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Instruction Manual

Encoder Counter Module

ECM-505/F

All technical data subject to change without notice.

August 07, 2007

FPGA Revision History:

REV 0, 2.8.2007, Checksum 1EB298F	

Description

The function of this module is to continuously read data from 5 SSI absolute encoders like Temposonics SSI, CRE 65-4096 R24 C E01 from TWK-Elektronik GmbH or many other SSI absolute encoders/sensors. The controller reads a programmable number of data bits from all 5 encoders in parallel. The readout clock frequency is 250 kHz. One loop takes approx. 150 µs (e.g. 24 databits). The SSI data length is programmable from 1 to 32 bits. The SSI data format can be Binary or Gray code and is programmable. The programmed data length and data format is valid for **all** five sensors.

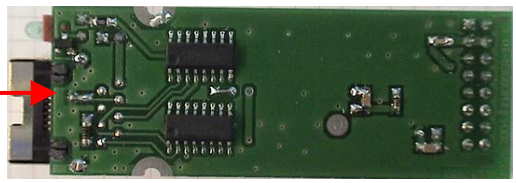
The ECM-505/F module is based on the SSI-550 module and may run with the same epics software driver.

Submodule Description

Encoder-IO:

This submodule communicates with one absolute encoder. The encoder is supplied from this module. The supply voltage is fixed to 24V. Uninet cable 4x2 twisted pair wires are recommended.

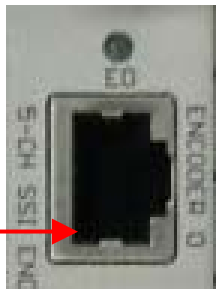
Code sense programmin g resistor



Removing this Resistor changes counter direction to CCW (when supported by the encoder).

SSI-505 RJ45 Connector:

Pin 1



Connector Cable:		
Color	**RJ45 8-pol.**	**function**
brown	1	SSI, Data +
brown/white	2	SSI, Data -
blue	3	SSI, clock +
blue/white	4	SSI, clock -
organge	5	nc
orange/white	6	Code sense
green	7	+24V/115mA
green/white	8	GND

E0..E4 LED	Shows the least significant bit of the encoder	
SSI-IO	Data-Input RS422 , impedance 120 Ohm	
	Clock-Output RS422 , into 120 Ohm	
Encoder supply	24V / 115mA max	
Code sense	CW at Vi = “Log 0”	(Log 0 < 0.8V)
	CCW at Vi = “Log 1”	(Log 1 > 3.2V or not connected)

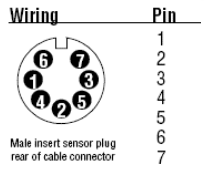
Encoder connector cable examples:

Extension cable for Encoder type: CRE 65-4096 R24 C E01

Connector:			
Color	**RJ45 8-pol.**	**Binder 423 EMC**	**Function**
brown	1	2	SSI, Data +
brown/white	2	3	SSI, Data -
blue	3	4	SSI, clock +
blue/white	4	5	SSI, clock -
organge	5		nc
orange/white	6	6	Code sense
green	7	7	+24V/115mA
green/white	8	1	GND

Extension cable for Encoder type: Temposonics R series SSI

Connector:			
Color	**RJ45 8-pol.**	**Amphenol C 091**	**Function**
brown	1	2	SSI, Data +
brown/white	2	1	SSI, Data -
blue	3	3	SSI, clock +
blue/white	4	4	SSI, clock -
organge	5		nc
orange/white	6		Code sense
green	7	5	+24V/115mA
green/white	8	6	GND



VME Interface

Bit Assignment:

Sensor Register (0x00..0x10)

Bit	Function
D0..D31	Sensor Data

Control Register (0x80)

Bit	Function	Access	Default Value
D4..D0	Data Length [SSI]	R/W	0x17 (=24 bit)
D5	Data Format [SSI]	R/W	0x0 (=Binary)
D15..D6	not used	R/W	
D31..D16	Module ID	R	0x505F

Data Length

D4..D0	Data Length [SSI Bits]
0x0	1
...	..
0x1F	32

Data Format

D5	Data Format [SSI]
0	Binary
1	Gray

Module ID: 0x505F
This sixteen bit module identification number is read only. It is used for automatic epics driver detection.

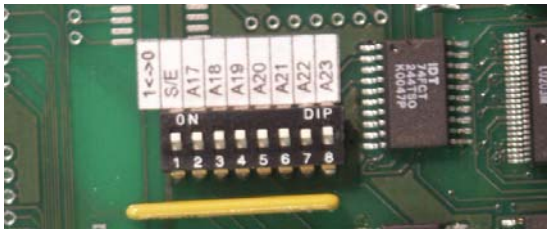
Base Address Settings

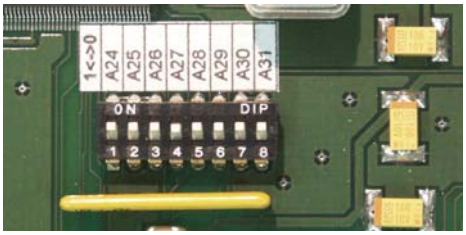
Base address + offset:	
0x00	Sensor 0
0x04	Sensor 1
0x08	Sensor 2
0x0C	Sensor 3
0x10	Sensor 4
0x14..0x7F	Not used
0x80	Control Register

The address range is selected by two 8bit dip switches (address selector, A31..A17). This address range is accessible via read commands (A32D32 or A24D32).

The RAM of the ECM-505/F is located between base address + 0x00..0x13, 0x80..0x83.
The base address can be mapped with the dip switches to 128kByte boarders within the VME address space.

Access via A24D32 Standard
A32D32 Extended





This Standard/Extended address range switch is marked on the print with „S/E“. Standard address range (A24) is selected with the switch in the OFF position. The extended address selector switch (A31..A24) is then disabled.

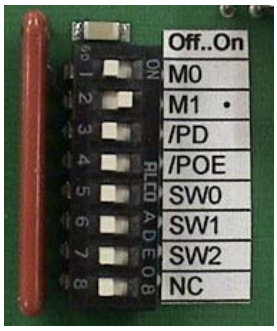
Base address	A31 ... A24	A23	A22	A21	A20	A19	A18	A17		A24/A32 Switch
with the STA/EXT-Switch = 1: STANDARD										
0x000000	x	0	0	0	0	0	0	0		**1**
0x020000	x	0	0	0	0	0	0	**1**		**1**
0x040000	x	0	0	0	0	0	**1**	0		**1**
0x060000	x	0	0	0	0	0	**1**	**1**		**1**
with the STA/EXT-Switch = 0: EXTENDED										
0x00000000	0	0	0	0	0	0	0	0		**0**
0x00020000	0	0	0	0	0	0	0	**1**		**0**
0x00040000	0	0	0	0	0	0	**1**	0		**0**

a.s.o.

Address Modifier:

	Addressing Space	AM-Codes
STA	STANDARD A2..A23	3D, 39
EXT	EXTENDED A2..A31	0D, 09

Boot and Option Switches:



BOOT-SW: M0, M1, /PD, /POE, NC:
This is the default position . These switches define the bootmode of the module and **must** stay at their default positions.

OPTION-SW: SW0, SW1, SW2:
Reserved for options

Temperature Range:	Ventilated VME-Crate is required
Power Requirements:	max. 7 A at +5V
Physical:	Single width VME module