DIALOOG 4.

Serial Interface
for Data Input/Output

Edition 4.86-511/874 E
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Pin assignment complies with the DIN 66020 standard, with the CNC DIALOG control designated as a data terminal unit.

V.24 interchange circuits (Fig. 2)

Which of the available control and status signal circuits are used depends on the peripheral equipment.

If the status signal circuit (CTS) is not connected, it will be switched to "ON" by internal pull-up resistors.
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1. V.24 interface

1.1 General information
The V.24 interface of the CNC DIALOG control employs V.24 receivers and V.24 transmitters which comply with the DIN 66020 standard.

The DIN 66020 specification defines the interface connecting data terminal equipment (DTE) with data communications equipment (DCE). It is based on recommendations V.24 and V.28 issued by the CCITT (Comité Consultatif International Télégraphique et Téléphonique), which, in turn, are derived from the U.S. EIA RS232 standard.

The interface employed in the CNC DIALOG control represents a combination of all standard V.24 and/or RS232 signals and thus complies with their electrical characteristics.

1.2 Interchange circuits
All of the interface signals described in the following refer to the CNC DIALOG control system, which is defined as data terminal equipment (DTE).

**Ground circuits:**
E2: Signal ground (102)

This is the common return for all interchange circuits.
1.3 Polarity and signal level allocation

Data circuits

Control circuits

All signal levels are based on signal ground E2 (102).

The signal level is not defined in the transition region (+3V to -3V).
Fig. 4

Which of the available control and status signal circuits are used depends on the peripheral equipment.

If the status signal circuit (CTS) is not connected, it will be switched to "ON" by internal pull-up resistors.
2. 20 mA interface

2.1 General information
This interface is not standardized. Due to its widespread use, however, it has become virtually a working standard (TTY = TeleType interface). On the CNC DIALOG 4, it is available only on the universal interface I.

2.2 Interchange circuits
All of the interface signals described below refer to the CNC DIALOG control system. The 20 mA interface on the CNC DIALOG 4 is active, i.e. it supplies the 20 mA current loop.

Data circuits:

Tx+ : Transmitted data +
Tx- : Transmitted data -
The current loop of the transmitted signal is carried through these two circuits.
2.4 Connection of peripheral equipment to CNC DIALOG control via 20 mA interface

A 25-pin female connector (subminiature DB25S) is located on the bottom panel of the CNC Dialog 4 control unit.

The connector pin assignment is shown in Fig. 6.
3. **Cassette recorder interface**

3.1 General information

The cassette recorder interface operates in accordance with the so-called "Kansas City" standard, in which the transmitted signal is modulated and/or the received signal demodulated.

3.2 Interchange circuits

Ground circuits:
SG: Signal ground
This circuit is the common return for send and receive signal.

Data circuits:
Tx: Transmitted data
Modulated data are carried from the CNC DIALOG control to the cassette recorder though this circuit.

Rx: Received data
Modulated data are transferred from the cassette recorder to the CNC DIALOG control though this circuit.
3.4 Connection of peripheral equipment to CNC DIALOG control via cassette recorder interface

A 3-conductor jack is provided for this interface on the bottom panel of the CNC DIALOG 4 control system.

Fig. 7
4. **RS485 interface**

4.1 **General information**

This interface of the CNC DIALOG control system employs a driver and receiver module whose electrical characteristics conform to the U.S. EIA standard.

These drivers permit the development of a linear data network (bus system) with up to 32 devices. Symmetrical transfer provides for increased reliability of data links.

4.2 **Interchange circuits**

Data circuits:

A, B: The send and receive signal is carried via this paired circuit in the form of differential voltage.

4.3 **Signal level**

![Signal level allocation](image)
4.4 Connection to CNC DIALOG control via RS485 interface

Connection to the CNC DIALOG 4 is made via the universal interface I (optional). This additional jack connector (subminiature DB25S) is located on the bottom panel.

![Connector](image1)

**Fig. 9**

Connector
Universal interface II

Pin assignment is shown in Fig. 10.

![Diagram](image2)

**Fig. 10**

Dialog 4

A 25 Differential send
B 12 and receive circuits
5. Quick-reference information on interfaces

5.1 Pin assignment for serial interfaces

5.1.1 V.24 interface

a) Universal interface I (DTE assignment)

```
\\
\text{DIAG:LOG 4}
\begin{align*}
2 & \quad \rightarrow \quad D1(103) \quad \text{Transmit data} \\
3 & \quad \rightarrow \quad D2(104) \quad \text{Receive data} \\
4 & \quad \rightarrow \quad S2(105) \quad \text{Request to send} \\
5 & \quad \rightarrow \quad M2(106) \quad \text{Clear to send} \\
7 & \quad \rightarrow \quad E2(102) \quad \text{Signal ground}
\end{align*}
```

b) Universal interface II (DCE assignment)

```
\\
\text{DIAG:LOG 4}
\begin{align*}
2 & \quad \rightarrow \quad D2(104) \quad \text{Receive data} \\
3 & \quad \rightarrow \quad D1(103) \quad \text{Transmit data} \\
4 & \quad \rightarrow \quad M2(106) \quad \text{Clear to send} \\
5 & \quad \rightarrow \quad S2(105) \quad \text{Request to send} \\
7 & \quad \rightarrow \quad E2(102) \quad \text{Signal ground}
\end{align*}
```
5.1.4 RS485 interface
(universal interface II only)

Dialog 4

A

25

Differential send
and receive circuits

B

12

5.2 Signal identification

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<th>Description</th>
<th>Standard</th>
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</tr>
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<td>RD</td>
<td>Receive data</td>
<td>V.24</td>
</tr>
<tr>
<td>RTS</td>
<td>Request to send</td>
<td>V.24</td>
</tr>
<tr>
<td>CTS</td>
<td>Clear to send</td>
<td>V.24</td>
</tr>
<tr>
<td>SG</td>
<td>Signal ground</td>
<td>V.24</td>
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<td>Transmit data +</td>
<td>20mA</td>
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<td>Receive data +</td>
<td>20mA</td>
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<td>RX</td>
<td>Receive data</td>
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</tr>
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Cassette recorder

Cassette recorder

Cassette recorder
5.3.2 Cassette recorder interface format

Transmit format:

Receive format:
6. Program format

6.1 Permissible ASCII codes

<table>
<thead>
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<th>HEX CODE</th>
<th>ASCII input</th>
<th>HEX CODE</th>
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<td>GS</td>
<td>3E</td>
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<td>5E</td>
<td>_</td>
<td>7E</td>
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<td>5F</td>
<td></td>
<td>7F</td>
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</tbody>
</table>

+ Permissible code

x Permitted in tape leader and trailer only
Line feed
Last block number
Space
M function
Line feed
Line feed
1st subroutine number
Space
Milling cycle
Space
 .
 .
 .
Line feed
3rd subroutine number
Space
M function
Line feed
End of program
Line feed
Checksum (hex)
Line feed
Line feed
Trailer (63)

Explanatory notes:

**Leader**
Consists of 50 ASCII codes "NUL".
Trailer
Consists of 63 ASCII codes "NUL".

ASCII codes "NUL" "CR" "LF" "SP" serve only to make the printout more legible and are ignored by the control system.

The cassette format differs from the this punched tape format only in that the former uses a different LEADER.

The cassette leader has 50 ASCII codes "U".

6.3 Memory load and checksum

Sample program:

```
% (8X1/000058"EXAMPLE")
N1 G0 X0 Y0 Z100
N2 T1
N3 G0 Z0 D1
N4 G1 X100 Y50 F500 S+0
N5 M30
```

Memory load: dec 88 (hex 000058)
Checksum: dec 2891 (hex 0B4B)
6.4 Word structure (metric)

%06, %06*03, N06, N*06, G02, XL+043, YL+043,
ZL+043, CL+043, D+02, ID043, JD043, KD043,
F04, S+04, M02, T02, L02, AD043, WL+043

Key:

<table>
<thead>
<tr>
<th>1st letter</th>
<th>2nd letter</th>
<th>Prefix sign</th>
<th>1st numeral</th>
<th>2nd numeral</th>
<th>3rd numeral</th>
</tr>
</thead>
<tbody>
<tr>
<td>address</td>
<td>L</td>
<td>D</td>
<td>+</td>
<td>0</td>
<td>decades</td>
</tr>
</tbody>
</table>

- Absolute/incremental
- Incremental
- Absolute dimensions with positive or negative prefix.
- Leading zeros may be omitted: variable word length.
- Number of digits before and after decimal point.
- (coordinate values X, Y, Z, I, J, K in mm)
7. **Selection of interface and baud rate**

You can select the desired type of interface and the baud rate for both universal interfaces from an on-screen menu in operating mode 14. Please refer to your Operator's Manual for further details.
Suppliers:

3-conductor plug, type PJ 068:
available from the firm Bürklin, Munich and Düsseldorf.