EMB-1 – RoboTronix
Introduction to advanced robot electronics
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Preparation:

Please complete the following before we meet for our first lecture

- **Read** the enclosed application notes:
  - AN-77
  - AN-140
- **Read** and familiarize yourself with the following (enclosed) component datasheets. You should be able to explain their overall logic function, their major similarities and differences, and their timing.
  - 74HC04
  - 74HC14
- Make a sketch (paper and pencil is fine) of a repeating triangular waveform voltage v(t), with the following properties:
  v_min = 0V
  v_max = 5V
  time min → max = 10s
  time max → min = 10s

  Assume that v(t) is connected to one of the inputs of a 74HC04, and to one of the inputs of a 74HC14 (Both supplied with VCC=5V)
  - Sketch the voltage v4(t) of the corresponding output of the 74HC04
  - Sketch the voltage v14(t) of the corresponding output of the 74HC14
  - Repeat the procedure for a faster waveform where the 10s interval is replaced by a 10ns interval.
- Save the sketches for inclusion in a later portfolio (scan/photograph it if on paper)
- **Read** the application notes (enclosed), in preparation of making your own oscillator in the lab
  - AN-88
  - AN-118
- Note the age of the enclosed application notes, and remember that the techniques they describe are no longer a recommended practice. They represent a creative use of the analog aspects possessed by all digital components – even modern ones – at a time where there were few feasible alternatives – unlike today. As part of this course is to teach you about the analog/continuous aspects that constitute "imperfections" in digital components, these ancient application notes are still relevant for pedagogical purposes, but not as modern design practices. The same goes for the 40 and 74HC logic family, which are both obsolete – but still very easy to acquire and work with for educational purposes.
- **Read** and familiarize yourself with the lab assignment enclosed.
  - You will be assigned to a group and do the lab exercise as part of our first day
  - Make sure you understand the components, materials and techniques needed

- Make sure you participate actively in the exercise, not just as an observer – you may get an exam question regarding the exercise.