

Doc No.: AN-334

Version: 1.0

Date: 8 December 2015

Subject: Euro205X to Euro404/408

APPLICATION NOTE

1. Summary

The Euro 404/408 is the closest controller in the MC4 range to the performance and functionality of the Euro 205X. This document gives the answers to the most asked questions about the upgrade path from Euro 205X to the new Euro 404/408.

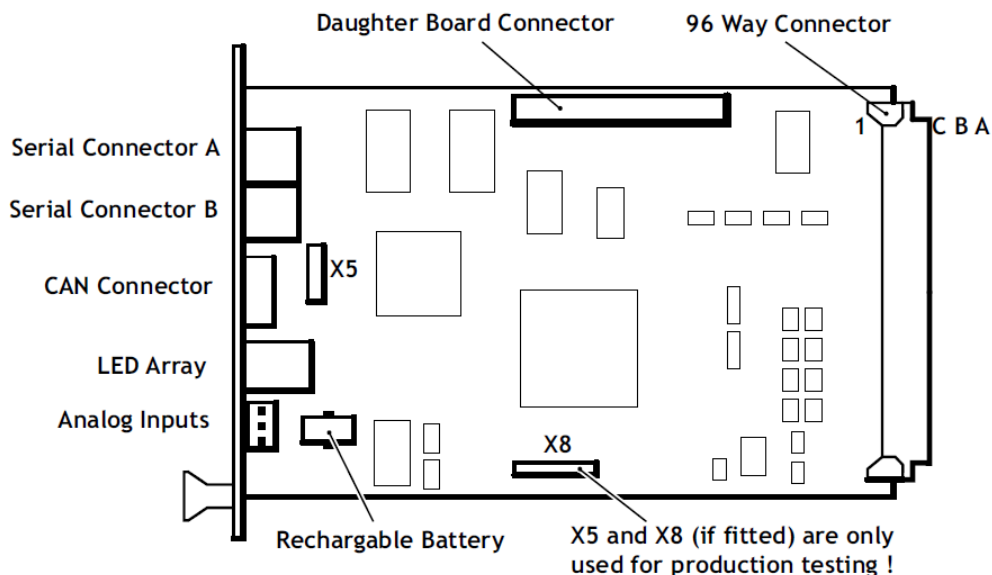
2. Key Features

Feature	Euro 205X	Euro 404	Euro 408
Max number of Servo Axes	5 (Up to 8 using SERCOS/CANopen)	4	8
Ref Encoder Axes	5 (Up to 8 using SERCOS/CANopen)	4	8
Max number of Stepper Axes	5 (Up to 8 using SERCOS/CANopen)	4	8
Daughter board slots	1	0	0
Serial Ports	2 x RS232 and 1 x RS485	1 x RS232 1 x RS485	1 x RS232 1 x RS485
Command Line access	Serial port 0	Ethernet port only	Ethernet port only
USB port	Optional with P295	Not supported	Not supported
Ethernet port	Optional with P296	Yes	Yes
Fibre-optic Keypad port	Requires P435 Serial to Fibre-optic converter	Not supported	Not supported
Analogue Inputs	2 x 12 bit 0 to 10V	2 x 12 bit 0 to 10V	2 x 12 bit 0 to 10V
Analogue Outputs	4 Isolated 16 bit +/-10V	4 Isolated 12 bit +/-10V	8 Isolated 12 bit +/-10V
Digital Inputs	16 Opto-isolated 24V inputs	16 Opto-isolated 24V inputs	16 Opto-isolated 24V inputs

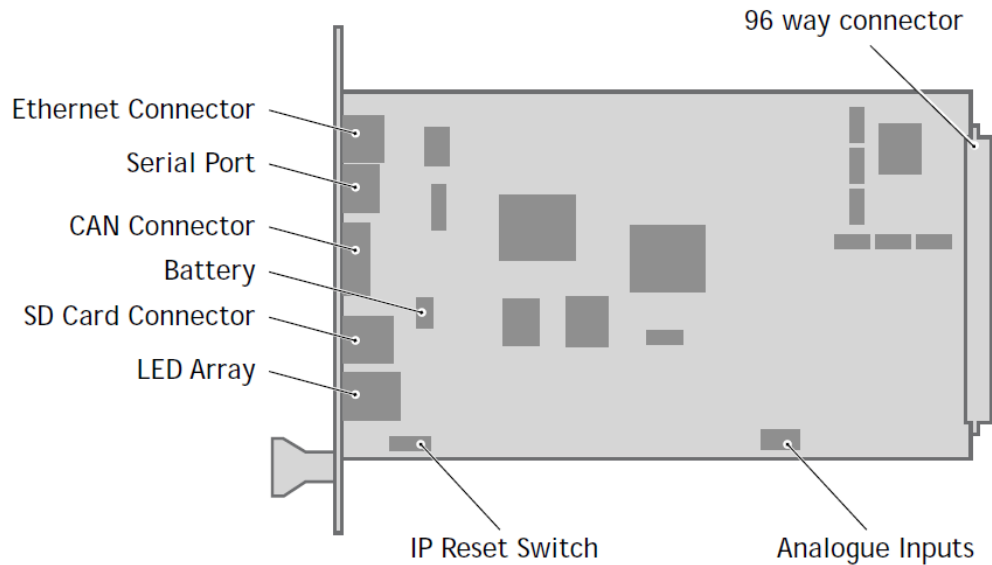
Registration Inputs	4. One per axis shared with inputs 0 to 3	8 shared with inputs 0 to 7	8 shared with inputs 0 to 7
Encoder Inputs	4 differential 5V inputs, 6MHz maximum edge rate	4 differential 5V inputs, 6MHz maximum edge rate	8 differential 5V inputs, 6MHz maximum edge rate
Stepper Outputs	4 differential (5V) or open collector (5 to 24V) step & direction outputs. Maximum frequency 500kHz (OC), 2MHz (Differential).	4 differential step / direction outputs 2MHz max rate	8 differential step / direction outputs 2MHz max rate
Digital I/O	8 Opto-isolated 24V current sourcing (PNP) 250 mA outputs	8 Opto-isolated 24V outputs. Current sourcing (PNP) 250 mA. (max. 1A perbank of 8)	8 Opto-isolated 24V outputs. Current sourcing (PNP) 250 mA. (max. 1A per bank of 8)
DAC power supply	+/- 12 V. Supply	I/O 24V	I/O 24V
Multi-tasking processes	7	10	22
Equivalent processing speed	1x	7 x faster than Euro 205X	7 x faster than Euro 205X
System Software	Trio Multi-tasking BASIC V1	Trio Multi-tasking BASIC V2	Trio Multi-tasking BASIC V2

3. Connections

3.1. Euro 205X



3.2. Euro 404/408



4. Flashstick / MicroSD card

A micro SD card can be used with the Euro 404 / 408 allows a simple means of transferring programs without a PC connection. Offering the OEM easy machine replication and servicing. The Euro404 / 408 supports SD cards up to 16Gbytes. Each Micro SD Card must be pre-formatted using a PC to FAT32 before it can be used in the SD Card Adaptor.

It is not possible to use an SD card with the Euro 205X at all.

5. Communication Interfaces

For the new generation of Euro cards (Euro 404/408) the Serial Connector A has been replaced for an Ethernet interface. This Ethernet interface functions as a programming interface for Motion Perfect as well as a communication port for the protocols supported by Trio system software running over Ethernet.

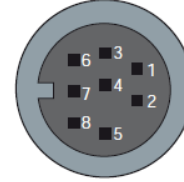
The Serial Connector B remains with the **same Pin Out** and functionality as you can see on the following images:

5.1. Euro 404 / 408

SERIAL CONNECTOR B:

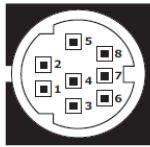
Euro404 / 408 Serial Port Connections

Pin	Function	Note
1	RS485 Data In A Rx+	Serial Port #2
2	RS485 Data In B Rx-	
3	RS232 Transmit	Serial Port #1
4	Serial 0V	
5	RS232 Receive	Serial Port #2
6	5V OUT	
7	RS485 Data Out Z Tx-	Serial Port #2
8	RS485 Data Out Y Tx+	



5.2. Euro 205X

Serial Connector B:



Pin	Function	Note
1	RS485 Data In A Rx+	Serial Port #2
2	RS485 Data In B Rx-	
3	RS232 Transmit	Serial Port #1
4	RS232 GND	
5	RS232 Receive	Serial Port #2
6	Internal 5V	
7	RS485 Data Out Z Tx-	Serial Port #2
8	RS485 Data Out Y Tx+	

Note that Euro 205X allows the possibility to use Ethernet, USB and Profibus daughter boards to provide additional communications options. Daughter boards are not supported by the new generation (404/408).

If a Euro 205x is fitted with the P296 Ethernet daughter board, then the same functionality can be found in the built-in Ethernet port on the 404/408. The Euro 404/408 Ethernet port is a “multi-socket” Ethernet port and can accept connections from Motion Perfect, Modbus TCP, Trio PC ActiveX, Ethernet IP (Industrial Protocol) and text file transfers all at the same time over one cable.

The Euro 205x supports Trio’s fibre-optic network with the optional P435 serial to fibre-optic adaptor connected to the appropriate serial connector (Serial Connector A). This is not supported by the new generation (404/408).

6. Backplane connector pin out (96 Way DIN41612)

	Euro 205X			Euro 404			Euro 408		
	C	B	A	C	B	A	C	B	A
1	5V	5V	5V	5V	5V	5V	5V	5V	5V
2	5V	5V	5V	5V	5V	5V	5V	5V	5V
3	0V	0V	0V	0V	0V	0V	0V	0V	0V
4	IO GND	OP13	OP10	IO GND	OP13	OP10	IO GND	OP13	OP10
5	OP9	OP12	OP15	OP9	OP12	OP15	OP9	OP12	OP15
6	OP8	OP11	OP14	OP8	OP11	OP14	OP8	OP11	OP14
7	IO 24V	IN0 / R0	IN1 / R1	IO 24V	IN0 / R0	IN1 / R1	IO 24V	IN0 / R0	IN1 / R1
8	IN2 / R2	IN3 / R3	IN4	IN2 / R2	IN3 / R3	IN4 / R4	IN2 / R2	IN3 / R3	IN4 / R4
9	IN5	IN6	IN7	IN5 / R5	IN6 / R6	IN7 / R7	IN5 / R5	IN6 / R6	IN7 / R7
10	IN8	IN9	IN10	IN8	IN9	IN10	IN8	IN9	IN10
11	IN11	IN12	IN13	IN11	IN12	N13	IN11	IN12	N13
12	IN14	0V	IN15	IN14	0V	IN15	IN14	0V	IN15
13	0V	DIR2	0V	N/C	N/C	N/C	A7- /STEP7-	B7- / DIR7-	Z7- /ENABLE7-
14	STEP1	STEP2	DIR3	N/C	N/C	N/C	A7+ /STEP7+	B7+ / DIR7+	Z7+ /ENABLE7+
15	DIR0	DIR1	STEP3	N/C	N/C	N/C	A6- /STEP6-	B6- / DIR6-	Z6- /ENABLE6-
16	STEP0	FAULT	RESET	N/C	N/C	N/C	A6+ /STEP6+	B6+ / DIR6+	Z6+ /ENABLE6+
17	ENABLE 1	ENABLE (OC)	AIN(0)	N/C	N/C	N/C	A5- /STEP5-	B5- / DIR5-	Z5- /ENABLE5-
18	BOOST1	BOOST0	ENABLE 2	N/C	N/C	N/C	A5+ /STEP5+	B5+ /DIR5+	Z5+ /ENABLE5+
19	BOOST3	BOOST2	Z3- /BOOST3-	N/C	N/C	N/C	A4- /STEP4-	B4- / DIR4-	Z4- /ENABLE4-
20	A3- / STEP3-	B3- / STEP3-	Z3+ /BOOST3+	N/C	N/C	N/C	A4+ /STEP4+	B4+ / DIR4+	Z4+ /ENABLE4+
21	A3+ / STEP3+	B3+ / STEP3+	Z2- / BOOST2-	A3- /STEP3-	B3- / DIR3-	Z3- /ENABLE3-	A3- /STEP3-	B3- / DIR3-	Z3- /ENABLE3-
22	A2- / STEP2-	B2- / STEP2-	Z2+ /BOOST2+	A3+ /STEP3+	B3+ / DIR3+	Z3+ /ENABLE3+	A3+ /STEP3+	B3+ / DIR3+	Z3+ /ENABLE3+
23	A2+ / STEP2+	B2+ / STEP2+	Z1- /BOOST1-	A2- /STEP2-	B2- / DIR2-	Z2- /ENABLE2-	A2- /STEP2-	B2- / DIR2-	Z2- /ENABLE2-

24	A1- / STEP1-	B1- / STEP1-	Z1+ /BOOST1+	A2+ /STEP2+	B2+ / DIR2+	Z2+ /ENABLE2+	A2+ /STEP2+	B2+ / DIR2+	Z2+ /ENABLE2+
25	A1+ / STEP1+	B1+ / STEP1+	Z0- /BOOST0-	A1- /STEP1-	B1- / DIR1-	Z1- /ENABLE1-	A1- /STEP1-	B1- / DIR1-	Z1- /ENABLE1-
26	A0- / STEP0-	B0- / STEP0-	Z0+ /BOOST0+	A1+ /STEP1+	B1+ /DIR1+	Z1+ /ENABLE1+	A1+ /STEP1+	B1+ /DIR1+	Z1+ /ENABLE1+
27	A0+ / STEP0+	B0+ / STEP0+	VOUT0	A0- /STEP0-	B0- / DIR-	Z0- /ENABLE0-	A0- /STEP0-	B0- / DIR-	Z0- /ENABLE0-
28	VOUT3	VOUT2	VOUT1	A0+ /STEP0+	B0+ / DIR+	Z0+ /ENABLE0+	A0+ /STEP0+	B0+ / DIR+	Z0+ /ENABLE0+
29	+12V	+12V	+12V	N/C	N/C	N/C	VOUT7	VOUT6	VOUT5
30	AGND	AGND	AGND	AGND	N/C	VOUT3	AGND	VOUT4	VOUT3
31	-12V	-12V	-12V	VOUT2	VOUT1	VOUT0	VOUT2	VOUT1	VOUT0
32	Earth	Earth	Earth	ENABLE1	ENABLE2	Earth	ENABLE1	ENABLE2	Earth

7. Programming

The same BASIC programming language is use in the Euro 404/408 as was used on the Euro 205X. The compiler is more advanced but is 99% backwards compatible with the older Motion Coordinator. There are some details that must be attended to when converting a project from the Euro 205X to the Euro 404/408.

7.1. Motion Perfect

The Euro 205X project will be in Motion Perfect 2 format. However, the project must be converted to the Motion Perfect version 3/4 format. This conversion is very simple and is a reversible process that is handled within Motion Perfect version 3/4.

7.2. Axis types

If the programs specifically set or read the ATYPE axis parameter, then the Euro 404/408 uses a different set of ATYPE numbers for similar axis types:

Axis function	Euro 205X ATYPE	Euro 404/408 ATYPE
Servo with incremental encoder feedback	2	44
Encoder only	3	76
Stepper (or pulse + direction)	1	43
Stepper with registration	4	43

Default ATYPES are set depending on the axis “Feature Codes” in the Euro 205X, and depending on which of the 2 types (servo or stepper) the Euro 404/408 is. The ATYPES should be set in MC_CONFIG in the Euro 404/408 if changing away from the default is needed.

7.3. Processes

The Euro 205X has 8 processes for multi-tasking programs numbered 1 to 7. Processes 6 and 7 are the fast tasks.

In the Euro 404 there are 10 processes numbered 0 to 9. Processes 8 and 9 are the fast tasks.

In the Euro 408 there are 22 processes numbered 0 to 21. Processes 20 and 21 are the fast tasks.

As the Euro 404/408 processing is very much faster than the Euro 205X, there will not be any observable reduction in performance if the project is set to run on processes 1 to 7. 8 and 9 will then not be in use and the 8 programs will share the processor equally. This is the best configuration to use in most cases.

7.4. Non-volatile memory

The Euro 205X has a NiMh re-chargeable battery which maintains the VR global memory and the TABLE memory when the power is off.

The Euro 404/408 has no battery and instead saves the VR globals into the Flash EEPROM. The TABLE memory is not maintained and is therefore volatile. TABLE values will be lost on power off.

The change in TABLE functionality may need to be addressed when porting a project over to the Euro 404/408. There is a new command FLASHTABLE which allows the programmer to store blocks of TABLE memory into the Flash and to restore them on next startup.

This memory area used by the application programming will need to be examined and action taken when porting the project from Euro 205X to Euro 404/408.