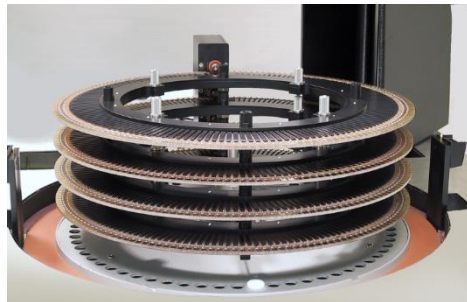


- Automated software based quartz crystal temperature test system
- Holds up to 1280 devices per run
- Standard sizes available include:

TYPE	DISC CAPACITY	TOTAL CHAMBER CAPACITY
SMD 5 x 7mm	140	560
SMD 4.5 x 8mm	140	560
SMD 3.5 x 6mm	160	640
SMD 3.2 x 5mm	160	640
SMD 2.5 x 4mm	160	640
SMD HC-49USMD	100	400
LEADED HC-45/49	100	400

- Custom SMD sizes available
- High speed fan mounted inside the chamber cover provides fast temperature soak time



- Measures over 75 different parameters
- Parameter and curve fit characteristics checked against easy to define QC limits
- Crystals of different frequencies tested in a single temperature run
- All data published in a *Microsoft Access*™ database and 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 Stability:	± 0.1°
Example Throughput:	5 temperature points (-20 0 25 50 85) 1200 parts per hour

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

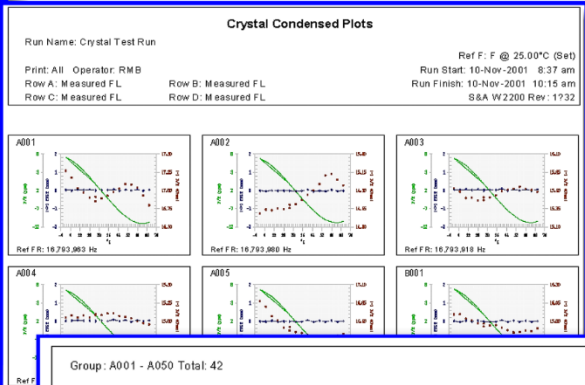
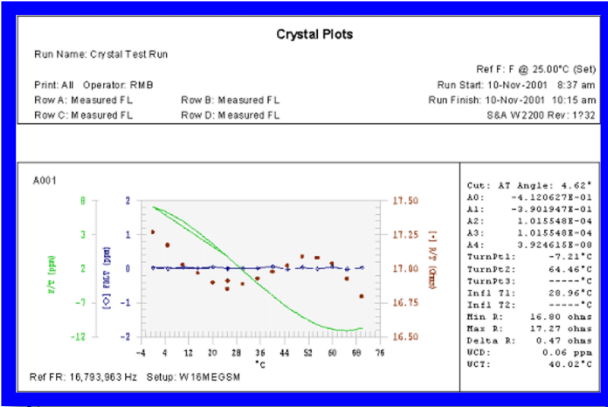
SAUNDERS & ASSOCIATES, LLC

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

SYSTEM CONFIGURATION

- S&A 250B-2 or 250C-2 Network Analyzer
- Two S&A 2451 Switch Controllers
- Two S&A 4220 Temperature Test Chambers (LCO₂, LN₂, or Mechanical Refrigeration Cooling)
- Two IEC-444 Pi-Network Test Heads
- Windows[®] based System Software
- System Controller
- Printer (Optional)

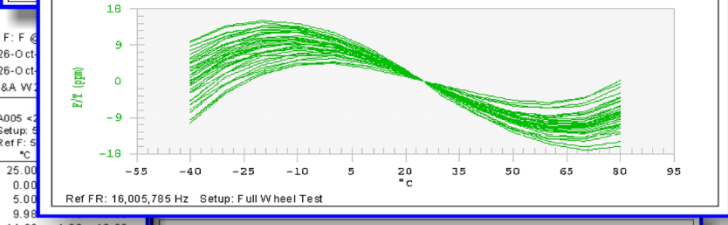
SAMPLE REPORTS



Crystal Tabular

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

A001 <2a001> Setup: 12megw2 Ref F: 12,795,174 Hz				A002 <2a002> Setup: 12megw2 Ref F: 12,795,955 Hz				A003 <2a003> Setup: 12megw2 Ref F: 12,795,917 Hz				A004 <2a004> Setup: 12megw2 Ref F: 12,795,942 Hz				A005 <2a005> Setup: 12megw2 Ref F: 12,795,917 Hz			
°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	0.00	21.44	0.00	3.28	12.96	-0.01	3.74	12.49	0.00							
6.02	0.33	4.98	5.00	6.79	20.77	4.99	3.16	12.82	4.99	3.52	12.38	5.00							
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	19.91	15.00	3.07	13.65	14.99	3.33	13.33	14.99	1.33	18.93					
20.00	0.36	5.02	20.00																
25.00	0.09	5.05	25.01	-0.2															
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	-6															
54.99	0.33	4.98	55.00	-6															
59.99	1.33	5.05	59.99	-5															



Crystal Curvfit Tabular

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

°C	FR ppm	R	Curve	Delta	°C	FR ppm	R	Curve	Delta
25.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.00	8.23	-0.16	21.44	0.00	3.28	3.14	0.14	12.96
6.00	0.79	8.90	-0.19	20.77	4.98	3.16	2.98	0.18	12.82
10.00	5.24	5.45	-0.22	20.39	10.00	2.68	2.64	0.14	12.83
15.01	3.60	3.74	-0.14	19.91	15.00	2.07	1.86	0.21	12.68
20.00	1.68	1.91	-0.23	19.99	20.00	1.16	0.99	0.17	12.57
25.01	-0.23	0.01	-0.24	19.12	25.01	0.17	0.00	0.17	12.55
30.01	-2.04	-1.88	-0.16	18.87	30.01	-0.83	-1.05	0.23	12.40
35.00	-3.90	-3.89	-0.21	18.70	35.01	-1.93	-2.11	0.18	12.30
40.02	-5.61	-5.38	-0.23	18.62	40.01	-2.94	-3.09	0.15	12.19
45.02	-7.04	-6.86	-0.18	18.66	45.00	-3.78	-3.93	0.15	12.09
49.99	-8.22	-8.09	-0.13	18.50	50.01	-4.39	-4.56	0.17	11.95
54.99	-9.15	-9.01	-0.14	18.35	55.01	-4.73	-4.60	0.16	11.82
59.99	-9.76	-9.56	-0.20	18.30	60.01	-4.71	-4.65	0.14	11.69
					65.01	-4.71	-4.65	0.13	11.85
					70.01	-4.71	-4.65	0.17	11.77

Crystal Setup File Parameters

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

Setup: 12megw2
 Reference F: 12,795,900 Hz
 CL: 0.00 pF
 Power: 100.00 uW
 into 12.00 Ohms
 Measure: FR/T

STATUS	FR	CO	Rk	Q	CL	L	PWR	TEMP	F/T
	ppm	pF	Ohms	k	ΩF	mH	uW	°C	ppm
	10.0	3.0	25.0		19.0	19.00			
	-10.0	2.5			12.0	11.00			
DTR	WCD	R/F	CUT	ANGL					
Ohms	ppm	Ohms	*						
		25.0							

Fail	FR	Lo	-56.7<	4.6<	4.9	119	21.3<	7.26<	77	25.01	4.9
A001	<2a001>	Pass	0.2	-0.1	5.1	AT	0.60				
A002	<2a002>	Pass	4.3	2.7	18.7	54	12.3	12.55	194	25.03	-9.9
A003	<2a003>	Pass	3.5	0.2	21.4	AT	4.47				
A004	<2a004>	Pass	1.3	2.6	12.4	82	12.2	12.65	122	25.02	-4.9
A005	<2a005>	Pass	1.2	-0.2	11.9	AT	2.51				
A006	<2a006>	Pass	3.3	2.7	12.0	85	12.1	12.73	121	25.01	-5.8
A007	<2a007>	Pass	1.5	-0.2	11.0	AT	2.66				

Crystal Failures Only

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

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

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