

Changing to the Processor T11

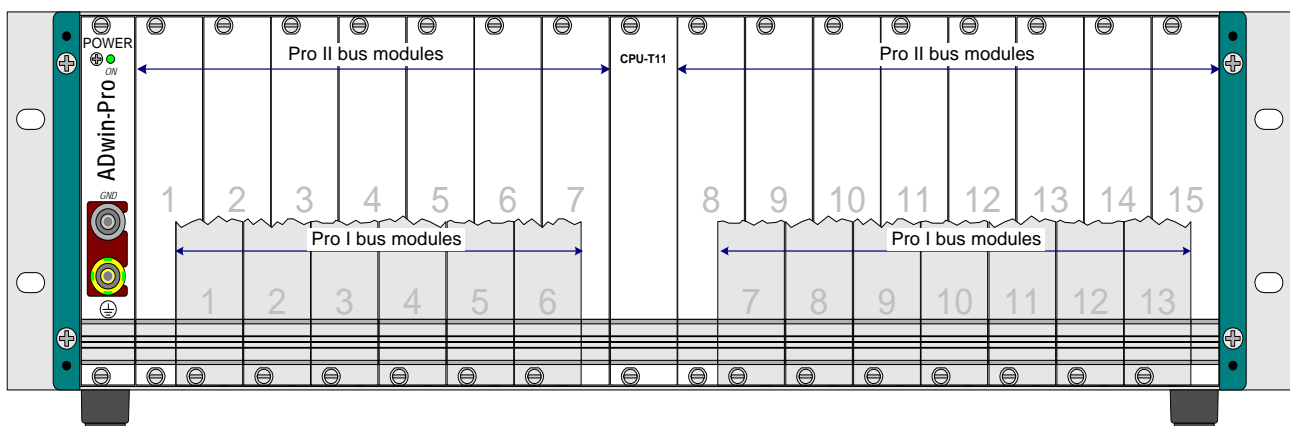
The following text describes the features of the module Pro-CPU-T11 compared to its predecessors and the necessary changes to be made.

The processor module Pro-CPU-T11 has the following main features:

- Processor clock rate: 300MHz.
 - Internal calculation resolution for float values: 40 Bit.
 - Internal memory: In addition to the program memory (PM) and data memory (DM) there is an extended memory (EM) for free use.
- The memory size of PM, DM und EM is 256 kB each. The external memory (DX) has a size of 256 MB.
- Enclosure: The module Pro-CPU-T11 will run in the new enclosure only, which contains both the previous Pro I bus and the new Pro II bus. The module T11 is plugged in at the center position.
 - {bml ICO-OnlHlp-HandRight.wmf}Modules: Please note, that modules for Pro I bus (grey in the diagram) be plugged-in staggered to the position of Pro II bus modules (as is Pro-CPU-T11).

The output modules Pro-AOut-x will work with T11 from Rev. B only.

Features



The diagram shows the half slot gap between CPU-T11 and modules for Pro I bus (cover sheets are accompanied). Future modules for Pro II bus will fit alongside the module Pro-CPU-T11 without a gap.

Existing *ADbasic* programs need to be changed partly:

- The processor T11 needs the Include file `<ADwinPro_All.inc>` to be included. In parallel all other include files for Pro modules should be deleted from the program.
- The time unit of the `PROCESSDELAY` (cycle time) is 3.3 ns for both high priority and low priority processes.

All referring values and calculations must be adapted to the new time unit. The greatest possible Processdelay corresponds to 7.1 s; a greater cycle time can be achieved using an auxiliary variable.

- The time unit of 3.3 ns is also true for the internal counter, i.e. counter queries with `READ_TIMER` must be adapted, too.

Please note: The process timing in connection with I/O instructions has become more complex (see below). Thus, a time difference determined with `READ_TIMER` will now refer to a part of the total process timing only.

Necessary Changes

Include file

PROCESSDELAY

READ_TIMER

- The instruction `SLEEP` must be replaced by one of the following new instructions.
 - `CPU_SLEEP` causes the processor to wait. The instruction `SLEEP` had the same function with the processors T9 and T10.
 - `P1_SLEEP` causes the Pro I bus to wait, e.g. to co-ordinate I/O instructions.
 - `P2_SLEEP` causes the Pro II bus to wait, e.g. to co-ordinate I/O instructions.

The new instructions have a time unit of 10ns (`SLEEP`: 100ns).

Which instruction is right? Normally `SLEEP` is used to bridge the waiting time of an I/O instruction, e.g. the settling time of a multiplexer with `SET_MUX`. In this case the instruction `P1_SLEEP` fits for previous modules (Pro I bus), and `P2_SLEEP` for Pro II modules.

Why are there new instructions? The processor T11 distinguishes processor instructions on the one hand and I/O instructions on the other hand. The processor architecture enables a quasi-parallel processing¹ of both instruction groups and obtains a much faster processing of *AD-basic* processes. This also means that the instruction groups are (mainly) processed independently in respect to timing. Since the process timing shall be controlled by waiting, there needs to be a separate instruction for each group. The separate instruction for each bus is required, because an I/O wait is effected by halting the appropriate bus.

SLEEP

1. The processor architecture differs from T9 and T10 in this point: T9 and T10 processed instructions of both groups sequentially. Thus, halting the processor with a `SLEEP` instruction did make the waiting time for subsequent I/O instructions, too.