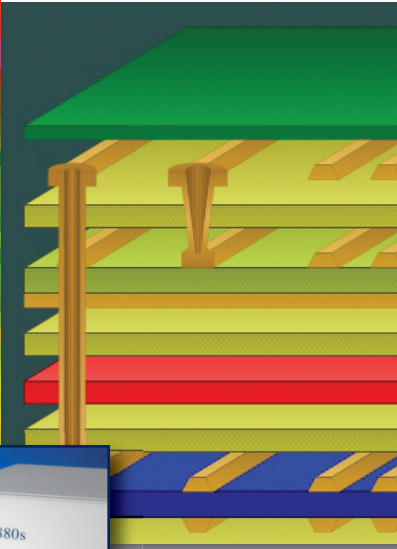


# Controlled Impedance Test System



Accurate impedance measurements  
with Launch Point Extrapolation  
for fine line traces

CITS880s

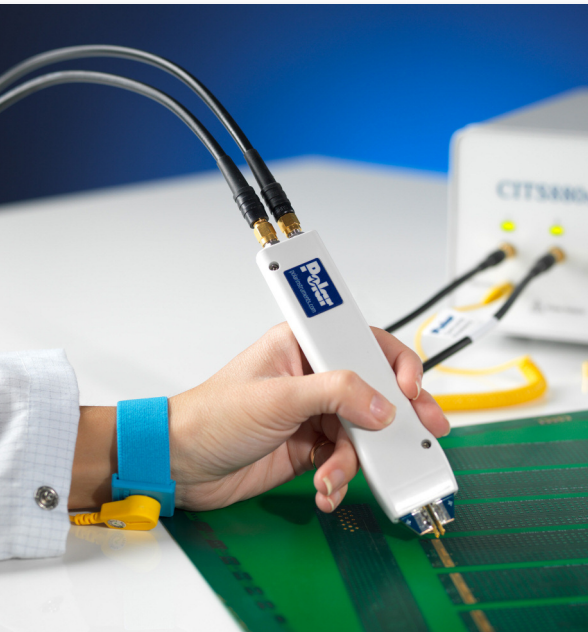
- Fast test speed
- Optimised pulse
- IPS Probes - high speed
- Excellent R&R
- 4 Channels
- On board measurement
- Shorter trace capability

**Polar**

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ACCURATE AND REPEATABLE RESULTS  
IN A PCB PRODUCTION ENVIRONMENT  
WITH LAUNCH POINT EXTRAPOLATION  
FOR MEASUREMENTS ON FINE LINE PCBs.

CITS880s has 4 channels to  
test single ended and  
differential traces on the  
same coupon



**Polar CITS controlled impedance test systems are the PCB industry's most widely trusted impedance test solution. Each new generation of CITS brings a blend of user requested enhancements and capabilities that move with the industry. Increasingly PCB transmission lines are being fabricated on finer lines and thinner copper layers - this has led to techniques which can accurately measure the impedance on lines where the trace itself is not entirely loss free.**

The CITS880s carries all the capabilities and trusted features of the 8 preceding generations, but now includes a technique called Launch Point Extrapolation (LPE) which can more accurately reveal the instantaneous impedance on fine line traces where the TDR trace exhibits a slope resulting from the resistive effects of the fine line copper.

**New in CITS880s**  
Launch Point Extrapolation

All new IPS probes

Enhanced measurement  
of close coupled traces

Easy migration from  
CITS880 and legacy CITS

Controlled impedance PCBs are used across a broad range of applications to help ensure high frequency signal integrity. Designers invariably specify these types of PCBs whenever the edge speeds of digital signals are faster than 1ns, or analog signals climb above 300MHz.

The dimensions of the trace and the properties of the PCB material – which can vary from batch to batch – determine the characteristic impedance of a PCB trace. To control trace impedance, PCB manufacturers usually vary trace width to compensate for different batches of PCB material. As geometries shrink, CITS customers have noticed that increasingly traces exhibit an upward sloping characteristic, which makes correlation with 2d field solvers more of a challenge. 2d field solvers predict the instantaneous impedance of the trace. CITS880s addresses this situation by adding LPE "launch point extrapolation" which is a linear regression line fitted to the impedance trace and projected back to the "launch" point of the pulse into the trace.

All new IPS series ergonomic probes (identified by the blue color on the tip and the labels and the robust metal insert supporting the SMA connector) are designed especially for the CITS880s and replace the legacy IP series probes used on prior generations of CITS. The combination of new probes and an enhanced low aberration pulse in the new CITS880s results in the flattest possible wave shape for LPE and as an important side benefit allows testing of shorter traces.





### The total test solution

The CITS880s uses TDR techniques to measure the reflection of fast rise-time pulses and provides a graphical view of a conductor's characteristic impedance along its length. It automatically reports when a measurement is outside the tolerance you specify.

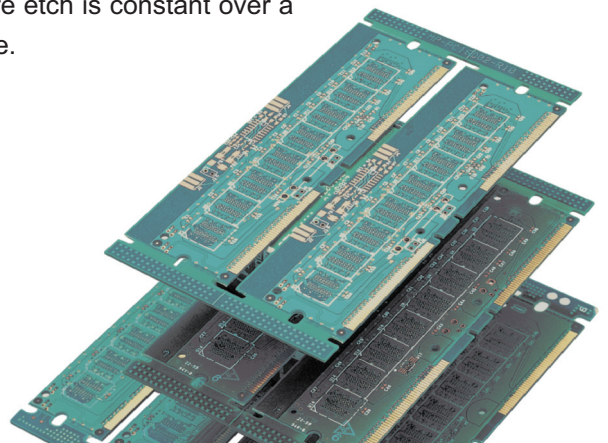
All Polar genuine authorised service and repair centres are equipped with precision air line transfer standards to ensure your CITS stays within its published accuracy over its entire lifetime.

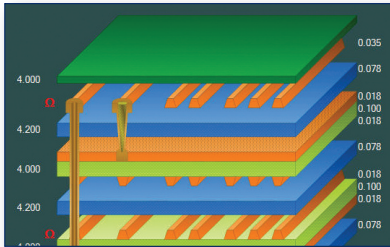
CITS880s has 4 channels that allow you to permanently connect two or more test probes making it ideal when your coupons have both single ended and differential traces.

The CITS880s software automatically prompts the user to select the correct probe. It also provides you with the ideal solution for easily and accurately verifying the impedance of PCBs, both single-ended trace impedance and the differential impedance of balanced traces.

### Enhanced Accuracy

Unlike other TDRs CITS is calibrated against impedance air line standards over a wide range of impedances. Many lab TDRs are calibrated for impedance at 50 Ohms only. CITS employs an internal reference and applies baseline correction on every acquisition to maximise stability over time and temperature. The CITS is factory calibrated against traceable air line standards at 28, 50, 75 and 100 Ohms and all Polar authorised service centres are equipped with transfer standard air lines to ensure your CITS remains a precision piece of measuring equipment over its entire lifetime. The optimised pulse and enhanced capability of the IPS probes mean you can also enjoy accurate repeatable measurements on shorter traces than possible on previous generations - though it's worth remembering that primarily as a process control tool there are real benefits to using a full 6 inch long coupon as recommended by the IPC to ensure etch is constant over a significant sample length of PCB trace.





Program from Speedstack

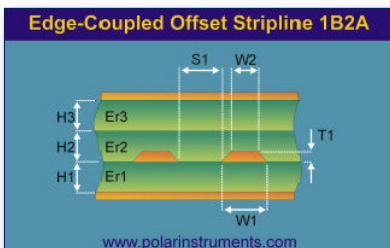
### Part of a package for Impedance

#### Speedstack – generate test programs

Whilst the CITS880s is a superb workhorse for stand alone impedance testing, Polar offers complementary software to enhance and further fine tune your impedance test experience. Speedstack is the Polar industry standard tool for layer stackup design and documentation, stackups created in Speedstack may also contain all the relevant impedance information – which may be exported into a CITS test program in just a few clicks of the mouse.

#### Applications

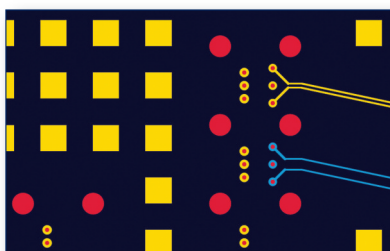
CITS880s is a robust instrument suitable for use in production environments by non-technical operators. It is also widely used by contract manufacturers and OEMs to verify conformance from PCB suppliers.



Model impedance with Si8000m

#### Si8000m controlled impedance field solver

Works alongside CITS and Speedstack and helps you fine tune line widths and stackups and optimise for maximum yields. Si8000m field solves the instantaneous impedance, and if you are working with fine line traces you should achieve good correlation when measuring fine lines on the CITS880s with the use of Launch Point Extrapolation. Powerful graphing in the Si8000m lets you see which trace property generates the most change in impedance and lets you fine tune for maximum yields.



Generate coupons with CGen

#### CGen PCB impedance coupon generator

Coupon generation used to be a chore but with CGen this is no longer the case. Used either stand alone or in conjunction with Si8000m or Speedstack, CGen auto creates your impedance coupons in a number of preferred industry styles. CGen also helps you choose preferred Polar impedance probe footprints for your coupons therefore keeping the cost of your CITS880s consumables to a minimum.



## Accessories

There are a wide number of accessories to support your specific application including:

### Probes

There is a wide range of probes with footprints to suit your coupon layout. These have been designed to ensure maximum repeatability and accuracy of measurement. The new IPS and IPDS probe cases are precision molded from ESD dissipative materials and include internal ESD grounding. For maximum protection against ESD damage Polar also recommends operators use a wrist strap connected to an appropriate ESD ground point.

### Calibration service and airlines

Polar offers a calibration service and a range of airlines (28, 50, 75 and 100 ohms) traceable to National Standards (NIST and NPL). These allow you to verify the accuracy of your measurements.

### Datalog Report Generator Pro

DRG Pro is an optional software module that imports data from the CITS datalog and produces customer reports including calculation of  $C_p$  and  $C_{pk}$ .

### Signal integrity toolkit

Simplify modeling of lossy controlled impedance traces with the Si8000m field solver. Ensure accurate documentation of HDI build structures with Speedstack & Speedstack Flex. Generate test coupons quickly with CGen.

### Insertion loss testing?

CITS is designed for testing of instantaneous impedance. For CITS-like ease of use and the ability to measure insertion loss with both industry standard SET2DIL and SPP methodologies please refer to the Polar Atlas brochure - part number LIT233.

### Impedance test coupons:

Impedance coupons are easily generated with the optional CGen PCB. CGen PCB works standalone or in conjunction with Si8000m and / or Speedstack to make precision engineered Gerbers for impedance test coupons.



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## CITS880s

### Measurement Capability

Range	20 – 150 ohm (single-ended) 40 – 200 ohm (differential)
Accuracy	1% at 50 ohm (Calibrated against traceable standards at 28, 50, 75 and 100 ohm)
Testable length	2m maximum
Horizontal resolution	0.2mm (0.008")
Vertical resolution	0.03 ohm

### System Inputs & Outputs

Test probe channels	4 (single-ended) or 2 (differential pairs)
Pass/Fail outputs	Opto-isolated, open collector
Socket for wrist strap	4mm x 2
Interface	USB 2.0
Power input	IEC, 90V - 250V @ 50/60Hz, 0.16A - 0.1A

### Standard Accessories

Description	Part Number
Probe cable	WMA371
100 ohm differential probe	IPDS100
50 ohm probe	IPS50
Sample coupon	MPCD1325
Footswitch	ACC383
Anti-static wrist strap & cable	ACC185 + ACC175
Operator Manual (pdf download only)	
Power cord (region specific)	
50 ohm reference impedance	WMA328
Torque wrench	ACC313
SMA adaptors	MQX428
USB cable	ACC371

### PC Requirements

PC Requirements PC running Windows 7, Windows 8, Windows 8.1, 1.6GHz or higher, 1Gb RAM, SVGA monitor, USB 2.0

### Ordering Information

Model	Description
CITS880s	Controlled impedance test system

### Optional Accessories

Model	Description
DRGPro	Datalog report generator
Annual calibration	Contact Polar authorised service center.

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