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Electrosoft: Software Solutions to Power Supply

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Abstract*: This paper is an application where the development of such a software is discussed which can schedule any kind of electrical power supply, whether it is A.C. or D.C., to minimize the electric consumption due to human errors. It can be used in large organizations to schedule their electronic device which consumes more electric power as well as small scale organizations to schedule their electric devices.
Keywords: electricity scheduling, scheduling software, electricity automation, automatic power supply

I. INTRODUCTION

The purpose of Electrosoft is to provide such software which saves electricity by scheduling the devices and minimizing the human mistakes.

A. The software is for automation of power supply of electronic devices.
B. To schedule power supply for electronic devices, this may or may not have embedded scheduler.
C. To save the electric power due to human errors which are likely.
D. To maintain centralized control for number of devices.
E. To provide only Administrator level control.

The software includes
Maintaining the time scheme for the devices.
Provides quick information of device status.
Provides a user friendly glossy interface.
Password protected entry & exit.

II. NEED OF ELECTROSOFT

Electricity is one of the major resources in development of human welfare, this innovation is a product which can schedule the power supply for electric and electronic devices and named as ELECTROSOFT. The ELECTROSOFT is based on the concept of automated scheduling which in turn provides electric power (A.C/D.C.) to respective electronic devices at the specified time intervals, mentioned in the software, installed in a Computer System, by the user through system ports.

As we know that there is no such software product exists in the market which can schedule the power supply of electronic device through system software. Using this device one can preset the time of an electronic device on which it is scheduled; the supply is switched on during that particular time interval and automatically switched off after the session. This product is valuable from an individual to large organizations thus benefiting the nation in every aspect.

III. MOTIVATION

According to IEA (2009) worldwide 1.456 billion people do not have access to electricity, of which 83% live in rural areas. Also India has a large part of their rural population without access to the electricity.

So what this project will contribute is that, apart from increasing our electricity generation capacity we have to save the electricity at every possible level & utilizing it towards the rural areas. Also it will reduce the wastage of electricity, by proper scheduling.

IV. BACKGROUND OF THE PROJECT

The project POWER SUPPLY SCHEDULER is an ambitious project. It will significantly save the Resources which is the need of the hour. If the project is implemented on a large scale, it will surely reduce the annual electric consumption of a nation.

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Also, in an organization it can manage the power routine of some common electronic devices like Lights, fans, Air conditioner etc. It can help in Colleges, Universities and schools to schedule their Hooters or Sirens, Mobile Jammers, Loudspeakers & Security cameras.

From national aspect, it can be used to manage the electric power of street lights of a certain landscape by setting the time in the Electrosoft. The nationwide Electrosoft, if successful, will permit the nation to fully realize the potential.

A. The Problem Definition

Problems with manual system are as follows

1) Due to human tendencies of forgetting tasks, making mistakes and possibilities of making errors, this will minimize the effect.
2) The time of accuracy of manually operating the switches of the devices may be low but POWER SUPPLY SCHEDULER will increase the efficiency.
3) Manually… controlling every device individually is complex and time taking, if the devices are a distance apart. We may keep a track on every device from a centralized point which is a major task in today's life.
4) Alteration and updating in scheduling is easily managed whereas in traditional system it was time taking.

B. Description of the Solution

The purpose of Electrosoft is to provide such software which saves electricity by scheduling the devices and minimizing the human mistakes.

1) The software is for automation of power supply of electronic devices.
2) To schedule power supply for electronic devices, which may or may not have embedded scheduler.
3) To save the electric power due to human errors which are likely.
4) To maintain centralized control for number of devices.
5) To provide only Administrator level control.
6) Prevents System to a normal shutdown till Electrosoft is running

V. METHODOLOGY

The principles of the object-oriented paradigm are the foundation for the construction of POWER SUPPLY SCHEDULER; our goal will be exploitation of the paradigm's encapsulation and inheritance properties, as well as benefits such as software reuse, fault containment, and reduction in complexity.

A. Development Agenda consists of 3 Stages

1) Construction of Software
2) Selection of appropriate hardware
3) Interfacing between the hardware and the software

VI. TECHNOLOGIES USED

The ElectroSoft is windows desktop application, developed in Microsoft Visual Studio 2008 using c#.net. ElectroSoft is targeted to DotNet Framework 3.5. The database for backend support used is MS Access.

A. Software Requirements

Development Platform: VISUAL STUDIO-2008
Programming Language: C#
Database Software: MS ACCESS DATABASE
Framework Software: DotNet Framework 3.5 or Higher

B. Hardware Requirements

Processor	:	Pentium III or higher.
Hard Disk	:	10GB or higher
RAM	:	256MB or more

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VII. DESCRIPTION OF THE SOFTWARE

After installation is complete, if the user enters a valid password then only user can access all the features of this software. Only one user (Administrator) is allowed to access the software with the facility to even change the pre-defined password provided with the software.

Project is related to turn ON/OFF any electronic or electrical device at a predefined time.

A. The Project's Major Functionalities are

1) Voice on events
2) Password protection
3) Hidden mode working
4) Single password protected quit control
5) Glossy attractive interface
6) Password Recovery Options
7) Database connectivity
8) Quick Desktop device status display
9) Automatic application launch service
10) Facilitates instant device disabling
11) Checkboxes to select the days of the week
12) Displays the current port's binary value

VIII. DESCRIPTION OF THE HARDWARE

The hardware of ElectroSoft is developed in two separate units in which each unit provides facility to control upto 4 devices, and by pairing, one can control upto 8 devices.

Below is the hardware screenshot to control upto 8 devices.

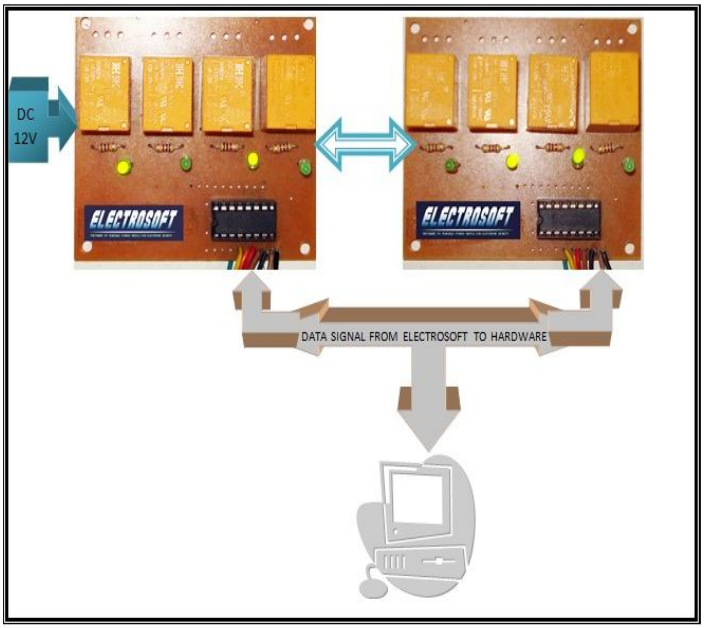

Figure 1 Snapshot of hardware prototype for interacting with parallel port

A. Components of Hardware for Circuit

Uln-2003
Parallel Port Male Connector
Relay
Other Basic Components (switches, wires, resistances, led etc)

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IX. IMPLEMENTATION DETAILS

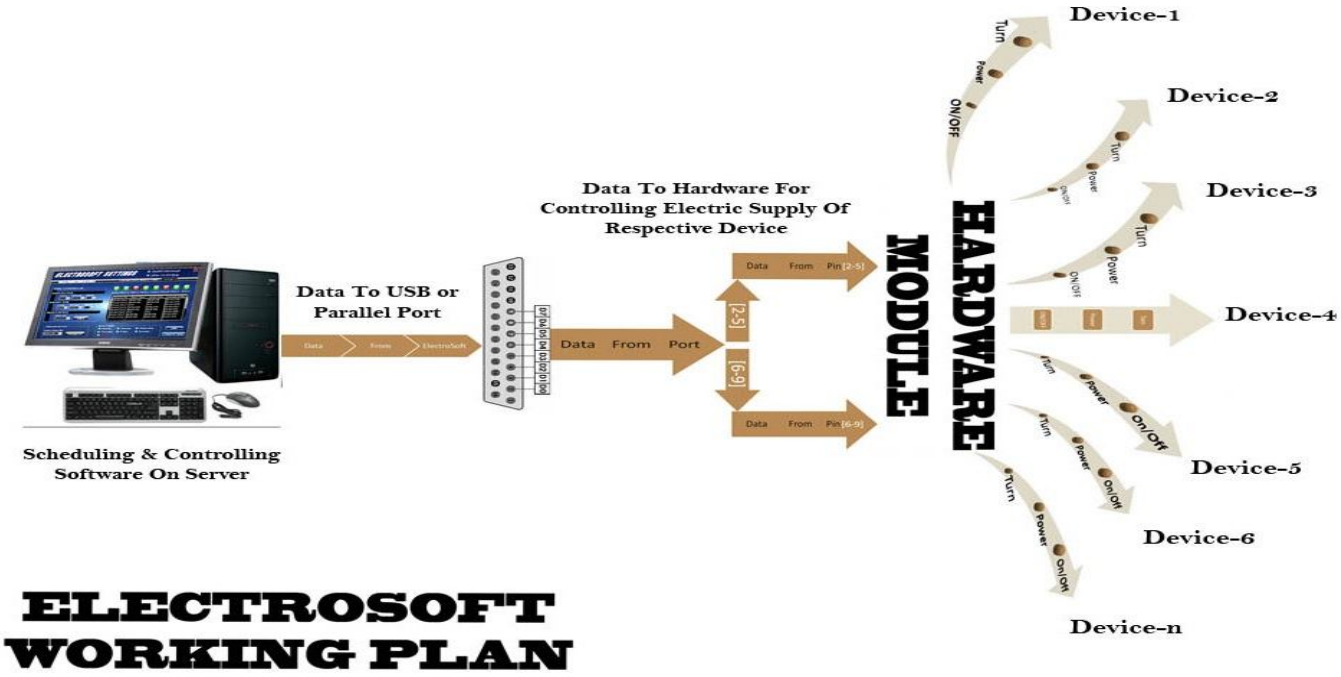

Figure 2 A block diagram for working of Electrosoft

B. Software Module

The software module contains only one user as the administrator or the user, who have the rights to change the scheduling settings of the connected devices. The administrator must have to provide the correct password to access the settings pan through which he/she can set the timing details of the different electric or electronic devices to enable its automatic turn ON and turn OFF functionality.

The software contains following GUI forms

1) *Login Form:* The login form facilitates the administrator to enter the valid password to access the electrosoft settings. It also gives the facility to change the password. The Contact us button provides you the details of the developer. The interface provides a button for terminating the login form.
2) *Change Password Form:* This screen allows the administrator to change the current password. Also it provides a button to GO BACK to the login screen.
3) *Main Settings Screen:* the electrosoft settings screen is the main control for the operation of devices to be scheduled. It provides facility to change time, enable Electrosoft, Hide Settings, Calendar Control, Day Selection, Device Current Status and some other settings.

   Major facilities provided by main screen:-

a) *Enable ElectroSoft Checkbox:*
   i) If the checkbox is checked only then the software c ontrols the devices using the scheduled time.
   ii) If the checkbox is unchecked, it means that the ElectroSoft is disabled and now the devices can be controlled manually.

b) *Show On Desktop Checkbox:*
   i) If checked, it will display the following gadget on the desktop continuously indicating the current status of the devices.
   ii) If unchecked the device status is not shown on desktop, but ElectroSoft is still working in Hidden Mode.

Figure 3 Snapshot **of desktop gadget**

Red circle: this shows that respective device is at off state.

Green circle: this shows that respective device is at on state.

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3) *Calendar Control:* It displays the calendar on main screen to provide the ease to select the time and day for scheduling.
4) *Current Port's Binary Value:* It indicates the value which the ElectroSoft is currently sending to the parallel port.
5) *Time Scheduler:* It allows the user to set the start time & end time for the selected device number to schedule it.
6) *Device Status Table:* This will show the description (Device No., Start & End time, Current status) of all the devices in tabular form.
7) *Turn Device Off:* It allows the user to turn off the selected device and also terminates the scheduling.
8) *Select Days:* Here the user can select the days on which the software has to work.
9) *Info Button:* The button displays the following screen which shows information about developer & the one developed for.
10) *Send To Tray:* This button sends the ElectroSoft to system tray but still ElectroSoft keeps working in the hidden mode & ElectroSoft icon can be used to retain the login screen again
11) *System Tray Menu:* This menu is shown when the user right-clicks on the ElectroSoft icon in the system tray. It provides following options
12) *Exit Option:* The exit screen is shown when the user clicks on "Exit" option in the system tray menu of ElectroSoft. Once the user clicks on "Exit" it will direct him to the following screen where the user has to enter the administrator password, for security reasons, to exit the entire application.

Info -> Contact Us Option: This option shows the details to contact the developers.

Info -> About Option: It shows a brief detail about the ElectroSoft and the details of organization for which it is developed.

X. COST EFFECTIVENESS

The manufacturing of the hardware of the ElectroSoft is simple & Under Budget.
The cost of hardware for an eight device controller ElectroSoft is shown in table:

S. No.	Component	Price(Rs.)	Quantity	Total
1	Relay(DC 12V)	15	8	120
2	Resistance(1k)	1	8	8
3	L.E.D	2	10	20
4	IC ULN-2003	50	2	100
5	Connecting Pins	8	2	16
6	Parallel Port Jack(MALE)	20	1	20
7	Connecting Wires	15/mtr.	2 mtr.	30
8	Transformer(12V)	85	1	85
9	PCB (4 Device)	40	2	80
10	Grand Total			479

Table 1 Table for cost of 8 device controller Grand Total = Rs. 479/-

XI. RETURNS

The returns expected through this project will be grater then the investment. The returns by this project are as follows:

A. Will save electricity
B. Reduce cost of man power
C. Centralised controlled
D. schedule power supply for electronic devices

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The venture could be converted into a profitable one if the concept is sought in bulk & we can assure you that people will be willing to pay for it

If ElectroSoft is launched in the market in a bulk production and that too with a monopoly market, for the time being, the organization developing the Electrosoft will surely get high profit.

XII. CONCLUSION, SCOPE & SOCIAL RELEVANCE

A. At Home

We all know that a human being tends to make an error, till date which has not been resolved anyhow so far. Household appliances which run on electricity like Air conditioners, Fans, Lights, Refrigerators, Television, Geysers and many more can be scheduled by ElectroSoft to work only at a specific time.

"What if all the devices are scheduled at once, through just a computer system, from one place "?

The solution to it is "The ElectroSoft". This can schedule the respective electronic devices from a single place and thus result into saving resources and electricity. i.e. If the devices are scheduled with their ON & OFF time, it will only consume the required amount of electricity and thus human errors will also be minimized.

B. At Organisation

Now, if we think it from an organization point of view, there is a computer system which works 24x7 which is called the SERVER. If ElectroSoft is installed in the Server, then power to every node or electronic device can be controlled by it centrally. This will also reduce the man-power in the organization and regulatory wages. The author can govern it centrally by saving his resources utilized and thus in turn slide profit.

Also, in an organization it can manage the power routine of some common electronic devices like Lights, fans, Air conditioner etc.

It can help in Colleges, Universities and schools to schedule their Hooters or Sirens, Mobile Jammers, Loudspeakers & Security cameras.

C. National Aspect

It can be used to manage the electric power of street lights of a certain landscape by setting the time in the ELECTROSOFT. Also it can be implemented in any running organization to schedule its power routine and thus reducing its electricity consumption.

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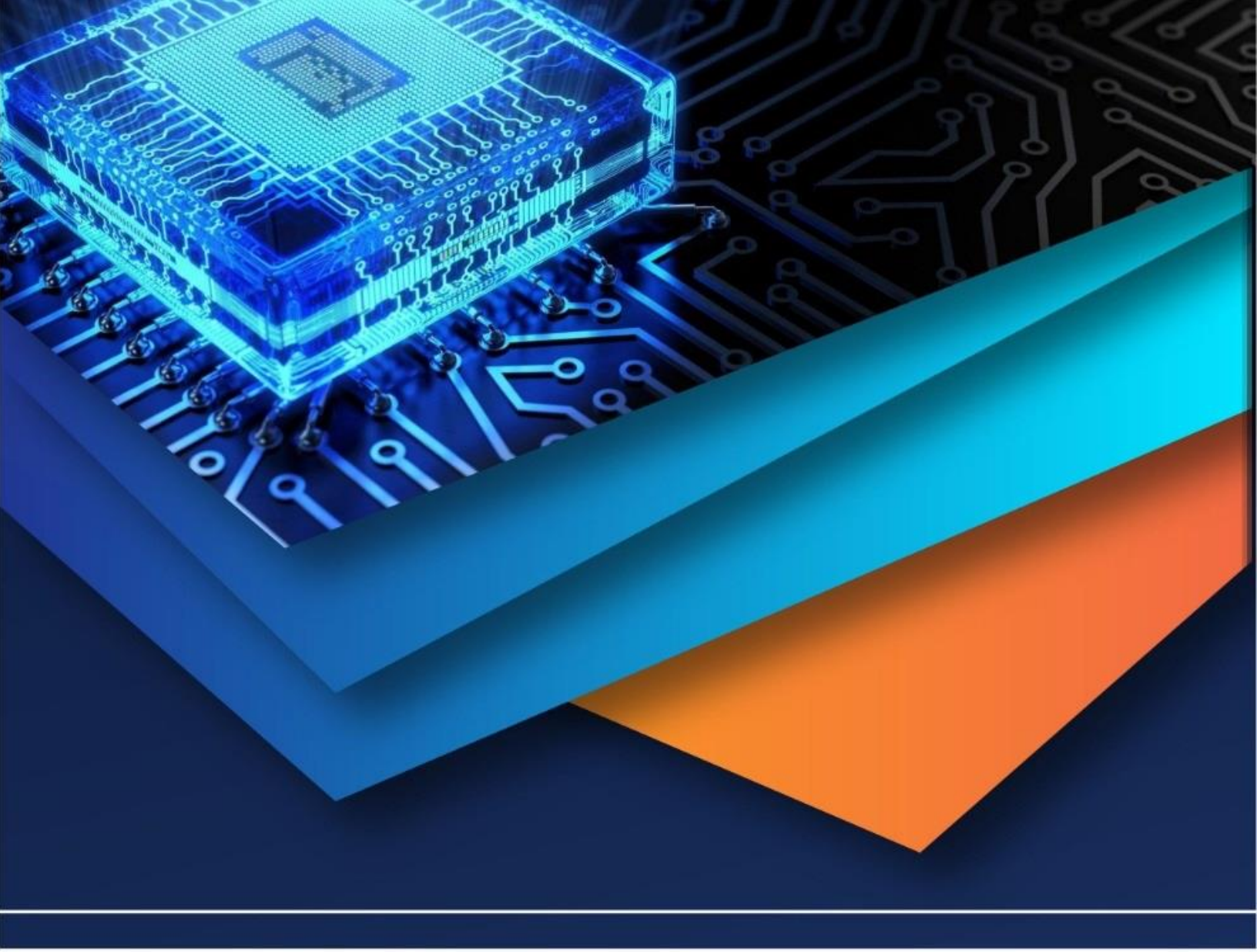

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