

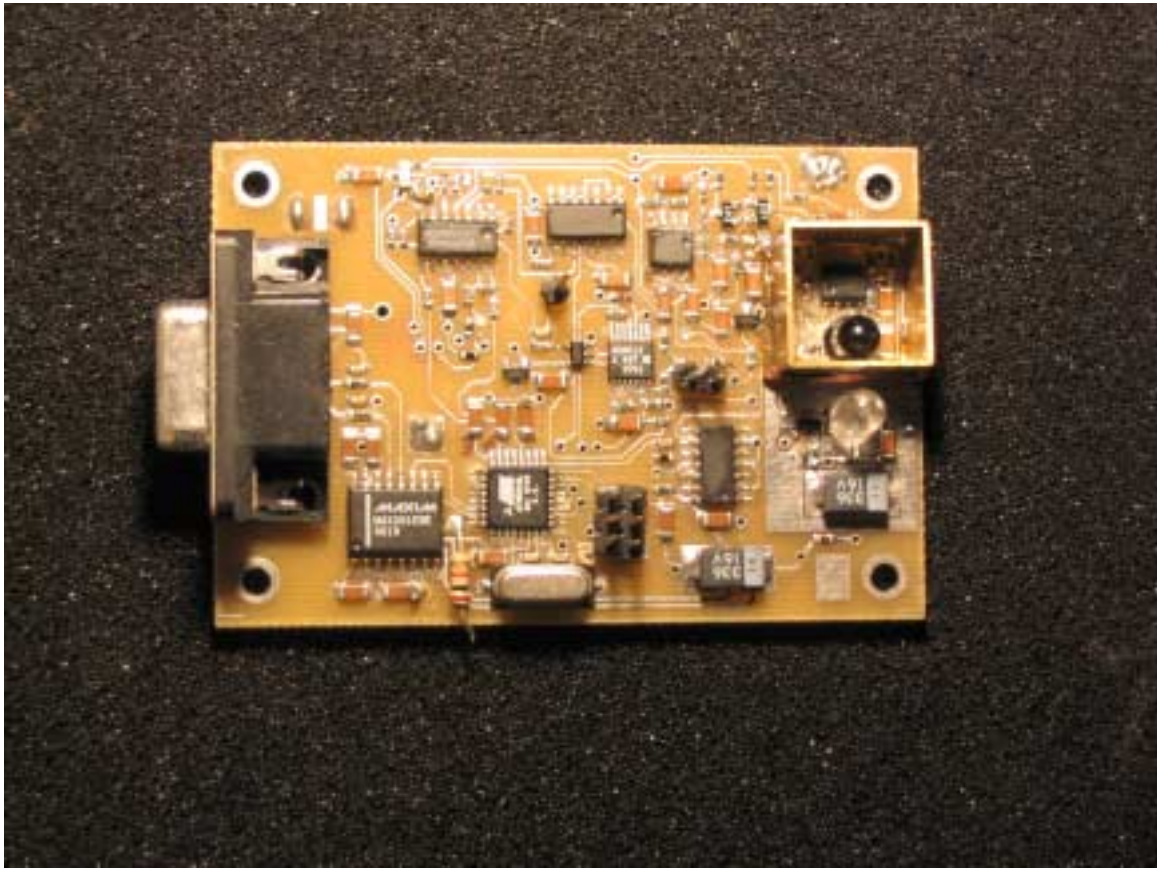
A3736 Infrared RADAR range finder

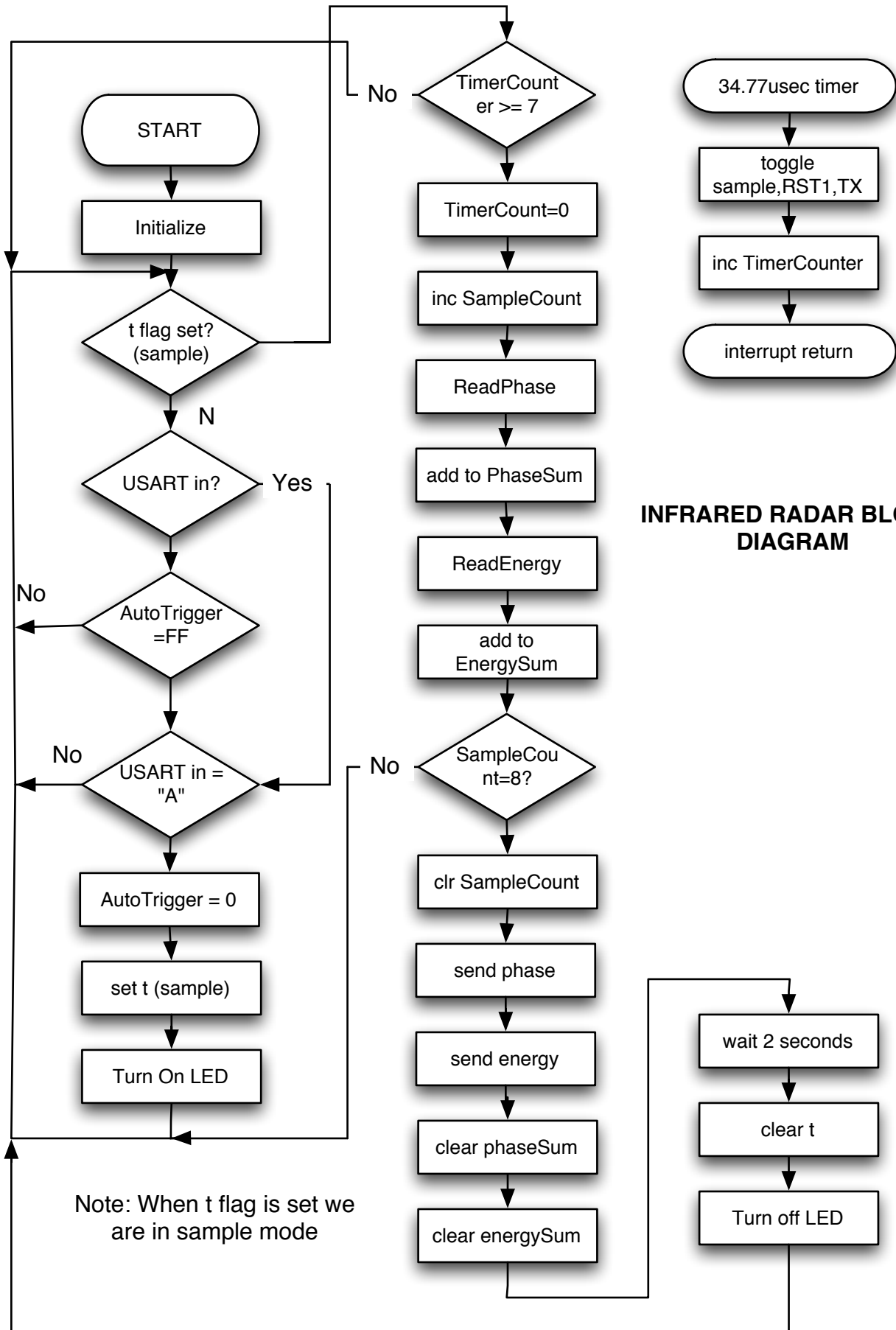
There are many range finder projects but they are usually based on ultrasonic measurements. Certain objects such as curtains, padded furniture and other sound absorbing materials can not be detected by such a system. To augment such a system, the project here uses infrared light to create a radar range finder. Ultrasonic ranging systems require many milliseconds of acquisition time rendering them unusable for fast moving systems. The range finder described here can make a measurement in sub millisecond time frame. It can detect a white sheet of 8.5 by 11 white paper at a distance of a few feet. Not only does it provide a range reading to the target, it also measures the reflectivity of the target which can further help the system determine the type of object.

The device works by sending a 40ns pulse of light through a infrared LED every 35usec. The returned light energy is detected by a photodiode. The signal is then amplified and goes through a variable attenuator. A loop assures that the output of the attenuator is a pulse of fixed height. This pulse is compared to the original transmitted pulse and the time difference between the two determined. The time difference is proportional to the distance to the object since light travels at approximately 1ns a foot. The automatic gain control voltage is used to detect the amount of energy coming back from the device. This information can help determine the reflectivity of the object detected.

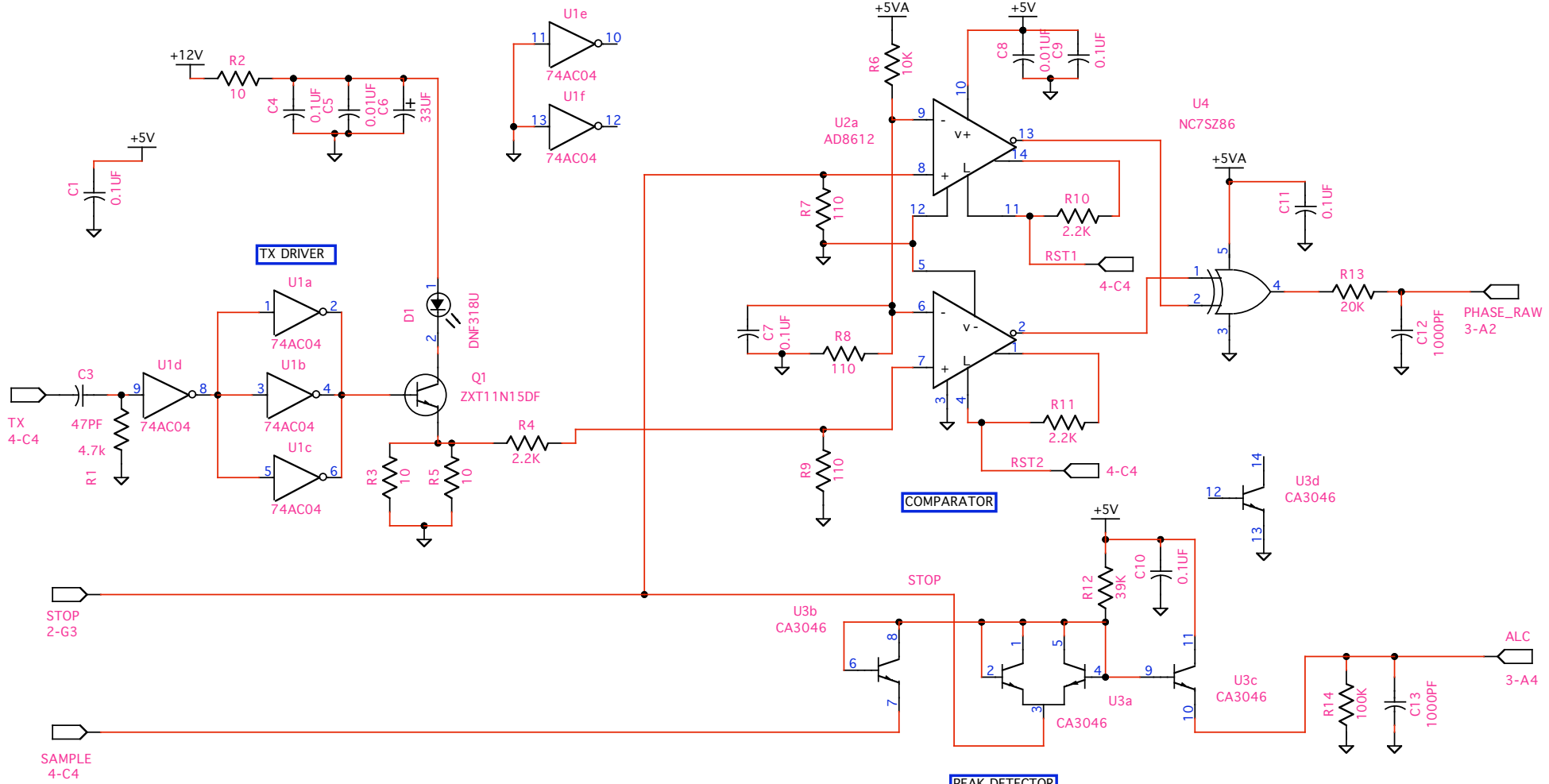
The heart of the circuit is driven by an ATMEL MEGA8 microcontroller that handles all the high speed timing signals, A/D conversion and RS232 communication. The raw speed and single cycle execution of the microcontroller makes this application possible without using external glue logic.

The program currently sends out two integer numbers every time an object is detected in the field of view. The first number is the phase information that is proportional to the distance to the object. The second number is proportional to the energy returned by the object. The device can also be set to manual mode in which sending the ASCII character "A" will initiate a reading and return the results.

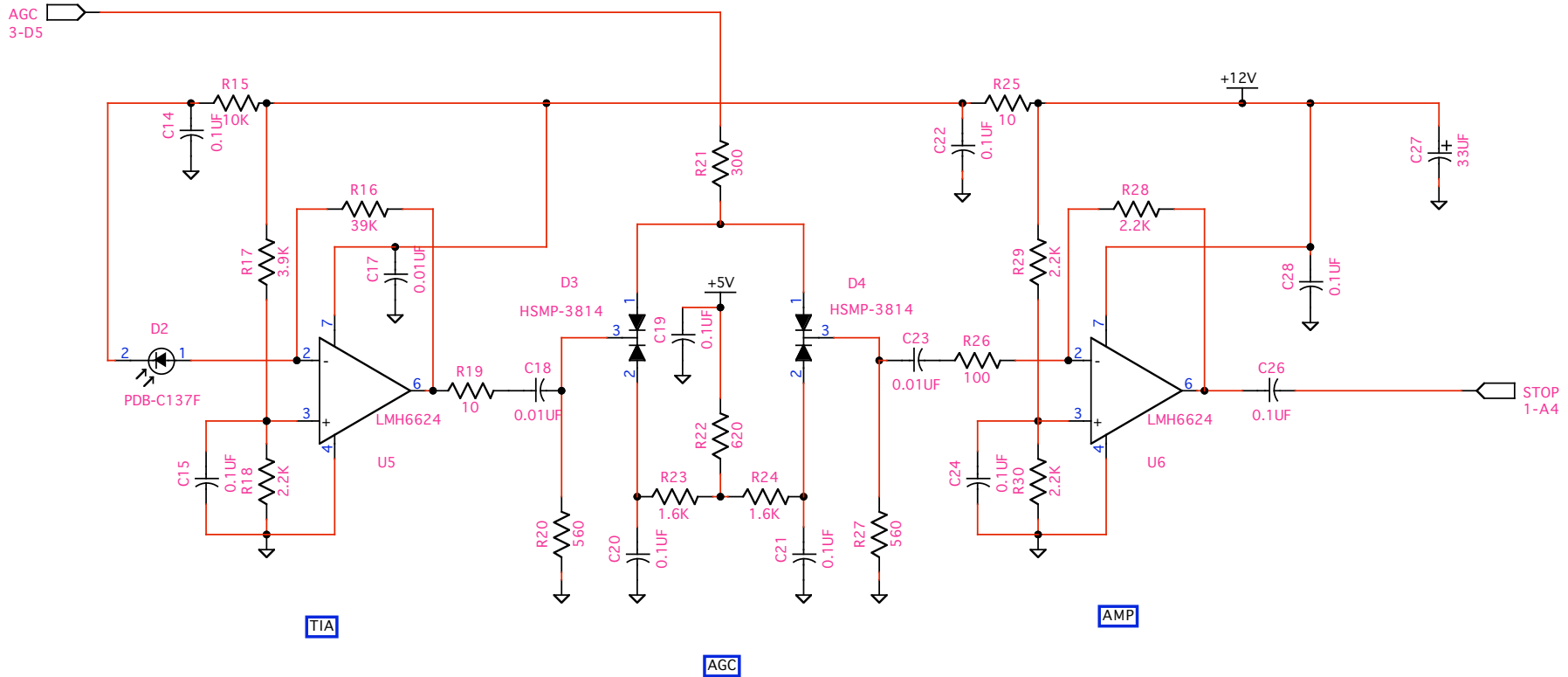




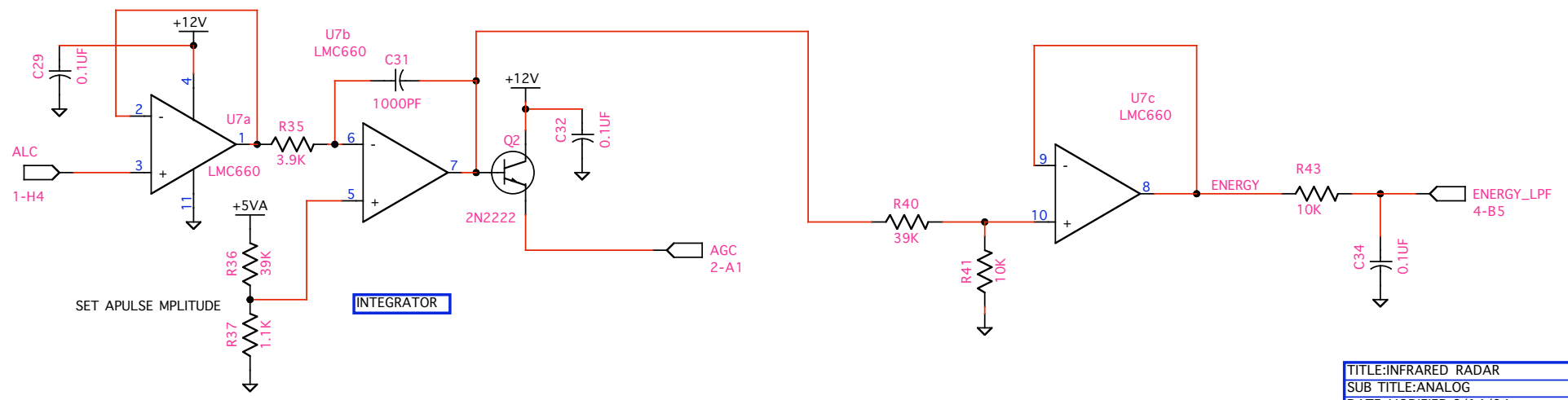
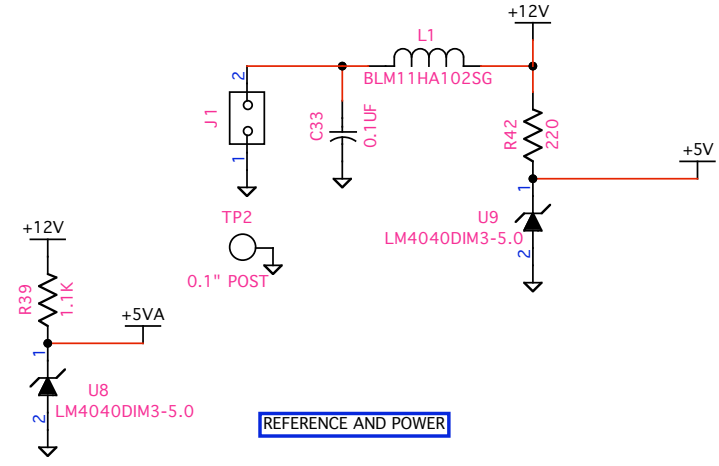
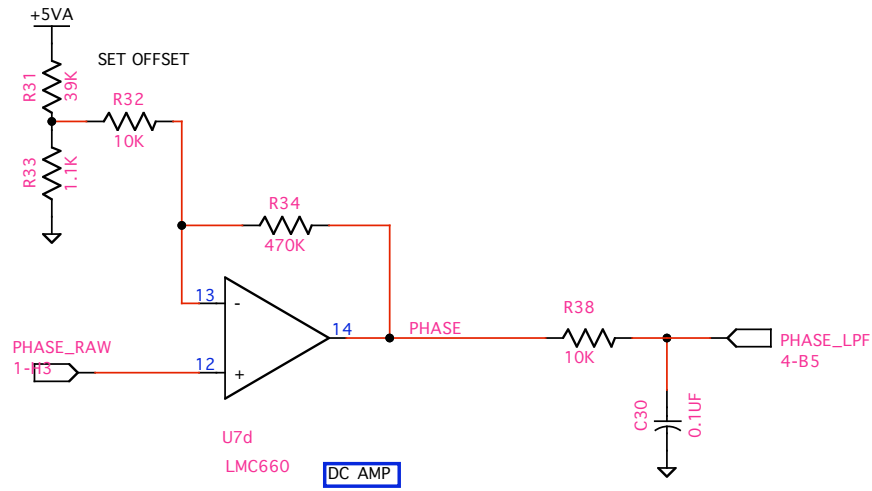
INFRARED RADAR BLOCK DIAGRAM



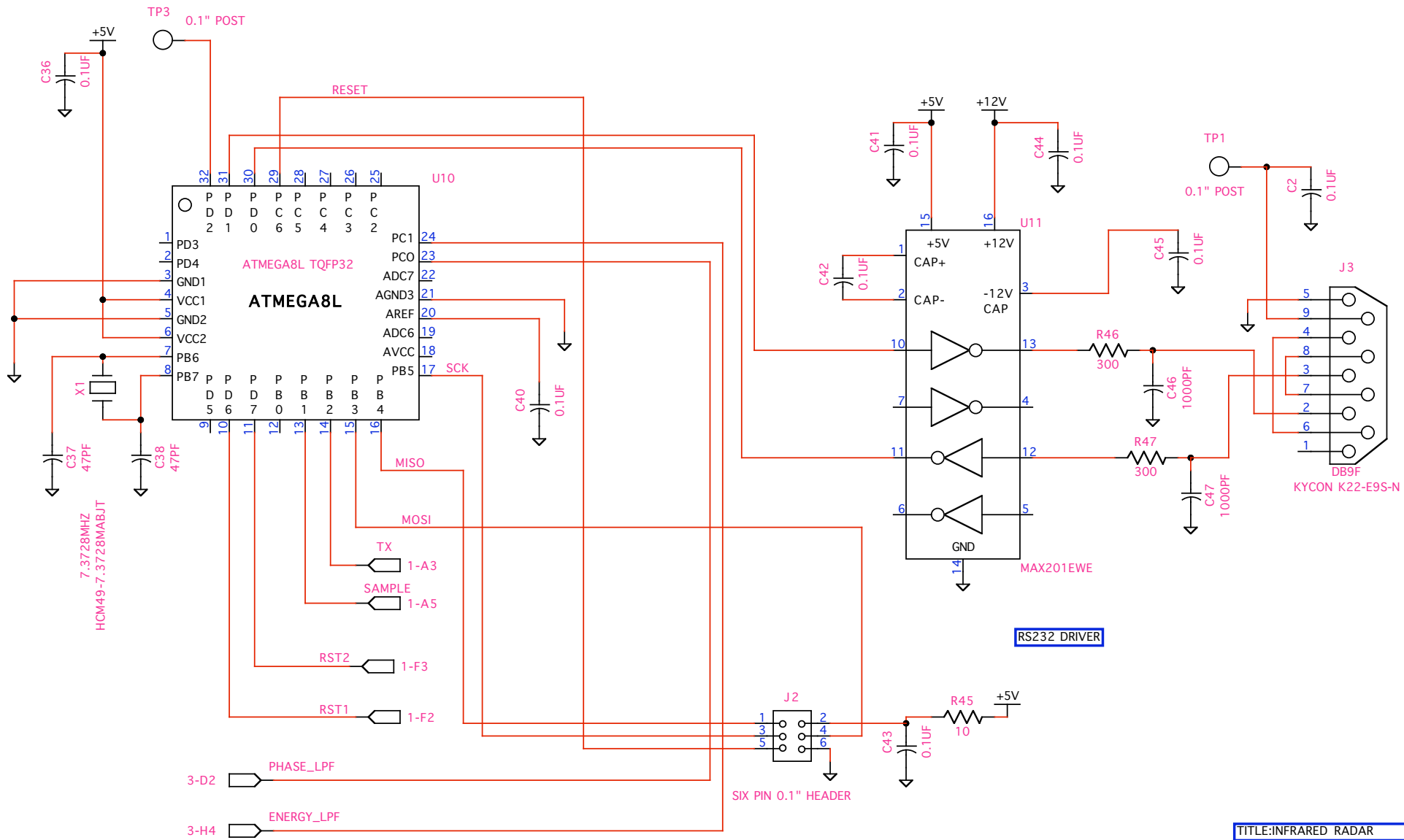
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