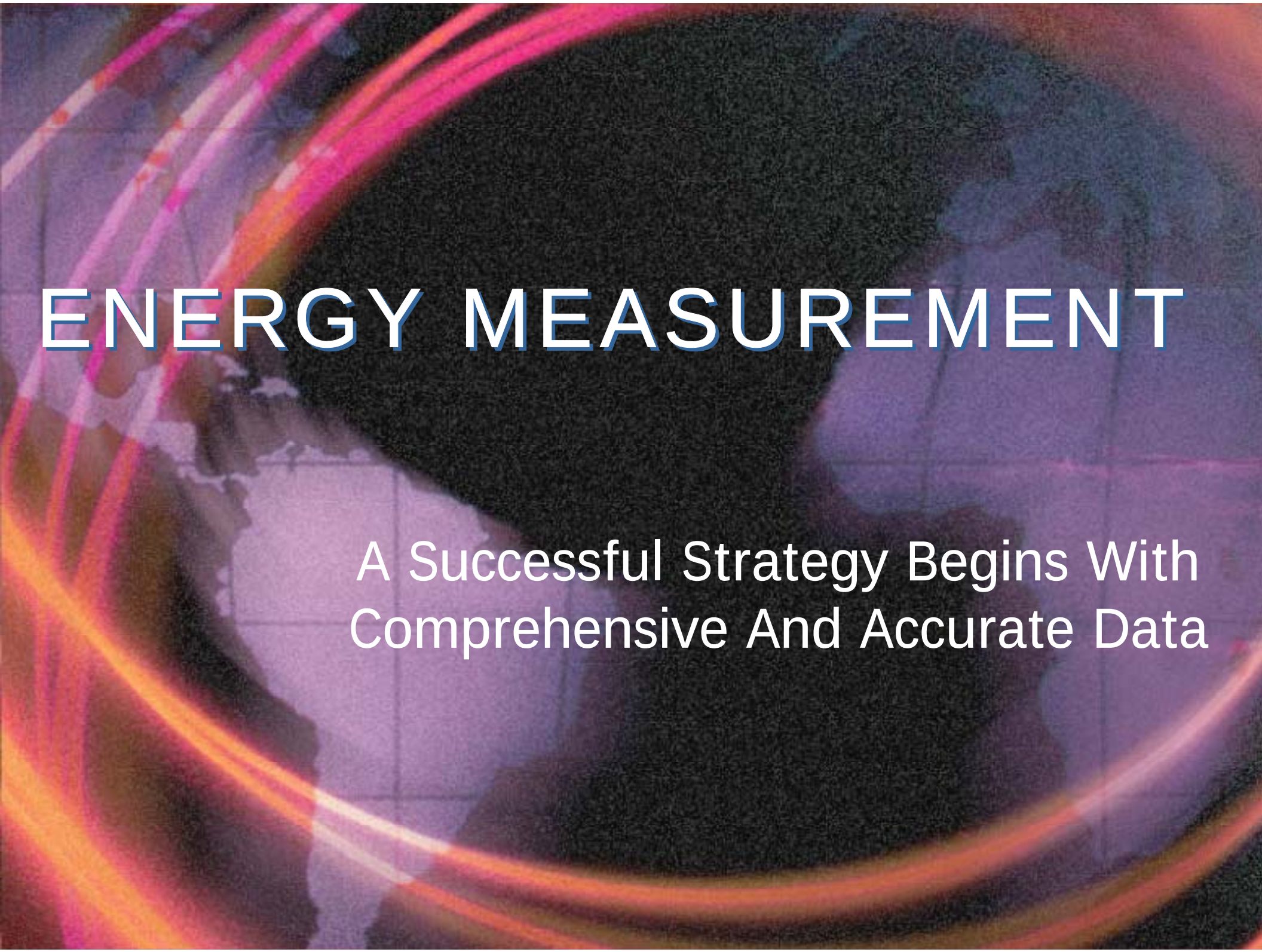

ENERGY MEASUREMENT
A Successful Strategy Begins With
Comprehensive And Accurate Data

ENERGY TRIAGE

Assess The Current Situation (data trending)

1. How much energy is consumed by the whole facility,
2. What systems or individual pieces of equipment are the major energy hogs,
3. How much energy are these components consuming,
4. When are they consuming the energy.

DENT Instruments, Inc.

Delivering Innovation and Excellence To Energy Professionals Around The World

DENT Instruments, Inc.

Tools For The Energy Professional

- ELITE*pro*™
- DATA*pro*™
- LIGHTING*logger*™
- MAG*logger*™
- CT*logger*™
- PLUG*logger*™

ELITE*pro*

Designed To Perform

- Load Profiling on critical panels and switchgear,
  - Sub-Metering tenants, process lines, etc.
- Measurement & Verification for capital upgrades,
- Energy Surveys to determine demand profiles,
- Demand & Power Metering to view physical characteristics of delivered electricity,
  - Substantiate energy savings.

ELITE*pro*

Measure – Store – Analyze:

Volts,

Amps,

Watts,

Volt-Amps,

Volt-Amps Reactive,

Kilowatts,

Kilowatt Hours, and

Power Factor.

ELITE*pro*

- Four channels of Current up to 6000 amps.
- Three channels of Voltage 0-600V ac or dc.
- Power Quality Features:
  1. View voltage, current & power waveforms,
  2. Calculate harmonics through 63rd,
  3. Report total harmonic distortion (THD), Crest Factor & Peak Voltage & Current.

ELITE*pro*

- Monitor Simultaneously;

1. Up to four single-phase loads, or
2. Two three-phase Delta loads, or
3. One three-phase Wye load.

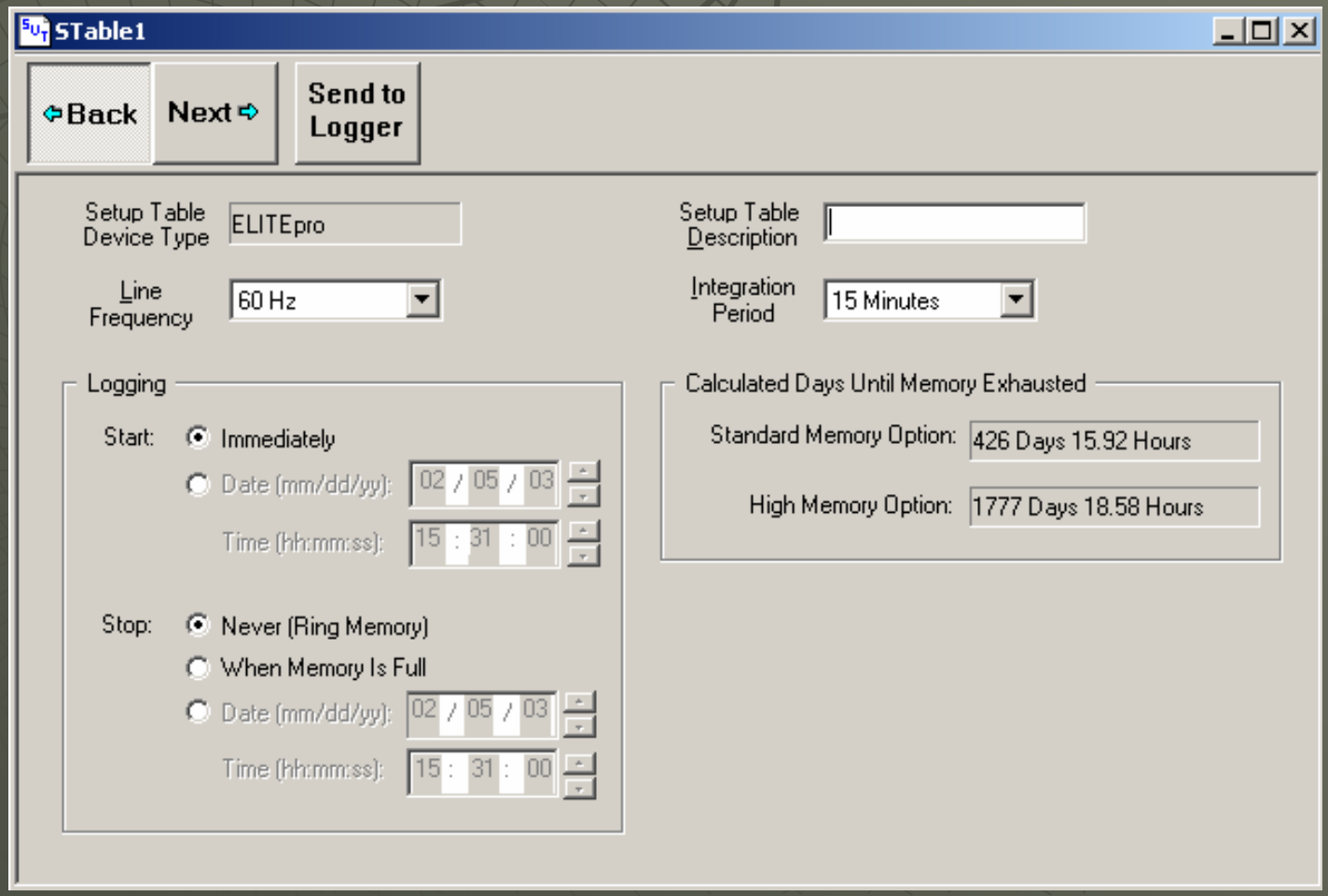
A total of 144 separate measurement parameters.

ELITE*pro*

- Powered by internal battery or external power transformer.
- Internal memory to 25,000 or 100,000 records.
- Sampling Rates;
  1. Waveform Sampling – 128 times per cycle,
  2. Analog Sampling Rate – 3 sec's on DC power, 1 min. on battery,
- Communication Options;
  1. Direct serial connection,
  2. Ethernet (wired or wireless),
  3. Land or Cellular phone lines.

ELOG *Software Features*

Logger Set Up Table

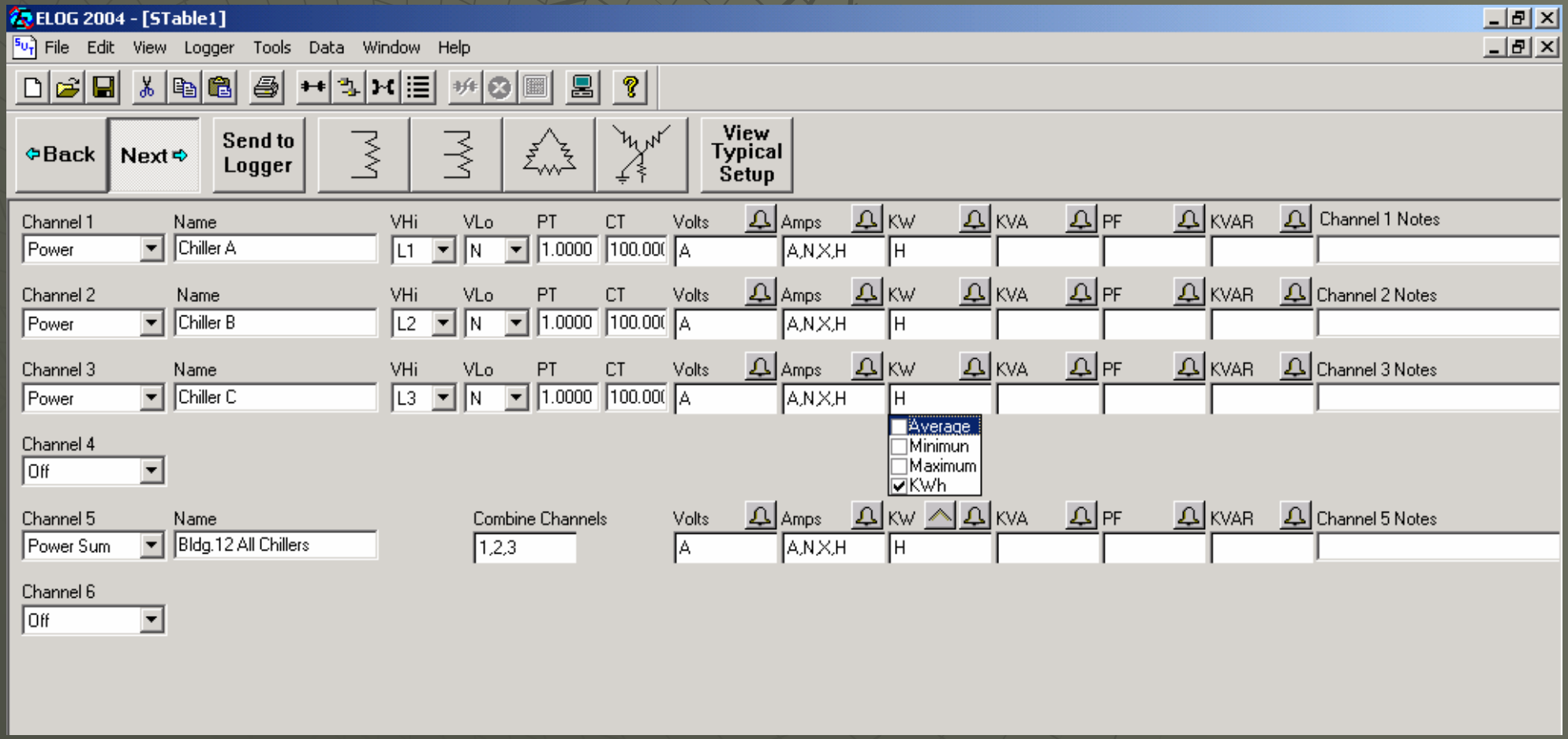


ELOG *Software Features*

Channel Setup

1 to 4 Power Channels

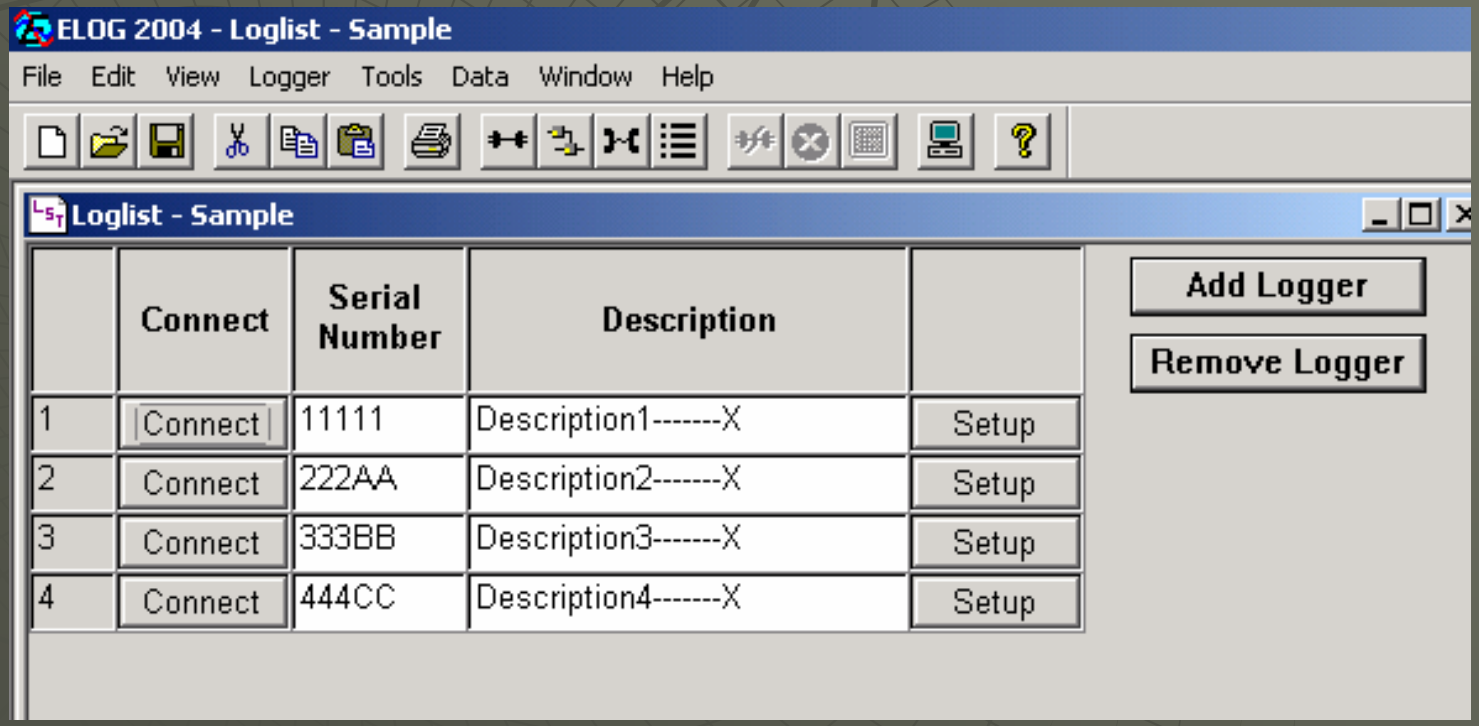
2 Power Sum Channels



ELOG *Software Features*

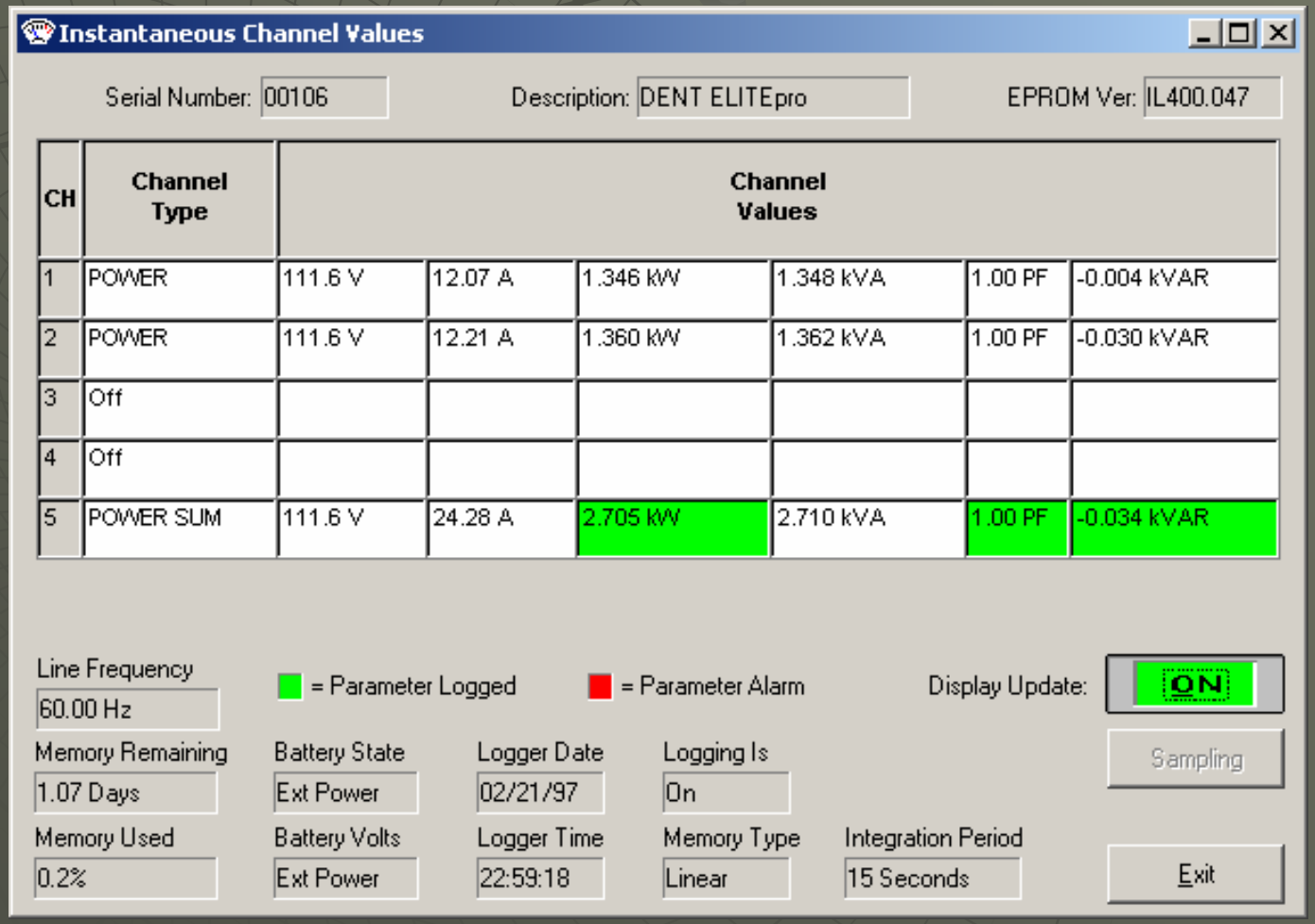
Communication

Logger List for networks with multiple loggers

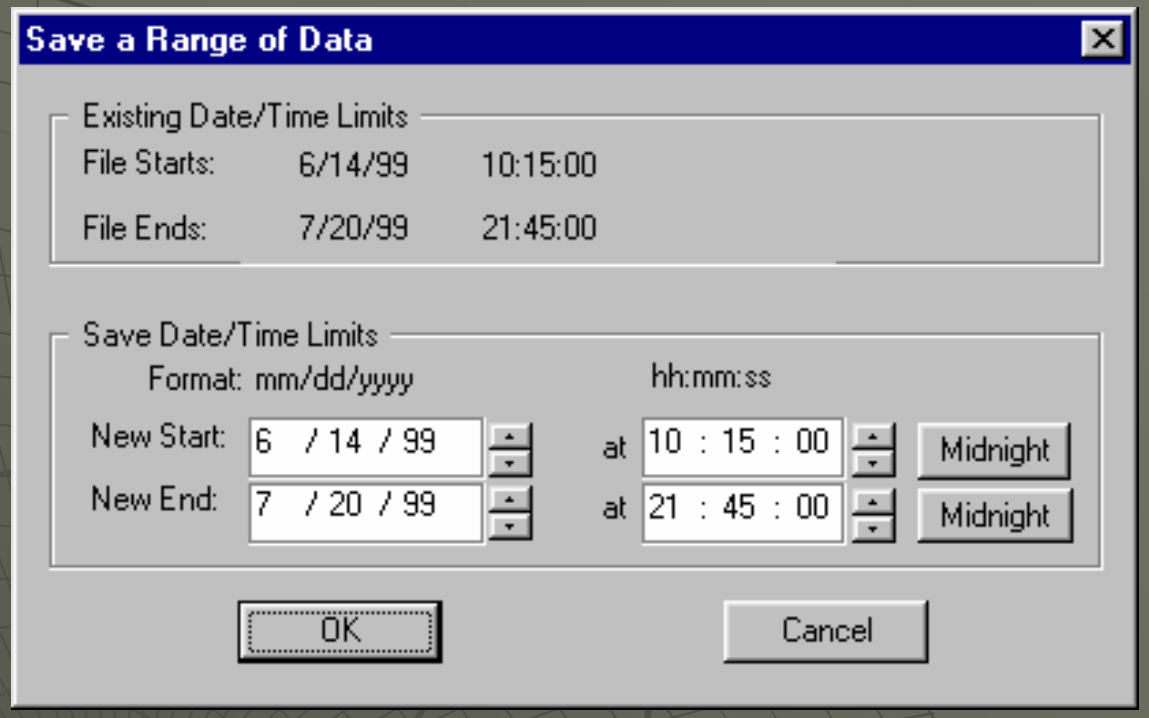


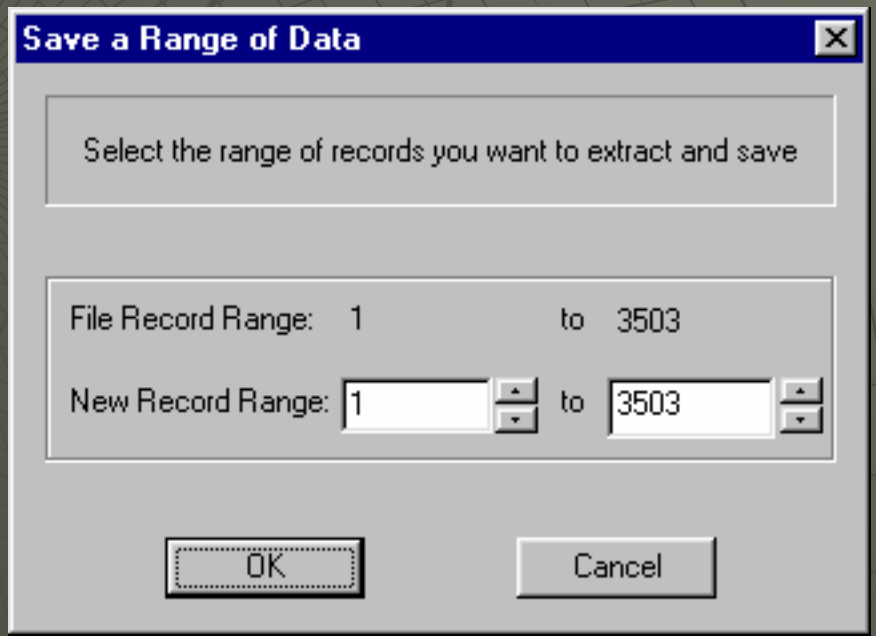
ELOG *Software Features*

Display Present Readings



Extract A Range of Data





ELOG *Software Features*

Viewing A Data File

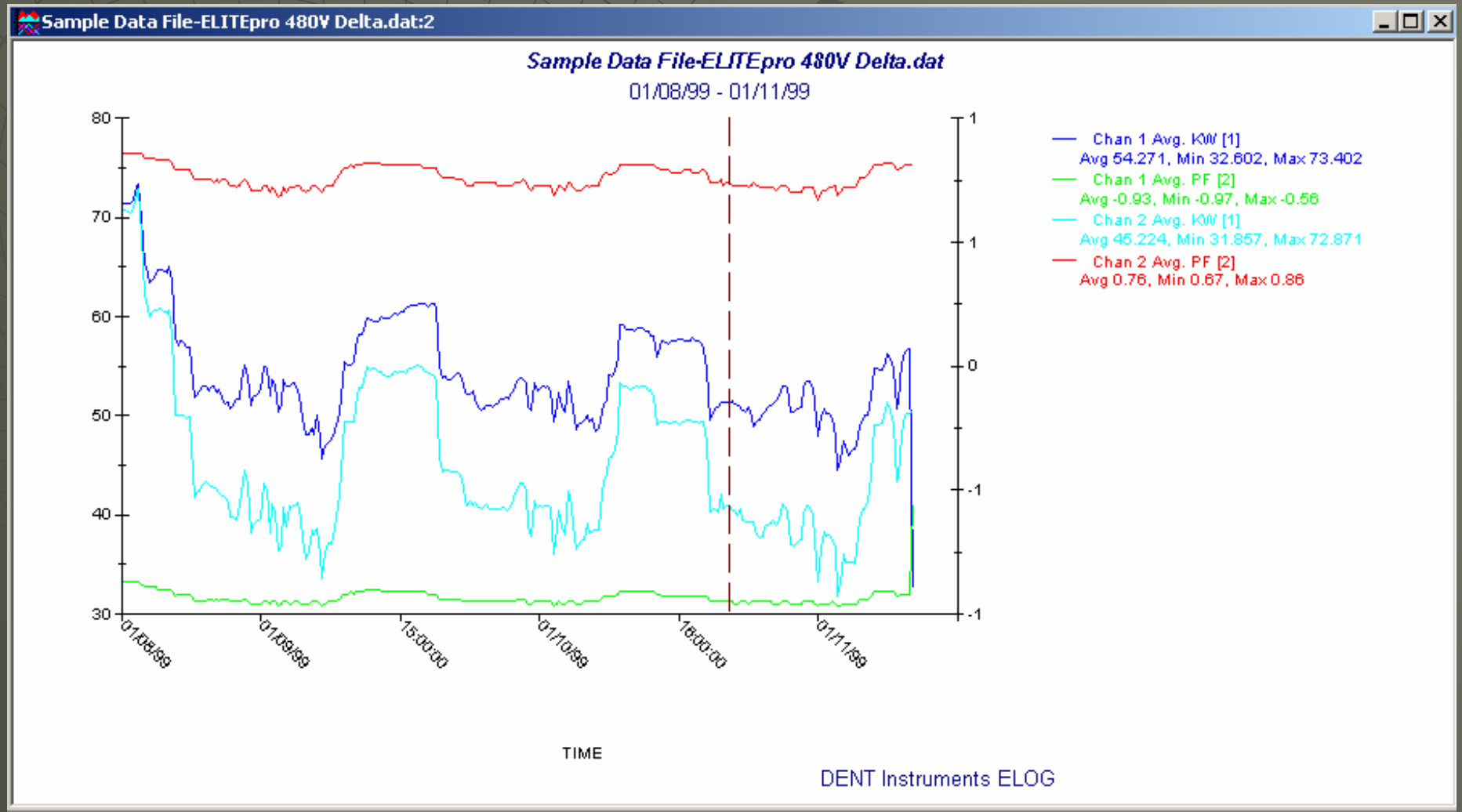
	Record Date	Record End Time	Chan 1 Avg. Volt	Chan 1 Avg. Amp	Chan 1 Avg. KW	Chan 2 Avg. Am
1	06/14/99	10:15:00	227.9	198.75	11.196	221.58
2	06/14/99	10:30:00	228.1	191.74	11.310	224.82
3	06/14/99	10:45:00	230.4	216.91		
4	06/14/99	11:00:00	225.7	217.90		
5	06/14/99	11:15:00	226.4	218.89		
6	06/14/99	11:30:00	231.3	218.62		
7	06/14/99	11:45:00	221.6	226.65		
8	06/14/99	12:00:00	230.1	223.47		
9	06/14/99	12:15:00	229.4	228.90		
10	06/14/99	12:30:00	228.5	241.45		
11	06/14/99	12:45:00	231.9	238.75	14.645	246.94

Analysis Functions

- Average
- Load Factor
- Maximum
- Minimum
- Total
- Graph
- Daily Profile Graph
- Daily Profile Data Points
- Extract a Range of Data

ELOG *Software Features*

Create A Graph



Data File Summary

Data File Name: 00000-01.dat
First Data Record End Time: 02/02/04 12:55:15
Last Data Record End Time: 02/02/04 12:58:30
Monitoring Period Duration: 0.00 day
Peak Demand: 277.002kW on Monday 02/02/04 at 12:55:00
Total Usage (Channel 5): 11kWh, 15kVAh, 0kVARh
Total Usage (Channel 6): 0kWh

Average	Maximum (Date Time)	Minimum (Date Time)	Total
Chan 1 Avg. KW 112.373	151.521 (02/02/04 12:55:30)	98.160 (02/02/04 12:58:15)	1573.228
Chan 1 Avg. PF 0.75	0.76 (02/02/04 12:58:15)	0.73 (02/02/04 12:55:30)	10.52
Chan 2 Avg. KW 113.959	153.113 (02/02/04 12:55:15)	99.800 (02/02/04 12:56:30)	1595.427
Chan 2 Avg. PF 0.75	0.77 (02/02/04 12:57:45)	0.73 (02/02/04 12:55:30)	10.53
Chan 5 KW Hours 0.943	1.269 (02/02/04 12:55:30)	0.825 (02/02/04 12:58:15)	13.204
Chan 5 Avg. KVA 301.104	416.661 (02/02/04 12:55:30)	259.440 (02/02/04 12:58:15)	4215.459
Chan 5 KVAR Hours 0.068	0.075 (02/02/04 12:56:45)	0.053 (02/02/04 12:55:30)	0.958

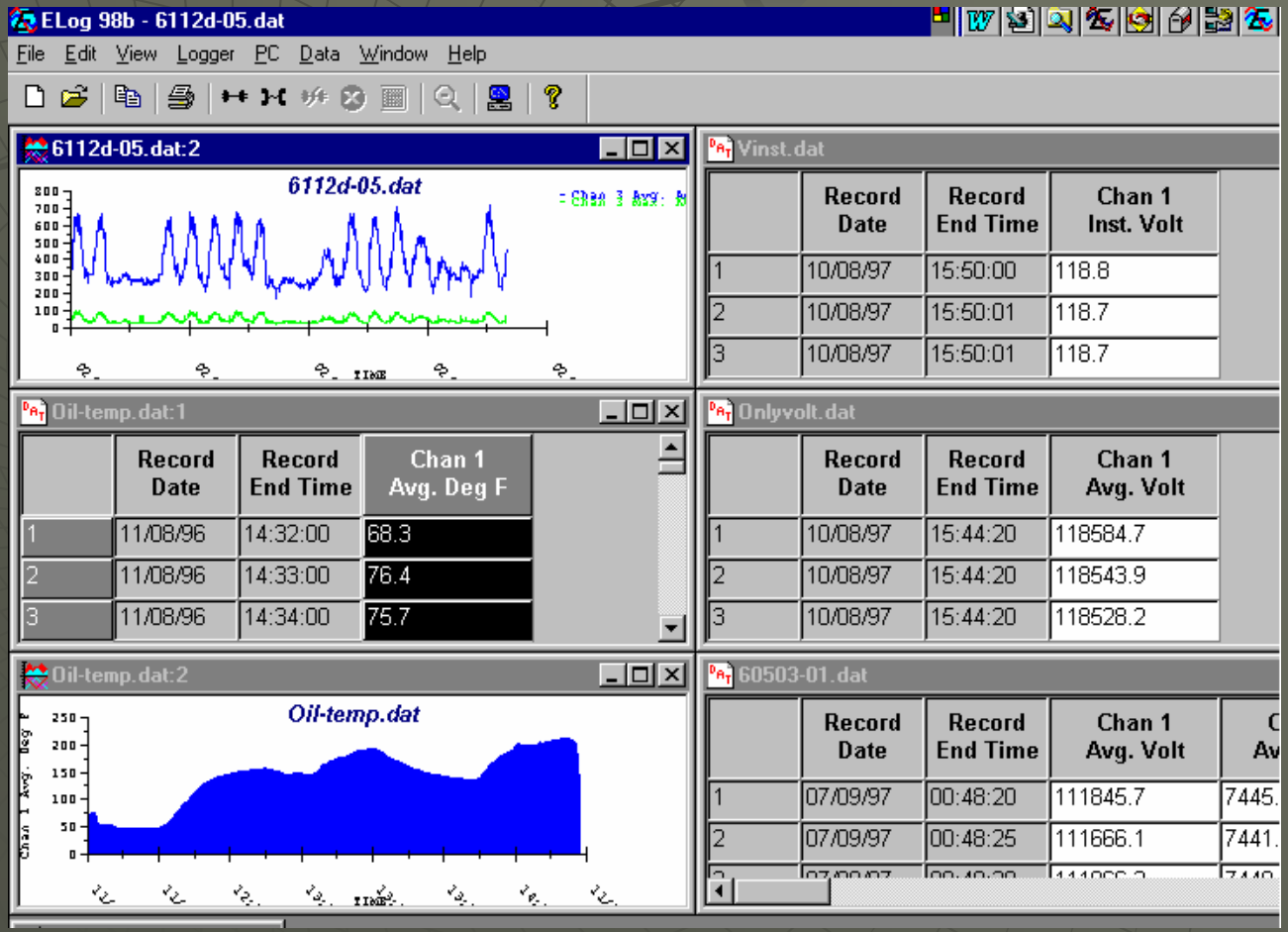
Setup Summary

Setup Table Description:
Channel 1 - Power: VHi: L1, VLo: N; PT = 100.000; CT = 150.000
Channel 2 - Power: VHi: L1, VLo: N; PT = 100.000; CT = 100.000
Channel 5 - Power Sum: 1,2
Memory Type: Ring
Line Frequency: 60 Hz
Integration Period: 15 Seconds
Channel 5 Peak kW Demand Window: Moving, Width = 1 minutes
Logger Summary

Logger Description Line: DENT ELITEpro Logger
Logger Serial Number: 00000
Logger type: ELITEpro
Firmware Version: IL400.057

ELOG *Software Features*

Multiple Window Display



PROVEN APPLICATIONS

- University of Illinois
- U.S. Navy – Fleet Operations
- Newark Transit Authority
- Jefferson County School District, Denver CO.
- Ft. Lewis Army Base
- Conoco-Phillips
- Black Hills Power, South Dakota
- Trane, Global Controls & Contracting Division
- University of Washington
- TXU
- Lawrence Livermore National Labs
- E & J Gallo Winery
- Bonneville Power Administration
- Pacific Gas & Electric

DATA*pro*

We Don’t Make The Sensors You Use – We Make The Sensors You Use Smarter.

DATA*pro*

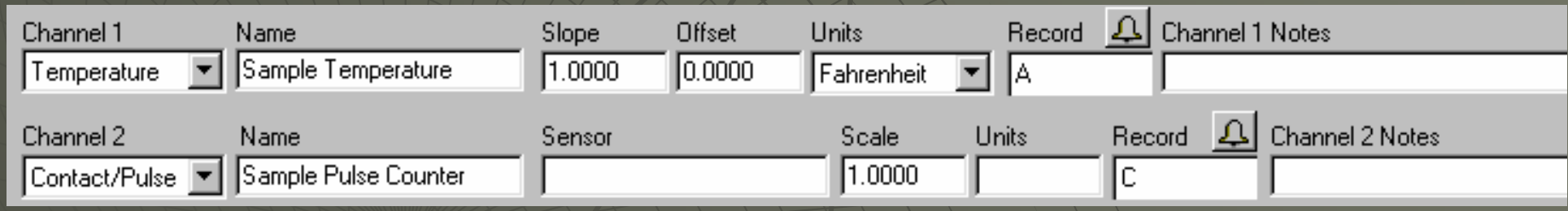
All DATApros Have 4 Input Channels To Fit A Variety of Measurement Applications;

- 1T/3P 1- temperature channel & 3 pulse counters,
- 2T2P 2- temperature channels & 2 pulse counters,
- 4T 4- temperature channels,
- 4C 4- AC current measurements,
- 4M 4- 0-25ma or 4-20ma inputs,
- 4V 4- 0-10Vdc inputs,
- 4P 4- pulse counters.

DATA*pro* Software Features

For Temperature & Pulse Loggers

(Models 1T/3P, 2T2P, 4T, 4P)



DATApro Software Features

For 4-20 and 0-25ma Loggers

(Model 4M)

DATA*pro* Software Features

For AC Current Loggers

(Model 4C)

DATA*pro* Software Features

For DC Voltage Loggers

(Model 4V)

PROVEN APPLICATIONS

- Siemens Building Technologies
- Sea-Tac Airport, Seattle
- Kema / Xenergy
- Los Angeles Department of Water & Power

SMART*loggers*

Single Channel, On-Off Data Loggers

Time-Of-Use and Operating Schedule Information

SMART*loggers*
Three Models

- **LIGHTING*logger***, Model TOU-L for monitoring lights.
- **MAG*logger***, Model TOU-M for monitoring electric motors, compressors, computers, or any device generating a magnetic field.
- **CT*logger***, Model TOU-CT-S for monitoring electric load status using a clamp-on probe.

SMART*loggers*
FEATURES

- Ease of Installation, no wires to connect.
- No Electrical Knowledge Necessary to install.
- No computer needed for set-up.
- Easy to use software for analysis and graphing.
- Largest Internal Memory in Industry, 8,192 transitions.
- Longest battery life in industry, 10 years.
- Built-in durability with a 3 year warranty.

SMART*ware* Software Features

- Windows Based,
- Graphically displays recorded data,
- Total On-Time Rate Schedule Graphs and Summaries,
- Load Profile Graphs,
- Summary Statistics and Time Series Analysis,
- File Aggregation,
- Data File Exporting.

SMARTware Software

Example of Summary Report

Data File Name:		F:\Data\40131001.log
Logger Serial Number:	930922-364	
Description:	Television	
Logger Reset:	11/28/98 2:39:10 PM	
Data Starts:	11/28/98 2:39:10 PM	
Data Ends:	1/31/99 7:20:13 PM	
Total Elapsed Time:	1540.68	hrs
On-Time since Reset:	582.5	hrs
Number of Turn-Ons:	216	
Percent On:	37.8 %	
Total On-Time:	582.56	hrs
Average On-Time:	2.70	hrs
Longest On-Time:	14.53	hrs
Shortest On-Time:	< 0.01	hrs
Number of Turn Off's:	215	
Percent Off:	62.2 %	
Total Off-Time:	958.12	hrs
Average Off-Time:	4.46	hrs
Longest Off-Time:	69.69	hrs
Shortest Off-Time:	< 0.01	hrs

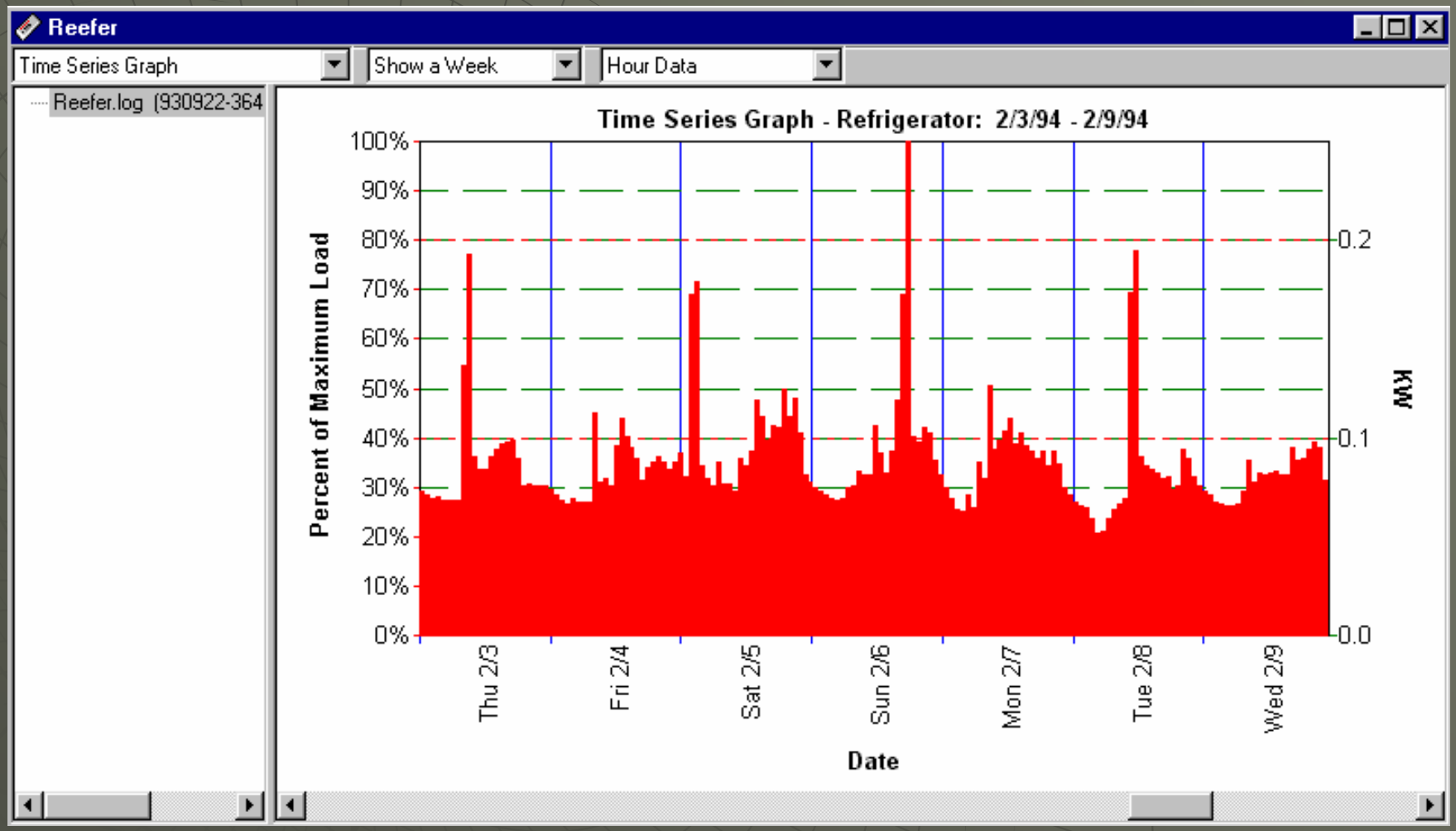
SMARTware Software Transition Data Points

	Date	Time	Transition
1	11/28/98	2:39:10 PM	Was ON
2	11/28/98	4:28:35 PM	Turned OFF
3	11/28/98	8:02:09 PM	Turned ON
4	11/28/98	11:30:54 PM	Turned OFF
5	11/29/98	7:35:41 AM	Turned ON
6	11/29/98	7:35:43 AM	Turned OFF

SMART*ware* Software
Time Series Data Points

Date	Starting	Ending	Percent On
11/28/98	2:45:00 PM	2:59:59 PM	100.0%
11/28/98	3:00:00 PM	3:14:59 PM	100.0%
11/28/98	3:15:00 PM	3:29:59 PM	100.0%
11/28/98	3:30:00 PM	3:44:59 PM	100.0%

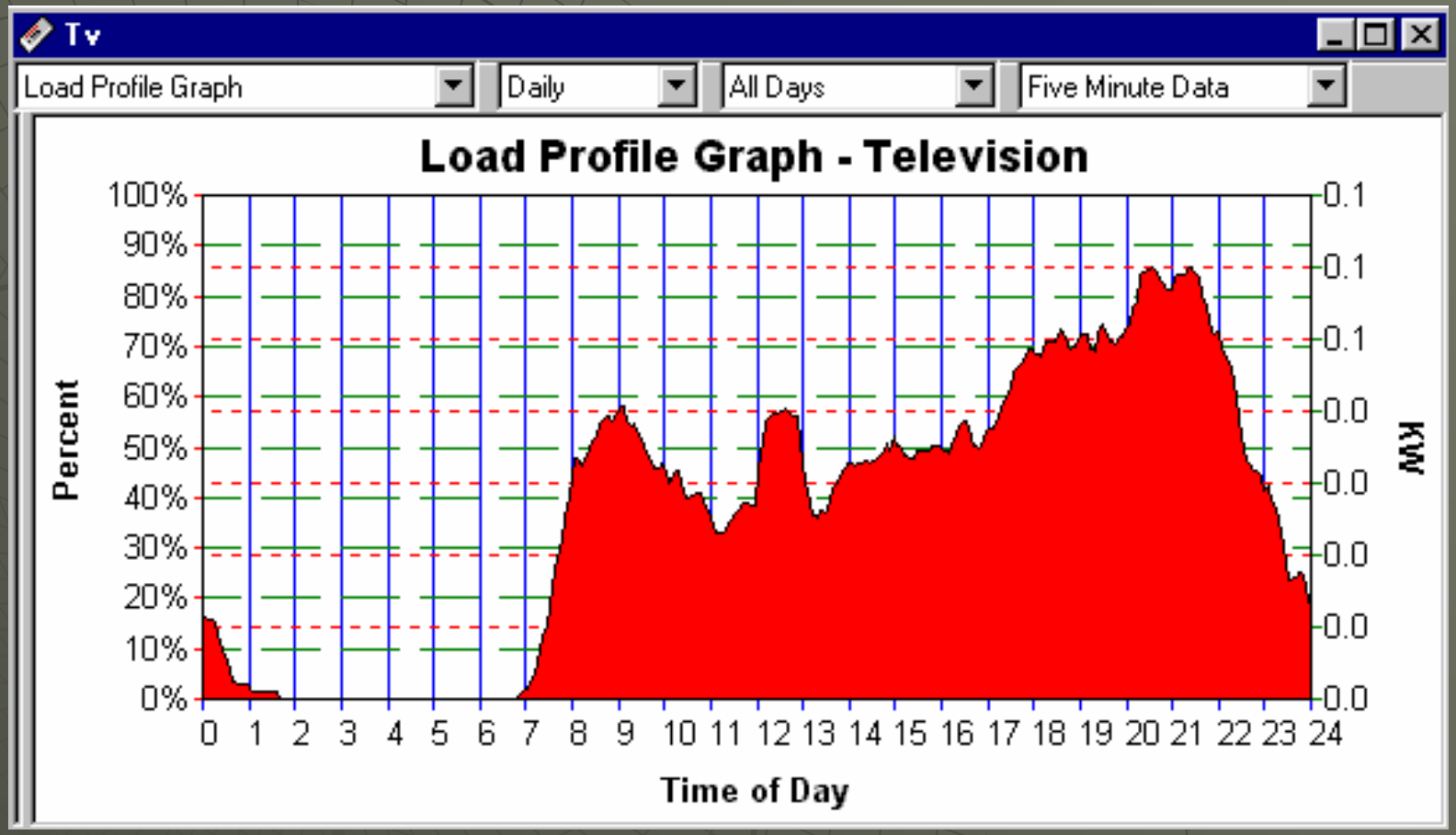
SMARTware
Time Series Graph



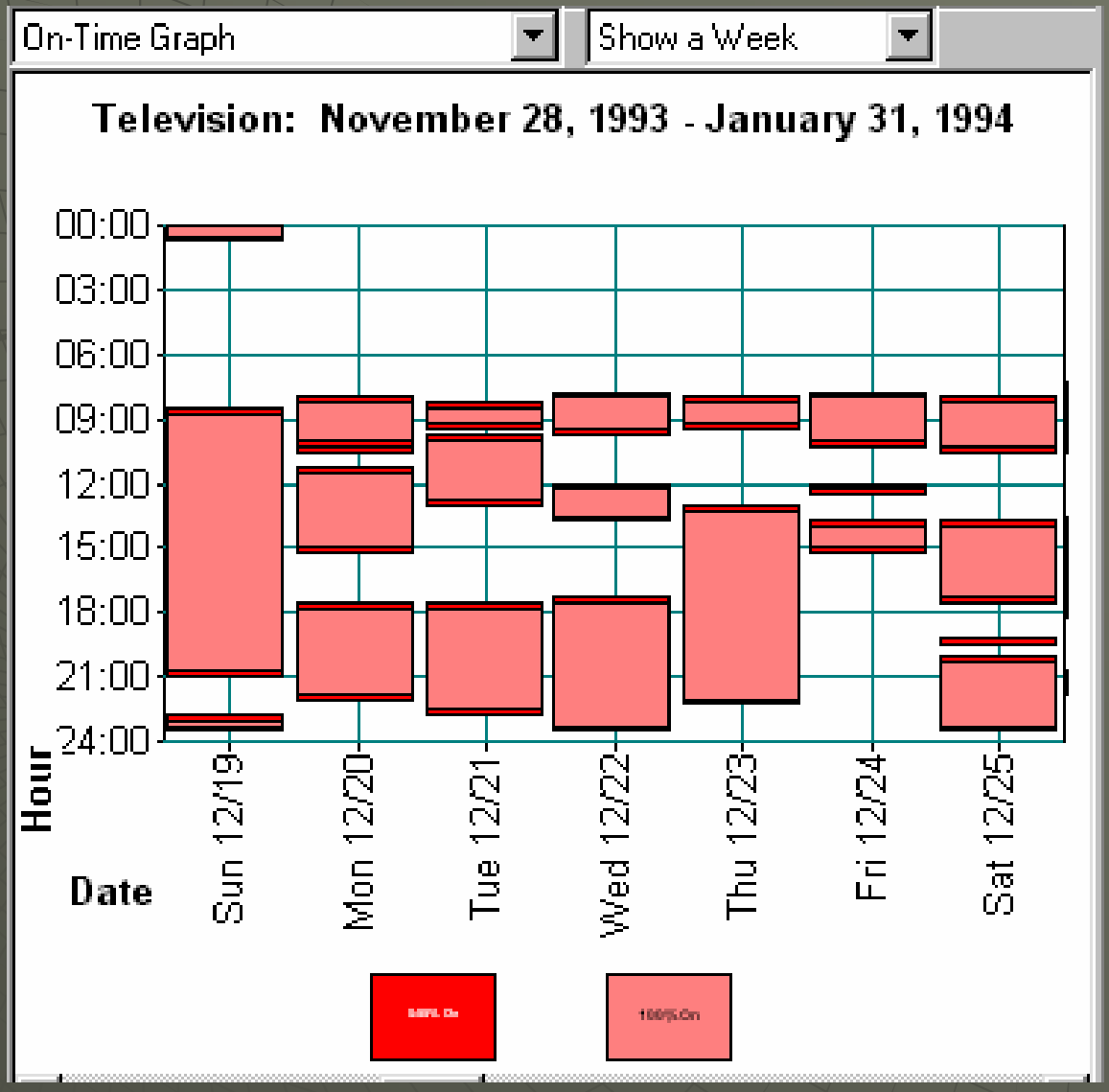
SMART*ware* Software
Load Profile Data Points

Starting On	Ending Off	Percent
7:00:00 AM	7:59:59 AM	19.0%
8:00:00 AM	8:59:59 AM	51.8%
9:00:00 AM	9:59:59 AM	51.4%
10:00:00 AM	10:59:59 AM	41.7%
11:00:00 AM	11:59:59 AM	36.0%

SMARTware
Load Profile Graph



SMARTware
On-Time Graph



PROVEN APPLICATIONS

- Cornell University
- Xenergy
- B.C. Hydro
- Long Island Power Authority
- Boeing

PLUG*logger*

Simple, Versatile, Compact & Convenient Measurement of 110V Plug Loads

Total Energy Cost of The Load,
Look Ahead Predicted Average Monthly Energy Cost,
Look Ahead Predicted Yearly Energy Cost,
Total Hours of Monitoring,
Line Voltage,
Current Draw of Load,
Power Draw in Watts,
Volt-Amps Drawn by The Load,
Displacement Power Factor,
Total Kilowatt-hours Consumed by The Load.

PLUG*logger*
FEATURES

- No Wires To Connect,
- Non-Volatile Flash Memory,
- Easy Reset,
- Settable Utility Rates,
- Compact,
- Durable Construction,
- Attractive Look.

PROVEN APPLICATIONS

- State Community Action Programs
- Florida Power & Light
- Madison Gas & Electric
- Milliken
- Wright-Rundstad, Seattle

DENT Instruments, Inc.

- Post Sales Support

  - Warranty
  - Tech Support
  - Factory Upgrades
  - Software Enhancements

DENT Instruments, Inc.

- Seventeen Years Of Meeting The Needs Of Energy Professionals.
- Hundreds Of Long-Term Clients.
- Hundreds Of Peer Recommendations.
- Thousands of Instruments In The Field.