This function has been implemented as a look up table (LUT) in the program memory of a controller MM535 (WG Electronics) based on a Simens model PB 80C535 micro-controller. The micro-controller ADC converts the input voltage, V_{ref1}, to its eight bit number representation, which is a LUT address. Finally, the controller sets an appropriate wiper position of the digital potentiometer and consequently the dc voltage gain of A_1. The reference sources V_{ref1}, V_{ref2} are based on the Maxim models REF02 , REF01, respectively.

3. Results and conclusions

The precision of the emission current stabilizer has been presented in terms of the relative standard deviation of the stabilized emission current versus its intensity. The emission current has been measured by means of a Keithley model DMM 2000. The duration of the measurement for each value of the emission current was 300s. The results for the investigated tungsten filament are shown in figure 2.

The obtained mean relative standard deviation of the electron emission current, for a tungsten filament operated at the pressure of p=0.1Pa, is 36 ppm.

In conclusion, one may state that the application of the expotencjal dc voltage gain in the emission current stabilizer enhances the emission current quality as compared to the previous design [3]. For this reason the presented stabilizer is perfectly applicable to electron-impact gas ion sources, for example in isotope ratio mass spectrometers.

Another important conclusion is that the presented configuration of the electron emission current stabilizer allows to easely investigate the other dc voltage gain functions (selected by other methods).

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CONCEPT OF STREET LIGHT CONTROL SYSTEM USING THE PLC TECHNOLOGY

The lights in the streets, roads and squares is a big budget load, so the solutions for decreasing of the costs are strongly required. The paper includes two proposition of dealing with the problem. The first is finding more efficient sources of light and the second is optimizing the usage of existing ones. The second way has been described in this work.

1. Introduction

The lights in the streets, roads and squares is a serious problem to the budget, therefore we are looking for solutions where the main criteria is lowering the electricity consumption. We can find two ways of dealing with the problem. The first is finding more efficient sources of light and the second is optimizing the usage of existing ones. The second way is to be dealt in this work.

There is a need for modern intelligent solutions based on microchip and remote network structures in lighting system. There are few possibilities: radio wave communication, separate cables for data transfer. It is possible to use PLC technology for this purpose. There is no need to build a network of separate cables but we use the existing electric wires. There is much less noise in comparison to radio system. It is easy to install the elements of PLC to the modern lighting instalation as well as t the modernized one. Therefore this solution was chosen.

2. System conception

The designed system meets the requirements of controlling and diagnosing the lighting installation. To ensure the realization of these aims we have to analyse different types of the lighting network structure. On this basis build he proper physical and logical structure of control-steering modules. In the simplest case of monitoring, the system provides information about the proper work of the lighting circuits in cascade. The information would be available at the beginning of the cascade, where we can find the on/off chip or in the stering center if the cascade begins there.

The lighting installation is flexible as far as its construction is concerned. The traditional steering may be central, group, individual, and cascade. Each section is a group of a number of streetlights powerd from the common source controlled by a connector turned on by a preceding section. The main switch turned on manually is in the central. The turning on the first section results in turning on the following ones unless there is a failure in one of the connectors in the line.

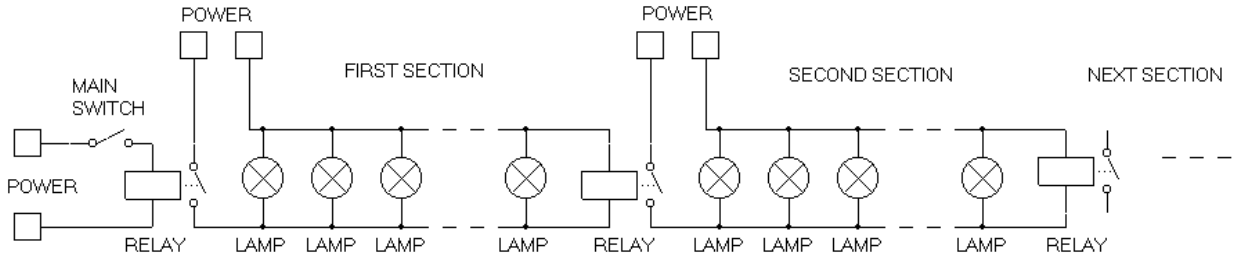

Fig. 1. Simplified diagram of light cascade

So every section is separated from neighbouring ones. It is possible to power it from any local source without centralizing the whole system into one circuit. To transmit desired information from the last cascade to the beginning using the PLC technology it is necessary to install proper electronic chips into the existing lighting network. Universal modules were rejected due to economic reasons. There were new ones designed which were dedicated to the specific needs and offered universality.

The modules are equipped with a micro controller steering their work, and giving them a wide range of configuration. Each module has two interfaces between microchip energetic circuits, to realize connection (so called “bridge”) between separate sections. Assuming that the streetlights are away from each other up to 100 meters and each section consists of several dozens lights. Because of the distance it will not be possible to achieve communication between all the modules of a section. Modules therefore must send data to one another so that the data can reach longer distances, which means that some of the modules within a section will become so called repeter. It is necessary to solve the problem of cooperation between more than two modules in one physical circuit (section).

As such system doesn’t require fast data transfer or a determined access to the data channel we use the Token Ring type of link. In the given electric circuit one module will be Master and the rest will be slave. The Master module will have the address to the next module in section and in the case of that it won’t have any information to send it will give access to transmission. According to this algorithm communication without conflicts between modules of one section will be possible.

Each module connecting two sections is powered from the major section so that in case of turning one the given section the informing about its proper functioning module will be powered. If one of the sections malfunctioned the proper module would not be powered and won’t receive the transmission from

the preceding one. Program realization of checking whether the receiving module reacted. Thanks to such information we can quickly find the place o malfunction.

In the most advanced versions of the system it is possible to install a single module for each light and steering it individually, which would allow for realization of economic matters of streetlight control. Example: At night when there is no traffic certain lights can be turned of. Constant monitoring of every single lamp is also possible.

3. Practical realization

Including not too high distance requirements which helps in comunications betwen modules, considering the economic aspects we decided to use transmission systems TDA5051. The transmission equal to 1200 bod`s is attended to be sufficent. But we may have some different situations where the distence betwen adjoined modules can be higher (for example, one of the iluminating circuits is much more remote from the distributing cabinet). And it was the reason why we design modules with the use of the integrated circuits ST7537 thanks to the work of modulation FSK and the more endearment receiver make possible the transmission on the higher distance.

To receive the more generality and compatibility betwen designed modules we have attendanced some solution where all modules PLC consist of two or three pieces. The base trivial consists of freeder, systems accomplish steering, control and the injuction of the trivial transceivers. If the given module does not fulfilled the sternum function we will add only one transceiver which uses the precised modulation ASK or FSK with the steering of micro-auditor. But if the needed modul has to be fulfil in the sternum function, in the first junction we must place the module with the applied modulation before the sternum and micro-auditor. In the second junction we must assemble the module with the required modulation on the other side of the sternum.

The sternum helps to realise two tasks. The first one is to merge transmission PLC of two circuits supply from different phases or energy sources, or when the part of the iluminating circuit is characteristic to the high distances betwen modules (then we have to add transceivers in the systems ST7537). If the distances are less, the economic aspects will be support the modulation ASK (tranceivers with chipper systems TDA5051).

Such a framework of the modules has some additional qualities. The number of modules has been reduced to design the right picture. In this way we avoided bigger problems which are mostly appear in this phase of system, installation modules in the iluminating frames and in the further service steps. The application of the module structure gives a lot of possibilities of the quick function change which is fulfiled by the given module (the sternum or the separate scheme) or the applied modulation through to easy and quick conversation or assembly the right transceivers. The conceivable repair of the module in case of the damage of the transceiver goes to one conclusion – the tranceiver needs to be re-replacement. This solution does not require the assemble of the completly new module.

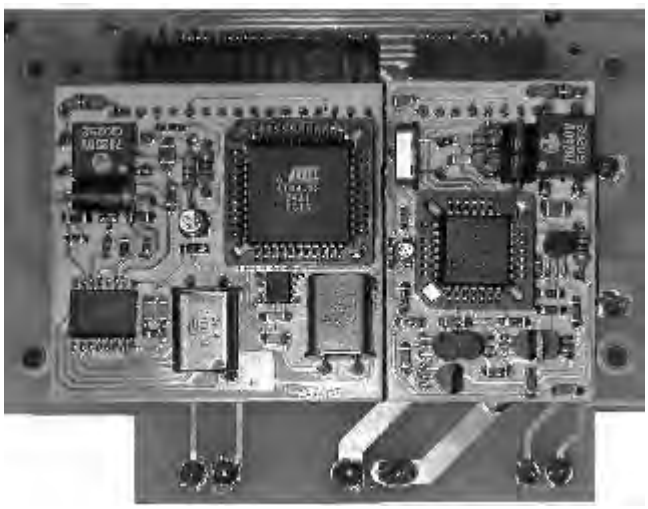

Fig. 2. The configurated module as the sternum with the conversation to the different sort of modulation

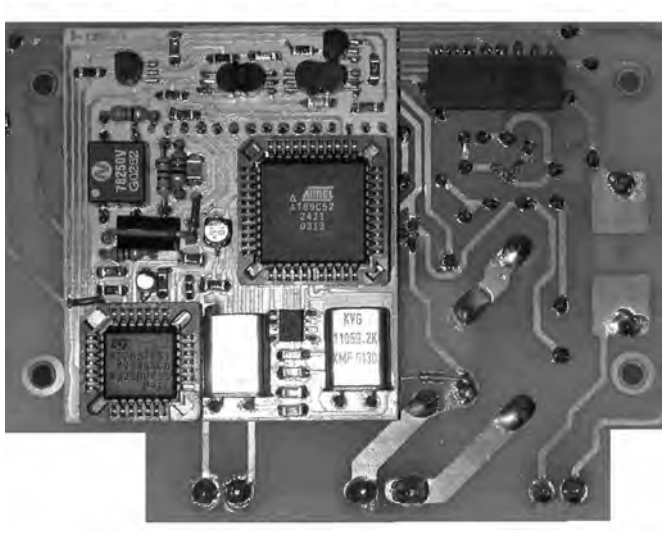

Fig. 3. The configurated module as the hitch or the repeter with the FSK modulation

The example module work configurations are showed in Fig. 2 and 3.

The integrated circuts TDA5051 and ST7537 fulfil the norms CENELEC and they exploit the maximum flat of the outcome signal (116dBμV). The outcome schemes and the schemes connected with the energy trap have been made in accordance with the applicated schemes. It helps as to expect that the flat of the outcome signal does not cross the admissible value (the norm). It was also experimentaly proven.

The transmission distance experimentaly verify confirm the usefulness of the designed modules in this written work. To use the chipper transceivers TDA5051 we may obtain the communication betwen adjoined schemes - but the distance can not be further than 150 meters. In the case of ST7537 schemes the distances are further and they cross 200 meters. Of course this values are in some aspects subordinated to the trap parameters and the disturbances within it. The arrangement of the communication modules in each or in choisen lamp can ensure the transmission in any distance. We may expect only further delays in the base flow.

4. Software

All modules communicate in the trap but only modules which are close to each other are in a position to directly enter the connection. It is the reason why we elaborated the project based on the conversation. Characteristic are performing frames with different distance and appropiation and also the addressing to the different hitch. Each module after switching on the trap gets the uniq hitch address and the addresses of the nearby modules. All the communication sysytem takes place in the project of the hitch programming configuration and it also define its function and tasks to do. During the typical work setting in the programm all frames are used in steering signal hitch, the group of hitchs and the signal frame. To be sure, we use the transmission as the only method of the detecting CRC defects. In the case of its existing the right frames are generating according to the requirement of the renew transmission.

The whole system can be configurated, steered and supervised strickly from the operator console which is generaly in front of the cascade. The right electronic circuit helps us to conect the computer PC by the serially link RS232 to the supply trap in which the transmission takes place. Steered software offersthe possibility of different transmission creating within its trap`s frame and analyse the pack of send hitchs. Thanks it the operator can steer the iluminate and currently observe all defects.

5. Conclusions

The generality and low price is characteristic to designed system. It can be used in the iluminating schemes with diffenent topology. It makes easer the central monitoring the whole iluminating trap – and each lamp separately – and also a fluency regulation the ilumination intensity.

Some troubles may have some influence on distances from the iluminating circuits situated for example, on the edge of cities. It is also connected with the instalations which are function individually,

steer programmer unit or through the broadcasting-track. Here is impossible to use the PLC technology to the comunication with the power-station. The real possibilities give the broadcasting-track or the added copper or optical fibres wiring.

All used solutions (which involved needed tools and programmes) give us many possibilities of using recommended system in different distracted traps which do not require such a quick base transmission. For example, to assemble information from the sphere like moisture, temperature ec.

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RELATION BETWEEN DOMAIN STRUCTURE DISTORTION AND ELECTRIC PERMEABILITY AND SPONTANEOUS POLARISATION IN L-LYSINE DOPED TGS SINGLE CRYSTALS

Researches upon relation between domain structure and electric properties of ferroelectric TGS doped single crystals are presented in this paper. Finding such relation should make possible elaboration of simplified method of samples preselection, that should be very convenient from the point of view of its application in fabrication of active elements of pyroelectric detectors. Possibility of finding such relation includes directly from theoretical model constructed by authors [8].

1. Introduction

Triglicyne Sulphate (TGS) is one of the most intensively examined ferroelectric material, finding wide application, as active element of the IR sensors in room temperature. Temperature of the Curie point for TGS is 49ºC and the material shows second order phase transition. Structure of the crystal lattice is monoclinic, both below, and above the Curie point. Cleavage plane is perpendicular to the ferroelectric b axis (0,1,0). One of the most important disadvantage of TGS is depolarisation process, influencing the change of electric parameters. This fact influences the performance of the detectors based on this material. One of the methods for elimination of mentioned disadvantages is doping pure TGS with optical active particles [2, 3, 4].