NetCube®

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APPLICATION NOTE No. 004
Real time monitoring of production machines and DNC functionality
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Description

1. Monitoring machine status

A central database connected to an MES application displays on PCs spread in the factory every minute the status of each machine.

Due to the highly heterogeneous machine serial protocols coming from more than 30 different manufacturers the customer decided to assign on each machine a set of PLC-outputs to defined machine states and events.

This approach was much simpler than reverse engineering each serial protocol, some of them not documented at all or proprietary.

A NetCube is connected to the machines. The NetCube inputs monitor the PLC-Outputs and signal any status change to a central server. The NetCube can also respond to direct requests from that central server. This information is used further by several intranet applications displaying a regularly updated status of the production.
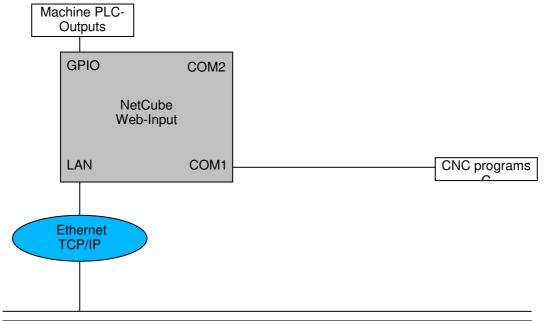
2. DNC function

Upon request from the central server the NetCube are also used to download/upload CNC programs into or from the machines,.

Logical behaviour (pseudo-code)

```
loop
        read digital input
        if input changed for more than 3 seconds then
                generate HTTP request with new status as parameters
        endif
endloop
```

Overview of the installation

```
┌──────────────────┐
│  Machine PLC-    │
│    Outputs       │
└──────────────────┘

┌─────────────────────────────────┐
│ GPIO                    COM2     │
│                                  │
│          NetCube                 │
│          Web-Input               │
│                                  │
│ LAN                     COM1 ────┼──────────── ┌──────────────────┐
└─────────────────────────────────┘              │ CNC programs     │
                                                  └──────────────────┘
        ╭────────────╮
       ╭   Ethernet   ╮
       │   TCP/IP     │
        ╰────────────╯
```

Central application server / database

- Receives the status of the machines (via GPIO of the NetCube)
- Sends the production programs (via the COM port of the NetCube)