



Trio Motion Technology Ltd.
Shannon Way, Tewkesbury,
Gloucestershire. GL20 8ND
United Kingdom
Tel: +44 (0)1684 292333
Fax: +44 (0)1684 297929

1000 Gamma Drive
Suite 206
Pittsburgh, PA 15238
United States of America
Ph: +1 412.968.9744
Fx: +1 412.968.9746

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Subject: Euro1 – Euro205x differences

Application Note

1. Background:

The original Trio Motion Coordinator Eurocard has gone through 2 stages of development since the original Euro1 was released.

Euro1 – single task running BASIC on a 68000 processor

Euro205 – Multi-tasking, running up to 5 programs on Texas DSP

Euro205x – Multi-tasking, running up to 7 programs on Texas DSP

This document describes the differences between the original Euro1 and the Euro205x for those Trio customers who want to use the 205x in a design to update an older machine.

2. Hardware:

Serial Port connectors

Table 1: Euro1

Serial Connector A:		Serial Connector B:	
Pin	Function	Pin	Function
1	-	1	RS485 A Rx+ (Port 2)
2	-	2	RS485 B Rx- (Port 2)
3	RS232 Transmit (Port 0)	3	RS232 Transmit (Port 1)
4	0V	4	0V
5	RS232 Receive (Port 0)	5	RS232 Receive (Port 1)
6	-	6	+5V output
7	-	7	RS485 Z Tx- (Port 2)
8	-	8	RS485 Y Tx+ (Port 2)

Table 2: Euro205x

Serial Connector A:		Serial Connector B:	
Pin	Function	Pin	Function
1	Internal 5v - P435 supply	1	RS485 A Rx+ (Port 2)
2	Internal 0v - P435 supply	2	RS485 B Rx- (Port 2)
3	RS232 Transmit (Port 0)	3	RS232 Transmit (Port 1)
4	0V	4	0V
5	RS232 Receive (Port 0)	5	RS232 Receive (Port 1)
6	Internal 5v	6	+5V output
7	Output to P435	7	RS485 Z Tx- (Port 2)
8	Input from P435	8	RS485 Y Tx+ (Port 2)

Trio fibre-optic network

The Euro1 comes complete with an optional fibre optic interface fitted to the main PCB.

To connect the fibre optic cable to the Euro205x it is necessary to purchase an adapter, part number P435, and connect it to serial connector A.

CANbus connector

A CANbus port is fitted to the Euro205x for communication to the Trio range of CANbus based input/output modules. The Euro1 does not have a CANbus port.

Daughter board expansion slot

The Euro205x has a connector to allow the addition of a 5th axis or a communications port, e.g. Ethernet, by the addition of a Trio daughter board. A Euro1 does not have this expansion capability.

DIN41612 96 way connector

Table 1 shows the pin connection of the Euro1 compared to the Euro205x. Changes to the interface wiring will be needed if high-speed position capture (registration) is used. The Euro1 has registration inputs R0 to R1 sharing with the boost outputs, whereas in the Euro205x, the registration inputs share with the digital inputs IN0 to IN3. If all the inputs are already in use on the Euro1, then it may be necessary to add a P315 CAN 16IO expansion module.

The pins which are most likely to affect an upgrade from Euro1 to Euro205x are highlighted in the table.

Table 1. Backplane 96 way connector

X	C (Euro 1)	C (Euro205x)	B (Euro1)	B (Euro205x)	A (Euro1)	A (Euro205x)
1	5v	5v	5v	5v	5v	5v
2	5v	5v	5v	5v	5v	5v
3	0v	0v	0v	0v	0v	0v
4	IO GND	IO GND	OP13	OP13	OP10	OP10
5	OP9	OP9	OP12	OP12	OP15	OP15
6	OP8	OP8	OP11	OP11	OP14	OP14
7	IO 24v	IO 24v	IN0	IN0 / R0**	IN1	IN1 / R1**
8	IN2	IN2 / R2**	IN3	IN3 / R3**	IN4	IN4
9	IN5	IN5	IN6	IN6	IN7	IN7
10	IN8	IN8	IN9	IN9	IN10	IN10
11	IN11	IN11	IN12	IN12	IN13	IN13
12	IN14	IN14	0v	0v	IN15	IN15
13	0v	0v	DIR2	DIR2	0v	0v
14	STEP1	STEP1	STEP2	STEP2	DIR3	DIR3
15	DIR0	DIR0	DIR1	DIR1	STEP3	STEP3
16	STEP0	STEP0	FAULT	FAULT	RESET	RESET
17	ENABLE 1	ENABLE 1	ENABLE (OC)	ENABLE (OC)	-	AIN(0)*
18	R1 / BOOST1	BOOST1	R0 / BOOST0	BOOST0	ENABLE 2	ENABLE 2
19	R3 / BOOST3	BOOST3	R2 / BOOST2	BOOST2	Z3-	Z3- / BOOST3-*
20	A3-	A3- / STEP3-*	B3-	B3- / DIR3-*	Z3+	Z3+ / BOOST3+*
21	A3+	A3+ / STEP3+*	B3+	B3+ / DIR3+*	Z2-	Z2- / BOOST2-*
22	A2-	A2- / STEP2-*	B2-	B2- / DIR2-*	Z2+	Z2+ / BOOST2+*
23	A2+	A2+ / STEP2+*	B2+	B2+ / DIR2+*	Z1-	Z1- / BOOST1-*
24	A1-	A1- / STEP1-*	B1-	B1- / DIR1-*	Z1+	Z1+ / BOOST1+*
25	A1+	A1+ / STEP1+*	B1+	B1+ / DIR1+*	Z0-	Z0- / BOOST0-*
26	A0-	A0- / STEP0-*	B0-	B0- / DIR-*	Z0+	Z0+ / BOOST0+*
27	A0+	A0+ / STEP0+*	B0+	B0+ / DIR+*	VOUT0	VOUT0
28	VOUT3	VOUT3	VOUT2	VOUT2	VOUT1	VOUT1
29	+12V/+15V	+12v	+12v / +15V	+12v	+12v / +15V	+12v
30	AGND	AGND	AGND	AGND	AGND	AGND
31	-12V/-15V	-12v	-12v / -15V	-12v	-12v / -15V	-12v
32	-	Earth	-	Earth	-	Earth

* Bi-directional encoder port: encoder input or differential step+direction output.

** Shared pin function: registration input and digital input.

3. Software:

The main differences in software commands are listed here. It is not guaranteed that this list is complete and programmers should test their code changes thoroughly before putting the machine back into service. Note that there may be significant timing changes due to the multi-tasking system and the comparatively higher processor speed of the Euro205x. Also there may be differences in the results of calculations caused by the different processor's arithmetic unit functions.

Command checklist

CT	Clear PLC rule table [Euro1 only]	No Euro205x equivalent
EC	Define rung in PLC ladder [Euro1 only]	No Euro205x equivalent
PLC=	Turn PLC ON/OFF [Euro1 only]	No Euro205x equivalent
ZSET	Register Z [Euro1 only]	No Euro205x equivalent
PLCEVENT	Define statement for PLC event	No Euro205x equivalent
WHEN	Move WHEN condition [Euro1 only]	No Euro205x equivalent
CP()	Change a parameter [Euro1 only]	
RP()	Read a parameter [Euro1 only]	
		Use Parameter names in Euro205x
&	Logical and bitwise AND	Use AND in Euro205x
	Logical and bitwise OR	Use OR in Euro205x
!	Logical and bitwise XOR	Use XOR in Euro205x

If the PLC related commands are used in the Euro1 program, the logic of the PLC operation must be decoded and re-written in BASIC to run as a separate task in the multi-tasking.

Axis Parameters

The parameters P_GAIN, I_GAIN, D_GAIN, VFF_GAIN and OV_GAIN are stored as an integer number in the Euro1, with a weighting of 1/256. Therefore all gains must be divided by 256 to work correctly in the Euro205x. e.g.

Euro1: P_GAIN = 256	----->	Euro205x: P_GAIN = 1.0
Euro1: P_GAIN = 430	----->	Euro205x: P_GAIN = 1.68
Euro1: P_GAIN = 180	----->	Euro205x: P_GAIN = 0.70

TABLE

The table memory in the Euro1 contains only signed integer numbers. In the Euro205x the table memory is stored in floating point format. This may produce some rounding errors in the stored values, but in most cases the DSP

floating point format correctly stores integer values up to 2^{24} . (16,777,215)

4. Advice to programmers:

Save the program from the Euro1 using the MCSETUP DOS utility which is available from the download archive on the Trio website; www.triomotion.com.

Using a text editor, search for the commands listed above and change them as suggested. If the EC command is present, you must assume there is a background PLC operation in use and you will need to decode the PLC function. Use the Euro1 manual to decode the EC command list. Euro1 manual chapter 8 page 29 has the details of this command. Once the PLC functions are understood, write a new program in BASIC to mimic the same functions but be aware that the BASIC timing will not be as precise as the PLC, so it will be important to prioritise the testing of inputs and setting of outputs. Some may be more time-critical than others.

Test the new programs thoroughly on the machine. It should be possible for a programmer familiar with Trio's series 2 Motion Coordinators to make the changes and test the software in one or two days.