

Optimised Control Ltd

EuroSystem Release Notes

Three Channel Encoder Interface

Issue: 1.0

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Manual Revision History

| Issue | Revision | Date | Reference | Comments |
|--------------|-----------------|-------------|------------------|---|
| 1.0 | 000 | Nov 93 | | First Release of Three Channel Encoder manual |
| | | | | |

Three Channel Encoder Interface

The Three Channel Encoder Interface allows the connection of up to three additional incremental encoders to any Optimised Control euro-card based controller. The encoders can have either single ended or differential outputs, as the input circuit has a differential line receiver and is capable of correctly receiving either type of signal. The quadrature signals (A and B) are then taken to individual decoder chips whose outputs are read by the controller. The index pulses from the encoders can be read directly from the controller via a register on the option board, this register also contains an flag which is set by the rising edge of the relevant index pulse. The flags can be cleared by writing a dummy value to the encoder registers (this only clears the individual index flag and has no other effect irrespective of the value).

The board has two main uses:-

1. To add encoder channels allowing all axes to follow a separate encoder during Cam following or a software gearbox.
2. To allow monitoring of the position where, due to backlash or other mechanical factors, the position of the motor is not sufficient, or in stepper motor systems to provide position confirmation.

Addressing

The three channel encoder interface occupies 8 bytes in the option memory space and can be installed in any slot. The memory map is shown below.

| Address Offset | Contents When Reading | Contents When Writing |
|----------------|---------------------------|-----------------------|
| +0 | Encoder 0 high byte | Clear index flag 0 |
| +1 | Encoder 0 low byte | Clear index flag 0 |
| +2 | Encoder 1 high byte | Clear index flag 1 |
| +3 | Encoder 1 low byte | Clear index flag 1 |
| +4 | Encoder 2 high byte | Clear index flag 2 |
| +5 | Encoder 2 low byte | Clear index flag 2 |
| +6 | Index register (bit mask) | |
| +7 | Index register (bit mask) | |

Notes:

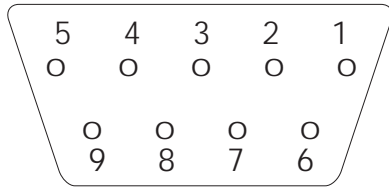
- In for correct operation the high byte of an encoder must be read before the low byte.
- The index latch in the encoder board is currently unsupported by software other than by the use of PEEK and POKE.

The factory set position for 3 channel encoder boards is slot 1 and the firmware support will only work correctly when in this position.

Encoder Pinout Details

The encoder inputs are brought out onto 9 pin 'D' type female sockets. The encoder should be wired to a 9 pin 'D' male plug.

CHA SCRN !CHB INDEX +5V



!CHA CHB GND !INDEX

encoder/mc

| Pin No. | Signal Name & Function | Type |
|---------|-----------------------------|--------|
| 1 | +5V : Power to Encoder | Output |
| 2 | INDEX : Index Mark | Input |
| 3 | !CHB : Channel B Compliment | Input |
| 4 | SCRN : Cable Screen | Input |
| 5 | CHA : Channel A | Input |
| 6 | !INDEX : Index Complement | Input |
| 7 | GND : Signal Ground | |
| 8 | CHB : Channel B | Input |
| 9 | !CHA : Channel A Compliment | Input |

Using the 3 axis encoder board, encoder following can be performed by setting the FOLLOWAXIS keyword. The FOLLOWAXIS keyword has been extended to allow the following values:

| FOLLOWAXIS | Description |
|------------|-----------------------------------|
| 0 | Axis to follow axis 0 |
| 1 | Axis to follow axis 1 |
| 2 | Axis to follow axis 2 |
| 3 | Axis to follow external encoder 0 |
| 4 | Axis to follow external encoder 1 |
| 5 | Axis to follow external encoder 2 |

For example:

```
FOLLOWAXIS[0] = 3
FOLLOW = 1
```

New Keywords

Please note that to use the XENCODER keyword and extended features of the FOLLOWAXIS keyword, a firmware change is required.

XENCODER/XE

Purpose:

To read the position of the encoder on the 3 channel encoder board.

Syntax:

```
v = XENCODER[axis]
```

Description:

The XENCODER keywords allows the encoder value from the 3 channel encoder board to be as a positional value. The value returned is in quadrature counts only and is not scaled using the SCALE keyword.

Example:

The 3 channel encoder board is used as a position reference for an open loop stepper system. Assume a 1:1 relationship between the step rate and encoder counts.

```
MOVEA = 100 : GO[0]
PAUSE IDLE
finalPos = POS
WHILE POS <> XENCODER
  MOVER = finalPos - XENCODER : GO
  PAUSE IDLE
ENDW
```

See also:

ENCODER, POS