Ninthway
Radio
Network
Technology
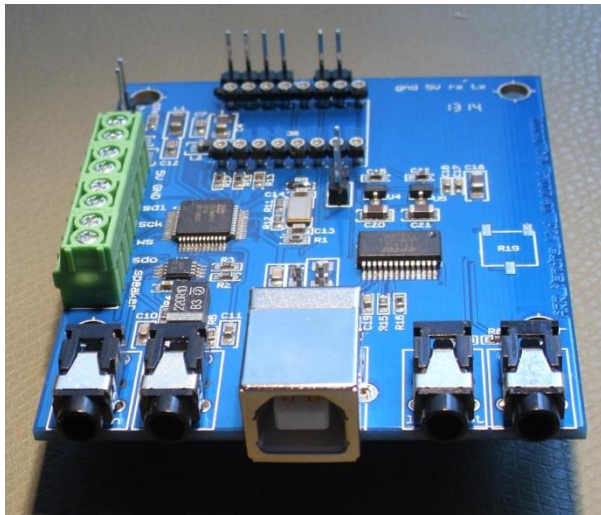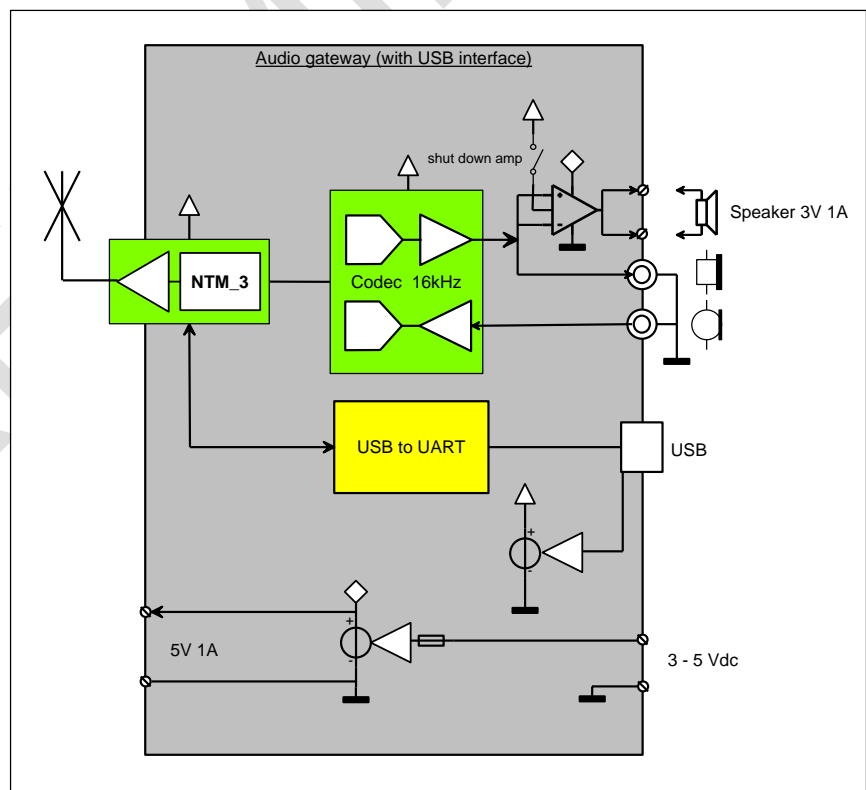
Audio gateway	
Article number:	NTM_COMM
Size:	60 x 70 x 18 mm
Function:	Gate between an audio source and the Ninthway Radio Network
Standards:	EN300-220-1 EN300-220-2 EN300-220-3 IEEE 802.15.4 EN54-25 IIC IIS

Specifications

Functional diagram

Audio gateway	
Description	The Audio gateway provides a routing from audio output device to the Ninthway Radio Network. Audio might be analogue or digital I2S.
VORN	It digitizes the analogue audio signal into audio frames that are broadcasted @ 500kpb on the BBN frequency band. The digital signal is compressed into the same size as the digitized analogue signal and is in this way interchangeable with it. It can also transform the digitized audio data from the network and make it available either as an analogue line-out signal for audio equipment, as a I2S digital signal or as audio signal ready for an external speaker. In this way a half duplex audio communication over the Ninthway Radio Network can be set up. Full duplex operation requires the use of two audio bands. In that case all repeater stations need to be equipped with a BBN transceiver that operates on the second audio frequency. The gateway is powered via a USB connector. The USB connector is connected with the NTM transceiver through a USB to UART bridge and can be used to communicate with the transceiver and send/receive data via the backbone frequency of the network.
VORN connections	Audio input 1Vpp voltage line input socket 3.5 mm. - AGC microphone input socket 3.5 mm. - I2S 4 terminal block (16 bit PCM) bidirectional. Audio output 1Vpp audio output socket 3.5 mm - Current output socket 3.5 mm
Jumpers	J13: prg, to set the NTM in wired programming mode. When removed programming is only possible via remote programming.
Parameters	Parameters of the Audio gateway are similar to NCA. In detail operation instruction can be found in Application note 7. Appropriate command for the gateway: VORN? *CRLF* returns the number of the active VORN function. VORN=n *CRLF* Sets the VORN function.

Audio gateway

n = 0, VORN in idle mode, amplifiers are powered down
 	
    1, Audio reception, audio signal fed to amplifiers.
 	
    2, Audio gateway function, microphone connected with network
 	
    3, Audio gateway function, line input connected with network
 	
    4, Audio powered down
 	
    5, Audio powered up
 	
    6, Audio gateway function, I2S input connected with network
 	
    7, Audio reception, Audio signal to I2S output.
 	
VORN=2 *CRLF*   will stream audio from microphone to network.
VORN=3 *CRLF*   will stream audio from line input to network.
VORN=4 *CRLF*   will power down the audio gateway.
 	
The use of the audio gateway in a half-duplex mode is explained in application note 7.

Power supply and current consumption	Supply voltage: terminal block 5V 400 mA. Reverse polarity protected. Alternative: USB (max 500 mA).
Radio parameters	Audio data is transmitted real time over the network in 80 frames per second using the CSMA-CA protocol. This is outside the duty cycle regulations for bands like 868 MHz. Therefore VORN operations take place on the 863 – 865 MHz band. This requires gateway and repeater stations to have their BBN transceiver set to the 863 MHz band and their data rate to 500 kbps. The settings for the sensor and actor network band stays @ 868.3 MHz and 100 kbps data rate. A VORN command will set the transceiver on an audio receiving station to the proper BBN band and data rate.
VORN	The NCB mode is activated using function 4.
Mounting instructions	For the best performance of the radio transceiver mount the PCB with the antenna upright when possible.
Additional information	Datasheet NTM_3. Datasheet NCA.

Audio gateway
Application note 1; Programming the NTM. Application note 2; Ninthway high secure radio network. Application note 7; Manual for the nurse call binary station.