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C1202 USB Datenanfrage Analyse



1. Messaufbau:

- 1.1. C1202 mit FW 1.1.0.0
- 1.2. Digimatic Kabel: DK-U1
- 1.3. Messung: Saleae logic Pro 8
- 1.4. Empfänger/Anforderung: PC06-451

2. Interface Beschreibung

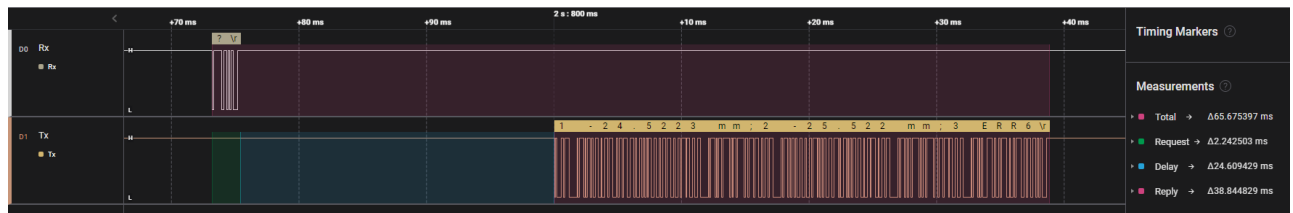
- interface: 9600 7E2
[20220926_DK-U1 Instruction Set.xlsm](#)

**\\ssfs01\Abteilungen\Benutzergruppen\Firmware_Software\Interface Beschreibung Datenkabel
DK-U1\Release\20220926_DK-U1 Instruction Set.xlsm**

3. Messungen:

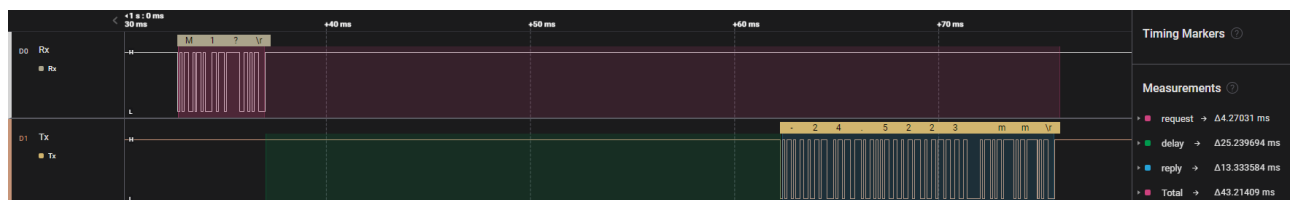
3.1. Einzelantwort für '?':

- Anzahl Merkmale: 1, 2 oder 3
- Toleranz: Nein
- Warngrenzen: Nein
- Anforderung: Befehl ('?')
- Daten Senden: Parallel
- Gesamtzeit: 60ms



3.2. Einzelantwort für 'M1?':

- Anzahl Merkmale: 1, 2 oder 3
- Toleranz: Nein
- Warngrenzen: Nein
- Anforderung: Befehl ('M1?')
- Daten Senden: Parallel
- Gesamtzeit: 40ms



3.3. Zyklischeanforderung für alle Merkmale:

- 1000ms



- 500ms



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- The diagram shows two digital signals, D0 (Rx) and D1 (Tx), over a time period of 0.8ns. The top signal, D0 (Rx), is a high-frequency signal with a period of 100ns. The bottom signal, D1 (Tx), is a low-frequency signal with a period of 100ns. The diagram illustrates the timing relationship between the two signals, showing that D0 (Rx) is sampled at the rising edge of D1 (Tx).

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- The timing diagram illustrates the 100BASE-T1 PHY signals over a 11ns duration. The Rx signal (D0) is a high-frequency signal with a period of 10ns. The Tx signal (D1) is a high-frequency signal with a period of 10ns. The Tx signal is shown as a series of pulses with a period of 10ns. The Rx signal is shown as a series of pulses with a period of 10ns. The Tx signal is shown as a series of pulses with a period of 10ns.

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- Timing diagram showing the relationship between D0 (Rx) and D1 (Tx) signals. The diagram includes a time scale from 0 to 0.6 ns and a legend for Rx and Tx signals.
- | Signal | Width (ns) | Position (ns) |
|---------|------------|---------------|
| D0 (Rx) | 0.1 | 0.05 |
| D0 (Rx) | 0.1 | 0.15 |
| D0 (Rx) | 0.1 | 0.25 |
| D0 (Rx) | 0.1 | 0.35 |
| D0 (Rx) | 0.1 | 0.45 |
| D0 (Rx) | 0.1 | 0.55 |
| D0 (Rx) | 0.1 | 0.65 |
| D0 (Rx) | 0.1 | 0.75 |
| D0 (Rx) | 0.1 | 0.85 |
| D0 (Rx) | 0.1 | 0.95 |
| D0 (Rx) | 0.1 | 1.05 |
| D0 (Rx) | 0.1 | 1.15 |
| D0 (Rx) | 0.1 | 1.25 |
| D0 (Rx) | 0.1 | 1.35 |
| D0 (Rx) | 0.1 | 1.45 |
| D0 (Rx) | 0.1 | 1.55 |
| D0 (Rx) | 0.1 | 1.65 |
| D0 (Rx) | 0.1 | 1.75 |
| D0 (Rx) | 0.1 | 1.85 |
| D0 (Rx) | 0.1 | 1.95 |
| D0 (Rx) | 0.1 | 2.05 |
| D0 (Rx) | 0.1 | 2.15 |
| D0 (Rx) | 0.1 | 2.25 |
| D0 (Rx) | 0.1 | 2.35 |
| D0 (Rx) | 0.1 | 2.45 |
| D0 (Rx) | 0.1 | 2.55 |
| D0 (Rx) | 0.1 | 2.65 |
| D0 (Rx) | 0.1 | 2.75 |
| D0 (Rx) | 0.1 | 2.85 |
| D0 (Rx) | 0.1 | 2.95 |
| D0 (Rx) | 0.1 | 3.05 |
| D0 (Rx) | 0.1 | 3.15 |
| D0 (Rx) | 0.1 | 3.25 |
| D0 (Rx) | 0.1 | 3.35 |
| D0 (Rx) | 0.1 | 3.45 |
| D0 (Rx) | 0.1 | 3.55 |
| D0 (Rx) | 0.1 | 3.65 |
| D0 (Rx) | 0.1 | 3.75 |
| D0 (Rx) | 0.1 | 3.85 |
| D0 (Rx) | 0.1 | 3.95 |
| D0 (Rx) | 0.1 | 4.05 |
| D0 (Rx) | 0.1 | 4.15 |
| D0 (Rx) | 0.1 | 4.25 |
| D0 (Rx) | 0.1 | 4.35 |
| D0 (Rx) | 0.1 | 4.45 |
| D0 (Rx) | 0.1 | 4.55 |
| D0 (Rx) | 0.1 | 4.65 |
| D0 (Rx) | 0.1 | 4.75 |
| D0 (Rx) | 0.1 | 4.85 |
| D0 (Rx) | 0.1 | 4.95 |
| D0 (Rx) | 0.1 | 5.05 |
| D0 (Rx) | 0.1 | 5.15 |
| D0 (Rx) | 0.1 | 5.25 |
| D0 (Rx) | 0.1 | 5.35 |
| D0 (Rx) | 0.1 | 5.45 |
| D0 (Rx) | 0.1 | 5.55 |
| D0 (Rx) | 0.1 | 5.65 |
| D0 (Rx) | 0.1 | 5.75 |
| D0 (Rx) | 0.1 | 5.85 |
| D0 (Rx) | 0.1 | 5.95 |
| D0 (Rx) | 0.1 | 6.05 |
| D0 (Rx) | 0.1 | 6.15 |
| D0 (Rx) | 0.1 | 6.25 |
| D0 (Rx) | 0.1 | 6.35 |
| D0 (Rx) | 0.1 | 6.45 |
| D0 (Rx) | 0.1 | 6.55 |
| D0 (Rx) | 0.1 | 6.65 |
| D0 (Rx) | 0.1 | 6.75 |
| D0 (Rx) | 0.1 | 6.85 |
| D0 (Rx) | 0.1 | 6.95 |
| D0 (Rx) | 0.1 | 7.05 |
| D0 (Rx) | 0.1 | 7.15 |
| D0 (Rx) | 0.1 | 7.25 |
| D0 (Rx) | 0.1 | 7.35 |
| D0 (Rx) | 0.1 | 7.45 |
| D0 (Rx) | 0.1 | 7.55 |
| D0 (Rx) | 0.1 | 7.65 |
| D0 (Rx) | 0.1 | 7.75 |
| D0 (Rx) | 0.1 | 7.85 |
| D0 (Rx) | 0.1 | 7.95 |
| D0 (Rx) | 0.1 | 8.05 |
| D0 (Rx) | 0.1 | 8.15 |
| D0 (Rx) | 0.1 | 8.25 |
| D0 (Rx) | 0.1 | 8.35 |
| D0 (Rx) | 0.1 | 8.45 |
| D0 (Rx) | 0.1 | 8.55 |
| D0 (Rx) | 0.1 | 8.65 |
| D0 (Rx) | 0.1 | 8.75 |
| D0 (Rx) | 0.1 | 8.85 |
| D0 (Rx) | 0.1 | 8.95 |
| D0 (Rx) | 0.1 | 9.05 |
| D0 (Rx) | 0.1 | 9.15 |
| D0 (Rx) | 0.1 | 9.25 |
| D0 (Rx) | 0.1 | 9.35 |
| D0 (Rx) | 0.1 | 9.45 |
| D0 (Rx) | 0.1 | 9.55 |
| D0 (Rx) | 0.1 | 9.65 |
| D0 (Rx) | 0.1 | 9.75 |
| D0 (Rx) | 0.1 | 9.85 |
| D0 (Rx) | 0.1 | 9.95 |
| D0 (Rx) | 0.1 | 10.05 |
| D0 (Rx) | 0.1 | 10.15 |
| D0 (Rx) | 0.1 | 10.25 |
| D0 (Rx) | 0.1 | 10.35 |
| D0 (Rx) | 0.1 | 10.45 |
| D0 (Rx) | 0.1 | 10.55 |
| D0 (Rx) | 0.1 | 10.65 |
| D0 (Rx) | 0.1 | 10.75 |
| D0 (Rx) | 0.1 | 10.85 |
| D0 (Rx) | 0.1 | 10.95 |
| D0 (Rx) | 0.1 | 11.05 |
| D0 (Rx) | | |

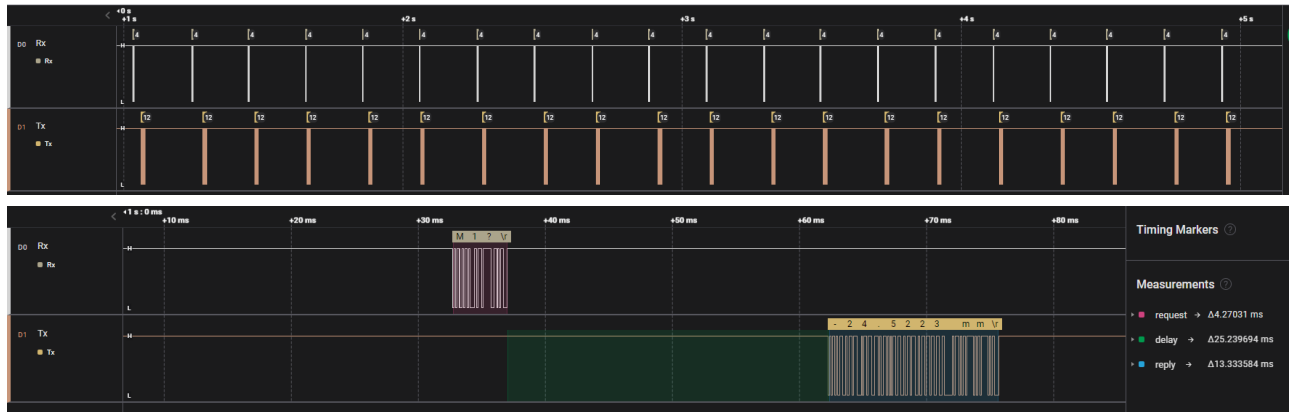
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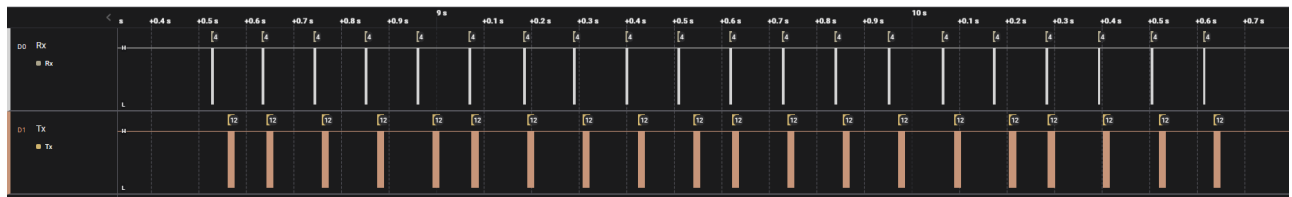
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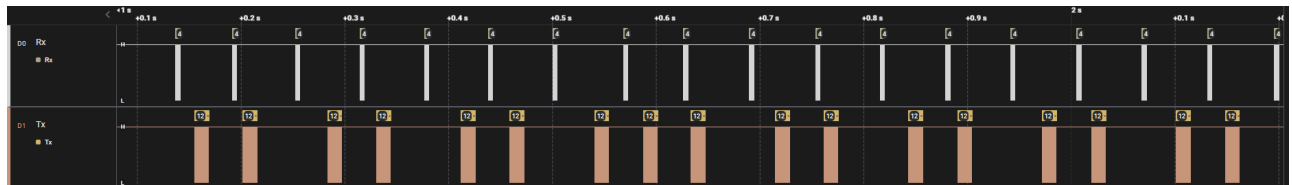
- 200ms:



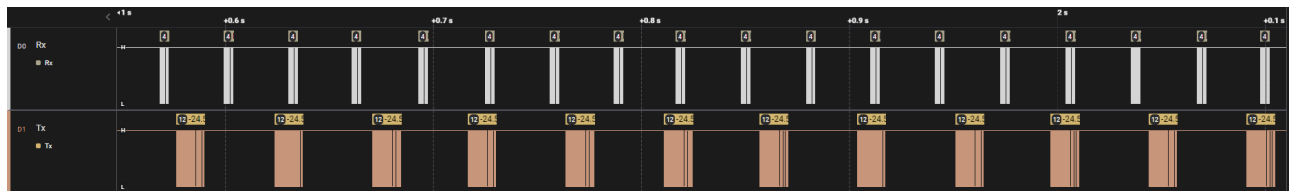
- 100ms:



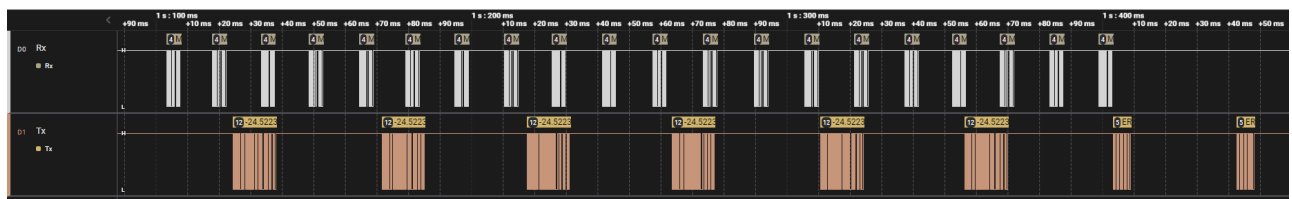
- 50ms:



- 20ms:



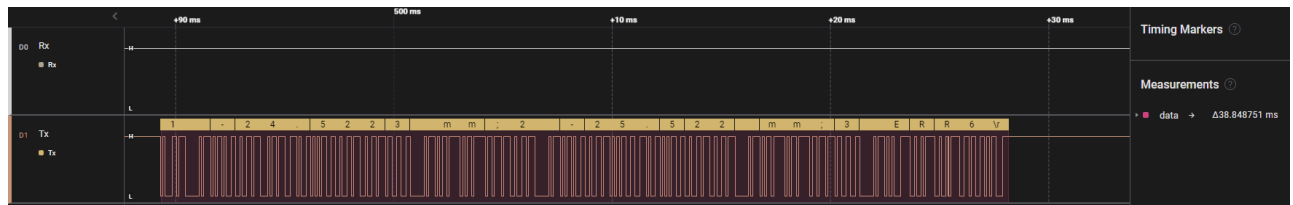
- 10ms:



3.5. Automatische senden für Zeit gesteuerte Messung

- Schnellste Einstellung ist: 200ms (Messdauer=0,1 sek, Pausendauer=0,1 sek):





Nachrichtlänge: ca. 40ms

4. Ergebnis:

- Ausgabewerte sind plausibel mit aktuellem Werten.
- Limitierungsfaktor ist baud rate: 9600 bps
- Zeiten:
 - Kurze Anfrage ('?'): ca 2ms
 - Länge Anfrage ('Mx?'): ca 4ms
 - Antwort verzögerung: ca 20ms
 - Nachricht ca 15-40ms
 - Frage-Antwort: 40-60ms
 - Maximale Anforderrate: 100ms (10 Werte pro sekunde)

5. Zeitverkürzungs möglichkeiten (Mehr Data Anfordern):

- Einzelwert Anfragen: 'Mx?'
- Baudrate erhöhen, (Antwortzeit ca. 30ms)
- digimatic Schnittstelle nutzen

Source code for testing

Python / Jupyter Notebook

```
import serial
import time
import ipywidgets as widgets

dataReq = '?\r'.encode('ASCII')

ser = serial.Serial()
ser.baudrate = 9600
ser.port = 'COM5'
ser.bytesize = 7
ser.parity = 'E'
ser.stopbits = 2
ser.timeout = 0

def runtest(time_ms, request_qty):
    ser.open()
    print("start: " + str(time_ms/1000) + " s ...")
    for i in range(request_qty):
        ser.write(dataReq)
        time.sleep(time_ms/1000)
    print("finished")
    ser.close()

widgets.interact_manual(runtest, time_ms=widgets.FloatSlider(min=10, max=1000,
step=10), request_qty=widgets.IntSlider(min=10, max=100, step=10));
```