




Expansion port CNT

USER'S GUIDE

Used symbols

Danger – important notice, which may have an influence on the user's safety or the function of the device.

Attention – notice on possible problems, which can arise in specific cases.

Information, notice – information, which contains useful advice or special interest.

Declared quality system
ISO 9001

Issue in CZ, 12/15/2011

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1. Safety instructions

Please observe the following safety instructions:

- The expansion port must be used in compliance with all applicable international and national laws and in compliance with any special restrictions regulating the utilization of the communication module in prescribed applications and environments.
- Use only the original Conel company accessories. Thus you will prevent possible health risks and damage to the devices and ensure compliance with all relevant provisions. Unauthorised adjustments or use of unapproved accessories may result in damage to the expansion port and breach of applicable laws. Use of unapproved adjustments or accessories may lead to cancellation of guarantee, which has no effects on your legal rights.
- Do not expose the expansion port to extreme conditions. Protect it from dust, moisture and heat.

2. Product disposal instructions

The WEEE (Waste Electrical and Electronic Equipment: 2002/96/EC) directive has been introduced to ensure that electrical/electronic products are recycled using the best available recovery techniques to minimize the impact on the environment. This product contains high quality materials and components which can be recycled. At the end of it's life this product MUST NOT be mixed with other commercial waste for disposal. Check with the terms and conditions of your supplier for disposal information.

Contact www.vitriko.com info@vitriko.com

3. CNT description

The user interface CNT is for monitoring and processing of analogue and binary signals and to control (settings) of binary signals. Available are 2 counter and 2 binary inputs or 4 binary inputs, 2 analogue inputs and 1 binary output. The settings of binaries and counter inputs by the help of firmware in which the single input and output is defined. Binary output is off by default configuration(is not switched to ground).

At expansion port CNT including in modem it is possible use power supply management. At permanent idleness the expansion port CNT is switch to low power supply mode when demand current is very low (100 μA). Switch time to this status is program adjustable. The module wake up is possible by PORT status variation.

4. Input and output description

4.1. *Analog input*

On analogy input it detected current, converted to digital 12-bits value and modified by multiplicative and additive constant. Next the value is averaged on user settings and stored to PC memory. The basic range of input current is 0 – 20 mA at input resistance 100 Ω.

Equal of value is: *((12b value + addit. constant) * multiplic. constant)/1000*

The sample period on analogy inputs is adjustable in range 0 ÷ 65535 seconds. At value 0 it is sampling once per second and measurement circuit is permanent switch on. At sampling it is possible to set time of measurement circuit switch from 16 ms to 375 ms.

On the basis of signal change about bigger value then setting upper/lower limit is generated alarm. The alarm end is on the basis of bigger/lower signal change about set hysteresis than is upper/lower limit.

4.2. *Binary input*

The binary input is potential-free contact which is 8x per second sampling and sampling time is 1/64 seconds. For binary inputs is possible to set active level either log. 0 or log. 1. Choice active level can generate alarm.

4.3. *Counter input*

The counter inputs are meters maximal to 100 Hz. The ratio impulses on input can be maximal 1:10, that means the impulse width mustn't be lower than 1/10 signal period. At lower width it isn't guaranteed the true evaluation of the metered signal. For metering of small frequencies (about mHz) it is important set the multiplicative constant which multiples metering frequency (flow) because of true evaluation.

On the basis of signal change about bigger value then setting frequency upper limit is generated alarm. Alarm is possible send after time after which upper limit must be overrun.

In case that it isn't any change on input, it is possible to define time after which the value on input will zero.

4.4. *Binary output*

The binary output is realized by transistor with open collector. In inactive state (log. 0) the transistor no transfer and is as switch off. In active state (log. 1) is transistor switch on and connect signal on ground (GND).

Maximal switching current on output is 100 mA. Maximal voltage which can be on transistor collector is power supply voltage of the router.

The impulse length is possible set in range 125 ÷ 8000 ms which is possible to send on output after impulses number setting (1 ÷ 65535) on input BIN1/CNT1.

In sleep mode the all inputs and outputs values are metered and controlled.

5. Selecting the current of binary input

If active level is set as log. 1, electric current can be selected with jumper. When jumper J4 (viz. picture) is mounted on pins, electric current value is 20 mA. When jumper J4 is not mounted, electric value is 8μA. If current value is 20mA, CNT has higher consumption, also it has higher resistance to industrial noise.

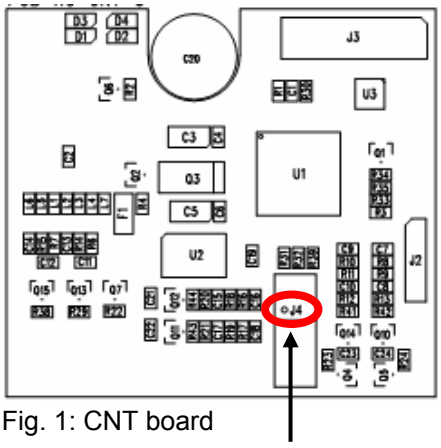

Fig. 1: CNT board

6. Connection of connector

Panel socket RJ45.

Pin number	Signal mark	Description	Data flow direction
1	BIN1/CNT1	Binary input/counter input	Input
2	BIN2/CNT2	Binary input/counter input	Input
3	BIN3	Binary input	Input
4	BIN4	Binary input	Input
5	GND	Signal ground	
6	OUT1	Binary output (open collector)	Output
7	AN1	Analogue input	Input
8	AN2	Analogue input	Input

Table 1: Connection of CNT connector

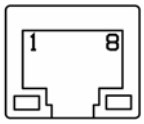

Fig. 2: CNT connector

Typical connection of the router measuring circuits:

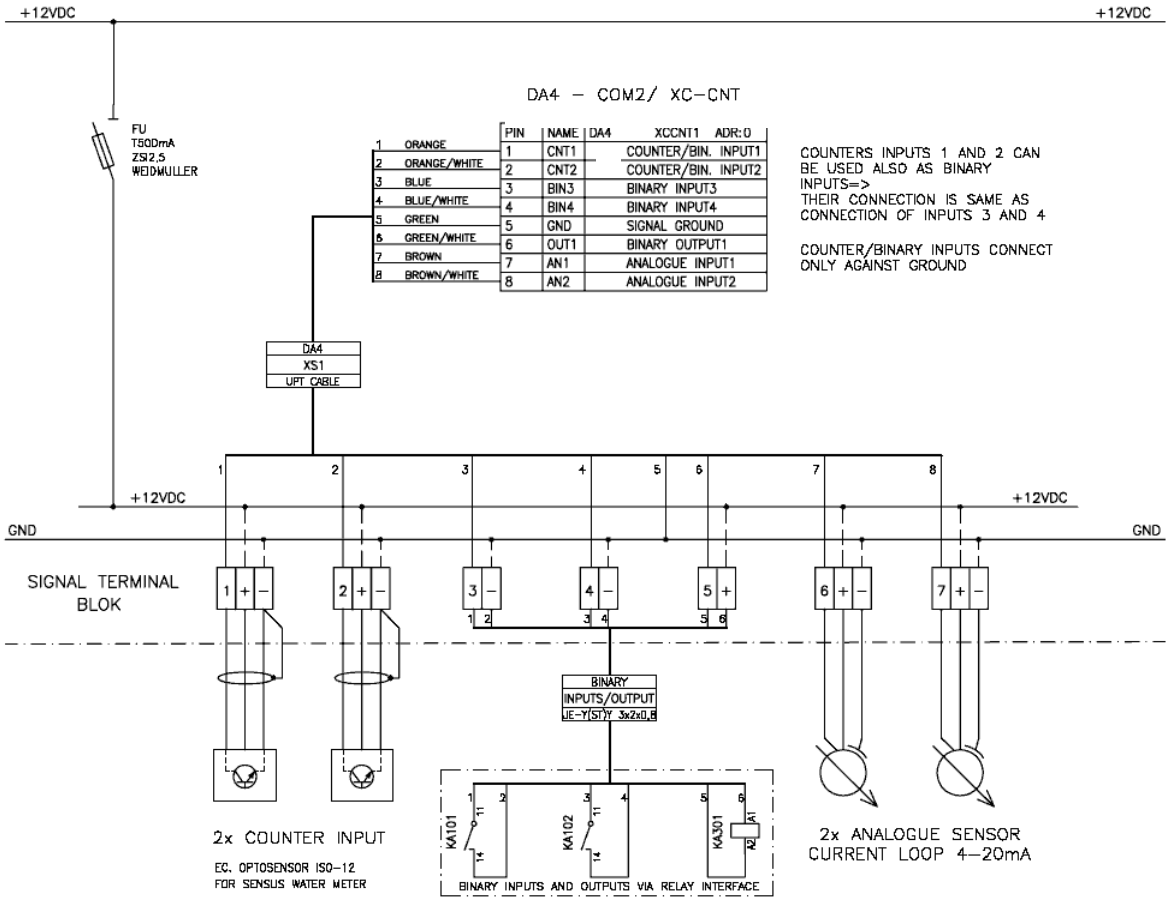

Fig. 3: Connection of the router measuring circuits

The router does not support to modify any signals of the CNT port, for example logical functions.

7. Description of protocol XC-CNT MODBUS ASCII Slave

The XC-CNT MODBUS ASCII slave protocol is communication protocol through which router communicates with the CNT board. By the help of this protocol the station configures board software, reads her buffer, controls binary output and switch main station supply off.

The expansion port CNT communicates by this protocol with bit rate 9600 bit/s (8N1).

Address space

Address	Access	Description
0x0000	R/-	Firmware type
0x0001	R/-	Upper 16 bits of firmware version
0x0002	R/-	Lower 16 bits of firmware version
0x0003	R/-	Supports firmware characteristics • bit 0 – analogy input AN1 • bit 1 – analogy input AN2 • bit 2 – counter input CNT1 • bit 3 – counter input CNT2 • bit 4 – binary input BIN1 • bit 5 – binary input BIN2 • bit 6 – binary input BIN3 • bit 7 – binary input BIN4 • bit 8 – binary output OUT1 • bit 9 – automatic feeder control • bit 10 – fullduplex counter CNT1/CNT2
0x0004	R/-	Maximal logs number in buffer
0x0005	R/W	Marker of log launching and alarms work
0x0006	R/W	Upper 16 bits of seconds number from 1.1.1970
0x0007	R/W	Lower 16 bits of seconds number from 1.1.1970
0x0008	R/W	Upper 16 bits of log actual number
0x0009	R/W	Lower 16 bits of log actual number
0x000A	R/-	Alarms actual status
0x0100	R/-	Binary inputs status
0x0200	R/W	Binary outputs status
0x0300	R/-	Recalculate value of analogy input AN1 (with sign)
0x0400	R/-	Recalculate value of analogy input AN2 (with sign)

0x0500	R/W	Upper 16 bits of counter CNT1 value
0x0501	R/W	Lower 16 bits of counter CNT1 value
0x0502	R/-	Prompt frequency CNT1
0x0503	R/-	Average frequency CNT1
0x0504	R/-	Minimal frequency CNT1
0x0505	R/-	Maximal frequency CNT1
0x0601	R/W	Upper 16 bits of counter CNT2 value
0x0601	R/W	Lower 16 bits of counter CNT2 value
0x0602	R/-	Prompt frequency CNT2
0x0603	R/-	Average frequency CNT2
0x0604	R/-	Minimal frequency CNT2
0x0605	R/-	Maximal frequency CNT2
0x0F00	R/-	0x0000 always
0x0F01	R/-	0x0000 always
0x0F02	R/-	Upper 16 bits of seconds number from 1.1.1970
0x0F03	R/-	Lower 16 bits of seconds number from 1.1.1970
0x0F04	R/-	Alarms status • bit 0 – active level on input BIN1 • bit 1 – active level on input BIN2 • bit 2 – active level on input BIN3 • bit 3 – active level on input BIN4 • bit 4 – analogy input lower limit overrun AN1 • bit 5 – analogy input upper limit overrun AN1 • bit 6 – analogy input lower limit overrun AN2 • bit 7 – analogy input upper limit overrun AN2 • bit 8 – limit frequency overrun CNT1 • bit 9 – limit frequency overrun CNT2
0x0F05	R/-	Binary inputs status • bit 0 – level on input BIN1 • bit 1 – level on input BIN2 • bit 2 – level on input BIN3 • bit 3 – level on input BIN4 • bit 6 – level on output BOUT1
0x0F06	R/-	Recalculate AN1 value (with sign)
0x0F07	R/-	Recalculate AN2 value (with sign)
0x0F08	R/-	Upper 16 bits CNT1

0x0F09	R/-	Lower 16 bits CNT1
0x0F0A	R/-	Prompt frequency CNT1
0x0F0B	R/-	Average frequency CNT1
0x0F0C	R/-	Minimal frequency CNT1
0x0F0D	R/-	Maximal frequency CNT1
0x0F0E	R/-	Upper 16 bits of counter CNT2 value
0x0F0F	R/-	Lower 16 bits of counter CNT2 value
0x0F10	R/-	Prompt frequency CNT2
0x0F11	R/-	Average frequency CNT2
0x0F12	R/-	Minimal frequency CNT2
0x0F13	R/-	Maximal frequency CNT2
0x1000	R/-	1. log – upper 16 bits of log number
0x1001	R/-	1. log – lower 16 bits of log number
0x1002	R/-	1. log – upper 16 bits of time stamps
0x1003	R/-	1. log – lower 16 bits of time stamps
0x1004	R/-	1. log – alarms status
0x1005	R/-	1. log – binary inputs status
0x1006	R/-	1. log – recalculate value AN1 (with sign)
0x1007	R/-	1. log – recalculate value AN2 (with sign)
0x1008	R/-	1. log – upper 16 bits CNT1
0x1009	R/-	1. log – lower 16 bits CNT1
0x100A	R/-	1. log – prompt frequency CNT1
0x100B	R/-	1. log – average frequency CNT1
0x100C	R/-	1. log – minimal frequency CNT1
0x100D	R/-	1. log – maximal frequency CNT1
0x100E	R/-	1. log – upper 16 bits of counter CNT2 value
0x100F	R/-	1. log – lower 16 bits of counter CNT2 value
0x1010	R/-	1. log – prompt frequency CNT2
0x1011	R/-	1. log – average frequency CNT2
0x1012	R/-	1. log – minimal frequency CNT2
0x1013	R/-	1. log – maximal frequency CNT2
0x1100	R/-	2. log
0x1200	R/-	3. log

...	R/-	...
0xEF00	R/-	224. log
0xF000	-/W	Samples stores period [min]
0xF001	-/W	Allowed: • bit 0 – active level on input BIN1 • bit 1 – active level on input BIN2 • bit 2 – active level on input BIN3 • bit 3 – active level on input BIN4 • bit 4 – analogy input AN1 lower limit overrun • bit 5 – analogy input AN1 upper limit overrun • bit 6 – analogy input AN2 lower limit overrun • bit 7 – analogy input AN2 upper limit overrun • bit 8 – limit frequency CNT1 overrun • bit 9 – limit frequency CNT2 overrun
0xF100	-/W	Binary inputs negative logical • bit 0 – input BIN1 • bit 1 – input BIN2 • bit 2 – input BIN3 • bit 3 – input BIN4
0xF200	-/W	Binary outputs normal level • bit 0 – output OUT1
0xF201	-/W	Feeder – impulse number on input BIN1/CNT1
0xF202	-/W	Feeder – impulse length on output OUT1 [1/8 sec]
0xF300	-/W	AN1 – samples period [sec]
0xF301	-/W	AN1 – multiplicative constant (with sign)
0xF302	-/W	AN1 – additive constant (with sign)
0xF303	-/W	AN1 – hysteresis value (with sign)
0xF304	-/W	AN1 – lower limit (with sign)
0xF305	-/W	AN1 – upper limit (with sign)
0xF306	-/W	bits 7-3: AN1 – metering circuit switch time • 0 → 1/64 sec • 1 → 2/64 sec • ...

		• 30 → 31/64 sec bits 2-0: AN1 – samples number for average • 0 → 1 sample • 1 → 2 samples • 2 → 4 samples • 4 → 8 samples • 5 → 16 samples
0xF400	-/W	AN2 – samples period [sec]
0xF401	-/W	AN2 – multiplicative constant (with sign)
0xF402	-/W	AN2 – additive constant (with sign)
0xF403	-/W	AN2 – hysteresis value (with sign)
0xF404	-/W	AN2 – lower limit (with sign)
0xF405	-/W	AN2 – upper limit (with sign)
0xF406	-/W	bits 7-3: AN2 – metering circuit switch time • 0 → 1/64 sec • 1 → 2/64 sec • ... • 30 → 31/64 sec bits 2-0: AN2 – samples number for average • 0 → 1 sample • 1 → 2 samples • 2 → 4 samples • 4 → 8 samples • 5 → 16 samples
0xF500	-/W	CNT1 – multiplicative constant
0xF501	-/W	CNT1 – upper limit
0xF502	-/W	CNT1 – time of limit overrun [sec]
0xF503	-/W	CNT1 – time for metering reset [sec]
0xF600	-/W	CNT2 – multiplicative constant
0xF601	-/W	CNT2 – upper limit

0xF602	-/W	CNT2 – time of limit overrun [sec]
0xF603	-/W	CNT2 – time for metering reset [sec]
0xFFFF	-/W	Switch main supply off on set time [min]

Table 2: Address space

8. State indication of CNT port

LED port indication	
Green LED	Indicates binary input 0
Yellow LED	Indicates binary input 1

Table 3: State indication

Status indication is supported from 5th revision of boards.

9. Delivery identification

Trade name	Type name	Power supply
XC-CNT	XC-CNT	Internal or external supply

Table 4: Delivery identification

Example of expansion port label:

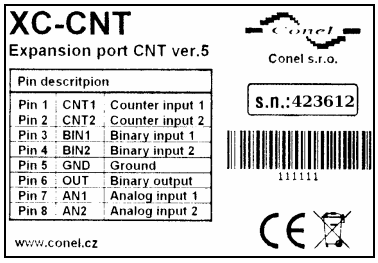

Fig. 4: Expansion port CNT label

10. Technical specification

Expansion port CNT		
Power supply	Internal	3,3V
	Sleep	100 µA (counter is functional)
	Operation	2 mA
Environment	Operating temperature	-30 .. +60 °C
	Storage temperature	-30 .. +85 °C
Standards	Emission	EN 55022/B
	Immunity	ETS 300 342
	Safety	EN 60950
	Isolation	EN 60747
Inputs/Outputs	2x counter	Max. 100 Hz, ratio max. 1:10
	2x analogue inputs	0 .. 20 mA, R_{in} 100 Ohms
	2x binary inputs	reed contact with J4 – 20mA without J4 8µA
	1x output (open collector)	30V/100 mA
Others	Voltage resistance	Permanent
	Sleeping mode	Controlled

Table 5: Technical specification

11. Recommended literature

[1] : **Application guide – Expansion port mounting.**

12. Customers support

Up to date information about the product is on website:

http://www.vitriko.com/

Upkeep-advices:

During cleaning of the modem do not use aggressive chemicals, solvents and abrasive cleaners!

Company hereby declares that the modem narrated in this user's guide fits all basic demands of directive 1999/5/EC (R&TTE).

Modem fits values of coefficient SAR defined by association ICNIRP and values of "About protection of health before non-ionized radiation".

CE Declaration about consistency was issued and is possible get it in accompanying CD or at producer.