TRIO
MOTION | TECHNOLOGY

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APPLICATION NOTE

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1. Introduction

Feature Enable Codes (FEC's) mean that you to only pay for the axis that you require and so reducing costs. They can be purchased at any time through your Trio distributor and programmed into your Motion Coordinator using Motion Perfect.

This document explains the relationship between the *feature number*, *function* and *product codes*. You can refer to this to help decide exactly which features you need to custom build your coordinator specification.

2. Products supporting feature enable codes

The following products support feature enable codes to enable additional axis.

- P151 Euro205x stepper base
- P156 Euro205x servo base
- P159 Euro209
- P136 MC206X
- P170 MC224
- P860 MC464
- P180 PCI208
- P821 MC403Z

- P823 MC403
- P827 MC405

- P291 SERCOS daughter board
- P293 Enhanced CAN daughter board
- P871 Panasonic interface (MC464)
- P872 SERCOS interface (MC464)
- P876 Ethercat interface (MC464)

Previous version of the above controllers also support feature enable codes.

3. Feature enable code types

3.1. Built in Axis

The Euro205x, Euro209, MC206X, PCI208 all have built in axis, only some of these are enabled through factory defaults. To enable additional axes you need to specify what axis type you require and on which axis.

The MC403, MC403Z and MC405 are sold as 2 variants each. The lower specification models have a reduced axis count and/ or have the servo capability disabled. We always recommend purchasing the model with the correct enabled features however if you need to upgrade to the full version you can add the 'axis upgrade' FEC.

3.2. Remote axes

SERCOS, Panasonic, CAN and Ethercat interfaces all come supplied with a limited number of axis, additional axes can be enabled through the feature codes. To enable these you need to specify how many additional axes you require. The Motion Coordinator will automatically distribute these axes to the system.

4. Feature Numbers

When you come to assign your feature enable codes to the Motion Coordinator you will be given a feature number. Depending on the coordinator this feature number will be a different feature type. The table in Figure 1 shows what each feature number enables on each coordinator

Feature Number	EURO205x/ MC206X/ MC224	PCI208/EURO209	MC464	MC403/ MC403Z/ MC405
0	STEPPER AXIS 0	STEPPER AXIS 0	1 REMOTE AXIS	-
1	STEPPER AXIS 1	STEPPER AXIS 1	2 REMOTE AXES	-
2	STEPPER AXIS 2	STEPPER AXIS 2	4 REMOTE AXES	-
3	STEPPER AXIS 3	STEPPER AXIS 3	8 REMOTE AXES	-
4	SERVO AXIS 0	STEPPER AXIS 4	16 REMOTE AXES	-
5	SERVO AXIS 1	STEPPER AXIS 5	32 REMOTE AXES	-
6	SERVO AXIS 2	STEPPER AXIS 6	-	-
7	SERVO AXIS 3	STEPPER AXIS 7	-	-
8	ENCODER AXIS 0	ENCODER AXIS 0	-	-
9	ENCODER AXIS 1	ENCODER AXIS 1	-	-
10	ENCODER AXIS 2	ENCODER AXIS 2	-	-
11	ENCODER AXIS 3	ENCODER AXIS 3	-	-
12	1 REMOTE AXIS	ENCODER AXIS 4	1 REMOTE AXIS	-
13	2 REMOTE AXES	ENCODER AXIS 5	2 REMOTE AXES	-
14	4 REMOTE AXES	ENCODER AXIS 6	4 REMOTE AXES	-
15	8 REMOTE AXES	ENCODER AXIS 7	8 REMOTE AXES	-
16	16 REMOTE AXES	-	16 REMOTE AXES	-
17	1 REMOTE AXIS	1 REMOTE AXIS	32 REMOTE AXES	-
18	2 REMOTE AXES	2 REMOTE AXES	-	-
19	4 REMOTE AXES	4 REMOTE AXES	-	-
20	8 REMOTE AXES	8 REMOTE AXES	-	-
21	16 REMOTE AXES	16 REMOTE AXES	IEC Feature Code	IEC Feature Code
22	SERVO AXIS 4*	-	Kinematic runtime	Kinematic runtime
23	-	-	-	Axis upgrade
24	-	Z REGISTRATION AXIS 0*1	-	-
25	-	Z REGISTRATION AXIS 1*1	-	-
26	-	Z REGISTRATION AXIS 2*1	-	-
27	-	Z REGISTRATION AXIS 3*1	-	-
28	-	Z REGISTRATION AXIS 4*1	-	-
29	-	Z REGISTRATION AXIS 5*1	-	-
30	-	Z REGISTRATION AXIS 6*1	-	-
31	-	Z REGISTRATION AXIS 7*1	-	-

Figure 1 Feature Number assignment

*MC206X only

*1Euro209 only

Features marked '-' are reserved for future use.

5. Feature types

5.1. Built in Axis

The following Feature types must be specified with the required axis number that you wish to enable.

5.1.1. Stepper

This enables a built in axis to be a stepper output

5.1.2. Z registration

When used with a Stepper code you can set the axis to stepper with z registration (ATYPE=37)

5.1.3. Servo

This enables a built in axis to use the encoder input to close a servo loop with a DAC output

5.1.4. Encoder

This enables a built in axis to be used as an encoder input. Or to add servo functionality when purchasing the optional DAC hardware.

On a PCI208 and Euro209 you purchase this code along with a DAC Module (P184 or P185) to enable an additional built in servo axis.

5.2. Axis upgrade

This will enable all axes on the controller. It is used to upgrade a limited functionality controller to use all hardware features.

5.3. Remote Axes

5.3.1. 1 Remote Axis

Enables 1 additional remote axis

5.3.2. 2 Remote Axes

Enables 2 additional remote axes

5.3.3. 4 Remote Axes

Enables 4 additional remote axes

5.3.4. 8 Remote Axes

Enables 8 additional remote axes

5.3.5. 16 Remote Axes

Enables 16 additional remote axes

5.3.6. 32 Remote Axes

Enables 32 additional remote axes

5.4. Complex Feature Types

5.4.1. Stepper Encoder – MC206X, Euro205x

By enabling both the Encoder and Stepper features you will enable Stepper output with feedback.

On the MC206X this is simply a hardware feedback of the stepper output to enable registration on a stepper axis. On the Euro205x it enables you to connect an encoder to the differential connection and a stepper on the open-collector output. There is no closed loop control of the axis but the encoder can be used for feedback and registration.

5.4.2. Stepper Encoder – Euro209

The Euro209 can enable Stepper Encoder with a Stepper code.

5.4.3. Stepper with Z registration – Euro209

This is Stepper output with Z-mark input for registration and datuming. There are two methods of enabling this feature either by setting both the Stepper and Encoder feature codes or by enabling both the Stepper and Z Registration codes.

5.5. Auxiliary Features

5.5.1. IEC Feature Code

This enables the full use of the IEC61131 programming language.

5.5.2. Kinematic runtime FEC

This enables full TrioBASIC functionality of the transformation features (FRAME, USER_FRAME, TOOL_OFFSET etc)

6. Product Codes

As with all Trio products there is a product (P) number associated with each feature, the table in Figure 2 shows how these relate to each Motion Coordinator.

	Euro205x	Euro209	PCI208	MC206X	MC224	MC464	MC403Z	MC403	MC405
STEPPER	P416	P182	P182	P395	-	-	-	-	-
SERVO	P406	P183	P183	P390*	-	-	-	-	-
ENCODER	P412	P183	P183	P393	-	-	-	-	-
Z REGISTRATION	-	P188	-	-	-	-	-	-	-
1 REMOTE AXIS	P701	P701	P701	P701	P701	P701	-	-	-
2 REMOTE AXES	P702	P702	P702	P702	P702	P702	-	-	-
4 REMOTE AXES	P704	P704	P704	P704	P704	P704	-	-	-
8 REMOTE AXES	P708	P708	P708	P708	P708	P708	-	-	-
16 REMOTE AXES	P716	P716	P716	P716	P716	P716	-	-	-
32 REMOTE AXES	-	-	-	-	-	P732	-	-	-
IEC Feature Code	-	-	-	-	-	P877	P877	P877	P877
Kinematic runtime	-	-	-	-	-	P750	P750	P750	P750
Axis upgrade	-	-	-	-	-	-	P812	P814	P817

Figure 2 Feature code Product numbers

* P391 if you need to enable a servo on AXIS 4

Remember, to enable a SERVO on the Euro209 and PCI208 you will need to have the DAC Module (P184 or P185) fitted.

You must specify an axis when ordering STEPPER, SERVO or ENCODER.

Features marked '-' are unavailable on that particular controller.

If you purchase a Servo code the Stepper code is included for free (on request).

If you purchase a Stepper code then the Z Registration code is included for free (on request).

7. Entering Codes

If feature codes are purchase at the same time as the coordinator you can arrange for distributor to enter them before shipping. The feature codes can also be entered using Motion Perfect, see "Feature Enable" in the HELP for more details.

8. Checking Codes

You can easily check your enabled feature codes by using Motion Perfect. It is also possible by typing "FEATURE_ENABLE" in the command line, this will return a list of feature numbers that are enabled. You can then refer to Figure 1 to check that it is the correct function.