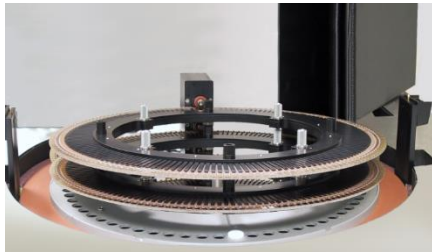




# W-2200 LOW FREQUENCY CRYSTAL DISC PALLET TEMPERATURE TEST SYSTEM

- Automated, software based quartz crystal temperature test system for low frequency crystals
- Up to 2 disc pallets can be stacked
- Leaded and SMD discs available
- Custom sizes available
- 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 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*™
- Dual chamber configuration available

## SPECIFICATIONS

<b>1000K Ohm Test Head</b>	
<b>Frequency Range:</b>	10 KHz to 300 KHz
<b>Frequency Correlation:</b>	± 1 ppm* at series (typical)
<b>Crystal Power:</b>	1 uW into 25,000 Ohms Max
<b>Temperature Stability:</b>	± 0.1° C

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

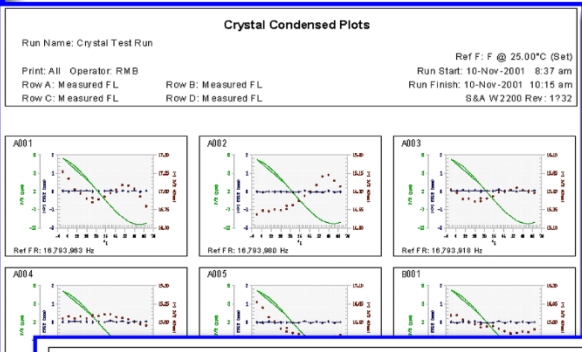
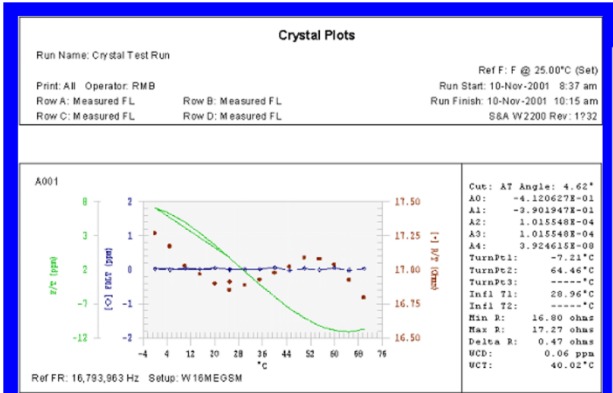
## SAUNDERS & ASSOCIATES, LLC

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 Network Analyzer
- S&A 2451 Switch controller (only required in dual chamber configuration)
- S&A 4220 Temperature Test Chamber (optional LCO<sub>2</sub> LN<sub>2</sub> or Mechanical Refrigeration Cooling)
- S&A 1000K Ohm Test Head
- System Controller
- Windows® System Software
- Printer (Optional)

# SAMPLE REPORTS

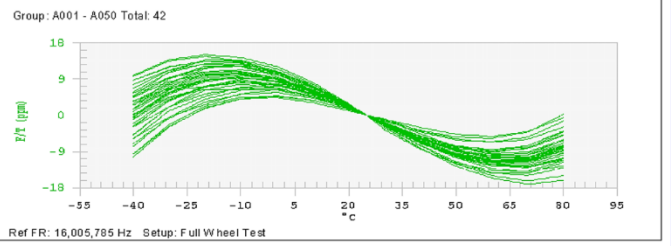


Crystal Tabular

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

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

°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	0.00	0.00
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	0.00	0.00
5.02	0.33	4.98	5.00	6.79	20.77	4.99	3.16	12.82	4.99	3.52	12.38	5.00	0.00	0.00
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	0.00	0.00
15.02	0.50	5.03	15.01	3.60	19.81	15.00	3.07	13.66	14.99	3.33	13.33	14.99	1.33	18.83
20.00	0.36	5.02	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25.00	0.09	5.05	25.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30.02	-0.12	5.04	30.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34.99	-0.39	5.03	35.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40.02	-0.55	5.04	40.02	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45.03	-0.52	5.06	45.02	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
49.99	-0.20	5.00	49.99	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
54.99	0.33	4.98	55.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
59.99	1.33	5.05	59.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



## Crystal Curvefit Summary

Run Name: Example Run  
Ref F: F @ 25.00°C (Set)  
Run Start: 26-Oct-2001 4:51 pm  
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S&A W2200 Rev: 1725

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Crystal Curvefit Tabular

Run Name: Example Run  
Ref F: F @ 25.00°C (Set)  
Run Start: 26-Oct-2001 4:51 pm  
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Row C: Measured FL  
Row D: Measured FL

°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	0.00	0.00
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	0.00	0.00
5.02	0.33	4.98	5.00	6.79	20.77	4.99	3.16	12.82	4.99	3.52	12.38	5.00	0.00	0.00
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	0.00	0.00
15.02	0.50	5.03	15.01	3.60	19.81	15.00	3.07	13.66	14.99	3.33	13.33	14.99	1.33	18.83
20.00	0.36	5.02	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25.00	0.09	5.05	25.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30.02	-0.12	5.04	30.01	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34.99	-0.39	5.03	35.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40.02	-0.55	5.04	40.02	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45.03	-0.52	5.06	45.02	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
49.99	-0.20	5.00	49.99	-0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
54.99	0.33	4.98	55.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
59.99	1.33	5.05	59.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Crystal Setup File Parameters

Run Name: Example Run  
Ref F: F @ 25.00°C (Set)  
Run Start: 26-Oct-2001 4:51 pm  
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S&A W2200 Rev: 1725

Print: All Operator:  
Row A: Measured FL  
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Row D: Measured FL

STATUS	FR	CO	RR	Q	CL	L	PWR	TEMP	F/T
	ppm	pF	Ohms	k	Ω	mH	uW	°C	ppm
	10.0	3.0	25.0		13.0	13.00			
	-10.0	2.5			12.0	11.00			
DTR	WCD	R/T	CUT	ANGL					
	Ohms	ppm	Ohms	°					
			25.0						

Crystal Failures Only

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

Print: All Operator:  
Row A: Measured FL  
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Row C: Measured FL  
Row D: Measured FL

Crystal#	Serial#	Setup File Parameters	Crystal Data	Curvefit Parameter
A001	<2a001>	Fail FR Low		

# SAUNDERS & ASSOCIATES, LLC