TestProg Example

A Much Better Idea : Logical : Unique

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Electronic Controllers

The TestProg example is what your CPDA-01 contains when we ship it to you. This is the program we use to test and calibrate the CPDA-01.

The method of sheet naming in this example is an illustration of the practice which we currently recommend. Each sheet has a meaningful functional name with its sheet number at both the beginning and the end, separated by underscores.
The number at the end of the name is essential: this must be unique for each sheet, because it forces the default function block names for that sheet.
If you have 2 or more sheets with the same number at the end of the sheet name, you will have function blocks and signal names which clash.

Sheet 1 links the digital (Switch) inputs to the digital (Transistor) outputs. This permits the digital functions to be tested independently.

Sheet 2 is more complex: it permits both analogue inputs and outputs to be tested and calibrated.

Looking at the circuit attached to OAN8, and going to the top left hand corner, we see that ISW0, 1, 2 and 3 have been combined into a single input terminal.
The subtle use of a combined mask value of 15 in the ISW0-3 TERMIN does this for us. This means that combinations of these inputs can generate values of any integer from 0 to 15.

If this value is 0, the data selector routes IAN8 (analogue value 0 to 1.0) multiplied by 10 to OAN8 to give a continuously variable output from 0 to 10V.

If any of the switches ISW0 through ISW3 is on, the non-zero integer value generated switches itself through to OAN8.

At the factory, the output signal of IAN8 is monitored via the communications link, so that we can apply precisely known voltages to the input and set the offset and scale values to calibrate the input. We can then manipulate the switch inputs and measure the corresponding output from OAN8, thus giving us the offset and scale values for the output.

The lower part of Sheet 2 is a copy of the top half, providing the calibration facilities for IAN9 and OAN9.

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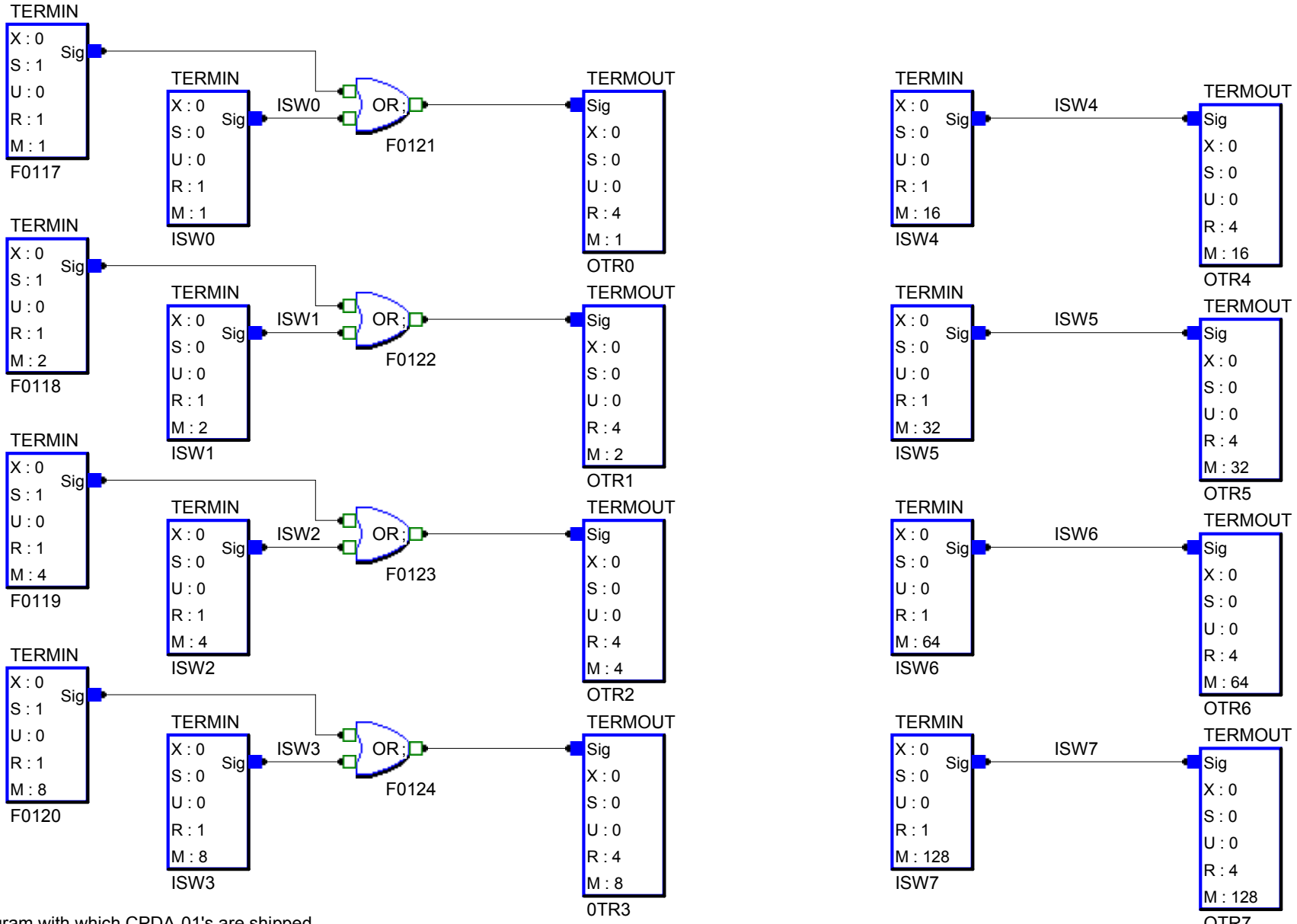
There are two additional parts to the control diagram which exercise the backplane communications.
By fitting an expansion module (e.g. EXDA-01) to Slot 1 of the test bed, we can verify that the backplane communications system is working correctly.

On Sheet 1, the ISW0 through ISW3 input are OR'd with the corresponding digital inputs of an expansion module in Slot 1. This module will affect the OTR outputs in the same way as the corresponding input of the CPDA-01.

On Sheet 3, there is a repeating ramp generator which feeds its output to OAN8 on the expansion module in Slot 1. The indicator LED for this output will therefore cycle, getting brighter for about 2.5 seconds, then extinguishing.



This is the test program with which CPDA-01's are shipped.

This sheet connects each digital input to the corresponding output.
In addition, ISW0 through 3 on an EXDA-01 or EXDA-4201 in Slot 1 are connected in parallel with the CPDA-01 ISW0 - 3 inputs.
This tests the backplane communications.

When this control diagram is run with an expansion module in Slot 1, the following effects are seen:-

1. The Comm LED on the Expansion Module is lit continuously;
2. OAN8 on the Expansion Module increases in intensity for about 2 seconds, then goes off - the cycle repeated continuously:
3. Inputs ISW0 through 3 on the Expansion Module reflect into OTR0 through 3 on the Processor Module.

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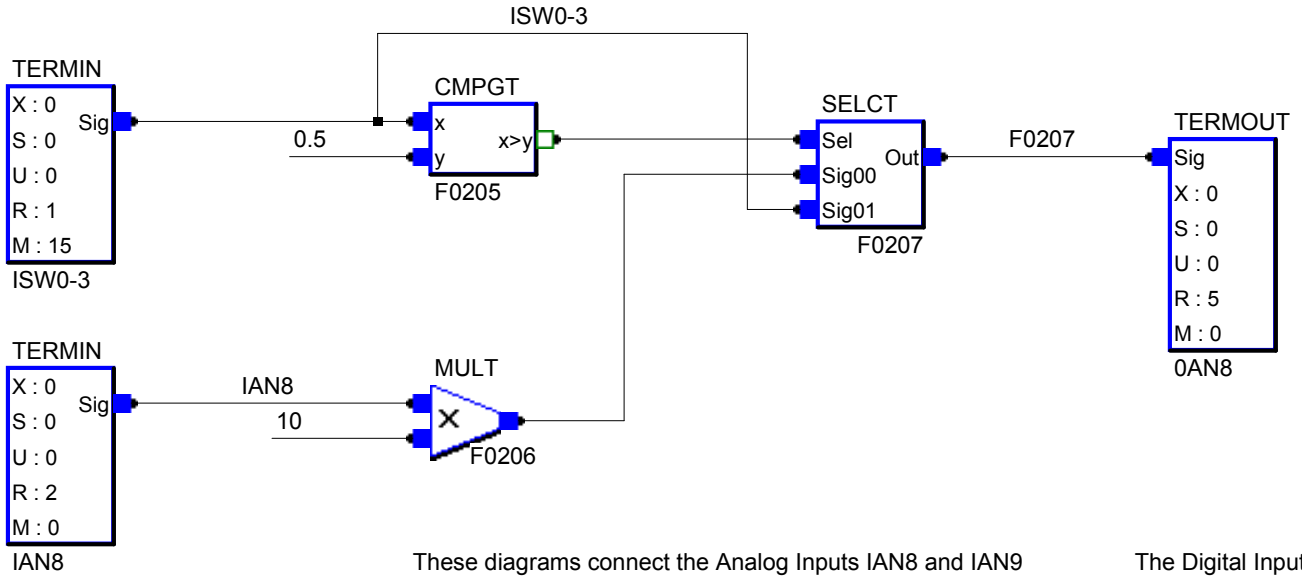
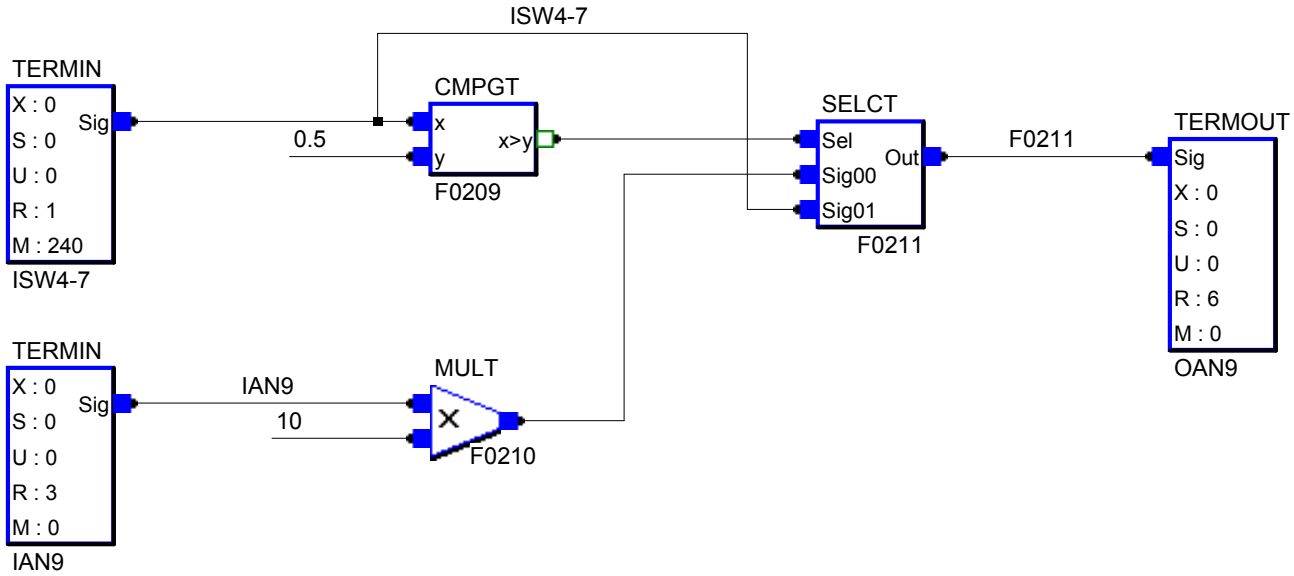
TEST PROGRAM SHEET 1
DIGITAL I/O TEST



These diagrams connect the Analog Inputs IAN8 and IAN9
(multiplied by 10) to their corresponding outputs,
unless any of the Digital Inputs is TRUE.

The Digital Inputs are combined in sets of 4 to produce
a 4-bit binary value from 0 through 15.
If this value is non-zero, it selects itself to be routed to the Analog Output,
so that precise voltages 1.00, 2.00 etc. up to 10.00 can be generated.



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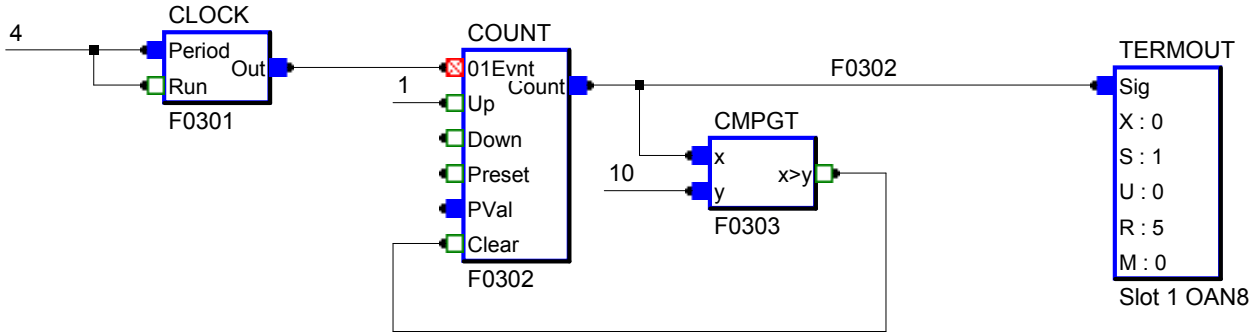
TEST PROGRAM SHEET 2
ANALOG I/O TEST



Staircase Generator - 4 step/sec

Routed to Slot 1 OAN8.
The OAN8 indicator on an EXDA-01 or the OAN2 on an EXDA-4201 will show an increasing intensity which periodically extinguishes approximately every 2.5 seconds.

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TEST PROGRAM SHEET 3
BACKPLANE SLOT 1 TEST