

Low Cost Portable Energy Audit Tool

The aim is to design & develop the instrument suitable for the energy auditors to log various parameters in industries. This will enable them to show the real time data and demonstrate the concepts of energy savings proposal.

Need/ relevance of the Technology:



For establishing baseline data associated with energy saving proposals, real time measurement of electrical energy and other physical parameters over a period of 24 hrs to 10 days is necessary. Almost all energy auditors are only concentrating on giving energy saving proposals without establishing the base-line data as affordable real-time measurement and logging equipment for the

above purpose is not available. In order to carry out effective energy audit studies, low cost equipment of this nature is very essential. This will enable them to show the real time data and demonstrate the concepts of energy savings proposal

The recent developments in embedded multitasking microcomputer modules with built-in RTC, ADC, Flash & RAM memory, SPI bus and inexpensive single chip IC's for comprehensive measurement of electrical parameters make it possible to now to develop this tool & sell at affordable cost. The logged data can be downloaded into the computer for data reports etc.

Technical description of the instrument:

The Portable Energy Audit Tool (PEAT - 1481) designed & developed by CSIO has the following main features:

- 1-channel of 3 ϕ Power & Energy Measurement,
- 4-channels of Analog Inputs,
- 8-channels of Digital Inputs and
- 1MB of RAM.

Hardware Features:

- ✓ Built-in Flash memory (512kB) & RAM of 1 MB.
- ✓ Inbuilt Real Time Clock with battery backup.
- ✓ LCD Display with 4 line & 20 characters with Backlight.
- ✓ 4 – Keys Membrane Keypad.
- ✓ Battery operation for the entire unit to make it portable.

Measurements:

- 1 channel of 3- ϕ Energy measurement (with time stamps)
 - Phase & Line Voltage
 - Line & Neutral Current
 - Individual phase power factor and equivalent power factor
 - Phase wise KW, KVA, KVAR
 - KWH, KVARH, Frequency
 - Maximum Demand
- 4 channel of (4 - 20) mA Analog Inputs for the measurement of parameters like Temperature, Pressure, Speed, etc.
- 8 channel of Digital Inputs

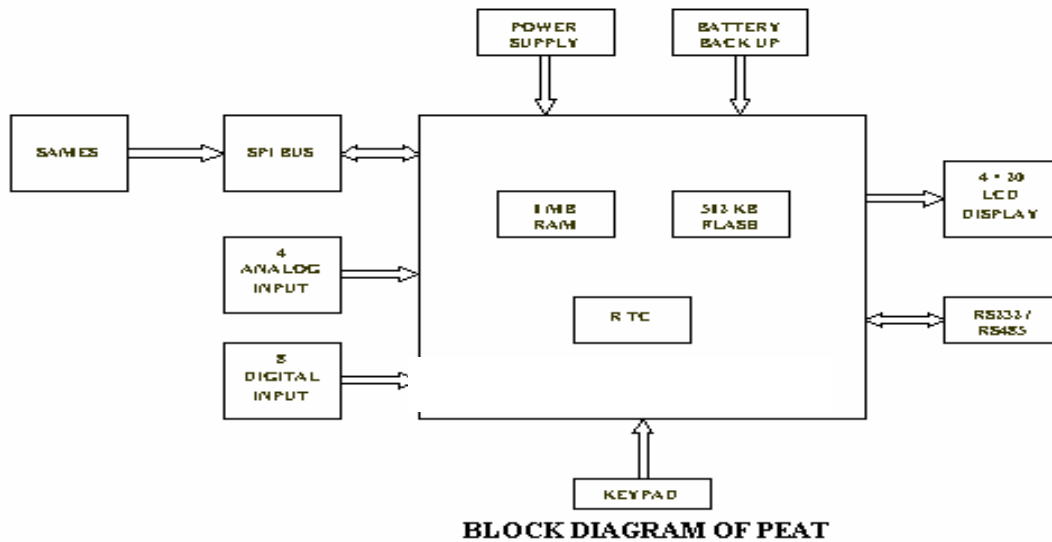
Software Features:

- ✓ Downloading algorithm using the standard MODBUS communication protocol.
- ✓ Storing of information into the MS-ACCESS database.
- ✓ Export data to MS-EXCEL or CSV or TEXT format for data exchange.
- ✓ Off-line trend graph, bar & Pie chart using the downloaded data.
- ✓ On-line accessing of the data from the PEAT for display and graph.
- ✓ Printing the data table and graph.
- ✓ Real- time recording of data collection from PEAT and real-time chart recording.
- ✓ Recording threshold, raising alarm and annunciation.
- ✓ Remote Configuration of the PEAT from the PC.
- ✓ Selection of parameters for the PEAT from the PC.
- ✓ Clearing the Memory Content of PEAT from PC.
- ✓ Statistical analysis of the data (min, max, Std, mean etc., start and stop time).

Data Logging & Storage Features:

- ✓ Storing of information with an interval of 1min for 200 hours. (more than 8 days)
- ✓ User selectable monitoring & logging intervals.
- ✓ Storing of all or only selected parameter information
- ✓ Serial interfacing for Downloading to PC via RS232 / RS485.

Block Diagram of the PEAT:



Technical Specifications:

Hardware:

Voltage Inputs:	270 V rms (max)
Current Inputs:	Clamp-On CTs with 330mV rms (max)
Analog Input Range:	4-20mA DC
Digital Inputs:	0 / 24 V DC

PC Requirements:

Processor:	Pentium III or above
RAM:	64MB or above
Working platform:	Windows 98/ 2000/ XP
Others:	One free COM port

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