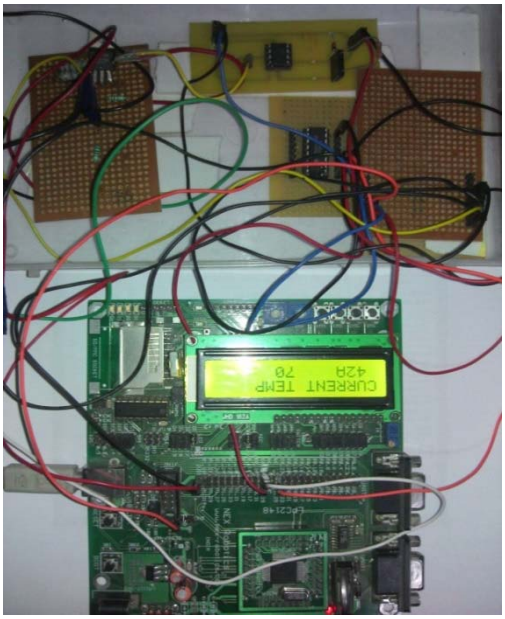
4.1 Temperature monitoring

The power amplifier's power consumption influences its performance. The PA sometimes operates at a high quiescent point but at low output power. Lots of energy is wasted heating the devices under test, thus decreasing their reliability. Monitoring the PA temperature and adjusting its operating point can achieve best system performance. The temperature sensor is placed near to the power amplifier module which digitizes the values to the resolution 0.025°C. n ad the valued is given to the ADC of LPC2148 ARM7.

4.2 Development Tools

The Keil development tools offer numerous features and advantages that help you to develop embedded applications quickly and successfully. They are easy to use and are guaranteed to help you achieve your design goals in a timely manner.



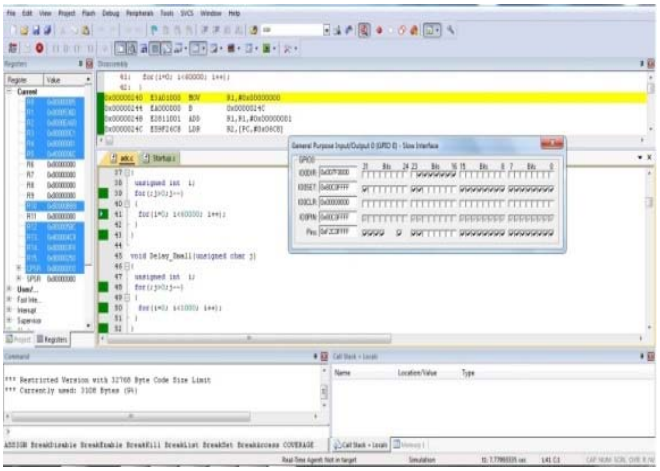
Transimpedance amplifiers are commonly used in receivers for Optical communications to convert the current generated by a photo-detector into a voltage signal for further amplification. In this particular designed control system the output current from the power amplifier module is needed to be controlled hence it is given to the I to V converter so that the analog voltage value is given to ADC1 of ARM7 (LPC2148) and further digital conversions are performed using ARM7 and values are being compared with the values in the LUT and required adjustments are done using the DAC and the closed loop is formed for a control system.

5. Simulation Results

Results of the application module indicate that the proposed system has performance considerations and safety and the control system with changes in temperature the affect over the threshold voltage is controlled using ARM processor.

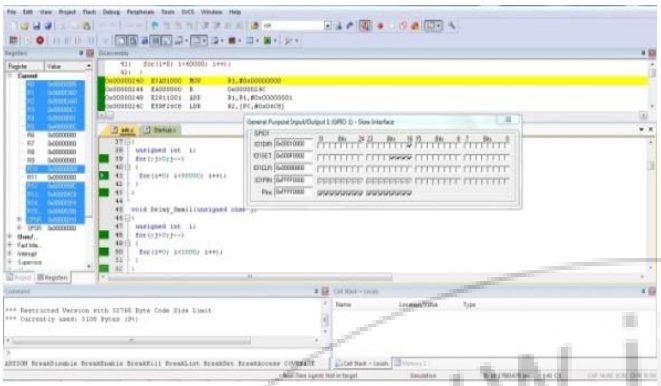
The results of case temperature and the drain current are studied and it is found that the decreasing graph is obtained. Regulation of gate voltage so as the bias point is maintained and the respective voltages at the output of the system is observed and found to be controlled using DAC of LPC2148Hence a controlled system with the bias voltage and temperature control due to rise in current of the circuit, the performance is carried satisfactorily

GPIO -0 Simulations



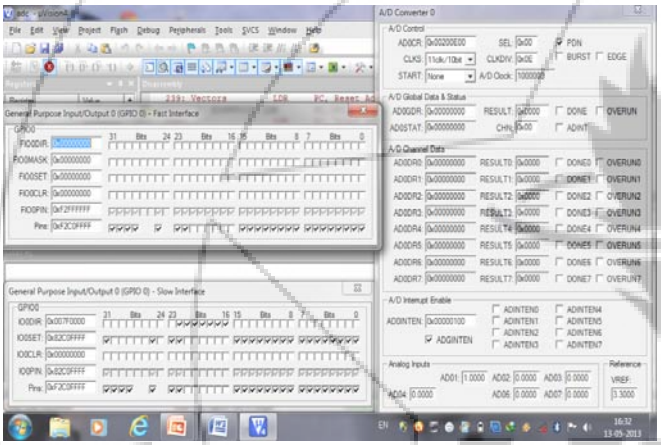
LCD is connected to port 0 from pin no 16 to 23 in which 16 to 19 are data line connected to D4 to D7 pins of LCD and pin 20,21,22 is connected to control signal of LCD i.e. En, R/W, respectively. LCD continuously display values of TEMP and CURRENT.

GPIO—1 Simulation Window

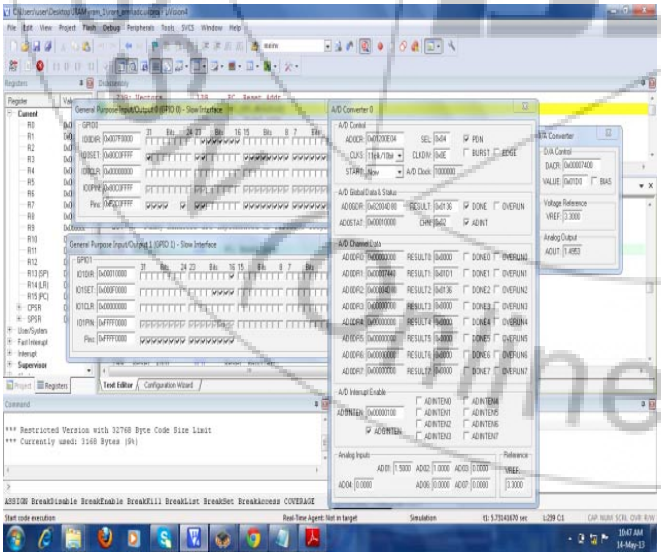


LED is connected to pin 16 of port 1. This led is to indicate whether temp exceed the given threshold value, When this led turn on I to V operation comes into picture.

Output Window1



Output Window 2



The above fig shows the description of the operation of the circuit when the temperature of the power amplifier exceeds the limit then the led at pin no. 16 of GPIO 0 fast interface becomes high as shown in GPIO window. And after this the analog data from the temperature monitoring unit is converted to DAC values which is shown at the DAC window, the respective changes with the analog values from the A/D convertor the DAC window configures the DACR register and shows the value in DACR register and value and the respective analog value is shown.

The above fig shows the simulation window in keilµvision4 general purpose input output pins status is shown. i.e. GPIO 0 slow interfaces and GPIO 0 fast interface and the output of the ADC is shown by the A/D convertor 0 window selected from the peripheral devices being used in debugging.

When the analog input is applied after the initialization of port 0The AD0 is applied with the input values to ADC and respective changes are being observed in A/D channel Data RESULT is shown

6. Experimental Result

Sr. No.	*Case Temp id degree Celsius*	*Current(ID in amp)*
1	20	12
2	25	11.5
3	30	11
4	37	10.5
5	50	10
6	60	9.2
7	75	8.6
8	90	7.4
9	100	7

7. Conclusion and Future Scope

7.1 Conclusion

Controlling the gate temperature and current for RF power amplifier, Graphs are plot between the various die temperature and gate voltage and at various junction temperatures. Hence a control system with the use of ARM processor for power amplifier is made. With the different ways of gate voltage control system design and various affecting measures such as temperature and current are found to be the sensitive parameters which are responsible for the hampering effect for an PA so among the available method the LUT (look up table) design using flash memory in ARM processor a feasible one and a system test design is made for an efficient monitor and a control system which can be useful for amplification in terms of power , current and with due effects of temperature on this technique with other multiuser software so that accuracy of result is maintained for better performances. Results of the application module indicate that the proposed system has performance considerations and safety and the control system with changes in temperature the affect over the threshold voltage is controlled using ARM processor.

8. Future Scope

In further study, it can be cut, expand and optimize the system, in order to make it more powerful. With the use of real time operating system so that the multitasking and sharing can be possible for an better efficient control system. In forthcoming efforts, analysis of different techniques by

utilizing the circuit components with temperature compensation, to achieve the gate voltage compensation, but the gate voltage may not be independently regulated through this method. The other one is the using of SCM (single chip microcomputer) and memory storage of tables. In future one can explore the failure analysis of discrete components and integrated ones which tends to fail, causes major power losses for base stations. Hence the future work can be a better control technique using controlling algorithms for various readings for concluding the automatic control of gate voltage for RF PA amplifier to ensure high efficiency and linear work and to save energy as well. It is a self correcting methodology self testing and correcting so further it can be implemented for various RF automatic applications.

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