# nedap

## NCC4

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The Network Communication & Control unit (NCC4) in the OS/T has several functions:

- Supplying the 33V DC power supply for all the units in the system. On 1 NCC4 it's possible to connect up to 16 receiver (NR4) or transmitters (NT4) units.
- Generating the HF sync signal for the whole system. This HF signal has a frequency of four times 8.2 MHz and sweeps between 30.... 36 MHz. One NCC4 has four outputs and on each output you can connect a NR4, NT4 or an other NCC4.
- The NCC4 is data-com master for all connected units. All data-communication between the connected units and the NCC4 will be initiated from the NCC4. With the external sync input from the NCC4 it's possible to integrate the NCC4 in a larger network with multiple NCC4's.
- Each NCC4 has a RS 232 communication connector from which it's possible to connect to the outside world, for example to a modem or to a PC. With this connection several things can be done, such as remote-diagnostics and firmware-upgrades.
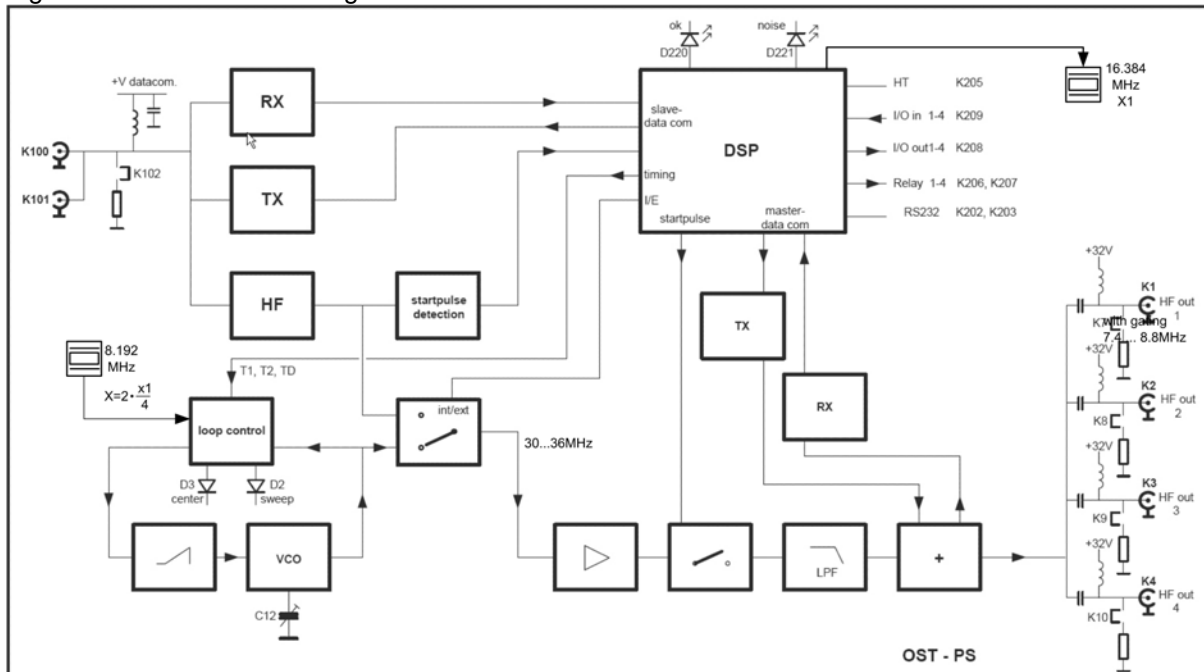
Figure 1 shows the block diagram of the OS/T NCC4.



Fig.1

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### DC power supply

The 33 Volt DC Power voltage from the OS/T system is generated in a Switched-mode power unit, which is connected with a short cable on connector K5. The power supply has a continuous DC output current rating of 3.2 A.

### HF

The HF signal is generated in a VCO. This VCO uses for its frequency control the 3 signals from the local DSP: TD, in advance of the start pulse and T1 and T2 on 345 and 1334 s after the start pulse. The signals T1 and T2 mark the time that the frequency of the NT4 passes the 7.7 and 8.7 MHz. A saw-tooth generator generates the waveform, necessary to sweep the VCO. The saw-tooth generator exists of a capacitor, charged with a constant current and is discharged at every pulse.
Regulation of the VCO happens only in the fly-back period to get the highest possible signal purity. By using a buffer stage the HF-signal gets the requested level and will be merged with the data-com signal. Then this signal is distributed to four output connectors K1 till K4.

### Data-com

One of the important features from the OS/T system is the data-com over the coax-cable. With this feature it's no longer necessary to use an extra data-cable between the units, which simplify the installation of the system. The NCC4 plays a central roll in providing the data-com. All the connected units are interrogated periodically by the NCC4. If there are messages like an alarm on a connected NR4, then the NCC4 will be process this and takes the necessary action: Sending a command, to turn on the lamps on the activated aisle.
At the beginning of each sweep, on a fixed timeslot, the NCC4 sends a data-block. This data-block may contain a question for a connected NR4 or NT4. The answer will be transmitted in another time-slot.
The transmission of data is accomplished by adding small pulses on the HF signal. With a low pass filter and a sensitive amplifier these pulses can be recovered on the receiving side..
If multiple NCC4's are necessary to be fitted in a larger installation, then they have to be linked. Every NCC4 is then a master for his own segment. The "upper neighbour" of a NCC4 is connected to a slave sync input, while the "under neighbour" in the circuit will be connected on an output. The slave sync input is doubled to link the incoming cable to the next segment of the "upper neighbour". When the NCC4 is the last one in a chain a terminator jumper must be placed.
A slave NCC4 may be switched off without disturbing the data communication.

### RS 232 interface

Each NCC4 is equipped with a RS232 connector. With this it's possible to connect a modem or a PC to communicate with the OS/T system.
With these capabilities you can use remote-diagnostics, firmware-upgrade and system configuration. The communication uses the standard UART circuit.

### I/O connector

The NCC4 comes with an I/O connector with four opto-coupler inputs, four opto-coupler outputs and four relay outputs with one voltage free make-and-break contact. All in- and outputs are galvanic separated from the power supply. The in- and outputs may be used for camera activation, metal detection alarm, extra alarm-lamps. The functionality of the in- and outputs is determined by the software.

### Hand-terminal connector

A standard NEDAP RS Handheld terminal may be connected to the NCC4. With these HT you can edit the various local settings.

Figure 2 shows the component arrangement of the NCC4 (*Hardware version 4)*:
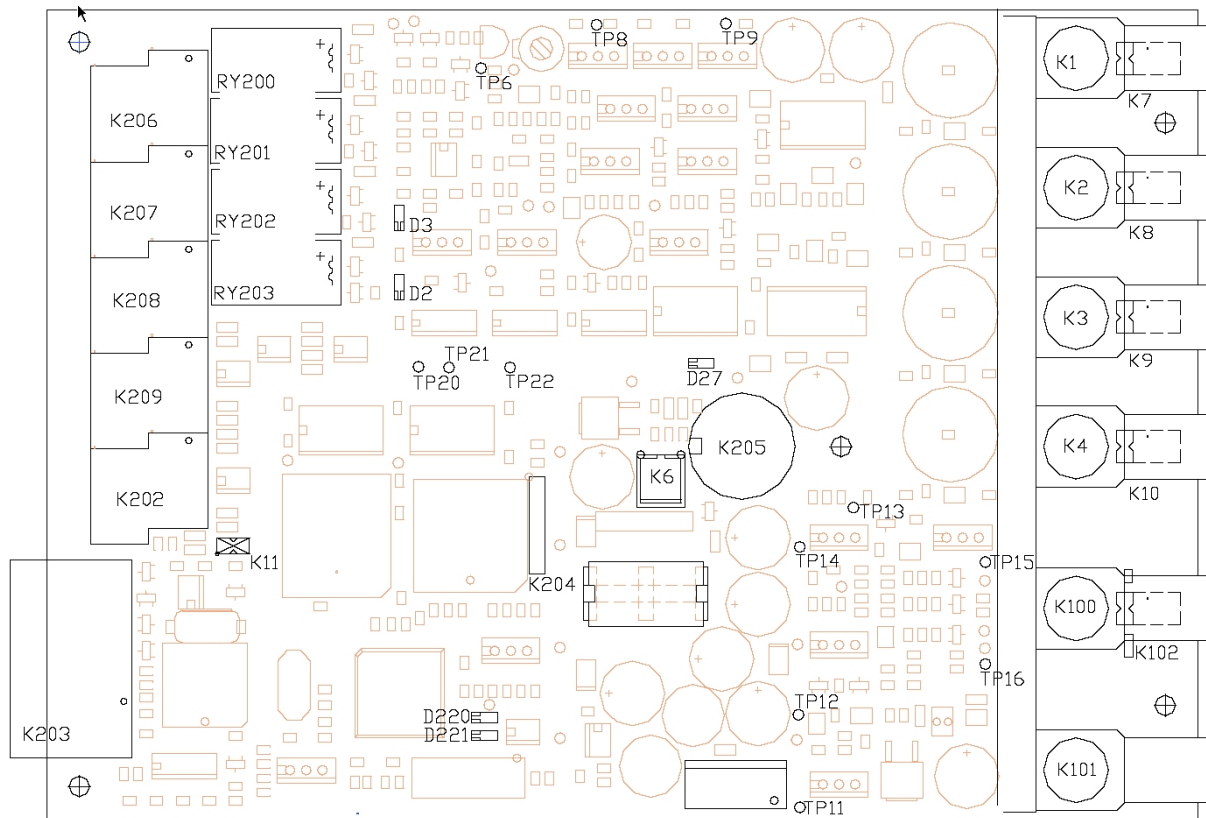


## The following points can be used

| | | | |
|---|---|---|---|
| K100 | slave sync input | K10 | 50 ohm terminator in aid of K4 |
| K101 | slave sync input | K11 | 50 ohm terminator in aid of K202 |
| K102 | 50 ohm terminator | K202 | RS 485 interface connector |
| K1 | Output | K203 | RS 232 interface connector |
| K2 | Output | K205 | Hand-terminal connection |
| K3 | Output | K206 | Relay outputs Ry3, Ry4 |
| K4 | Output | K207 | Relay outputs Ry1, Ry2 |
| K5 | 32V DC power input | K208 | Opto outputs 1-4 |
| K6 | power LED connection | K209 | Opto inputs 1-4 |
| K7 | 50 ohm terminator in aid of  K1 | C12 | VCO linearity |
| K8 | 50 ohm terminator in aid of K2 | | |
| K9 | 50 ohm terminator in aid of K3 | | |

## Indicator leds     ( Y = yellow, Rd = red, Gr = green)

| | | |
|---|---|---|
| D27 | Power (Gr) | |
| D220 | NCC4 (Y) | (On= a tag is detected by the NR4) |
| D221 | NCC4 comm fault (Rd) | (On= a segment doesn't answer) |
| D2 | Sweep lock(Y) | |
| D3 | Center lock(Y) | |

## Testpoints

| | | | | |
|---|---|---|---|---|
| Tp6 | Sweep voltage | | Tp11 | Slave Tx |
| Tp7 | Master Tx | | Tp12 | Slave Rx |
| Tp8 | Master Rx | | Tp13 | Slave Start |
| Tp9 | Master Clk | | Tp20 | T2 |
| Tp15 | Slave Clk | | Tp21 | T1 |
| Tp16 | Slave HF in | | Tp22 | TD |
| Tp14 | Slave HF 32MHz | | | |

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## Specifications

Mains NCC4:
Power Supply                                    230 Volt 50 Hz     (90-220 Volt 50-60 Hz)
Power Consumption                      Max 150 Watt

NCC4-pcb:
Power supply                                      33 Volt DC
Current consumption                      100 mA (excl connected slave units)
Sync input signal                              30-36 MHz, minimal 4 dB in 50 ohm (1Vtt)
Outputs (4x)                                     30-36 MHz, nominal 10 dB in 50 ohm (2Vtt)
Frequency sweep                            1400 kHz
Sweep frequency                            600 Hz saw tooth form.
Maximal DC load to one or more outputs     3.2 A (ca 16 slave units)at 230 V
Maximal DC load to one or more outputs     2.0 A (ca 10 slave units)at 115 V

## Revison-view:

### *Hardware version 5:*

| Nr | Index | Date | Description | Perform |
|----|-------|------|-------------|---------|
|    |       | april 2000 | - Jumper K11 removed and K202 became a feature connector.<br>- Jumper K102 moved a little.<br>- Components are removed / changed. | Nedap |

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