Control Software for Issue, Capture, and Distribution, of Electrical Energy

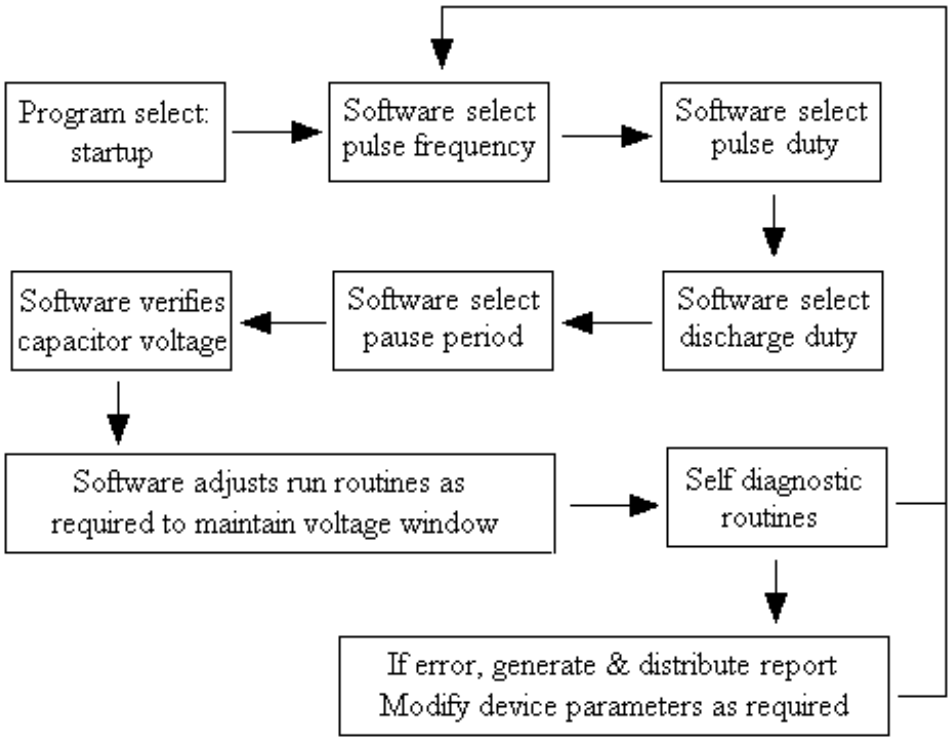
Abstract

Software for controlling the frequency and duty of an electromagnetic pulse, delivered typically, but not exclusively, into an air cored coil, rectifying the resultant ring down current into a capacitor, where generally a preferred voltage range is maintained. Further sub routines are used, to ensure the practical operation of the device, and render the proper distribution of the accumulated electrical energy to a target load.

References Cited

**** INSERT PRIOR ART SEARCH HERE ****

Figure 1: Schematic for outline structure of control software



FIELD OF THE INVENTION

The invention relates to the field of control software, whereby the physical operation of a device, and the nature of the effects therein manifested, may be easily and economically adjusted though relation to software routines. The software is designed to render application of the physical effect, both flexible and economical, in practical implementation.

BACKGROUND OF THE INVENTION

It is ordinary electrical knowledge that when circuits are first turned on, the current flow may be uneven before it is properly established, and voltage levels may fluctuate. In light of this phenomenon, practical circuits employ smoothing and filtering techniques, typically based upon well established grounding methodologies, to regulate any such electrical distortions. It is the purpose of this invention to make use of these electrical distortions for practical effect, most especially through the use of control software, for greatest flexibility of practical implementation.

BRIEF DESCRIPTION OF THE INVENTION

When initialized the software sets specific device frequency and duty pulse values, that when executed, manifest the desired physical effects. These values may remain fixed for the period of operation, or they may be dynamically altered, either following pre set routines, in response to sensor data, or specific commands, if this gains practical advantage.

Once the pulse is delivered into the coil, the back emf, or ring down current, is captured and rectified into a capacitor. This process again requires software intervention for optimal results, and the pause, or interval, period for the charge accumulated in the capacitor, may remain fixed for the period of operation, or be dynamically altered, either following pre set routines, in response to sensor data, or specific commands.

The software may also vary the period and duty of the discharge on both positive rail and negative rail, in order that the level of capacitor voltage be properly kept within a pre-determined target range. The duty and frequency of the discharge pulse may also be varied, as well as the period of the pause, or interval, between the discharge and charge pulses. Again, the values associated with these routines may be fixed when initialized, or may be actively managed by the software following pre set routines, in response to sensor data, or specific commands. The software also allows for the skip of the discharge pulse, for any number of times required to optimize the discharge cycle, in order that the total voltage within the capacitor might be increased, as regards the specific requirements of the target load. Again, the values associated with these routines may be fixed when initialized, or may be actively managed by the software following pre set routines, in response to sensor data, or specific commands.

From the capacitor, the accumulated charge may then be distributed to a working load, whether to charge a battery, run an electric motor, or other type is immaterial. Again, the software can dynamically control this process, by typically varying the duty of discharge pulse from the capacitor, although frequency adjustments are not excluded. This may be according to pre set routines, a dynamic response to sensor data, or specific commands.

In some configurations, it may be desirable to release a pulse back to the source battery, as well as the target load. This process may be managed passively or actively, in response to data supplied about the status of the source. The properties of the pulse, most especially in terms of duty and frequency, may also be varied by the control software, following pre set routines, in response to sensor data, or specific commands. Multiple loads, multiple outputs, and multiple sources, are not excluded from these arrangements.

The software is designed so that real time frequency and duty adjustments can be made such as to facilitate tuning of the coil, most especially during testing, allowing optimal frequency and duty values to be readily identified as regards the target application, and subsequently hard written into the registries, as required.

It may also be desirable to incorporate a degree of error correction into practical systems. These additions to the basic software offer to a certain extent, ability for the hardware to correct itself and repair faults. For example, a functional PWM output pin set might be able to bypass any malfunctioning PWM pin set. In this way, an element of redundancy may be incorporated into the software routines, for practical benefit.

To further ensure the practical operation of the device, it may be necessary for the capacitor to be periodically fully discharged. Again, this is a process that can be controlled by the software, according to pre set routines, sensor data, or specific commands.

Furthermore, to improve the practical utility of this invention, the software may dynamically monitor and log for analysis relevant data regarding the normal operation of the device, so that a known benchmark of operation is established. The software might also control the generation of an error report, such that could be distributed to a data collection point, via a variety of means, whether wireless, cable, or other, is immaterial, via a variety of protocols, whether typically TCP/IP, or other, is also immaterial.

In order to minimize power consumption, it may be advantageous for period and duty values described above and issued by the software, to not necessarily be set by PWM routines, as one would conventionally expect, but rather to be adjusted through the intelligent use of sleep, power down, and other low power states, commonly available in modern micro controllers, where these commands can be made to act as a form of pause for the software. In this manner, the same result may be affected as regards software control of the physical effect and the benefits therein manifested, yet in a way that is more practical for certain applications.

While a battery is stated as a typical source for the physical device managed by the software, it may be desirable in certain instances for the unit power supply to come from a solar panel, or other suitable supply. In this instance, there may be further advantage, or even requirement, for the software to manage and regulate the flow of power from this source for optimal system performance, with particular reference to frequency, duty, and throughput, although other variables are not excluded. In the specific case of a solar panel, it may be used to power the circuitry, micro controller, or output, alone or in any combination of the previous.

The practical implementation of the software herein described, is not limited to specific circuits, specific parts, or specific power levels. What is described is a system for software management

of ring down current, with particular reference to capacitors, as a practical method of accumulation and distribution of this form of electrical energy. Within this framework of software management, hardware components may be varied as determined by the requirements of practical application, covering a wide range of permissible power levels.

Hence the underlying novelty of this invention, lies not so much in the physical effect manifested, but rather in the use of control software to manage it. This document puts forward the principals upon which practical software management of this effect is based, but we do not mean to necessarily limit ourselves to the precise structures given, and variations on the given concepts in whole or part, should be seen as within the scope of the claims.

BRIEF DESCRIPTION OF THE DRAWING

Figure 1 illustrates a general structure of software code conforming to the principals outlined in this document, that when combined with appropriate circuitry, will properly manage the manifestation of the desired physical effect.

CLAIMS

What is claimed is:

1. The frequency and duty of a pulse delivered to a coil may be varied by the software

2. The ring down current manifested in the coil as a result of the pulse command, is rectified to a capacitor for storage

3. The period for charge accumulation in the capacitor may be varied by the software

4. The frequency and duty of the discharge pulse from the capacitor may be varied by the software

5. A pulse may be released back to the source of variable frequency and duty, as determined by the software.

6. The software management of multiple loads, multiple outputs, and multiple sources, are not excluded from these arrangements

7. The capacitor voltage level may be actively managed by the software, in relation to a target range of values

8. The discharge pulse can be skipped to increase capacitor voltage, as determined by the software

9. Real time adjustments may be made to the software

10. Redundancy and error correction routines may be incorporated into the software

11. Error reports may be produced and distributed externally of the physical location where the software is being run

12. The implementation of the software routines may be varied as regards the requirements of lowering the power consumption of the micro controller, without materially altering the principals upon which the software controls the physical operation of the device

13. Software routines may be fixed at initialization, dynamically varied in response to sensor data, or in response to specific commands

14. The software is not dependent upon specific hardware, which may be varied as regards the demands of practical application, covering a wide variety of possible power levels.