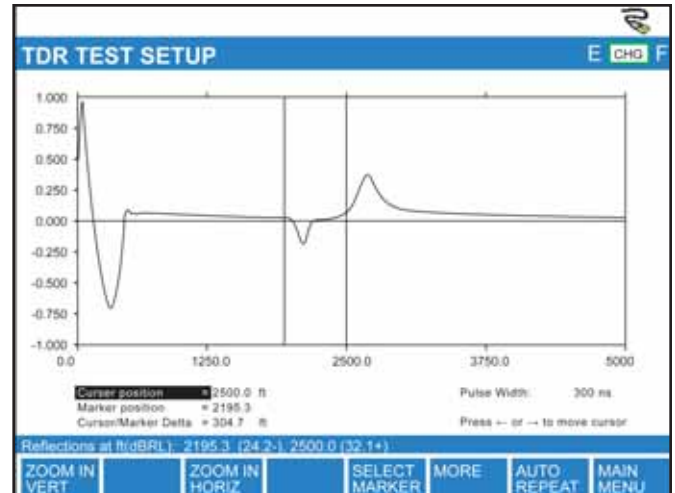
Opens, or breaks in the cable pair are often caused by careless or unauthorized digging. The TDR pulse is not dissipated by a terminating impedance, as an open presents an almost infinite impedance. Therefore, the pulse is reflected back to the source. A reflected pulse having the same amplitude and polarity as the original pulse is indicative of an open, as shown in figure.



Easy to Use DMM

## Uncover Elusive Pair-to-Pair Faults with the CableSHARK P3’s 4-Wire TDR

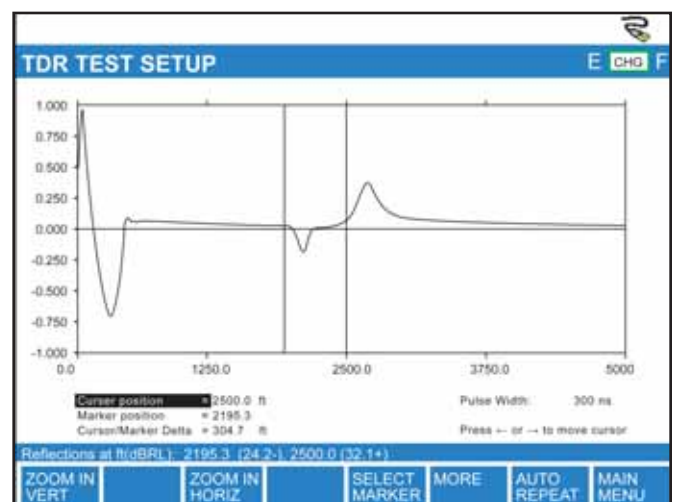
When cable bundles are damaged, often the problem is not a true break in the cable but is a short or partial short between pairs. Locating and repairing pair-to-pair faults is simplified with the new 4-Wire TDR functionality of the CableSHARK P3. A pulse is sent out on one pair while the reflection is sought on another. Like all TDR measurements, the distance to the fault(s) are clearly indicated both graphically and numerically.



4 Wire TDR Test Result

## Auto-TDR Testing Makes it Easy

The CableSHARK P3’s convenient Auto-TDR Test makes it easy to detect the Cable End or Bridge Taps. With Auto-TDR Testing, your technicians needn’t be concerned about what the correct pulse width should be, or even graph scaling. CableSHARK P3 will automatically calculate the best pulse width and pulse shape to use, based on the line conditions. Once the Auto-TDR Test finds any valid reflection, (up to four reflections), the CableSHARK P3 will place the cursor at the reflection corresponding to the end of the cable. CableSHARK P3’s TDR is the easiest, most powerful TDR available.



The CableSHARK P3 Finds Faults that Other TDR’s Cannot

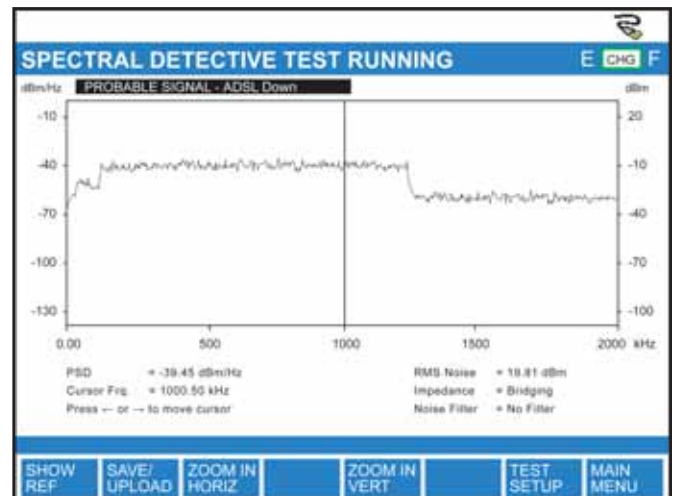
# Manage Unbundled & Shared Local Loops

## Spectrum Management

Your company does everything correctly. You deploy spectrally compatible DSL technologies in your cable bundles. You set all the levels correctly. You provision tens, perhaps even hundreds of thousands of new circuits, only to find out that a competitor is taking down your service levels wherever they deploy. Now you can rely on the CableSHARK P3's Spectral Detective feature to manage the spectrum in your cable bundle. In a non-intrusive way, it bridges onto live access loop circuits with high impedance so that the measured service is not interrupted. On the CableSHARK P3's graphic display, you can determine what service is deployed on the loop and at what power levels. This is an ideal way to find signals that are running too "hot" for the bundle. The Spectral Detective test may be run in Continuous, Snapshot (freezes the display upon command), or Peak Mode that is ideal for long term analysis of a circuit to help identify transients or intermittent crosstalk/noise.

## Automatic Disturber Identification

A single B8ZS coded (T1) signal in a cable bundle can knock out service to an entire neighbourhood due to crosstalk effects. Some telcos are moving away from 2B1Q coded HDSL and HDSL2 for the same reason. The CableSHARK P3 displays the Noise Power Spectral Density (Noise PSD) on unused loops showing the sum of all disturbers and automatically identifies the type of disturber by name. This arms telco techs, cable repair crews, and CLECs with the evidence they need to get action at the loop plant engineering level. Converting traditional T1 signals to more spectrally compatible signals such as G.SHDSL should be a priority. Much like the Spectral Detective feature, the Noise PSD Test may be run in Continuous, Snapshot (freezes the display upon command), or Peak Mode that is ideal for long-term analysis of a circuit to help identify transients or intermittent crosstalk/noise.

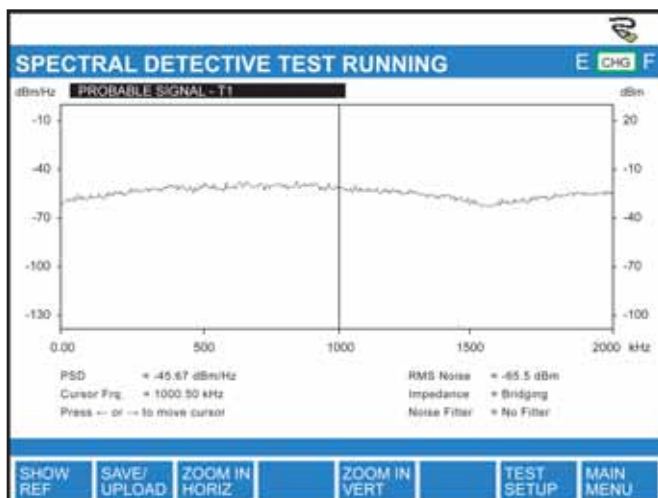


Determine the Effects of Other Disturbers on the Line

## Identify Split Pairs

Technicians create split pairs by robbing the single conductor from two defective pairs to create a single working circuit. While a split pair circuit will certainly pass current and will most likely support a POTS (Plain Old Telephone service) line, it will probably degrade or may even kill a DSL service. Telephone cable pairs are twisted to limit pair to pair crosstalk. Because a split pair no longer maintains the proper twisting, it is very prone to crosstalk. Split pairs are easy to find with a quick visual inspection provided the tech is at the proper pedestal. Determining if a loop has an unseen "section" of split pair requires the CableSHARK P3. A split pair will have abnormally high Crosstalk, but relatively normal Longitudinal Balance.

Measuring and observing unusually high crosstalk on cable pairs (a tell-tale sign that the pair is split) has always been possible on the CableSHARK P3 so long as the bundle and the specific binder group was already loaded with DSL. The Four-Wire Crosstalk Measurement offered by the CableSHARK P3 (with swept tone insertion) comes into play either when DSL is being added to a bundle for the first time, or to prevent a split pair from becoming a transmitting source of crosstalk. The CableSHARK P3 generates a swept signal into one pair while measuring crosstalk with selective FFT filtering on another.



Detect the Presence of T1 in the Bundle

## Find Intermittent Problems

The CableSHARK P3 will help you nail down those elusive intermittent faults. As an example, the CableSHARK can perform long-term monitoring for Wideband Impulse Noise. Results are displayed graphically in a histogram format.

## Locate Water in the Bundle

The ingress of water into a cable bundle can cause plenty of trouble for DSL circuits. The CableSHARK P3 can identify and locate water in four ways. The CableSHARK P3's Resistive Fault Location (RFL) Test will accurately indicate the location of the damaged section. The precise resolution TDR displays the "ripples" in the reflected signal associated with water. The CableSHARK P3's Stress/Leakage Measurement will show the repeatable charging effect associated with water, and the Resistance-to-Ground Measurement will show the trickle of current conducted by the water. The CableSHARK P3 not only indicates that there is water in the bundle, but also locates it with a TDR pulse.

## Metallic Testing

### Quickly Detect Shorts, Crosses, Grounds and Battery Crosses

The CableSHARK P3's Resistance Fault Location (RFL) Test effectively locates resistance faults (shorts, crosses, grounds and battery crosses) in aerial, direct buried or underground cable sections.

The K-Test is a variation of the RFL Test. It's invaluable whenever a double-sided fault is present (i.e., double-ground or double-cross), yet there are no good conductors in the cable to use for the "Good Wire" or "Good Pair" strapping function; it allows double-sided fault location which would otherwise be extremely difficult, if not impossible.

### Perform Metallic Testing with the Telcom-Specific DMM

A.C. voltage, D.C. voltage, tip-to-ring, tip-to-ground, ring-to-ground measurements are all automatically performed and documented without having to press a lot of buttons and without having to move the test leads. In addition, the CableSHARK P3 correctly measures tip-to-ring, tip-to-ground, ring-to-ground (and also loop) capacitance and resistance. It also measures loop current. The CableSHARK P3 automatically translates loop capacitance and resistance into distances.

## Is Your Station Ground Adequate?

The CableSHARK P3's Ground Resistance Test (also known as Station Ground Test) enables your technicians to verify that correct grounding rules are being followed at the location under test (usually the CO). An adequate station ground and ground distribution system provides a common electrical reference point for all telecommunications equipment in the installation and minimizes the danger of electrical potential developing between various equipments and equipment ground.

## Locate Insulation Breakdowns

Over time, cable insulation breaks down due to the elements, age, ultra violet light and physical wear and tear. In addition, cables may be damaged during installation or maintenance. The CableSHARK P3 can generate the high voltages needed to locate tricky to find compromises in cable insulation. The Stress/Leakage Measurement includes programmable soak time, and the ability to find faults of up to 999 Mohms.



Stress / Leakage Test



Measure AC / DC Voltage, Resistance, and Capacitance



# One-Person End-to-End Testing - Just in Case

The CableSHARK P3 performs a full evaluation from one end of a loop including the accurate prediction of upstream and downstream DSL rates. However, should end-to-end measurements need to be made, the application of two CableSHARK P3's have the ability to automatically communicate with each other in support of one person testing (Command & Respond).

## Use the CableSHARK P3 with Smart NID's

The CableSHARK P3 is compatible with Smart NID's. The CableSHARK P3 can command the Smart NID to terminate the far end of the line with an open or short for unbiased testing of the loop. This capability enables many tests to be performed without another expensive test instrument (and in some cases, test instrument and test technician) at the far end of the line being tested. Both DSL and VF tests benefit from this ability.

## Easily Qualify the Local Loop for POTS Services

The CableSHARK P3 possesses a truly impressive array of measurements to qualify the copper loop for plain old telephone service (POTS). This is especially important where DSL and voice operate on the same loop. Service Providers can ensure that the voice circuit has the proper quality using the CableSHARK P3.

The Level Frequency Test detects sources of attenuation distortion/3 tone slope on the loop. This distortion causes various symptoms such as muffled (high-frequency attenuation) or hissing (low frequency distortion) speech. Causes may include capacitive and inductive reactances, carrier filters, loaded cable effects, isolation transformers, and bridge taps.

Technicians use the VF Noise Measurement to detect noise caused by low frequency interferers, crosstalk and other interfering processes. The included weighting filters weight the noise reading to correspond to the subjective effect of the noise on voice communications and can be used to aid in the identification the noise source as they can help estimate the predominant frequency component in the noise. In addition, a VF Impulse Noise Measurement is also included, and it features three user-definable thresholds. Impulse noise is primarily caused by switching noise, loose pair connections, signalling equipment, and electrical storms. Bit error bursts in the digitized analog signal can also manifest themselves as impulse noise in the VF domain.

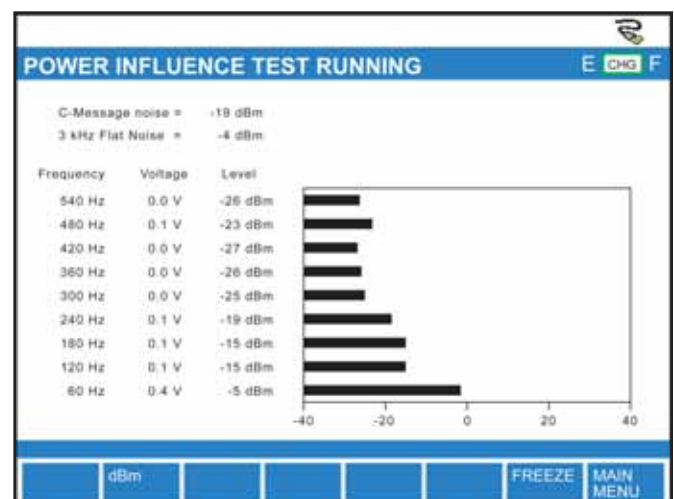
## Power Influence (PI)

Power Influence Measurements (Noise to Ground) are essential for detecting noise caused by AC signals (often centered at 60Hz), that is caused by nearby power lines. When present, this type of noise is common to both conductors of a 2 wire pair. The CableSHARK P3 also does an on-screen powerline harmonic analysis, showing a bar graph of the noise at 60 Hz and all harmonics up to the 9th.

The single-ended VF Auto Test quickly evaluates a cable to see if it is acceptable for voice frequencies based on pre-defined Pass/Fail criteria. The VF Auto test will perform a TDR Test, DMM Test, Load Coil Test, a Capacitive Imbalance Test and a Longitudinal Balance Test. If a Load Coil is found, the distance to the Load Coil is given.

## The Comprehensive VF Testing Suite Includes:

- VF Auto-Testing that includes TDR & Pass/Fail Indication
- VF Level/Frequency Measurement (300 Hz to 20 kHz)
- VF Noise Measurement with the following weighting filters: C-Message, C-Notched, 3 KHz Flat, 15 KHz Flat, 50 Kbit, & IEEE 743-1995 D filter (Psophometric, Psophometric-Notched, & SBDC filters are also available)
- VF Impulse Noise Measurement with three threshold settings
- VF Longitudinal Balance Testing
- VF Tone Generation (300 Hz to 4 kHz) with selectable level; variable frequency, spot frequency, sweep, 3-tone slope & tracing tone
- VF Tone Receive with level indicator
- Power Influence Test with analysis up to the 9th harmonic
- Dialling/Loop Holding
- Ringer Detection Test
- Drive capability Remote Test Responders



Measure PI to the 9th Harmonic

## Remote Control your CableSHARK P3™

### Graphical Remote Control with Visi-SHARK

Control of the CableSHARK P3 could not be easier than with the optional PC based software package Visi-SHARK supplied by Consultronics. Visi-SHARK allows users to take "remote" control of the CableSHARK P3 via a direct connection to the unit, dial-up modem, or via the Internet.

Visi-SHARK is a MS Windows® 95/98/ME/2000/XP software package that enables you to use your PC to control the CableSHARK. In addition to making remote control measurements, Visi-SHARK allows you to view, print or save to disk, information obtained from your local and/or remote CableSHARK P3(s). Results can be transferred to Microsoft® Excel® (98 or higher), or exported to JPEG format. This enables users to quickly email results to colleagues for detailed analysis.

To run a test using Visi-SHARK, you simply use your PC mouse to command a "virtual" CableSHARK P3. Visi-SHARK's intuitive controls will be instantly recognizable to any CableSHARK P3 user. Clicking the graphical buttons on the screen of your PC has exactly the same effect as pushing the buttons on the CableSHARK front panel. The information on the screen changes as you operate the unit.

In a Central Office environment, the CableSHARK P3 can also be commanded by the industry recognized TL1 control commands.



*Visi-SHARK Works with the CableSHARK P3 and Your PC*



### Remote Control Over the Internet

In addition to the convenient Visi-SHARK software, the CableSHARK P3 can also be controlled with nothing more than an Internet Browser. The CableSHARK P3 offers a choice of serial (RS232C) and TCP/IP (Ethernet) connections. Service Providers requiring direct access or dial-up access to the CableSHARK P3 will benefit from the CableSHARK P3's high-speed serial port while those pushing the technology envelope will want the power and flexibility of controlling the CableSHARK P3 over a LAN or WAN.

### Multi-Language Support

The CableSHARK P3 supports several international languages including: English, Spanish, French and others.

### Protect Your Investment & Your People

The CableSHARK P3 can be connected to any local loop at any time without fear. It has full protection against damage from ringing voltage, line powering for HDSL modems, battery, and even minor faults that cross power line voltages onto the pair. If the CableSHARK P3 detects voltages that would be dangerous to technicians, a bold warning message comes on the screen.

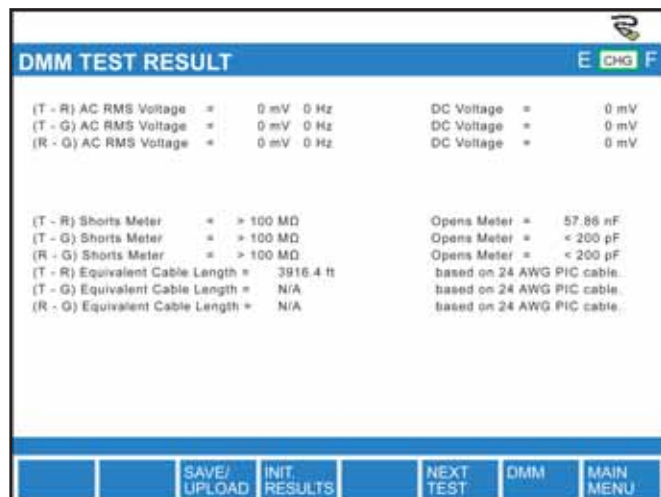
## Store Your Test Results to Memory

### The Convenience of Internal Non-Volatile Memory or Portable USB Memory

The CableSHARK P3 offers the convenience of an internal non-volatile memory to save test results. In addition, using the built-in USB (Universal Serial Bus) Port, your techs can also save the results of their tests to a portable USB memory stick.

### Compare Your Results Over Time with Reference Masks

Any graphical result saved to the CableSHARK P3's internal non-volatile memory or external USB Memory can be designated as a Reference Mask. Technicians can then designate any saved result as a reference for other similar tests so an on screen comparison can be made. This is useful in determining how a circuit may change from day to day or week to week. This feature is also beneficial in evaluating similar circuits with the same benchmark criteria.



Compare Test Results to Expected Standards

### Technical Support & Service

All Consultronics products are backed by free-of-charge technical support. Call and talk to Consultronics support personnel toll free at 1-800-267-7235 or 1-905-738-3741 between 7:30 am and 5:30 pm, Monday through Friday EST.

### Lifetime Software Upgrades

Specifications in the telecommunications industry are constantly changing. While other suppliers charge for software upgrades, Consultronics offers free lifetime downloading of the latest version of software for the CableSHARK P3 from the Consultronics Web site.\*

*\*Note: Software upgrades that enhance the existing set of features and measurements are free of charge. Consultronics reserves the right to charge for additional measurement functions, or for enhancements that require additional hardware.*

### Warranty & Repair Service

Each Consultronics test set is rigorously tested and calibrated to internationally traceable standards before they are shipped. All Consultronics products carry a 1-year parts and labor warranty (excludes soft pack carrying case, test cables, and/or manuals). Extended warranty coverage packages are also available.

### Patent Information

The End-to-End DMT test used by the Consultronics CableSHARK P3™ is patent protected. ADSL Data Rate Prediction (End to End): US Patent # US 6,445,773 B1 3-Sept-02

\*\* The Single-Ended DMT test used by the Consultronics CableSHARK P3™ is patent pending. ADSL Data Rate Prediction (Single End): US Patent Pending # 10/133,408



# CableSHARK P3™ VF / DSL Cable Qualifier

The Fastest Way to Locate and Repair Faults in the Local Loop

Find out more about EXFO's extensive line of high-performance portable instruments by visiting our website at [www.EXFO.com](http://www.EXFO.com).

Rugged Handheld Solutions		Platform-Based Solutions		
OPTICAL	DSL/COPPER	OPTICAL FIBER	DWDM Test Systems	Transport/Datacom
<ul style="list-style-type: none"> <li>• OLTSs</li> <li>• Power meters</li> <li>• Light sources</li> <li>• Talk sets</li> </ul>	<ul style="list-style-type: none"> <li>• ADSL/ADSL2+, SHDSL, VDSL test sets</li> <li>• VoIP and IPTV test sets</li> <li>• Ethernet test sets</li> <li>• POTS Test sets</li> </ul>	<ul style="list-style-type: none"> <li>• OTDRs</li> <li>• OLTSs</li> <li>• ORL meters</li> <li>• Variable Attenuators</li> </ul>	<ul style="list-style-type: none"> <li>• OSAs</li> <li>• PMS analyzers</li> <li>• Chromatic dispersion analyser</li> </ul>	<ul style="list-style-type: none"> <li>• SONET/DSn (DS0 to OC-192) testers</li> <li>• SDH/PDH (64 kb/s to STM-64c) testers</li> <li>• T1/T3 testers</li> <li>• E1 testers</li> <li>• 10/100 and Gigabit Ethernet testers</li> <li>• Fibre Channel testers</li> <li>• 10 Gigabit Ethernet testers</li> </ul>

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