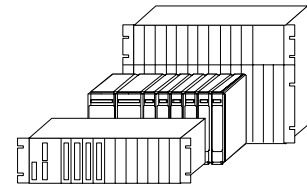


Ax 1703



Firmware Description

MOCZ00

EE Master for AEG Modicon 3964R Interfacing

HW-Type: 2541 / FW-Type: 2534

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This document is applicable to the following product(s):

MOCZ00

Rev. 01 and higher

Version	Revision	Date	Change
A, 1	00	28.01.02	first issue
A, 1	01	11.04.02	Change monitoring, Command processing, Setpoint values
A, 1	02	23.04.03	Command processing, Setpoint values

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1. System Overview

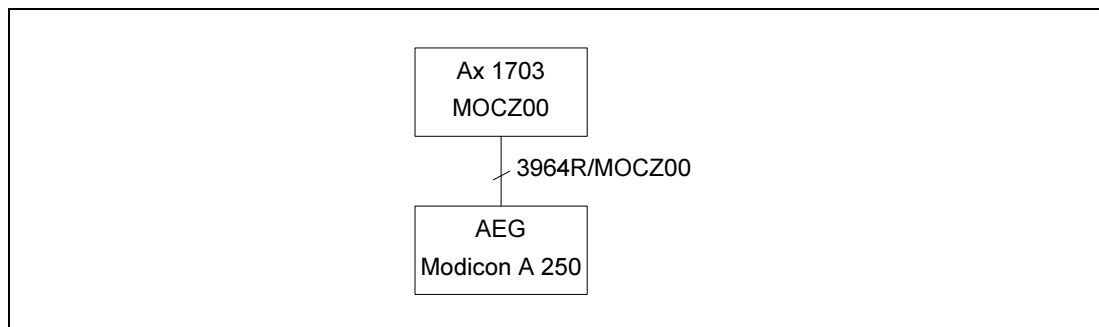
1.1. Brief Description

The MOCZ00 system element has been designed for the communication of Ax 1703 system components with an AEG Modicon 3964R Slave (e.g. A250). Data communication takes place at rates from 50 – 19200 bps.

Used for the adaptation to a third-party system, this protocol element implements only a part of the functionality and the data formats of the third-party interface. For a specific application example, it must therefore be verified in how far the actual requirements match the functionality implemented in this element and in how far additional extensions or adaptations will be necessary.

1.2. Configuration

Process images are transmitted cyclically with the 3964R protocol.



1.3. Interfaces

The communication to the BSE is handled via messages in the Ax 1703 format.
The communication to the remote station takes place via the 3964R procedure.

1.4. Protocol

Modulation: PCMBA

Byte frame: 10 bits, adjustable
8 data bits
1 stop bit
no parity

Baud rate: 9600 bauds, adjustable

Message protection: Hd = 4

Transmission procedure: 3964R, spontaneous, point-to-point master
(remote station = slave), adjustable

Interface: - RS232
- RS485

1.5. Failure Concept

The MOCZ00 protocol element detects a failure of the remote station by means of the "station call monitoring time" function. Once an interface error has been detected, a communication error will be signaled!

1.6. General Interrogation

In the event of the receipt of a GI message from the BSE, all pieces of binary information and measured values, contained in the process images in receive direction, will be transmitted to the BSE with a GI bit.

2. Protocol Description

2.1. Data Communication Control

Data communication control is based on the 3964R procedure (SAT is master). All parameterized data are queried or written cyclically by the master, as the case may be. Data point that have not been parameterized are transmitted to the remote station as "0". Thus, data communication control can also take place if not all queried data points in the AEG remote terminal unit have been parameterized!

2.1.1. General

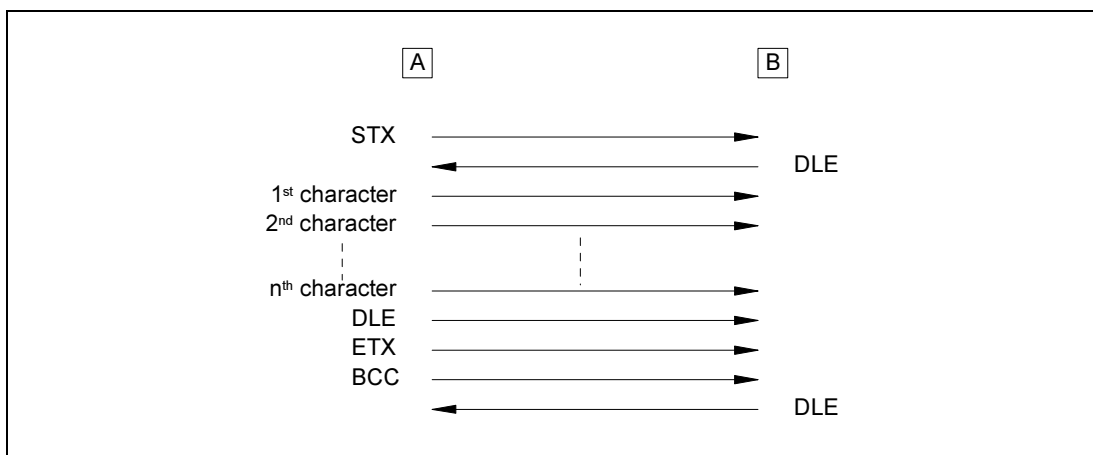
The 3964R transmission procedure generally relies on a half-duplex method.

Even so, both stations can attempt independently from one another to initiate a transmission procedure. Because of this conflict event, however, which is solved by prioritizing one of the two stations, the transmission must be suited for full-duplex mode transmission.

2.1.1.1. Transmitting with 3964R Procedure

To set up the connection, the STX control character is sent out. If the remote station replies with the DLE acknowledgement prior to the expiry of the acknowledgement delay period, user data will subsequently be transmitted. If the remote station replies with the NAK character, or if the acknowledgement delay period is timed out, the connection setup process will have been unsuccessful and retry processing will be initiated. Each DLE control character contained in the message is sent in duplicate (DLE doubling). Once the user data portion has been transmitted, the DLE and ETX characters, and the BCC block check character are sent as end identifier. Now, the remote station must send the DLE acknowledgement within the acknowledgement delay period so that the transmission can be completed successfully. If the DLE acknowledgement fails to arrive or if the remote station replies with the NAK character, retry processing will be initiated.

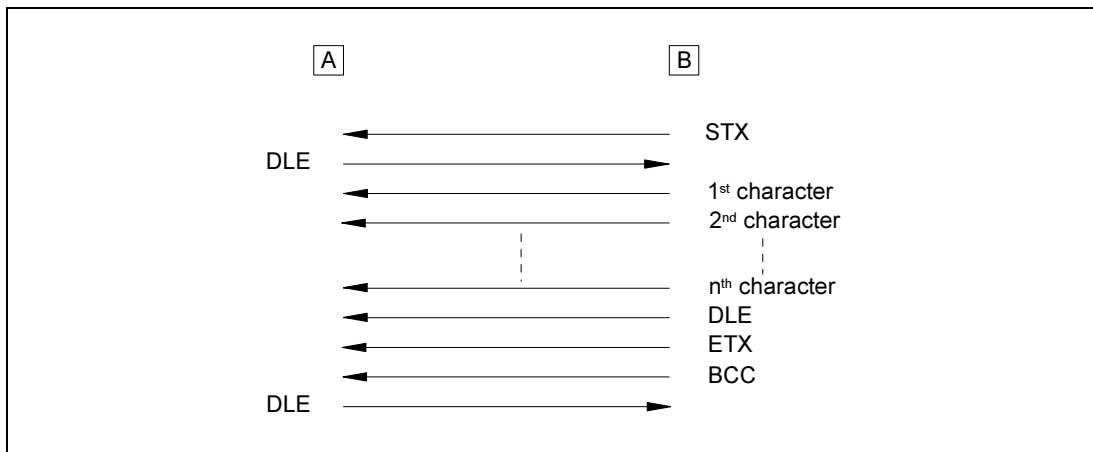
Example of a Flawless Data Traffic:



2.1.1.2. Receiving with 3964R Procedure

If the station receives the STX character (connection setup), it replies with the DLE acknowledgement within the acknowledgement delay period. Now, all user data are entered into the receive buffer until the DLE and ETX end characters, and the BCC block check character are received. If the BCC block check character (longitudinal parity) is correct, the message is acknowledged with the DLE character within the acknowledgement delay period.

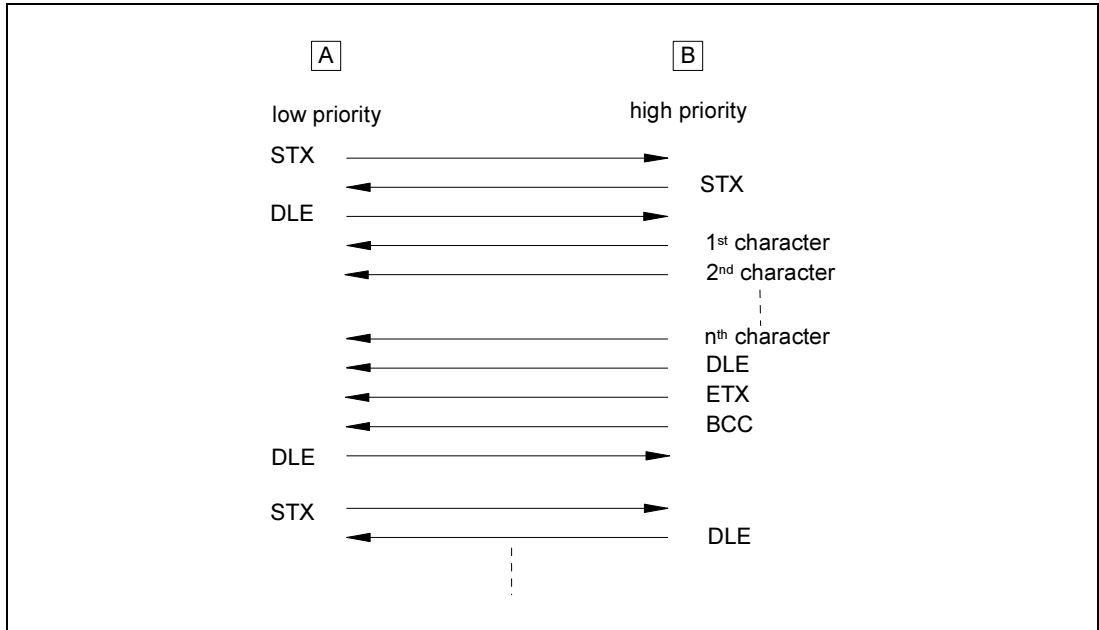
Example of a Flawless Data Traffic:



2.1.1.3. Initialization Conflict

If the remote station replies to the request to send (STX) of a station within the acknowledgement delay period with the STX character, there will be an initialization conflict. The station having the lower priority withdraws its request to send and replies with the DLE character. Now, the higher-priority station sends its user data. Following the connection setup, the lower-priority station may send its data.

Example of How to Solve Initialization Conflict

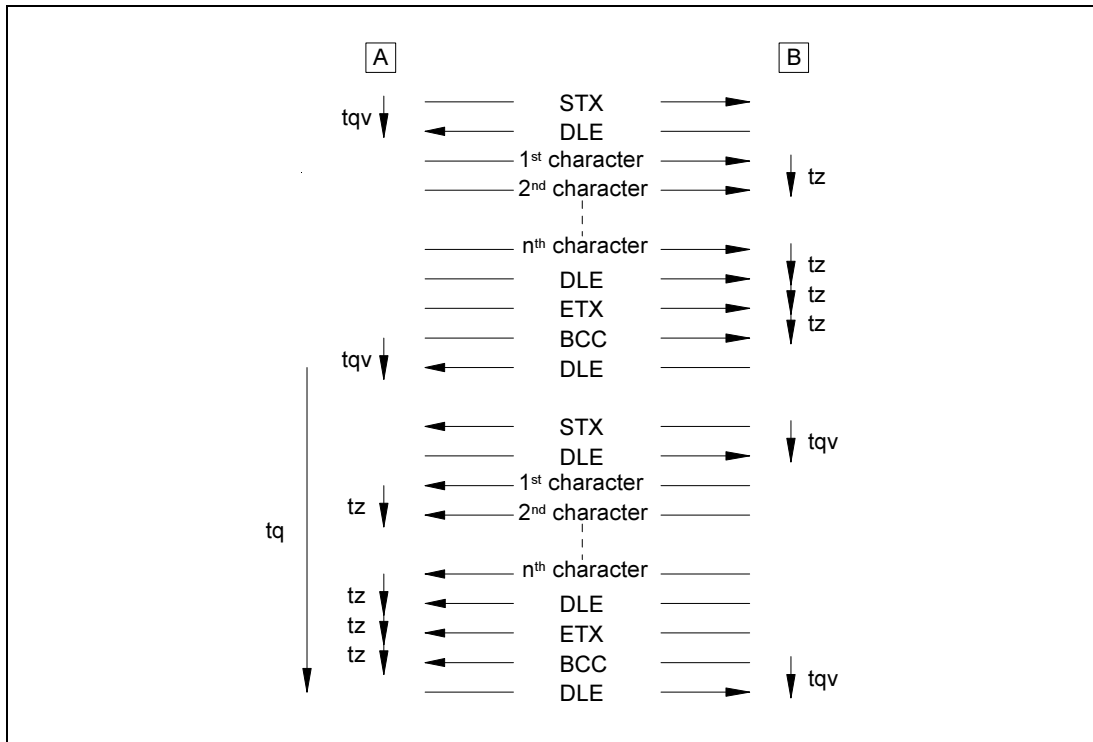


2.1.1.4. Monitoring Times

Character monitoring time (tz): This time interval between two characters to be received is monitored and must not be greater than 220 ms.

Acknowledgement delay (tq): This time interval is used to monitor the DLE acknowledgement for STX or BCC.

Expected acknowledgement time (tqv): This time interval is used to monitor the reaction message.



2.1.2. Monitoring Procedures

The 3964 R procedure generally defines two types of data transmission:

- a) SEND service
- b) FETCH service
- c) Passive service

ad a) SEND service (spontaneous operation)

All user data are sent to the remote station spontaneously.

ad b) FETCH service (querying mode)

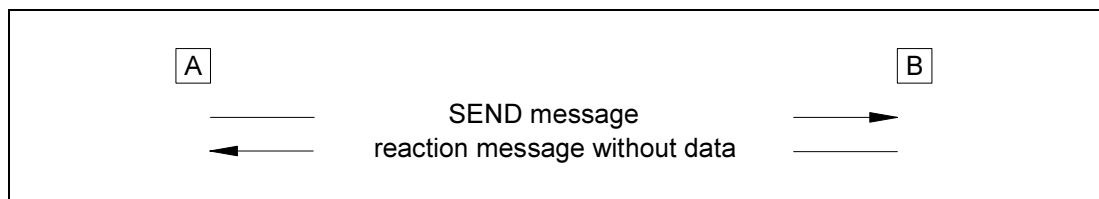
A station continuously sends a querying cycle (FETCH messages). The respective data block number or data value number, and the number of data words are queried directly.

ad c) Passive service

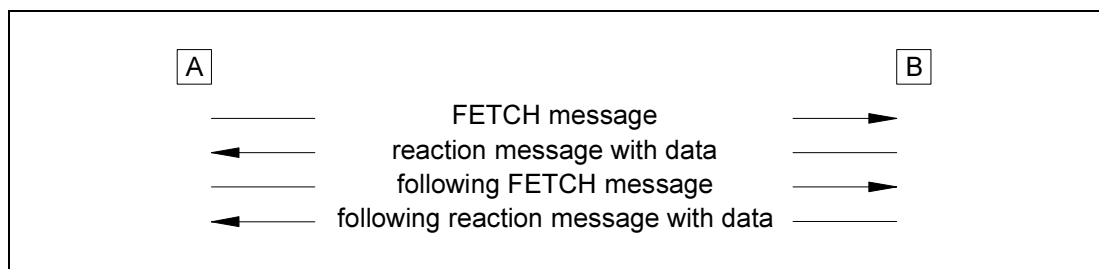
The station sends no SEND or FETCH messages, it can only receive SEND or FETCH messages from the remote station.

MOCZ00 only uses the FETCH service, the data being transmitted cyclically.

2.1.2.1. SEND Service



2.1.2.2. FETCH Service



2.2. Master/Standby Function

The Master/Standby Function is implemented by means of the redundancy function in the Ax 1703. If the firmware is in the standby mode, it will not send any messages to the remote AEG Modicon station.

2.3. Limitations

- 1000 data points max. in transmit direction
- 2000 data points max. in receive direction
- Binary information items and values must be unambiguous, word by word.

2.4. Modulation Method

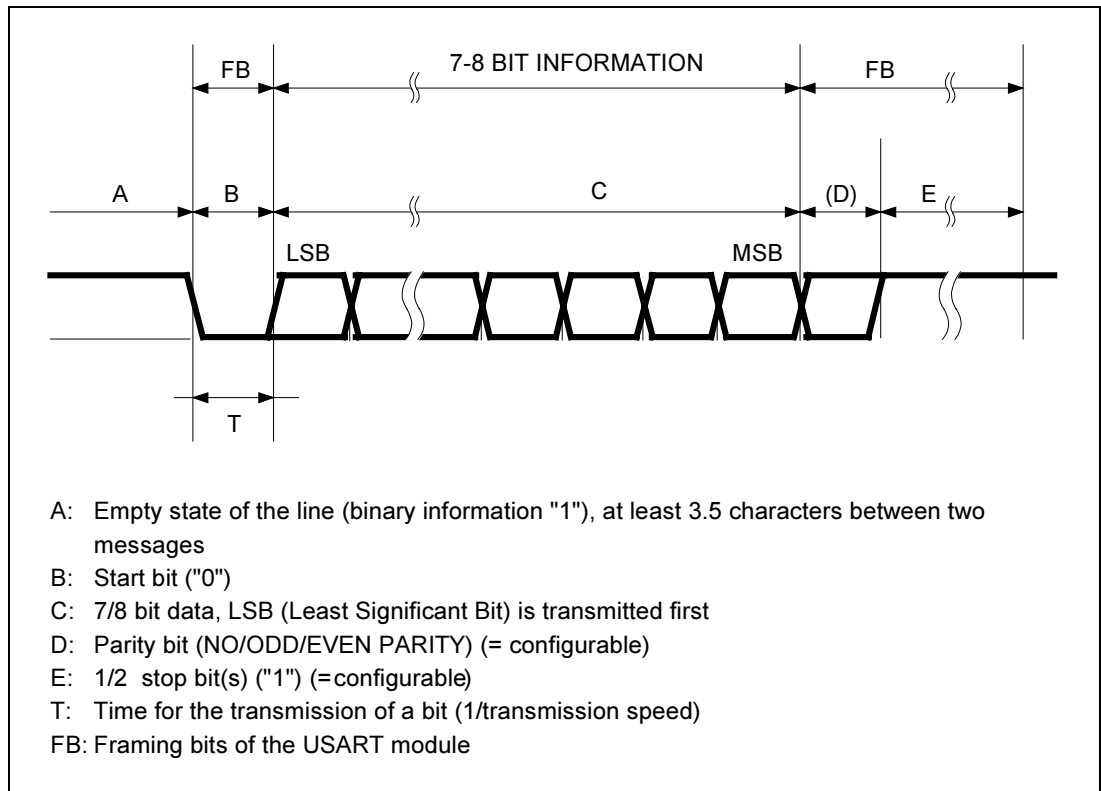
The data are pulse-code-modulated in groups of 7-8 bits each (depending on the "transmission mode") and transmitted asynchronously. In this context, a USART element in the asynchronous mode provides each byte with a byte frame (BR).

This byte frame contains:

1	start bit
7/8	data bits (transmission mode = ASCII: 7 data bits) (transmission mode = RTU: 8 data bits)
1/NO	parity bit (even, odd parity)
1/1.5/2	stop bits

The byte frame can be configured (SIP parameters).

Based on start and stop bits of the byte frame, the receiver will be resynchronized for each byte.



2.5. Message Structure

The message includes a process image of the entire RTU, in the first words (1 – 6, 8) is a header information, followed by the data.

Byte frame: see 3964R transmission procedure

Message protection: see 3964R transmission procedure

3964R Data Portion:

Header	User Data
--------	-----------

2.6. Transmission Protocol

The Modicon Master firmware (MOCZ00) can only communicate with one remote station. The communication takes place in the point-to-point traffic mode. For data communication control, the transmission procedure 3964R is used and the data are transmitted cyclically (image transmission).

2.7. Acknowledgement Behavior

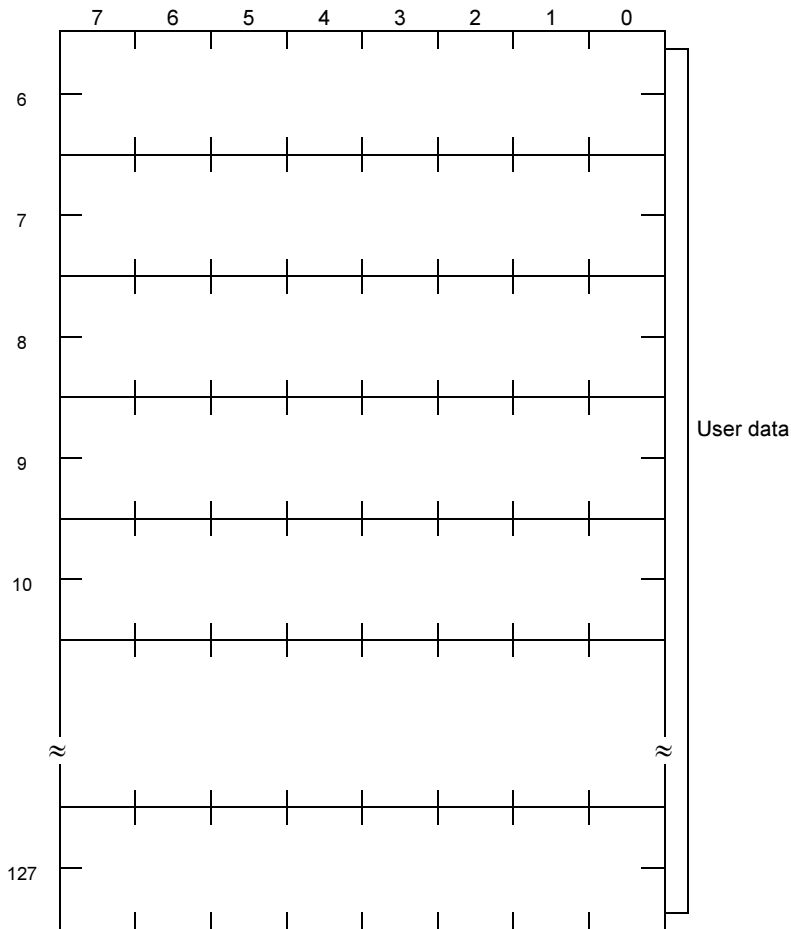
Every message transmitted by the Modicon Master must be answered by the slave.

3. Message Description

3.1. General Information

Address range	Value	6 – 127	in receive direction, 8 – 129 in transmit direction
			optional an offset (header) could be given
	Bit	0 – 15	(only information)
	Multiplex address	0 – 254	(only multiplex measured values in reception direction)
		255	not used
Modicon Format:	1	1	single-point information
	3	1	single command
	5	15 bit	measured value with VZ
	6	16 bit	measured value
	7	8 bit	measured value
	8	16 bit	transparent data

3.2. Messages in Receive Direction



Words 6 - 127user data

The user data are organized by words, however, binary information can be assigned bit-by-bit within a value.

Furthermore, the data portion may contain multiplexed data which require special configuring.

Binary information and values must be unambiguous, word by word.

3.2.1. Information in Receive Direction – Address Conversion

MODICON-Address					SAT-Address		
MODICON - Address	Bit-No.	MODICON MUX-Address	MODICON-Format	Index-change monitoring	Description	CASDU1..... Source-region# CASDU2..... Source comp.# IOA1 Source module# IOA2 Source value# IOA3 Source sub-address	TI (TK)
6 - 127	0 - 15	Not used	Single-point information	Not used	Single-point information		30

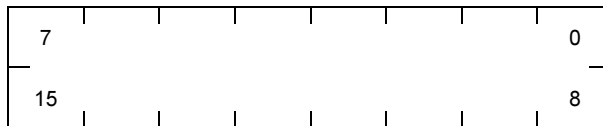
Information is converted from the set Modicon-Address (bit-wise) to the SAT-information format and transferred with the appertaining SAT-Address.
 A Modicon-word can also be converted transparently.
 For parameter settings see Toolbox II, OPM Receive-Routing for MOCZ00.

3.2.2. Measured Values in Receive Direction – Address Conversion

MODICON-Address					SAT-Address		
MODICON - Address	Bit-No.	MODICON- MUX Address	MODICON - Format	Index-change monitoring	Description	CASDU1 ... Source-region # CASDU2 ... Source comp.# IOA1 Source module # IOA2 Source value# IOA3 Source sub-address	TI (TK)
6 - 127	Not used	Not used	15 Bit Measured value with Vz.	0 – 30 31 not used	15 Bit + Vz (scaled)		35
6 - 127	Not used	Not used	16 Bit Measured value	0 – 30 31 not used	31 Bit + Vz		140
6 - 127	Not used	0 – 254 255 not used	Multiplex data	Not used	Measured value short floating point		36

Measured values are converted word-wise from the set Modicon-Address to the SAT-information format and transferred with the appertaining SAT-Address.

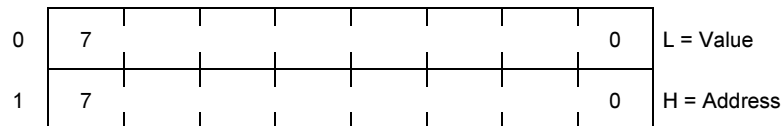
Modicon measured value:



For parameter setting see Toolbox II, OPM Receive-Routing.

In addition, there are multiplex data areas, whereby in this case the Low Byte of a word occupies the 8 Bit measured value and the High Byte a word of the appertaining address.

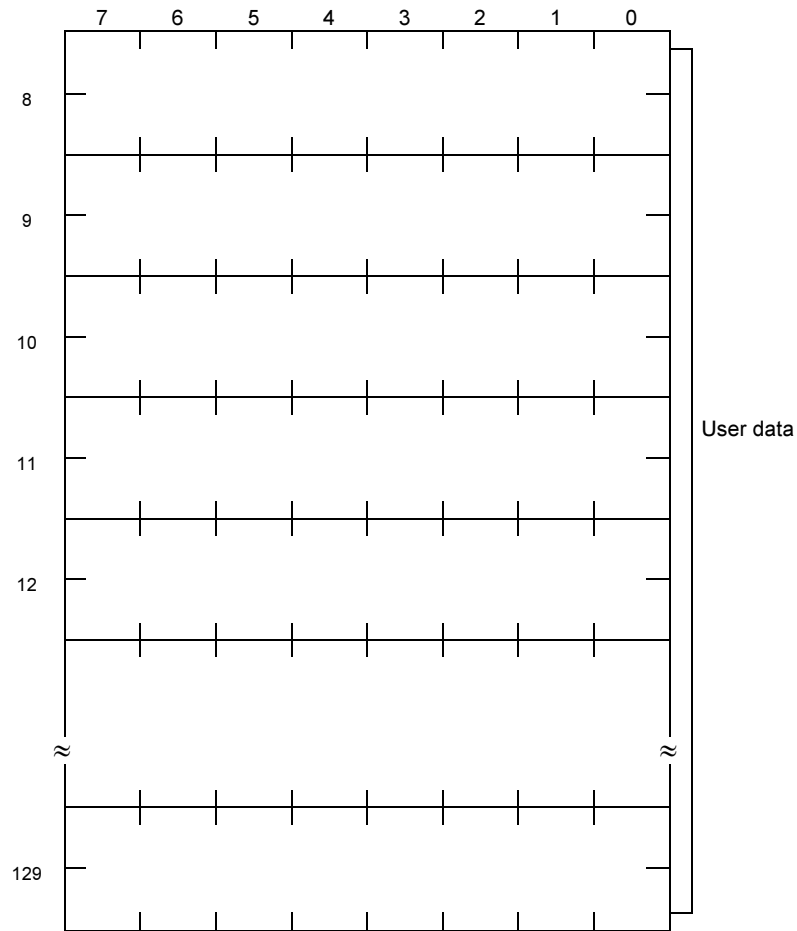
Modicon multiplex data:



3.2.3. Transparent Data in Receive Direction – Address Conversion

MODICON-Address					SAT-Address		
MODICON - Address	Bit-No.	MODICON-MUX-Address	MODICON-Format	Index-change monitoring	Description	CASDU1...Source region# CASDU2...Source comp.# IOA1.....Source module# IOA2.....Source value# IOA3.....Source subaddress	TI (TK)
6 - 127	Not used	Not used	16 Bit transp.	Not used	Bit pattern 32 Bit		35

3.3. Messages in Transmit Direction



word 8 - 129..... user data

3.3.1. Commands in Transmit Direction – Address Conversion

SAT-Address			MODICON-Address			SI-Address
CASDU1Source region#	Description	TI (TK)	MODICON - Address	Bit-No.	MODICON - Format	SI-CASDU1RM-Region#
CASDU2Source comp.#						SI-CASDU2RM-Comp.#
IOA1Source module#						SI-IOA1RM-Modules#
IOA2Source value#						SI-IOA2RM-Value#
IOA3Source sub-address						SI-IOA3RM-Sub-address
	Single command	45	8 - 129	0 - 15	Single command	

Modicon Additional Information			
Command Type	Time	Address for Control	Bit for Control
IEC-Command with default time			
IEC-Command with command sequence (ON/OFF)	n * 100	8 - 129	0 - 15
IEC-Command with command sequence (select/execute)	ms		

Commands are converted from the set SAT-format (with appertaining SAT-Address) and entered in the Modicon transmit image at the appropriate word- and Bit-number.

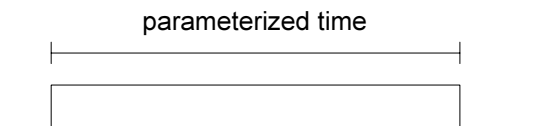
A word can also be converted transparently.

For parameter setting see Toolbox II, OPM-Transmit-Routing for MOCZ00.

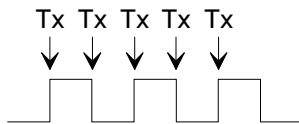
Status information address: SAT-Address of status information (see receive detailed routing).

Following commands are supported:

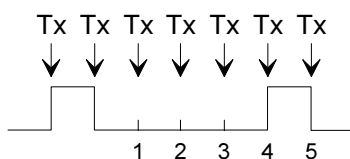
- IEC command with default time:



- IEC command with command sequence (ON/OFF):



- IEC command with command sequence (select/execute):



3.3.2. Setpoint Values in Transmit Direction – Address Conversion

SAT-Address			MODICON-Address				
CASDU1.. Source region#	Description	TI (TK)	MODICON- Address	Bit-No.	MODICON - Format		
CASDU2.. Source comp.#			8 - 129	Not used	15 Bit Measured value with Vz		
IOA1 Source module#	15 Bit + VZ scaled	35	8 - 129	Not used	16 Bit Measured value		
IOA2 Source value#			31 Bit + VZ	140	8 - 129	Not used	16 Bit transparent
IOA3 Source subaddress			Measured value short floating point	36	8 - 129	Not used	16 Bit transparent

Modicon Additional Information			
Command Type	Time	Address for Control	Bit for Control
Setpoint command (higher/lower)		8 - 129	0 - 15

Setpoint values are converted from the set SAT-format (with appertaining SAT-Address) in the Modicon measured value format and entered in the corresponding word in the transmit image.


Modicon setpoint-value:

7								0
15								8

For parameter setting see Toolbox II, OPM Transmit routing for MOCZ00.

Status information address: SAT-Address of status information (see receive detailed routing).

- Setpoint command (higher/lower)

command bit 
+ setpoint

3.3.3. Transparent data in transmit direction – Address conversion

SAT-Address			MODICON-Address		
	Description	TI (TK)	MODICON - Address	Bit-No.	MODICON - Format
CASDU1 .. Source region#					
CASDU2 .. Source comp.#					
IOA1 Source module#					
IOA2 Source value#	32 Bit Bit-pattern	7	8 - 129	Not used	16 Bit transparent
IOA3 Source subaddress					

A word can also be converted transparently.

No status information address is used.

3.4. Measured values

3.4.1. Change-monitoring

So as not to strain the transmission equipment unnecessarily, the values are monitored for change according to the following rules:

- the first value established is transmitted immediately
- each change in status of the measured value (valid/invalid/overrange) triggers an immediate transmission
- with valid measured values the additive threshold-value method is drawn upon for change-monitoring.

Additive threshold-value method:

With this method 2 thresholds can be set:

- large threshold and
- additive threshold

If the deviation to the last transmitted value is greater than the large threshold, then the new value is transmitted immediately.

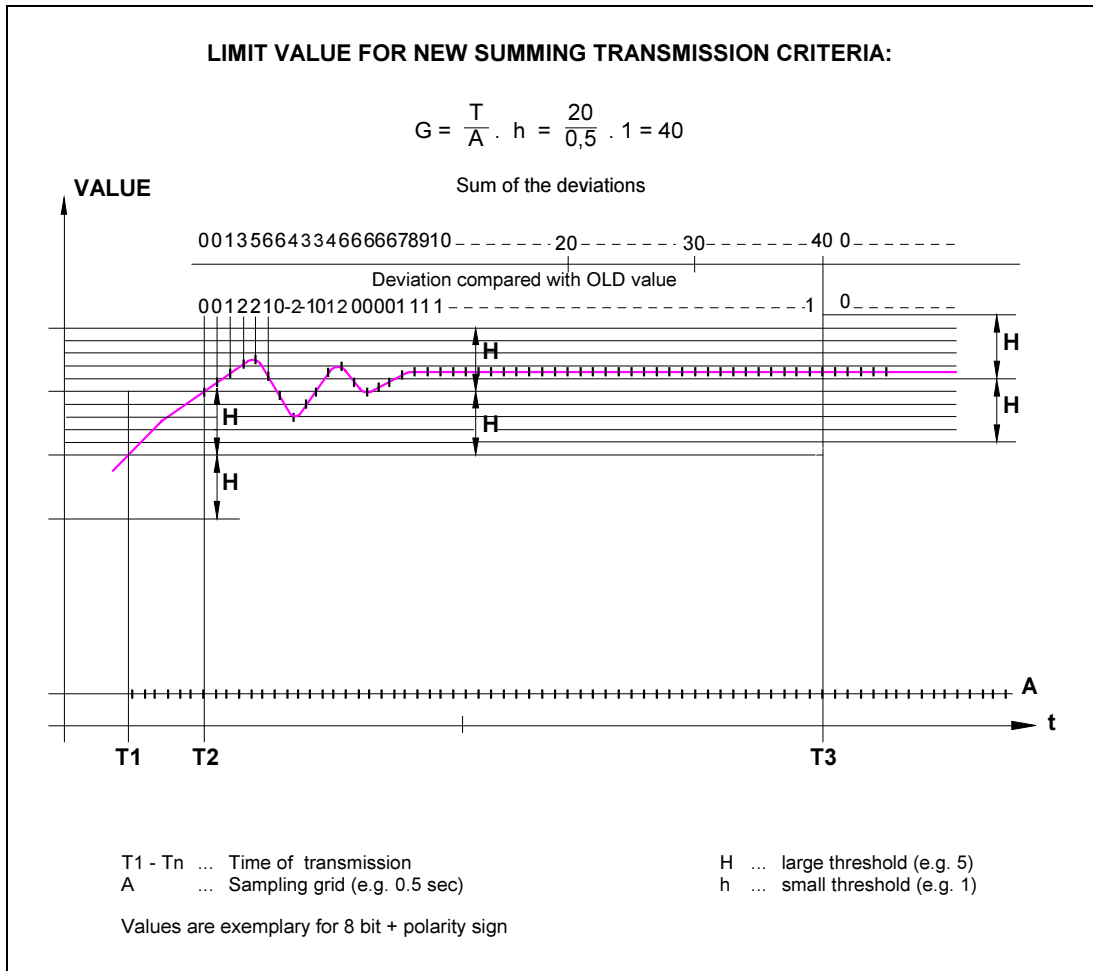
Otherwise the deviation of the last transmitted value is added with the correct preceding sign at each sampling time. First when this sum exceeds the set limit value (additive threshold) is the transmission with the current (new) value initiated.

The advantage of this method is, that the time to the next transmission of the value is in proportion to the average change, i.e. values with greater change are transmitted earlier than values with smaller change.

Additive change-monitoring

In operational stress-situations this causes

- all large changes to be transmitted spontaneously first
- then only after this the exact latest status of the measured values with simultaneous suppression of measured value fluctuations for reducing the line load.

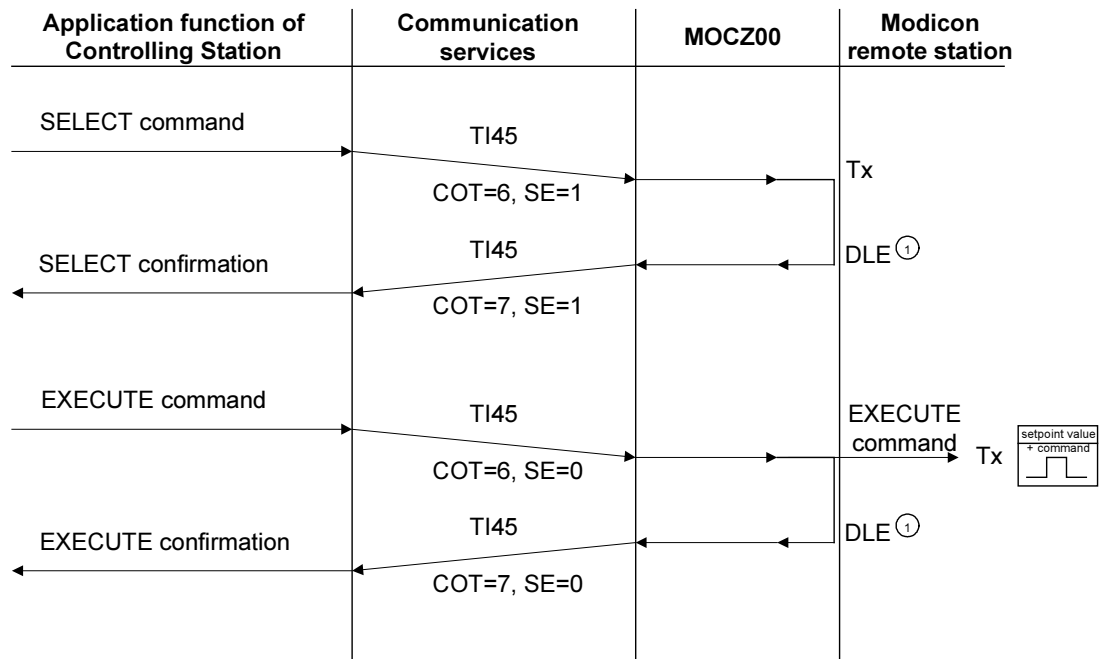


3.5. Setpoint Values

3.5.1. Setpoint Command (higher/lower)

Setpoint commands are set in the transmission image to the remote Modicon station, a command bit (*Übernahmebit*) will be set at the same time.

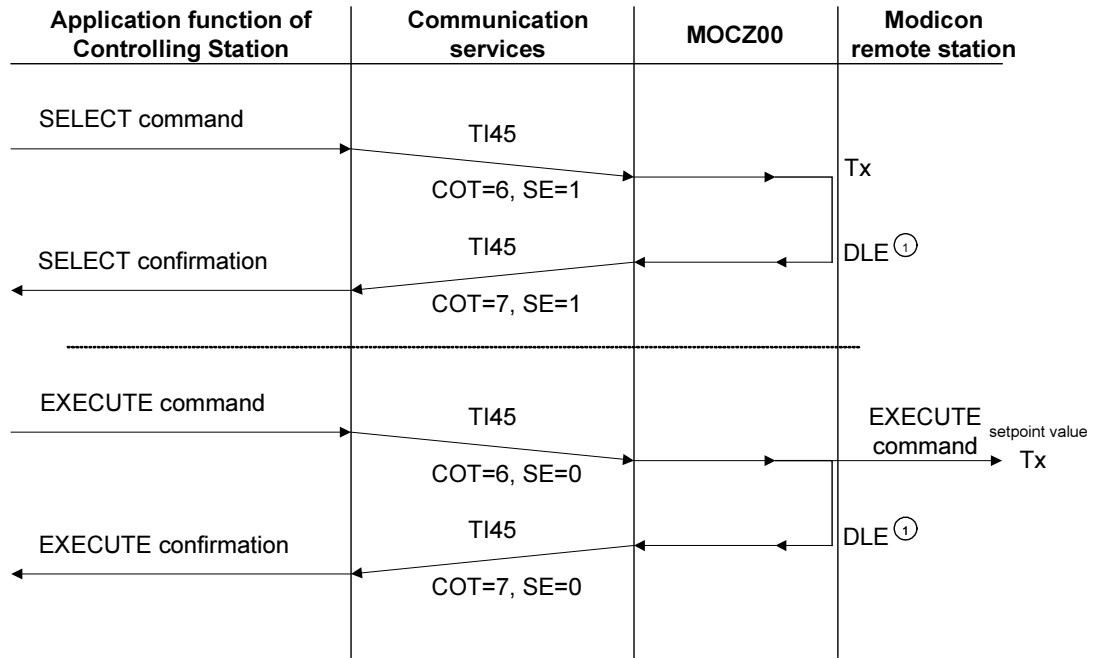
However since the command transmission on the LAN is required to be according to the "NUC" (Norwegian User Convention), this must be emulated by the Firmware (see diagram).



On receive from DLE (positive acknowledgement) Confirmation OK is emulated, on receive NOK (or Timeout) Confirmation NOK is emulated.

3.5.2. Setpoint Value

Setpoints are set in the transmission image to the remote Modicon station. However since the command transmission on the LAN is required to be according to the "NUC" (Norwegian User Convention), this must be emulated by the Firmware (see diagram).



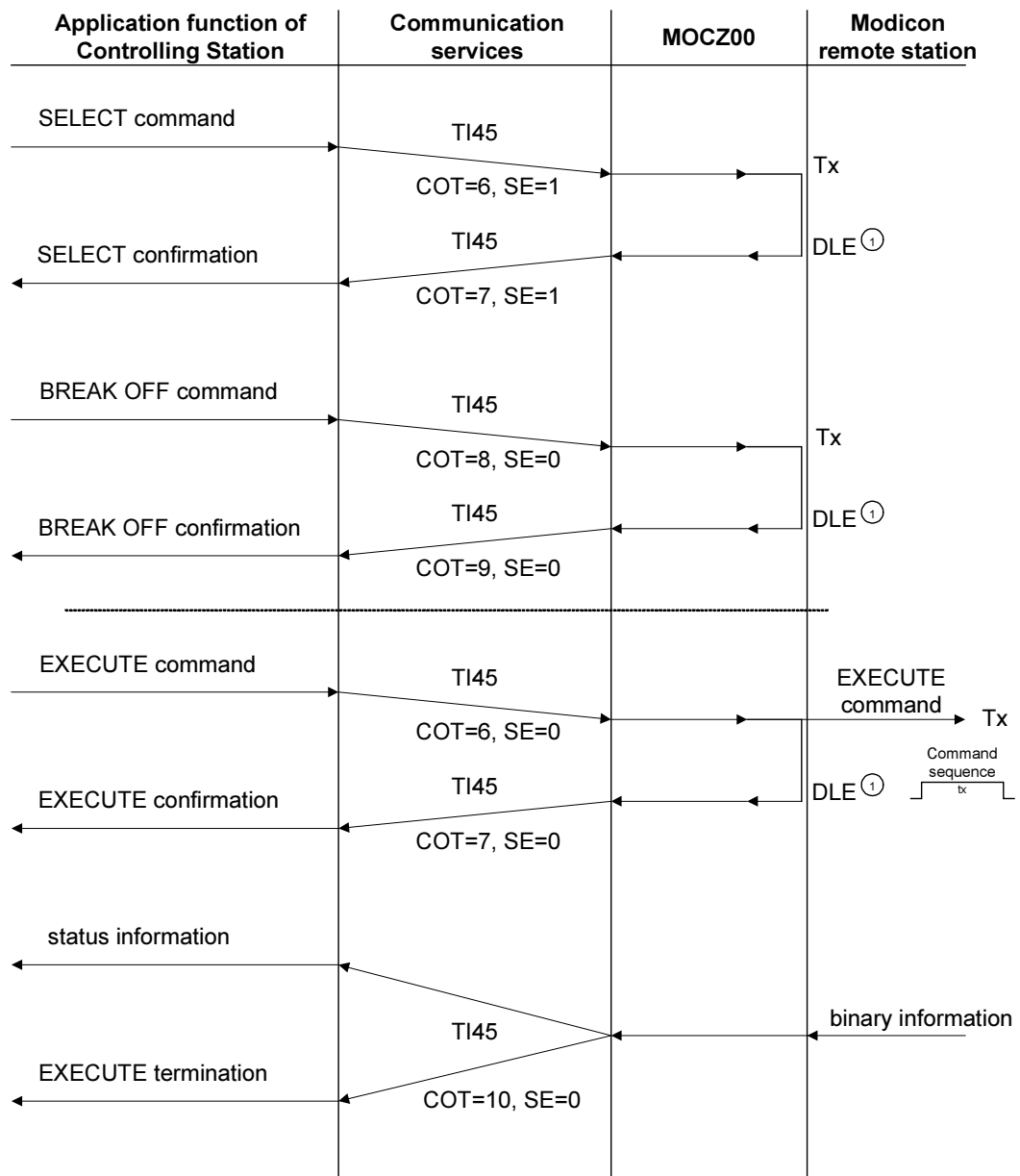
On receive from DLE (positive acknowledgement) Confirmation OK is emulated, on receive NOK (or Timeout) Confirmation NOK is emulated.

3.6. Setpoint processing

3.6.1. IEC Command with Default Time

Pulse commands are set in the transmission image to the remote Modicon station for the adjusted time and then reset again.

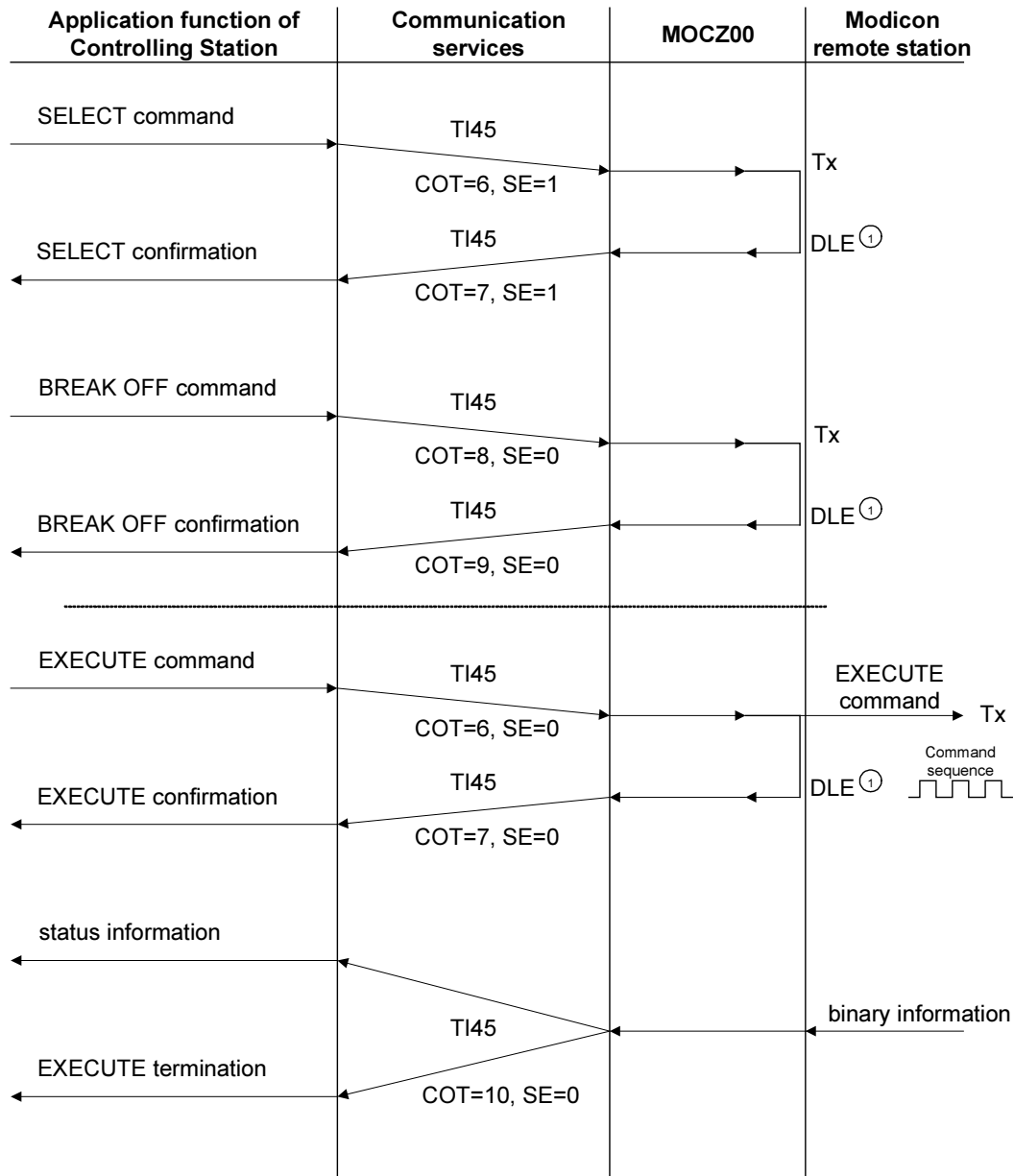
However since the command transmission on the LAN is required to be according to the "NUC" (Norwegian User Convention), this must be emulated by the Firmware (see diagram). The command output takes place exclusively 1 from n.



On receive from DLE (positive acknowledgement) Confirmation OK is emulated, on receive NOK (or Timeout) Confirmation NOK is emulated.

3.6.2. IEC Command with Command Sequence (ON/OUT)

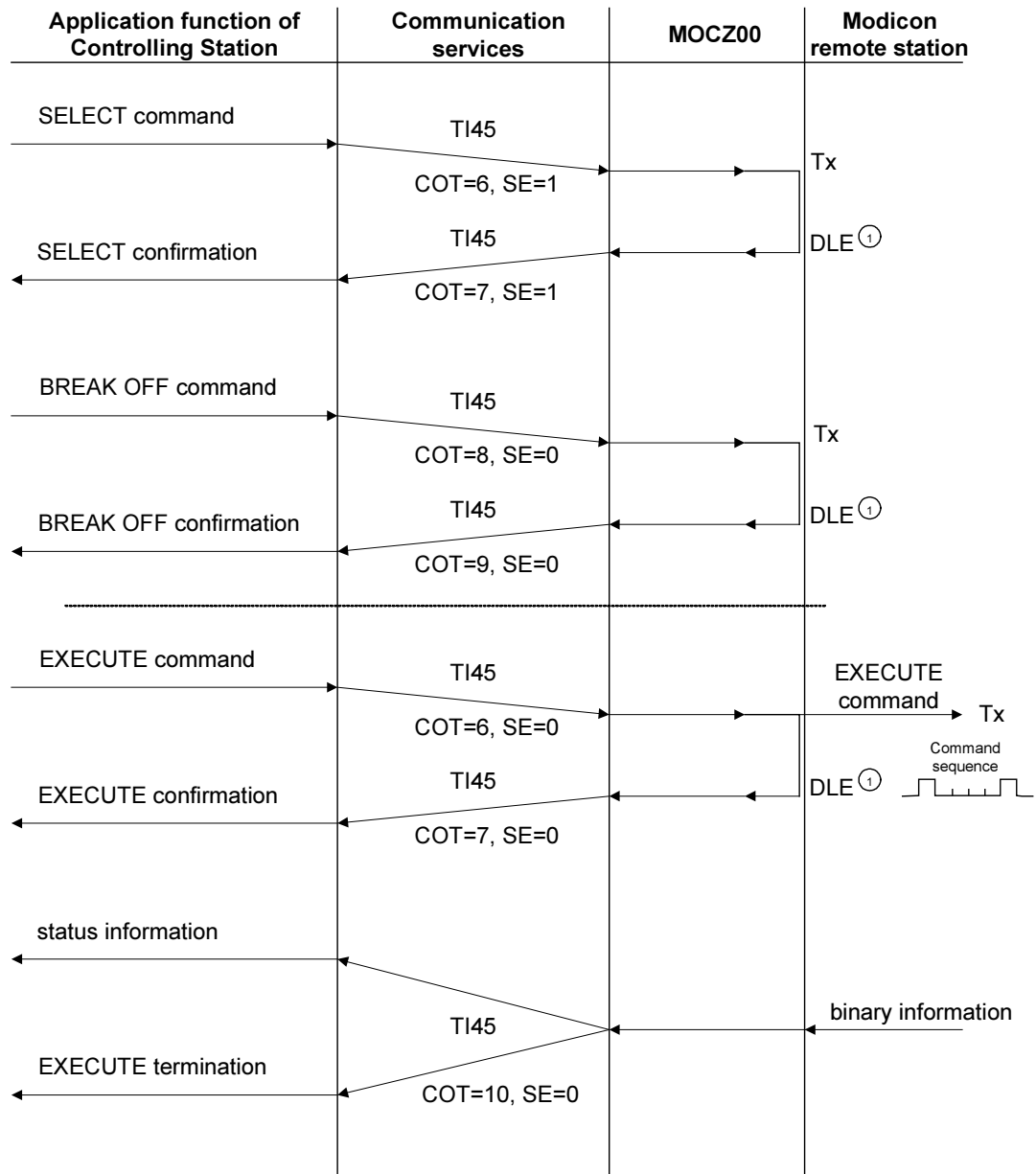
A command sequence is transmitted in the transmission image to the remote Modicon station (*bei jedem Senden wird getoggelt*). However since the command transmission on the LAN is required to be according to the "NUC" (Norwegian User Convention), this must be emulated by the Firmware (see diagram). The command output takes place exclusively 1 from n.



On receive from DLE (positive acknowledgement) Confirmation OK is emulated, on receive NOK (or Timeout) Confirmation NOK is emulated.

3.6.3. IEC Command with Command String (Sequence) (Select/Execute)

Command *sequence* is set in the transmission image to the remote Modicon station. However since the command transmission on the LAN is required to be according to the "NUC" (Norwegian User Convention), this must be emulated by the Firmware (see diagram). The command output takes place exclusively 1 from n.



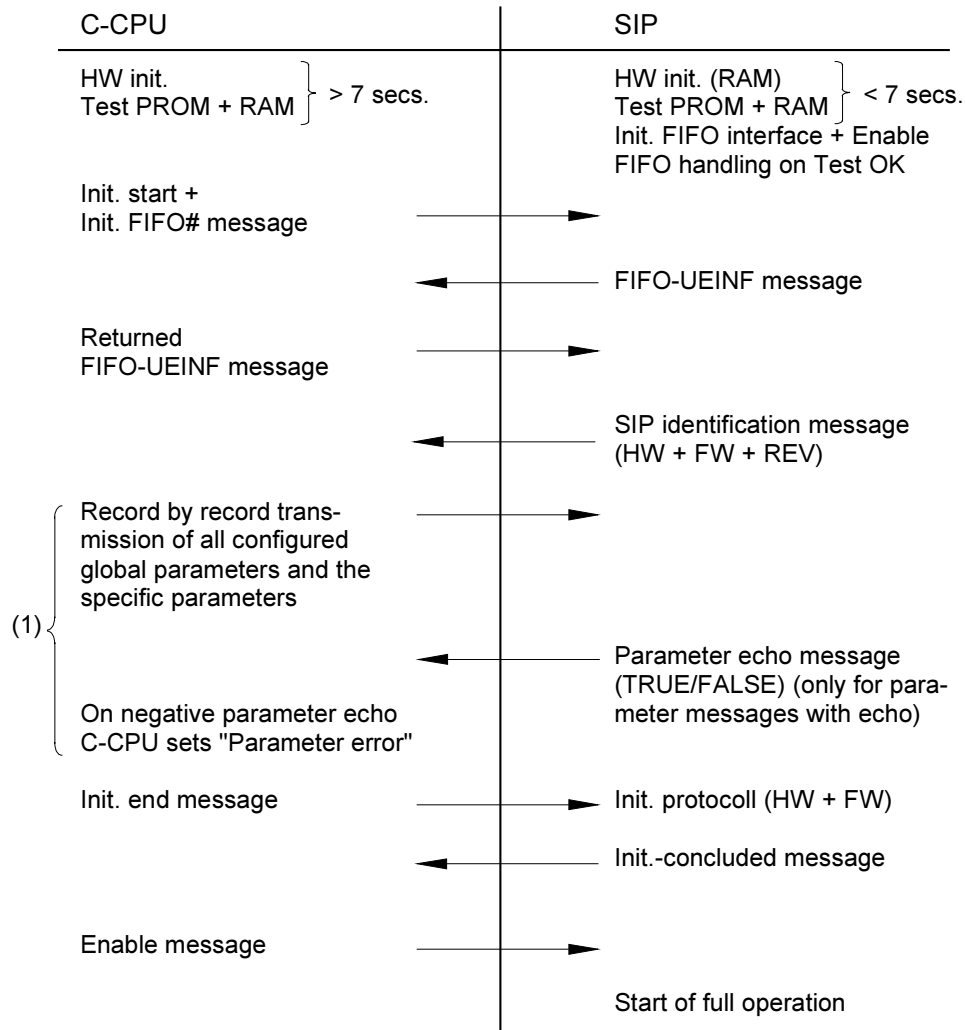
On receive from DLE (positive acknowledgement) Confirmation OK is emulated, on receive NOK (or Timeout) Confirmation NOK is emulated.

4. Parameter Concept

The exact way of functioning of the firmware is determined by parameters. The firmware uses parameters used in other functional units within a system component (global parameters) as well as parameters controlling the protocol processing sequence (specific parameters).

5. Startup Behavior

Following a reset, an exactly defined sequence of initialization and parameter configuration between C-CPU and SIP takes place.



(1) "n-times" until all parameters are transmitted from the C-CPU to the SIP

A. Appendix: Diagnostic

Overview:

```

legend category: I ... internal
                  E ... external
                  C ... communication
                  T ... test
                  W ... warning
                  B ... board/module failure
                  S ... startup
  
```

category	record (rel.)	record (abs.)	meaning
I	0	0	Internal error in the operating system
	2	2	SSE Parameter Errors
	3	3	SSE Format Conversion Errors
	4	4	Parameter Errors of Protocol-Specific Application Layer
	5	5	Errors in Detailed Routing
	6	6	Errors in General Parameter Check
C	2	42	Communication errors
T	0	50	Test Mode of Operating and Base System

```
category:    I
record:     0
meaning:    Internal error in the operating system

Bit 00 ... RAM error
Bit 01 ... STACK error
           The defined stack range was exceeded;
           replace system element or inform SAT.
Bit 02 ... firmware shut down
           Diagnosis:
           - read out system diagnostics ring (command ID R)
             in ST emulation (possibly store in file)
Bit 03 ... not enough freespace
           Not enough available RAM memory for dynamic
           memory management;
           Diagnosis:
           - change parameter setting of size definitions
             (e.g. real-time rings, pool size)
           - inform SAT.

Bit 04 ...
Bit 05 ...
Bit 06 ...
Bit 07 ...
Bit 08 ... CPU 80186 error
Bit 09 ...
Bit 10 ...
Bit 11 ...
Bit 12 ...
Bit 13 ...
Bit 14 ...
Bit 15 ...
```

category: I
record: 2
meaning: SSE Parameter Errors

Bit 00 ... Parameter error detected by SIP
Bit 01 ... Parameter error of LOCAL parameter block no. 06
Bit 02 ... General SSE parameter error
Bit 03 ...
Bit 04 ...
Bit 05 ... Parameter error in Modicon/3964 connection layer
Bit 06 ... Parameter error in Modicon application layer
Bit 07 ...
Bit 08 ...
Bit 09 ...
Bit 10 ...
Bit 11 ...
Bit 12 ...
Bit 13 ...
Bit 14 ...
Bit 15 ...

```
category:    I
record:      3
meaning:     SSE Format Conversion Errors

Bit 00 ...  Format conversion error in transmit direction
Bit 01 ...
Bit 02 ...  Format conversion error in receive direction
Bit 03 ...
Bit 04 ...
Bit 05 ...
Bit 06 ...
Bit 07 ...
Bit 08 ...
Bit 09 ...
Bit 10 ...
Bit 11 ...
Bit 12 ...
Bit 13 ...
Bit 14 ...
Bit 15 ...  Error detected in conversion of an PST control message
            Diagnosis:
            - Read out system diagnostics ring (command ID R)
              in ST emulation (possibly store in file)
```

```
category:    I
record:      4
meaning:     Parameter Errors of Protocol-Specific Application Layer
```

```
Bit 00 ...
Bit 01 ... SSE parameter error
Bit 02 ...
Bit 03 ...
Bit 04 ...
Bit 05 ...
Bit 06 ...
Bit 07 ...
Bit 08 ...
Bit 09 ...
Bit 10 ...
Bit 11 ...
Bit 12 ...
Bit 13 ...
Bit 14 ...
Bit 15 ...
```

```
category:    I
record:      5
meaning:     Errors in Detailed Routing
```

```
Bit 00 ... The following errors have occurred in transmit detailed routing:
Bit 01 ... The following errors have occurred in receive detailed routing:
Bit 02 ...
Bit 03 ...
Bit 04 ...
Bit 05 ...
Bit 06 ...
Bit 07 ...
Bit 08 ...
Bit 09 ...
Bit 10 ...
Bit 11 ...
Bit 12 ...
Bit 13 ...
Bit 14 ...
Bit 15 ...
```



```
category:    I
record:      6
meaning:     Errors in General Parameter Check

  Bit 00 ... Message conversion in transmit direction
  Bit 01 ... Message conversion in receive direction
  Bit 02 ...
  Bit 03 ...
  Bit 04 ...
  Bit 05 ...
  Bit 06 ...
  Bit 07 ...
  Bit 08 ...
  Bit 09 ...
  Bit 10 ...
  Bit 11 ...
  Bit 12 ...
  Bit 13 ...
  Bit 14 ...
  Bit 15 ...
```

```
category:    C
record:      2
meaning:     Communication errors
```

```
Bit 00 ... Communication failure to remote station
Bit 01 ...
Bit 02 ...
Bit 03 ...
Bit 04 ...
Bit 05 ...
Bit 06 ...
Bit 07 ...
Bit 08 ...
Bit 09 ...
Bit 10 ...
Bit 11 ...
Bit 12 ...
Bit 13 ...
Bit 14 ...
Bit 15 ...
```

```
category:    T
record:      0
meaning:     Test Mode of Operating and Base System
```

```
Bit 00 ... Memory test disabled
Bit 01 ...
Bit 02 ...
Bit 03 ...
Bit 04 ...
Bit 05 ...
Bit 06 ...
Bit 07 ...
Bit 08 ...
Bit 09 ...
Bit 10 ...
Bit 11 ...
Bit 12 ...
Bit 13 ...
Bit 14 ...
Bit 15 ...
```


B. Appendix: Literature

The following document(s) is(are) recommended for use as reference(s) complementing the Description of "MOCZ00":

SAT Description: "Ax 1703 Data Formats"
Item no.: MA0-000-r.xx

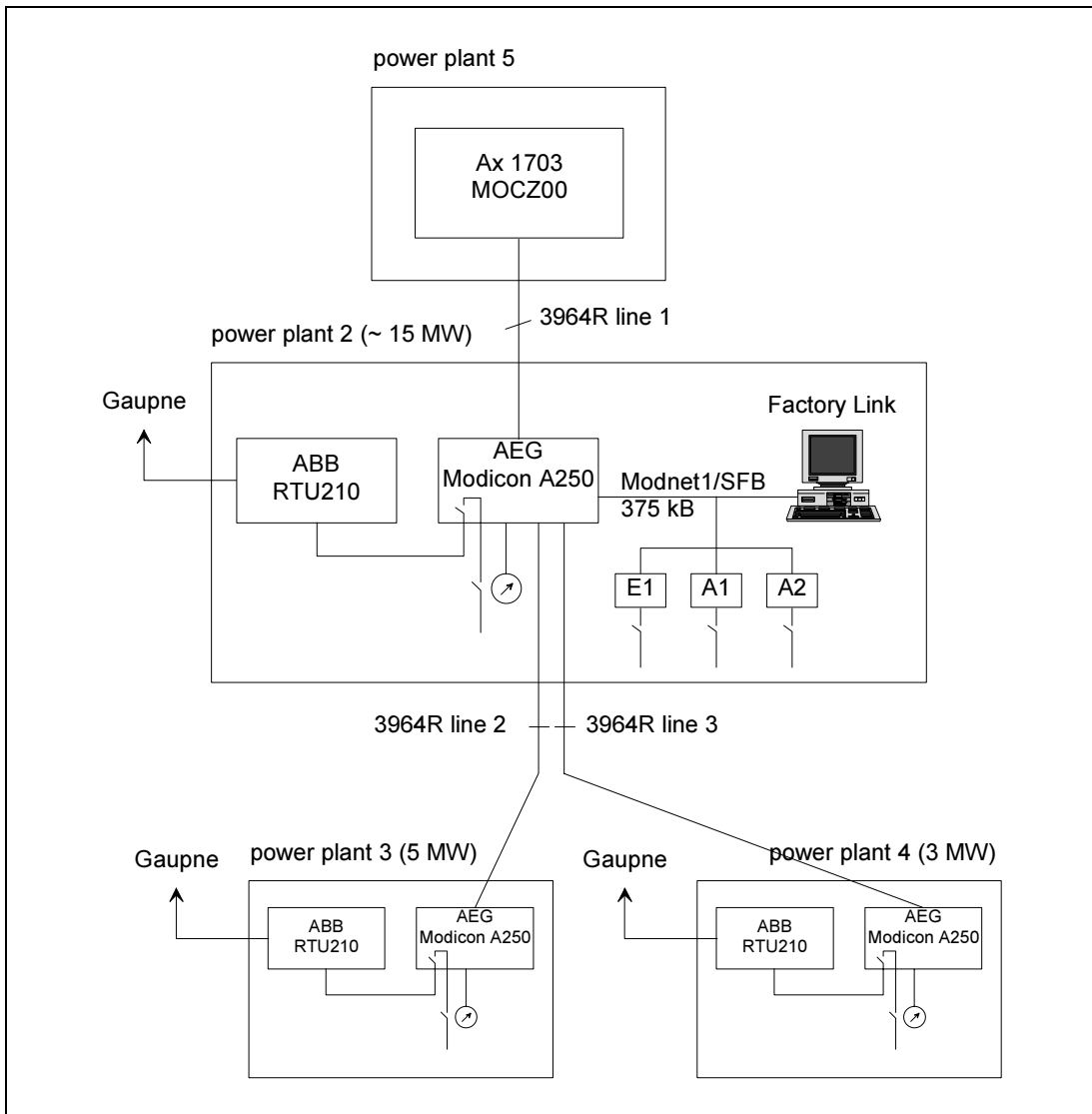
C. Appendix: HØYANGER Project

C.1. Protocol

Modulation:	PCMBA
Baud rate:	9600 bauds
Byte frame:	10 bits, departing from the standard 8 data bits 1 stop bit no parity
Message protection:	Hd = 4
Interface:	RS232

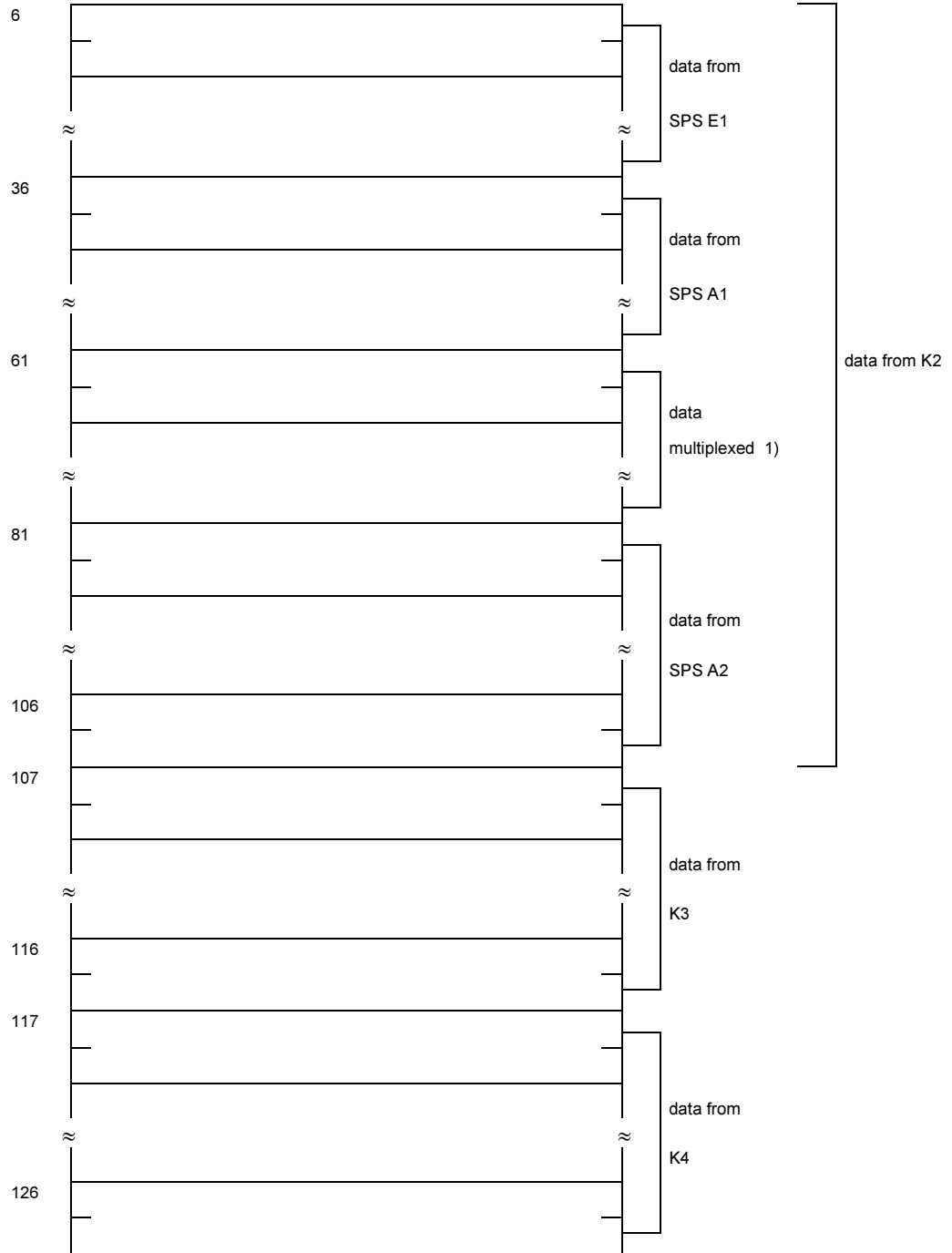
C.2. Configuration

At lines 1, 2, and 3, process images are transmitted cyclically, using the 3964R protocol. Lines 2 and 3 include only a few data points and they are contained as is in the rear portion of the data of line 1.



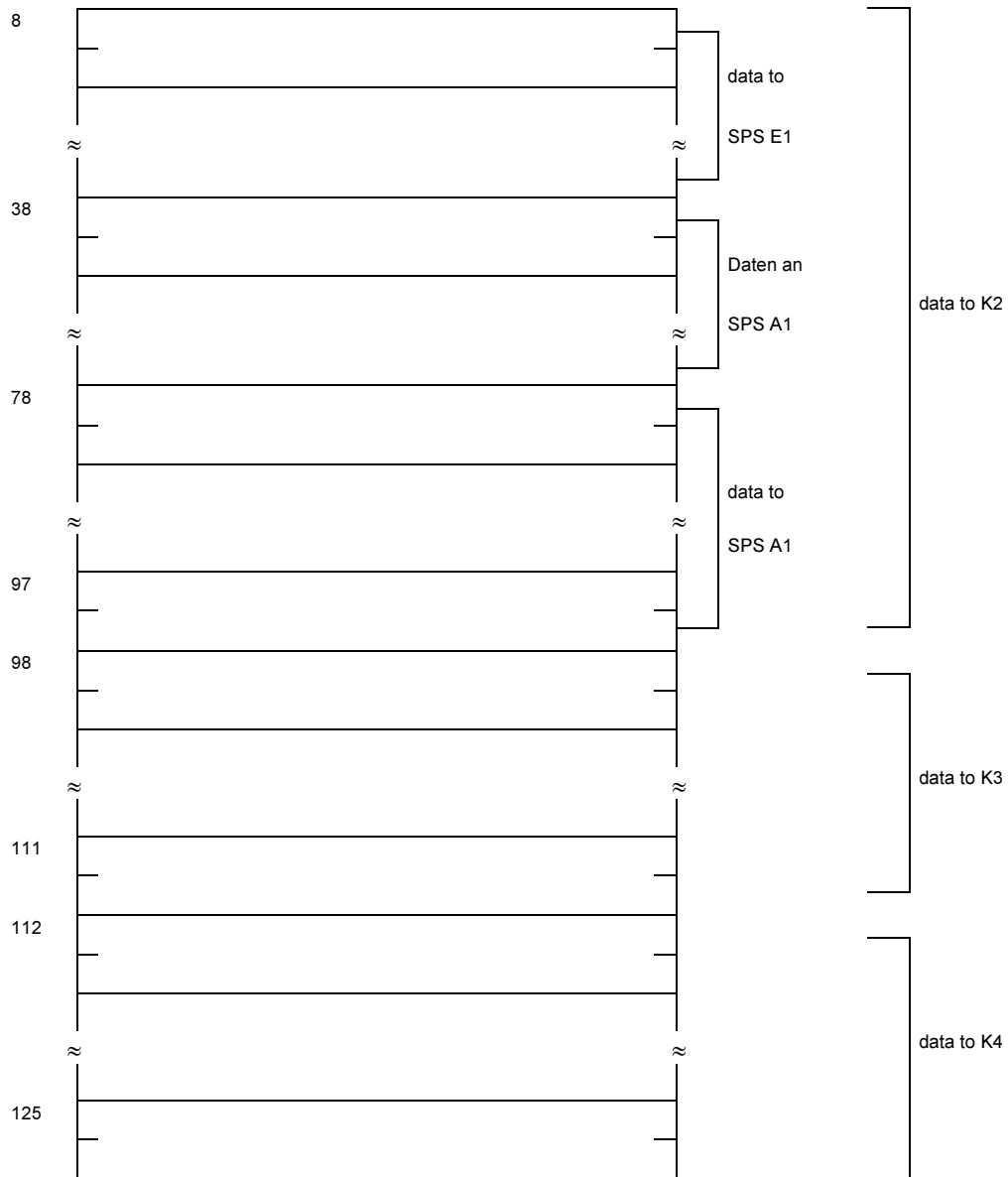
C.3. Message Structure

C.3.1. Image in Signaling Direction between K1 and K2



1) Multiplexed data, e.g., measured values that change slowly such as temperature, 1st word = address, 2nd word = value.

C.3.2. Image in Command Direction between K1 and K2



D. Appendix: Parameter Documentation

The firmware parameters are subdivided in several areas:

- Spreadsheet parameter
- OPM parameter
- PD form

Spreadsheet parameter:

are not used from this firmware.

OPM parameter:

There the transmission and the receive routing happens, i.e. the allocation of the *non-SAT address* to the SAT address.

PD form:

Following the parameter available in the **PD form** (Parameter dokumentation), are described more detailed.

- The parameters described in the PD form are available for parameterization with the PSR Configuring and Service Computer of a SAT TOOLBOX
 - The PD Form describes
 - all parameters that are available for a given firmware and as of which firmware revision they are effective
 - parameter functions and their value ranges
 - This appendix documents the parameters for the firmware set forth in the present document in the shape of a blank form filled with default values
 - The current state of parameters of a firmware of a certain system element can be documented with the PSR Configuring and Service Computer of a SAT TOOLBOX

Parameterizing with PD forms is supported by SAT TOOLBOX II (PSR II).

REVISION - PARAMETER DOCUMENTATION FORM

created		last changed		released	
on	by	on	by	on	by
12-11-01	SW-AUT/HPH	31-01-02	SW-AUT/HPH	11-12-02	SW-AUT/HPH

PHYSICAL INTERFACE

Baud rate:

Possible: 50, 75, 100, 110, 134.5, 150, 200, 300, 600, 1050, 1200,
1800, 2000, 2400, 4800, 9600, 19200

Transm. baud rate: 9600 bd

CT command: SPS 000(/D)

Recept. baud rate: 9600 bd

CT command: SPS 001(/D)

Byte frame:

The byte frame is adjustable!

Number of data bits: 00=5 bits; 01=6 bits; 10=7 bits; 11=8 bits
 Number of stop bits: 00=1 bit; 01=1.5 bits; 10=2 bits; 11=invalid
 Parity: 00=no parity; 01=even parity; 10=odd parity; 11=invalid

Number of data bits: 8bits CT command: SPL 02 /03(/B)

Number of stop bits: 1 bit CT command: SPL 02 /0C(/B)

Parity: even parity CT command: SPL 02 /30(/B)

=====

F u r t h e r P a r a m e t e r s

=====

MONITORING TIMES

Times: 0-32767[ms]; 0-4095[bit]

Time base: 0=bit; 1=ms

CAUTION! Times parameterized in "bit" depend on
the set baud rate!

Expected acknowledgement time (tq,tqv):

The expected acknowledgement time is started upon the transmission of STX
and stopped after the receipt of DLE (DLE after data).

Possible : 1 - 65535 (* 100 ms)

Current value : 2,0 sec

CT command: SPS 038(/D)

The expected acknowledgement time tq is used to monitor the reaction message
(only in receive direction).

The expected acknowledgement time is started upon the receipt of STX and stopped
upon the receipt of the data message.

Possible : 1 - 65535 (* 100 ms)

Current value : 2,0 sec

CT command: SPS 039(/D)

Empfangstimeout:

Wenn von der Gegenstelle keine Datentelegramme empfangene werden, dann
kommt es zum Ablauf dieser Zeit.

Möglich: 0 = keine Überwachung

1 - 25 (n * 1sec)

Empfangstimeout: 60 [sec] CT command: SPL 011 (/D)

Character Monitoring Time: (Message Interruption Monitoring)

Maximum pause between consecutive bytes of a message. Once a message interruption has been detected, the idle monitoring time will be started.

Character monitoring time: 100 [bit] CT command: SPS 00F/7FFF (/D)
Time base: bit CT command: SPS 00F/8000 (/D)

Idle Monitoring Time: (Monitoring of Idle State of the Line)

Following transmission faults or message interruptions, the line is monitored for its idle state. Once this monitoring time elapses, the "resynchronization of the receiver" will be carried out.

Idle monitoring time: 100 [bit] CT command: SPS 00E/7FFF (/D)
Time base: bit CT command: SPS 00E/8000 (/D)

TRANSMISSION CYCLE TIME

Here the transmission cycle time can be configured.

Possible : 1 - 255 (* 100 ms)
Current value : 0,6 sec CT command: SPL 03C (/D)

MESSAGE REPETITIONS (NUMBER OF RETRIES)

The number of the maximum message repetitions (retries) which have to be carried out can be set.

Possible: 0-255

Retries for data messages: 2 CT command: SPL 008 (/D)

COMMUNINATION-TYPE

With this parameter it is possible to run the protocol in master or slave mode.

possible: 0 = 3964R Master
1 = 3964R Slave

Current value: 3964R Master CT command: SPH 03A/80 (/B)

HEADEROFFSET

TESTPARAMETER: Number of words of header can be parametrized

Possible: 0-255

Headeroffset in transmit direction: 0 PT-Befehl: SPL 03B (/D)

Headeroffset in receive direction: 0 PT-Befehl: SPH 03B (/D)