# Specification of project „LTL-formula on Embedded Systems“

### Introduction

A given LTL formula should be checked by an networked embedded system which consists of four microprocessors. The LTL formula is provided to the microprocessors via computer, which is connected to them by a serial interface. The second input of the system is the time limit in seconds (for example 10). After that the system starts, i.e. all controllers start processing. The result should be if the formula is satisfiable or not.

### System-Overview

1 Master node: This node is connected direct to the computer and therefore has to distribute the formula to all other nodes. It is not necessary that this node distributes the time. An end-“word” signals the end of the formula-check.

3 Slave nodes: “Slave” only means that this node is independent of the time, so it goes on processing until the end-symbol is received.

### Pre-Conditions:

Each node is connected to a limited number of sensor devices (button, switch, temperature-sensor…). All relevant sensor devices, which could be included in such a LTL formula, must be defined at each node before the process starts.

### Ablauf:

1. Input formula:
   * via ttyTerminal, i.e. via serial interface or USB interface from PC
   * possible (parseable) input formats of formulas must be defined
2. Parse formula before distribution to other nodes (?)
   * …
3. Distribute formula to other nodes
   * Other nodes must acknowledge this
   * After that master-node sends START-word and begins the countdown
4. Parse formula after distribution to other nodes (?)
   * …
5. Each node processes the algorithm given in the paper
6. Continous synchronisation of the nodes. An important factor here is, that the time (i.e. the time-limit) need not be synchronized – it is only relevant for the master node, so if the master node hasn’t yet got a “satisfiable”-message at the endtime, it will send the end-word to all other nodes.
7. End or Cancel of process could be done via a special button of the master node, or by time-limit.

### Further implementations:

* Formula SAT or unSAT 🡪 display on LCD after process finished.
* If formula is unSAT at once 🡪 display on LCD and do not distribute formula to nodes.
* Display time countdown on display.
* …