



Instruction Manual

Encoder Counter Module

ECM-505/F

All technical data subject to change without notice.

Description

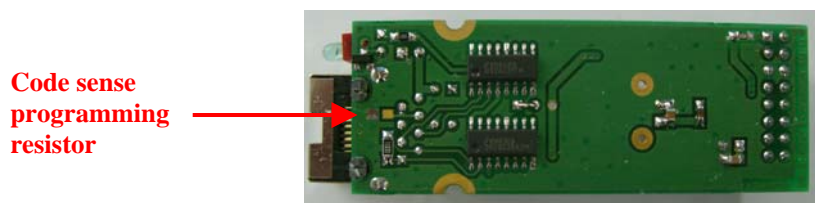
The function of this module is to continuously read data from 5 SSI absolute encoders like Temposonics SSI, CRE 65-4096 R24 C E01 from TWK-Elektronik GmbH or many other SSI absolute encoders/sensors. The controller reads a programmable number of data bits from all 5 encoders in parallel. The readout clock frequency is 250 kHz. One loop takes approx. 150 μ s (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

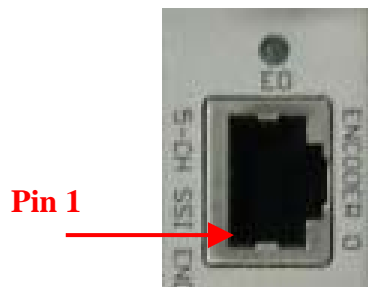
Encoder-IO:

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.



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

SSI-505 RJ45 Connector:



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 -
orange	5	nc
orange/white	6	Code sense
green	7	+24V/200mA
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 / 200 mA	
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:

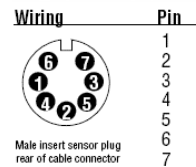
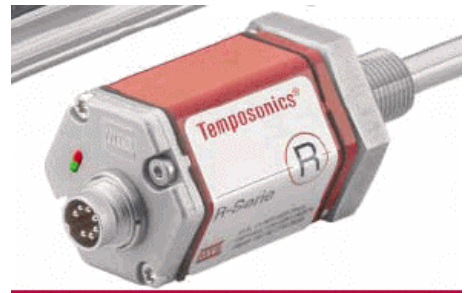
Extension cable for Encoder type: CRE 65-4096 R24 C E01

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 -
orange	5		nc
orange/white	6	6	Code sense
green	7	7	+24V/200mA
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 -
orange	5		nc
orange/white	6		Code sense
green	7	5	+24V/200mA
green/white	8	6	GND



Cable connection for Encoder type: Heidenhain ROQ 425 SSI

Connector:			
RJ45 8-pol.	Encoder ROQ 425/SSI	Encoder Color	Function
1	14	gray	SSI, Data +
2	17	pink	SSI, Data -
3	8	violet	SSI, clock +
4	9	yellow	SSI, clock -
5			nc
6			Code sense
7	7	brown/green	+24V/200mA
8	10	white/green	GND



Extension cable for Encoder type: TR-ELECTRONIC LTxxx-S

Connector:			
Color	RJ45 8-pol.	12-Pin Con	Function
brown	1	3	SSI, Data +
brown/white	2	4	SSI, Data -
blue	3	2	SSI, clock +
blue/white	4	1	SSI, clock -
orange	5		
orange/white	6		
green	7	11	+24V/200mA
green/white	8	12	GND



Cable connection for Encoder type: Baumer BMMH 30D1 X 24C SSI

Connector:			
RJ45 8-pol.	Encoder BMMH/SSI M9	Encoder Color (-4 -5)	Function
1	5	gray	SSI, Data +
2	6	pink	SSI, Data -
3	3	green	SSI, clock +
4	4	yellow	SSI, clock -
5			nc
6			Code sense
7	2	brown	+24V/50mA
8	1	white	GND



Important:

- Please recheck all encoder connections, pins and colors with your latest encoder datasheet
- Do not connect the encoder with the ECM-505/F board under power.

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

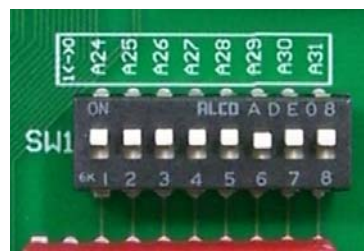
Base address + offset:	
0x00	Sensor 0
0x04	Sensor 1
0x08	Sensor 2
0x0C	Sensor 3
0x10	Sensor 4
0x14..0x7F	Not used
0x80	Control Register

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 boards within the VME address space.

Access via A24D32 Standard
 A32D32 Extended



Example: DIP-SW Address above is : 0x00000000, Extended Mode

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, PROG:

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

Power Requirements:

Temperature Range:

max. 1 A at +5V

max. 5 A at +12V

Ventilated VME-Crate is required

Physical:

Single width VME module

Datasheet Revision History:

August 2007	Page 3, Temposonics R series SSI added
October 2007	Page 2, Encoder Current increased to 24V / 200 mA
	Page 3, Heidenhain ROQ 425 SSI added
October 2007	Page 4, TR-ELECTRONIC LT-XXX-S series SSI added
February 2008	Page 4, Baumer Electronic BMMH 30 series SSI added

FPGA Revision History:

REV 0, 2.8.2007, Checksum 1EB298F	
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