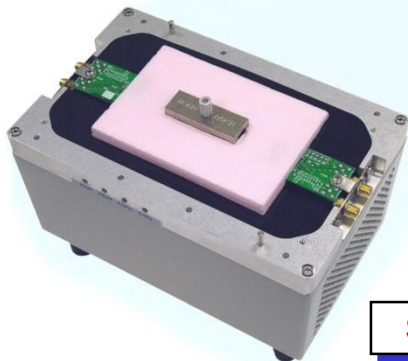


- Automated, software-based quartz dual crystal temperature test system
- Measures over 75 different tests
- Two crystal capacity
- Parameter and curve fit characteristics are checked against easy to define QC limits
- Precision Crystal Temperature Perturbation Analysis
- Example Perturbation Test:
  - - 40° C to +105° C
  - Over 1000 temperature points
  - Total test time of 45 minutes for SMD crystals
- Available test fixtures holding two SMD devices:
  - 2x2.5mm, 2.5x3mm, 3.2x5mm
  - 3.5x6mm, 5x7mm
  - HC-49U, HC-49SMD, HC-49SMD-LP
  - Custom



- All data is published in a *Microsoft Access™* data base
- Data can be exported to *Microsoft Excel™* for custom data analysis
- Printouts are generated using *Crystal Reports®*

### SPECIFICATIONS

**250B-2 Frequency Range:**

15 KHz to 220 MHz

**250C-2 Frequency Range:**

15 KHz to 420 MHz

**Frequency Correlation:**

± 1 ppm\* at series (typical)

**Crystal power:**

1 nW to 1000 uW (1 MHz to 50 MHz)  
1 nW to 500 uW (>50 MHz to 200 MHz)

**Temperature Range:**

- 40° C to +105° C @ 25° C Ambient

**Temperature Stability:**

± 0.1° C

\* Proprietary measurement and calibration algorithms provide correlation to industry standard crystal measurement equipment.

## SAUNDERS & ASSOCIATES, LLC

2520 E. Rose Garden Lane - Phoenix, Arizona 85050 USA (602) 971-9977 FAX (602) 971-5522  
E-Mail [sales@saunders-assoc.com](mailto:sales@saunders-assoc.com) - World Wide Web <http://www.saunders-assoc.com>

# SYSTEM CONFIGURATION

- S&A 250B-2 or 250C-2 Network Analyzer
- S&A PCIe TTL I/O Card
- S&A 4310 Bench Top Temperature Test Chamber
- *Windows*® based System Software
- System Controller
- Dual IEC-444 Pi-Network Test Head
- Printer (Optional)

## SAMPLE REPORTS

### Crystal Curvefit Summary

TCXO Crystal test  
Ref F: Fr Ref in Setup File

Run Name: TCXO High Speed Test  
Run Start: 22-May-2002 5:23 pm  
Run Finish: 23-May-2002 12:25 am  
S&A W2200 Rev: 3743 Report: 2.12

Print: All Operator: \_\_\_\_\_  
Row A: Measured FL      Row B: Measured FL  
Row C: Measured FL      Row D: Measured FL

A001  
Setup: TCXO Test  
Cut: AT Relative Angle: 4.43°  
Ref FR: 16,794,000 Hz

A0: -2.983952E+00	TurnPt 1: -7.34
A1: -3.745321E-01	TurnPt 2: 04.06
A2: -8.495129E-04	TurnPt 3: -----
A3: 9.803272E-05	Infl T 1: 28.88
A4: 6.015187E-08	Infl T 2: -----

WCD: -0.07 ppm    Min R: 16.18  
WCT: -39.86 °C    Delta R: 2.42

### Crystal Plots

Run Name: 4310 perturbation example test  
Ref F: F @ 25.00°C (Set)

Print: All Operator: \_\_\_\_\_  
Row A: Measured FL

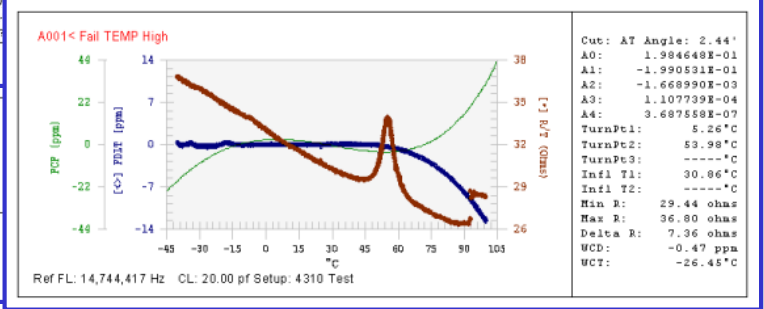
Run Start: 06-Oct-2005 5:16 pm  
Run Finish: 06-Oct-2005 5:49 pm  
S&A W2200 Rev: 3.50 Report: 2.22

### Crystal Tabular

Run Name: TCXO High Speed Test  
Ref F: Fr Ref in Setup File

Print: All Operator: \_\_\_\_\_  
Row A: Measured FL      Row B: Measured FL  
Row C: Measured FL      Row D: Measured FL

Run Start: 22-May-2002 5:23 pm  
Run Finish: 23-May-2002 12:25 am  
S&A W2200 Rev: 3743 Report: 2.12



### Crystal Curvefit Tabular

Run Name: TCXO High Speed Test  
Ref F: Fr Ref in Setup File

Print: All Operator: \_\_\_\_\_  
Row A: Measured FL      Row B: Measured FL  
Row C: Measured FL      Row D: Measured FL

A001  
Setup: TCXO Test  
Angle: AT(4.43°)  
Ref F: 16,794,000 Hz

A0: -2.983952E+00	TurnPt1: -7.34
A1: -3.745321E-01	TurnPt2: 04.06
A2: -8.495129E-04	TurnPt3: -----
A3: 9.803272E-05	Infl T 1: 28.88
A4: 6.015187E-08	Infl T 2: -----

*C	FR	ppm	Curve	Delta	R
-40.06	-9.09	-9.06	-0.02	18.49	
-39.86	-8.95	-8.88	-0.07	18.61	
-39.10	-8.20	-8.17	-0.03	18.66	
-38.20	-7.37	-7.36	-0.02	18.66	
-37.37	-6.62	-6.64	0.02	18.47	
-36.53	-5.92	-5.93	0.02	18.46	
-35.69	-5.24	-5.26	0.01	18.41	
-34.88	-4.58	-4.61	0.03	18.37	
-34.01	-3.95	-3.97	0.02	18.35	
-33.20	-3.37	-3.39	0.02	18.34	
-32.32	-2.77	-2.78	0.01	18.27	
-31.51	-2.24	-2.24	0.00	18.26	
-30.68	-1.73	-1.71	-0.02	18.20	
-29.84	-1.19	-1.20	0.01	18.12	
-28.99	-0.71	-0.71	0.00	18.15	
-28.16	-0.25	-0.25	-0.01	18.11	
-27.33	0.21	0.19	0.01	18.09	
-26.50	0.65	0.61	0.04	18.04	
-25.65	1.06	1.01	0.04	18.01	
-24.83	1.41	1.39	0.03	17.95	
-23.99	1.77	1.74	0.02	17.94	
-23.15	2.08	2.08	0.00	17.92	
-22.34	2.41	2.39	0.02	17.88	
-21.50	2.69	2.69	-0.01	17.88	

### Crystal Setup File Parameters

Run Name: TCXO High Speed Test  
Ref F: Fr Ref in Setup File

Print: All Operator: \_\_\_\_\_  
Row A: Measured FL      Row B: Measured FL  
Row C: Measured FL      Row D: Measured FL

Run Start: 22-May-2002 5:23 pm  
Run Finish: 23-May-2002 12:25 am  
S&A W2200 Rev: 3743 Report: 2.12

Start: A001 Stop: D160  
Setup: TCXO Test TCXO Crystal perturbation test  
Reference F: 16,794,000 Hz Power: 10.00 uW into 10.00 ohms Measure: FR/T

STATUS	FR	CO	RR	CL	L	PWR	WCD	DLTR
	ppm	pF	Ohms	fF	mH	uW	ppm	Ohms
A001	PASS	-9.1	2.1	18.5	7.8	11.52	10	-0.1 2.4