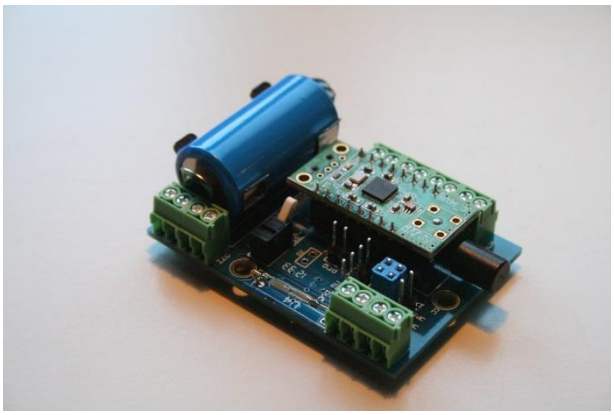
APPLICATION NOTE 5

MANUAL FOR THE NURSE CALL BINARY STATION

Working with the NCB



This call station handles binary in and output

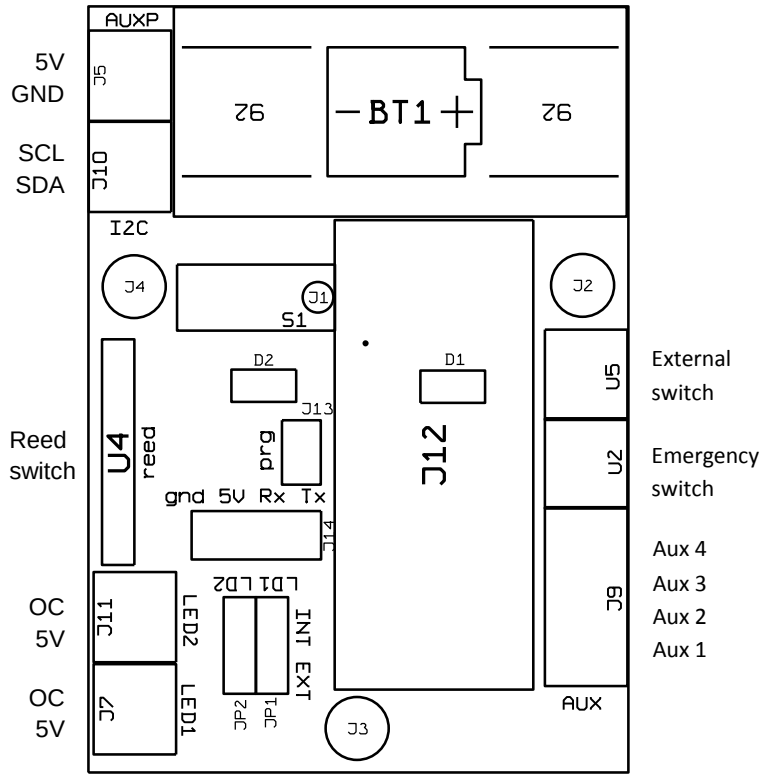
It uses an I2C 8-channel extender

- 4 channels are fixed switching inputs
- 4 channels are free programmable binary in and/or outputs

The NTM houses 2 Internal indicators that can be switched with jumper to external indicators

A change of state of one of the inputs triggers the transmission of a data frame with information for the receiving application program.

PCB lay out



Jumpers

JP1: selection of internal or external indicator 1
JP2: selection of internal or external indicator 2
J13: set; NTM in programming mode

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Flavours

The NCB comes with a number of pre settable operation modes called flavours that couple the input signals to the indicators.

Change of one or more inputs, triggers the NCB, depending on the set flavour, to set the indicators and transmit a frame with a two bytes payload.

- Byte 0 contains the code for the flavour
- Byte 1 contains the status of the extender inputs

Also the Alarm flag in de NTM status byte (byte 11) of the data frame is set when a channel is activated and reset when no channel is activated.

Input	Off	Payload byte 1
Pull cord	Change of state input	0000 000X
Emergency button	Change of state input	0000 00X0
Reed switch	Change of state input	0000 0X00
Extra button	Change of state input	0000 X000
Aux1	Change of state input	000X 0000
Aux2	Change of state input	00X0 0000
Aux3	Change of state input	0X00 0000
Aux4	Change of state input	X000 0000

Offuse

If the NCB is to be used as an output device and power consumption needs to be low, put the NTM into synchronized sleep mode by setting the sleep flag and actor flag. The NTM will try to find a beacon signal to synchronize with, the moment it leaves program mode (J13 removed).

Door

Flavours

In the Offuse mode the NCB can be used as a general purpose I/O device.
Channel values from expander are transmitted in byte 1. The setting of the channels is done with the AUXP command.

Payload byte 0 = 79

Typical application for the “Door” flavour is the door/window alarm contact.
Either use a single magnet mounted directly next to the reed switch or use a separate magnet/switch set and connect it to the external switch terminals.
Auxiliary channels can be set either as input or output. Inputs will trigger transmission of the state of the NCB.

Indicator

Outputs can be controlled via the CPRT command

Payload byte 0 = 68

Alarm

Output	At rest	Activated
LED 1	Off	Off
LED 2	Off	Quick flash

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Nsalarm
Syncalarm

The Indicator flavour is meant as wireless over the door side indicator.

The application program must link an Indicator to a master Syncalarm NCB by providing the device ID of the master using the STMS command.

The indicators will follow the indicators on the master NCB.

Payload byte 0 = 73

Alarm flavour makes the station applicable as a two button warning station.
Pull cord switch and external button act parallel as button 1.
Emergency button act as button 2.
Button 1 signals help (twice pulled), button 2 signals emergency.

The station is reset by activating the reed switch or input Aux1.

Payload byte 0 = 65

Output	At rest	Button 1 once	Button 1 twice	Button 2
LED 1	Off	Off	Slow flash	Quick flash
LED 2	Off	Off	Slow flash	Quick flash

Flavours Nsalarm and Syncalarm perform the same function. Syncalarm NCB broadcasts a beacon signal, Nsalarm does not.

Triple

They are similar to flavour Alarm, using a two button warning system.
Pull cord switch and external button act parallel as button 1.
Aux1 input acts as button 2.
Alternative:

- Emergency button act as emergency button

Pushing button 1 once or more, generates a help request
Pushing button 1 together with 2, generates an emergency request
Pushing button 2 only, resets the alarm
Alternative:

- Using the emergency button resets the alarm

Payload byte 0 = 78,83

Output	At rest	Button 1 once	Byte1 twice	Button 1&2
LED 1	Off	Slow flash	Slow flash	Quick Flash
LED 2	Off	Off	Slow flash	Quick Flash

Flavour Triple pull is a variant of the Nurse call flavours. It is about slow or fast pull cord switching.
The external switch acts again parallel to the pull cord switch.

1 pull within means help
2 pulls within 10 seconds means assistance required
3 pulls within 10 seconds is emergency
2 pulls later than 10 seconds after the last pull resets the system

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Working with the NCB

Alternatives:

- Reed switch resets the alarm
- Emergency button acts as emergency button

Output	At rest	pulled once	Pulled twice	Pulled trice
LED 1	Off	Slow flash	Slow flash	Slow Flash
LED 2	Off	Off	Slow flash	Quick Flash

Parameters/commands

NCB programming commands

n= number
LF = line feed
B= bit number 0 – 7
X= 0 or 1
_ = mandatory space

In addition the existing commands for the NTM (see application note 1), there are 9 extra commands to set parameters for the NCB.

TEMP?*LF* returns actual temperature
TMMX?*LF* request temperature threshold
TMMX= n*LF* temperature alarm threshold
DTdt?LF request temperature rise setting
DTdt=n*LF* minimum temperature rise alarm
NCFG?*LF* request NCB flavour setting
NCFG=x*LF* setting of the NCB flavour

x = O: Offuse (direct extender I/O)
D: Door (door contact)
I: Indicator (side indicator)
A: Alarm (basic call buttons)
N: Nsalarm (no sync call station)
T: Tripple (triple pull call station)
E: External (external I2C device)
S: Syncalarm (beacon emitter for side indicator)

AUXP?*LF* request auxiliary channel setting
AUXP=B_X*LF* program the four auxiliary channels into inputs and outputs
For Aux1 choose B = 4 (not available with flavours that use Aux1
For Aux2 choose B = 5
For Aux3 choose B = 6
For Aux4 choose B = 7
Example:
AUXP=4_1 makes Aux1 input
AUXP=4_0 makes Aux1 output
SRMS?*LF* request address of master
SRMS=n*LF* set address of associated master

MANUAL FOR THE NURSE CALL BINARY STATION

<table>
<tr><th colspan="2">Working with the NCB</th></tr>
<tr><td></td><td>
RDEX=nLF Read external I2C device
WDEX=nLF Write external I2C device

CPRT?LF reports the status of the 4 fixed inputs
CPRT=nLF sets the 4 aux outputs when defined as outputs. When a channel is set to input this command is ignored
“n” is a decimal value as indicated in following table. Sum of these values will activate multiple outputs (active low).
<table>
<tr><th>Function</th><th>n</th><th>Exterder bit</th></tr>
<tr><td>Pull cord</td><td>No use</td><td>0</td></tr>
<tr><td>Emergency button</td><td>No use</td><td>1</td></tr>
<tr><td>Reed switch</td><td>No use</td><td>2</td></tr>
<tr><td>Extra button</td><td>No use</td><td>3</td></tr>
<tr><td>Aux1</td><td>16</td><td>4</td></tr>
<tr><td>Aux2</td><td>32</td><td>5</td></tr>
<tr><td>Aux3</td><td>64</td><td>6</td></tr>
<tr><td>Aux4</td><td>128</td><td>7</td></tr>
</table>
</td></tr>
<tr><td>Additional information</td><td>Datasheet NTM_3
Datasheet Nurse call binary station
Application note 1; programming the NTM
Application note 2; Ninthway high secure radio network</td></tr>
</table>