

- Automated software based quartz crystal temperature test system
- Measures over 75 different parameters
- Parameter and curve fit characteristics are checked against easy to define QC limits
- Crystals of different frequencies can be tested in a single temperature run
- All data published in a *Microsoft Access*™ data base and can be exported to *Microsoft Excel*™ for custom data analysis
- Crystal part number can be used to set complete measurement parameters, QC limits, temperature test points, and data printouts
- Printouts are generated using *Crystal Reports*®



- Accommodates two dual row test wheels with extended life test head contacts
- Easily loaded S&A proprietary sockets accept HC-45, HC-49, HC-43, HC-49US, HC-18, SMD and tubular type packages
- Typically holds 508 devices per run

### SPECIFICATIONS

**250B-1 Frequency Range:**

15 KHz to 220 MHz

**250C Frequency Range:**

15 KHz to 500 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 Stability:**

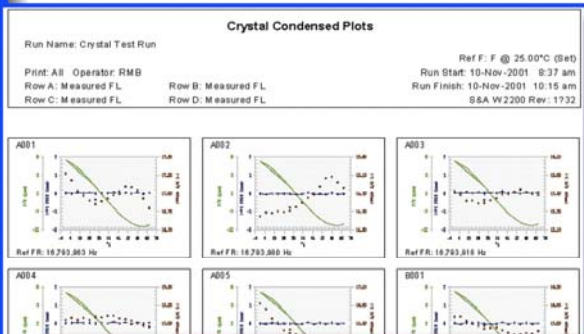
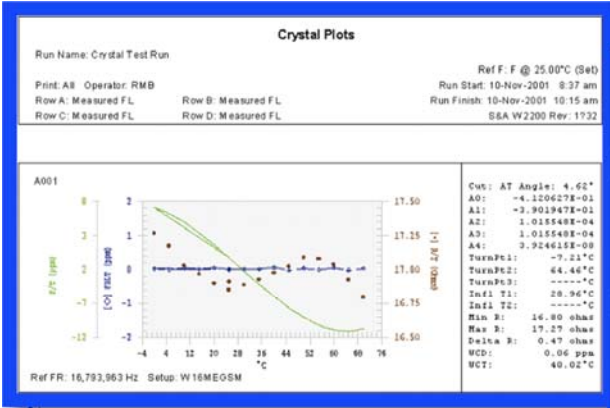
± 0.1° C

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

# SYSTEM CONFIGURATION

- S&A 250B-1 or 250C Network Analyzer
- S&A 2451 Switch Controller
- S&A 4220 Temperature Test Chamber (LCO<sub>2</sub>, LN<sub>2</sub>, or Mechanical Refrigeration Cooling)
- IEC-444 Pi-Network Test Head
- Windows® based System Software
- Printer (Optional)
- Computer Requirements:
  - Minimum 100 MHz Pentium III
  - One full PCI slot with +3.3V & 5V power, Windows 98®

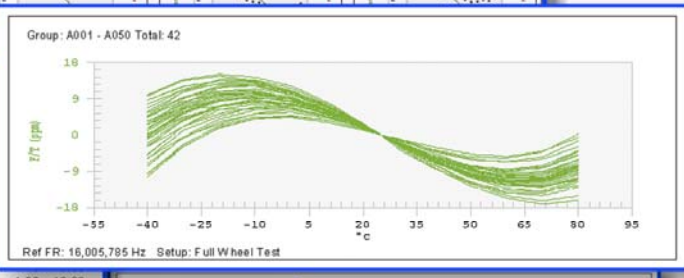
# SAMPLE REPORTS



Crystal Tabular

Run Name: Example Run	Ref F: F @ 25.00°C (Set)
Print: All Operator: RMB	Run Start: 26-Oct-2001 4:51 pm
Row A: Measured FL	Run Finish: 26-Oct-2001 6:34 pm
Row C: Measured FL	S&A W2200 Rev: 1725

A001 <2a001>	A002 <2a002>	A003 <2a003>	A004 <2a004>	A005 <2a005>										
Setup: 12megw2	Setup: 12megw2	Setup: 12megw2	Setup: 12megw2	Setup: 5										
Ref F: 12,795,174 Hz	Ref F: 12,795,955 Hz	Ref F: 12,795,917 Hz	Ref F: 12,795,942 Hz	Ref F: 5										
°C	FR ppm	R	°C	FR ppm	R	°C	FR ppm	R	°C	FR ppm	R	°C	FR ppm	R
25.01	0.00	4.92	25.03	0.00	18.71	25.02	0.00	12.39	25.01	0.00	11.97	25.00		
0.01	0.01	5.13	0.01	8.08	21.44	0.00	3.28	12.96	-0.01	3.74	12.49	0.00		
5.02	0.33	4.98	5.00	6.79	20.77	4.98	3.16	12.82	4.99	3.52	12.38	5.00		
9.98	0.44	5.03	10.00	5.24	20.39	10.00	2.68	12.83	10.00	2.94	12.39	9.98		
15.02	0.50	5.03	15.01	3.60	10.81	15.00	3.07	13.68	14.99	3.33	13.33	14.99	1.33	18.03
20.00	0.36	5.02	20.00											
25.00	0.09	5.05	25.01	-0										
30.02	-0.12	5.04	30.01	-2										
34.99	-0.39	5.03	35.00	-3										
40.02	-0.55	5.04	40.02	-5										
45.03	-0.52	5.06	45.02	-7										
49.99	-0.20	5.00	49.99	-8										
54.99	0.33	4.98	55.00	-9										
59.99	1.33	5.05	59.99	-9										



Crystal Curvfit Summary

Run Name: Example Run	Ref F: F @ 25.00°C (Set)
Print: All Operator: RMB	Run Start: 26-Oct-2001 4:51 pm
Row A: Measured FL	Run Finish: 26-Oct-2001 6:34 pm
Row C: Measured FL	S&A W2200 Rev: 1725

Crystal Curvfit Tabular

A002 <2a002>	A003 <2a003>						
Setup: 12megw2	Setup: 12megw2						
Angle: AT(4.47°)	Angle: AT(2.51°)						
Ref F: 12,795,955 Hz	Ref F: 12,795,917 Hz						
A0: -5.417392E-02	A0: -4.797002E-02						
TurnP1: -12.98	TurnP1: 0.12						
A1: -3.795108E-01	TurnP2: 63.94						
A2: 4.165318E-04	TurnP3: ---						
A3: 8.540013E-05	Int1 T1: 24.38						
A4: -9.575956E-08	Int1 T2: ---						
°C	FR ppm	Curve	Delta	°C	FR ppm	Curve	Delta
25.03	0.00	0.00	0.00	25.02	0.00	0.00	0.00
0.01	0.08	8.23	-0.16	21.44	0.00	3.28	3.14
5.00	6.79	6.98	-0.19	20.77	4.98	3.16	2.88
10.00	5.24	6.45	-0.22	20.39	10.00	2.69	2.64
15.00	3.60	3.74	-0.14	19.81	15.00	2.07	1.86
20.00	1.68	1.81	-0.23	19.39	20.00	1.16	0.99
25.01	-0.23	0.01	-0.24	19.12	25.01	0.17	0.00
30.01	-2.04	-1.88	-0.16	18.87	30.01	-0.93	-1.05
35.00	-3.80	-3.89	-0.21	18.70	35.01	-1.93	-2.11
40.02	-5.61	-5.38	-0.23	18.62	40.01	-2.94	-3.09
45.02	-7.04	-6.86	-0.18	18.66	45.00	-3.78	-3.93
50.00	-8.22	-8.09	-0.13	18.50	50.01	-4.39	-4.56
55.00	-9.15	-9.01	-0.14	18.35	55.01	-4.73	-4.80
59.99	-9.78	-9.56	-0.20	18.30	59.99	-4.71	-4.85

Crystal Setup File Parameters

Run Name: Example Run	Ref F: F @ 25.00°C (Set)
Print: All Operator: RMB	Run Start: 26-Oct-2001 4:51 pm
Row A: Measured FL	Run Finish: 26-Oct-2001 6:34 pm
Row C: Measured FL	S&A W2200 Rev: 1725

Reference F: 12,795,900 Hz	CL: 0.00 pF	Power: 100.00 mW	Into: 12.00 Ohms	Measure: FR/T					
STATUS	FR	CO	DR	Q	CL	L	PWR	TEMP	F/T
	ppm	pF	Ohms	k	FF	mW	mW	°C	ppm
10.0	3.0	25.0		13.0	13.00				
-10.0	2.8			12.0	11.00				
Delta	WCD	R/F	CUT	ANG					
Ohms	ppm	Ohms	25.0	°					

A001 <2a001>	Pass	Fail	FR	Lo	-56.74	4.64	4.9	11.9	21.3	7.26	77	25.01	-4	
A002 <2a002>	Pass	Fail	FR	Lo	-9.31	5.1	AT	0.60						
A003 <2a003>	Pass	Fail	FR	Lo	3.5	0.2	21.4	AT	4.47					
A004 <2a004>	Pass	Fail	FR	Lo	1.3	2.6	12.4	AT	8.2	12.2	12.65	122	25.02	-4

Crystal Failures Only

Run Name: Example Run	Ref F: F @ 25.00°C (Set)
Print: All Operator: RMB	Run Start: 26-Oct-2001 4:51 pm
Row A: Measured FL	Run Finish: 26-Oct-2001 6:34 pm
Row C: Measured FL	S&A W2200 Rev: 1725

Crystal #	Serial #	Setup File Parameters	Crystal Data	Curvfit Parameter
A001	<2a001>	Full FR Low		

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