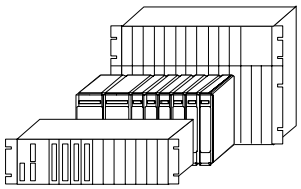
Ax 1703



Firmware Description

UMPS00

IEC 60870-5-101 Multi-point traffic Slave

HW-Type: 2541 / FW-Type: 2507

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

UMPS00	Rev. 07 and higher

Version	Revision	Date	Change
A, 1	05	09.01.02	first issue in English
A, 1	06	11.07.03	Parameterdocumentation revised
A, 1	07	21.07.04	Parameterdocumentation and Diagnoses revised
A, 1	08	28.09.05	Chap. 2.2. Master/Standby Function, Parameterdocumentation and Diagnoses revised

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09.01.02	SW-AUT/POM	28.09.05	SW-AUT/POM	28.09.05	SW-AUT/POM

Table of Contents

1. System Overview

1.1. Short Description

The UMPS00 firmware is used for the serial coupling of two Ax 1703 components in accordance with IEC 870-5-101.

The functions supported by IEC 870-5-101 are laid down in the interoperability list of Ax 1703.

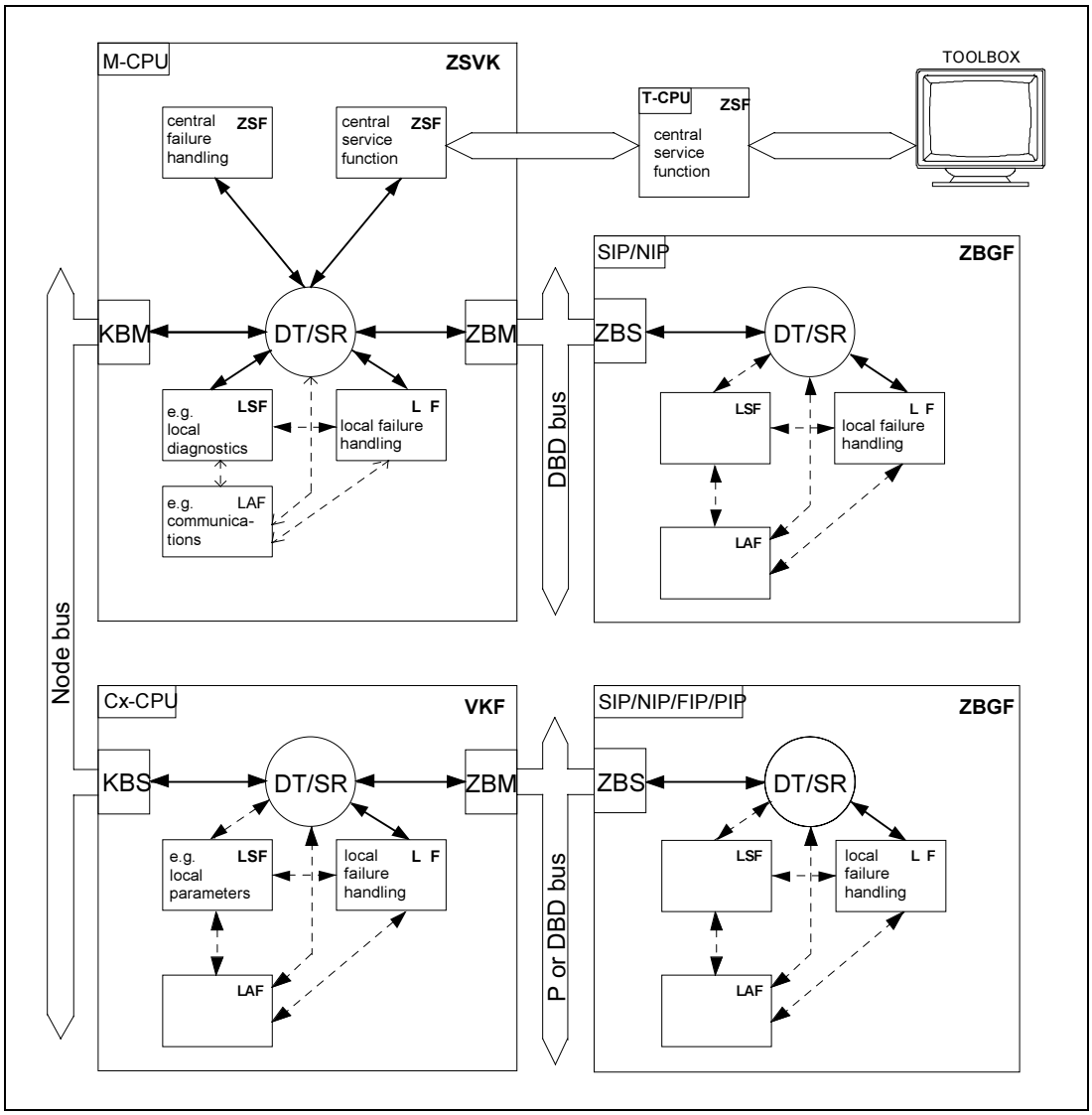
The message formats used correspond to the IEC 870-5-101 standard and the Ax 1703 Data Formats description.

The data communication control used for this firmware is an unbalanced secondary multi-point traffic slave.

1.2. Interfaces

The data exchange to the KOM is done via messages in the Ax 1703 format.

1.3. Embedding in the Environment



2. Protocol-specific Functions

2.1. Interface Fault

After an interface fault has been detected, a communications fault is signalled (if parameterized) and all further data which are presented for the master station by the BSE are acknowledged negatively.

2.2. Master/Standby Function

This function is supported from revision 21.

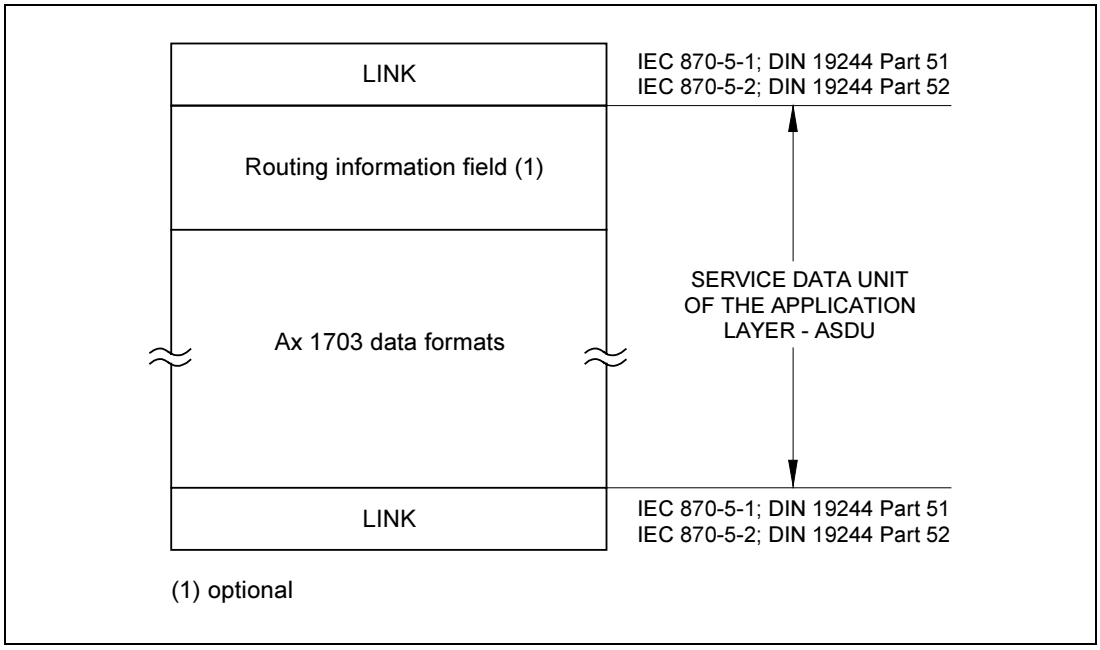
2.3. Routing (Repeater Functionality)

2.3.1. Basic Structure of the Application Data

In the "Ax-1703 Data Block Formats" document the structures of the application data (data model) which are needed for the telecontrol technology are extensively described.
Within the area of freedom of the protocol, selections must be made from this description for the application case at hand.
Over and above this, these selections must be made more precise by definitions in order to produce the compatibility.

In a compatible message (Link Protocol Data Unit: LPDU) basically only one PROTOCOL DATA UNIT OF THE APPLICATION LAYER (Application Protocol Data Unit: APDU) is transmitted.

A SERVICE DATA UNIT OF THE APPLICATION LAYER (ASDU) consists of the ROUTING INFORMATION (optional) and one or more data block formats which are external to Ax 1703.



Structure of a service data unit of the application layer - ASDU

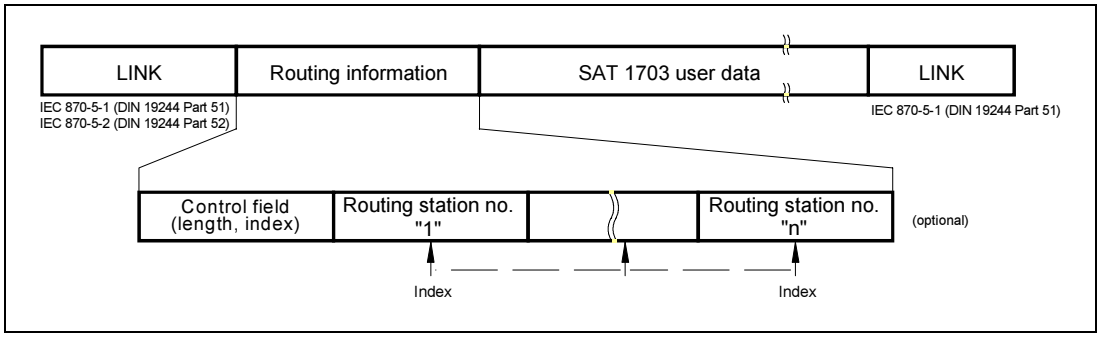
2.3.2. Description of the Routing Method

RTUs which cannot be directly reached by the central station due to the geographical conditions or the too low maximum possible transmission power of the radio equipment are interfaced via so-called "data relay stations" (routing stations).

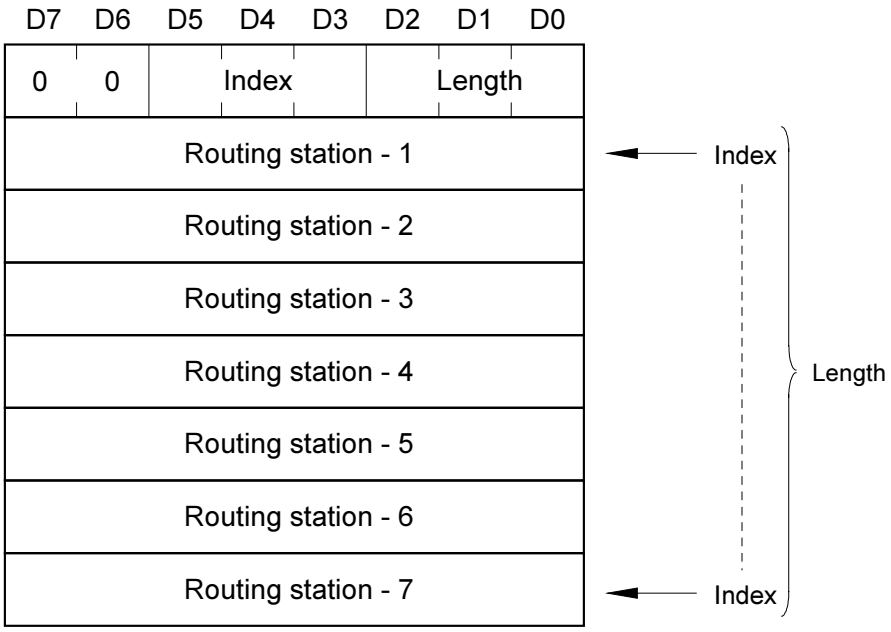
"Data relay stations" are stations which are used only for communications in repeater operation and which are not equipped with any local peripherals. For this, normal RTUs can likewise serve as "data relay stations".

"Data relay stations " can likewise be retrofitted with local peripherals and thus be used as normal RTUs if required.

The routing information describes the route via which "data relay stations" (intermediate stations) the RTUs can be reached by the central station.
The routing information is co-transmitted for each message addressed to a selected station which cannot be reached directly by the central station. The destination number is transmitted in the "LINK" (IEC 870-5-2).



Routing information in the message



Length ... Number of routing stations entered
- With the "optimized routing procedure" the length of the routing field is managed dynamically, i.e. only those routing stations which are actually needed are entered into the routing field.
- With the "non-optimized routing procedure" the routing field is always transmitted with the maximum length (8 bytes).
  However, only the actual number of fields used for routing stations is to be entered into the routing field. The unused routing fields are initialized with "FF".

Index ... Details about the routing fields which have already been dealt with.

Routing information field

Received messages are - after complete receipt - immediately sent out again by "data relay stations" if - based on the "routing information" (in the message) - they are intended for transmission onwards.

Messages received from stations which are not intended as the "final location" (= addressed RTU) or "data relay station" (station is not - or not yet - provided for in the routing information of the message) are not handled further.

The received routing information for the reply message which is to be sent out is entered in reverse order by the addressed "final location". In this way, the reply message is transmitted across the network via the route preset by the central station.

In repeater operation, stations can be reached by the "routing method" used via a maximum of 7 "data relay stations" (routing stations).

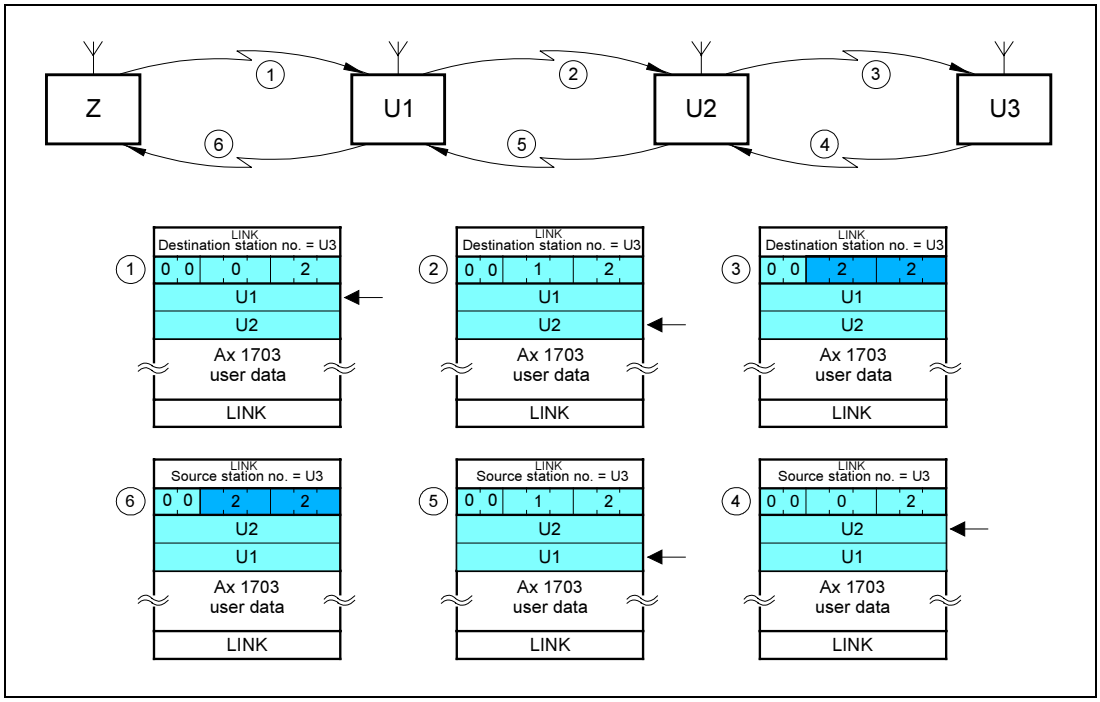
The configuration of routing information is not necessary for stations which can be reached directly by the central station.

Optimized Routing Method:

With the "optimized routing method for repeater operation" the routing information is managed "dynamically" in messages.

Calls to stations which can be directly reached by the central station do not contain *any* routing information (= Message format with fixed block length). Such stations - if no data are to be transmitted - reply with a single character or a short acknowledgement (no routing information in the message). User data are transmitted with the "message format variable block length" and a "0 routing information".

Calls to stations which cannot be reached directly by the central station contain only the necessary routing information (message format with variable block length). Such stations - if no data are to be transmitted - reply with an acknowledgement message and the required routing information (message format with variable block length). User data are generally transmitted with the "message format with variable block length" and the required routing information.

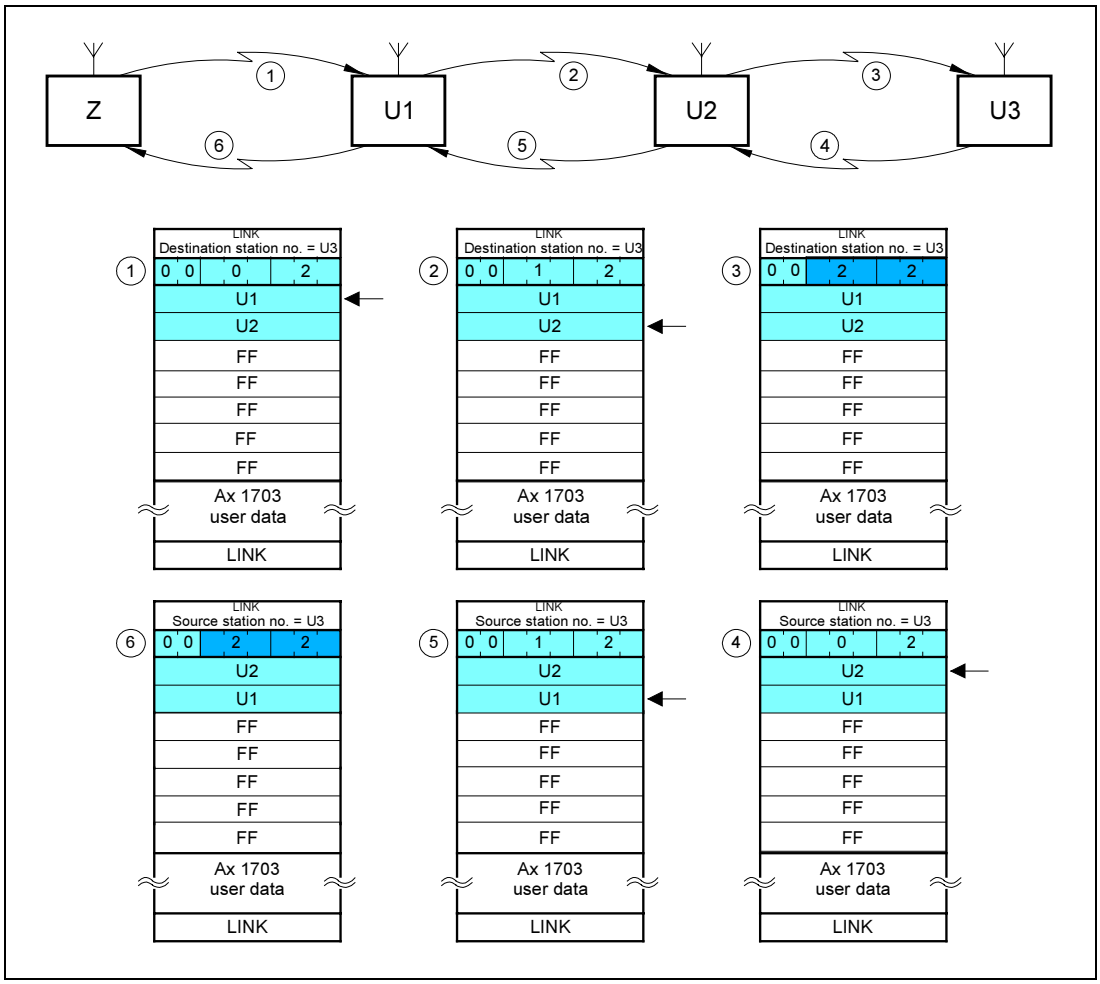


Example of the management of the routing information for 2 intermediate stations (routing stations) "Optimized routing method "

Non-optimized Routing Method:

With the "non-optimized routing method" the routing information in messages is managed "statically".

In messages with a fixed block length, the routing information is always present at its maximum length in messages with fixed/variable block length.
I.e. Calls/acknowledgements are generally transmitted with the "message format with fixed block length" and user data with the "message format with variable block length".
Single characters are not used.



Example of the management of the routing information for 2 intermediate stations (routing stations) "Non-optimized routing method "

2.3.3. Radio Circuit Identification

When using the same radio frequencies in different, locally and geographically separate regions, an RTU could receive station interrogations or even commands from a "foreign" central station due to "overreachings in radio traffic".

Similarly with several central stations, undesired plant behaviour caused by overreachings can be excluded by the use of different radio frequencies or a unique station number allocation

If unique station number allocation is not possible, a unique allocation (within the framework of the configuration possibilities) of all stations to their respective "own central station" can be achieved with the help of the "radio circuit identifier".

The radio circuit identifier (1 - 254) can be configured in the central station and in the RTUs.

All messages which contain routing information are sent out from the central station with the configured radio circuit identifier.

Messages are then only assessed by the routing RTUs if the radio circuit identifier contained in the message agrees with the configured one.
In this way, messages from "foreign central stations" which are received due to "overreachings in radio traffic" are not assessed.
In addition, messages received by the central station from "other radio regions" are likewise not assessed.

2.4. Failure Monitoring

2.4.1. Transmission Time Limitation

In order that RTUs or radio devices which are impaired in their function do not lead to a "blocking of the transmission section", the radio devices employed are fitted with a maximum transmission time limiter. This device switches the radio device off after a settable maximum time. After this protection device has been triggered in a fault event, the interrogation cycle to the remaining stations can be continued by the central station.

2.4.2. Failure Monitoring in the RTU

The failure of the central station can be detected in the RTU by the "call monitoring" function. If an RTU detects a failure of the central station, an interface fault is displayed.

2.5. Time Synchronization

Due to the restrictions in the available radio frequencies and the employment often of several intermediately connected intelligent relay stations, significantly longer total transmission times partly result. The disadvantage which results from the heavily delayed arrival of information for the logging and fault analysis should be compensated for by time tagging of the events in the medium voltage substation (= RTU). The keeping of a realtime clock which is required in each case for time tagging must often - for cost reasons and often bad receiving locations - be done without a decentralized DCF77 time character receiver. With this there is, above all, a control technology problem because, regarding one RTU there are at least two parallel paths each with up to 6 control circuits which are connected one after the other whose deviations compensate or total differently dynamically and so diverge from one another. In connection with continuous switching between the redundant transmission routes which is desirable for monitoring reasons, with regard to the synchronization of these RTUs, contradictory inputs arise about in which the direction the clock should be moved. Hard setting to the last time in each case is not possible as, due to such time jumpbacks, the sequence of the acquired events is confused and a precise analysis of the course of the process can be made impossible.

2.5.1. Time Setting

CAUTION: Time synchronization of the central station by the RTU is not possible.

It is generally the case that a time setting of the RTU is always received in the same minute in which the message was sent out by the central station. During a time setting procedure, binary information changes in the RTU are forwarded to the central station for several minutes with the "old time".

The time setting message is also used for time synchronizing.

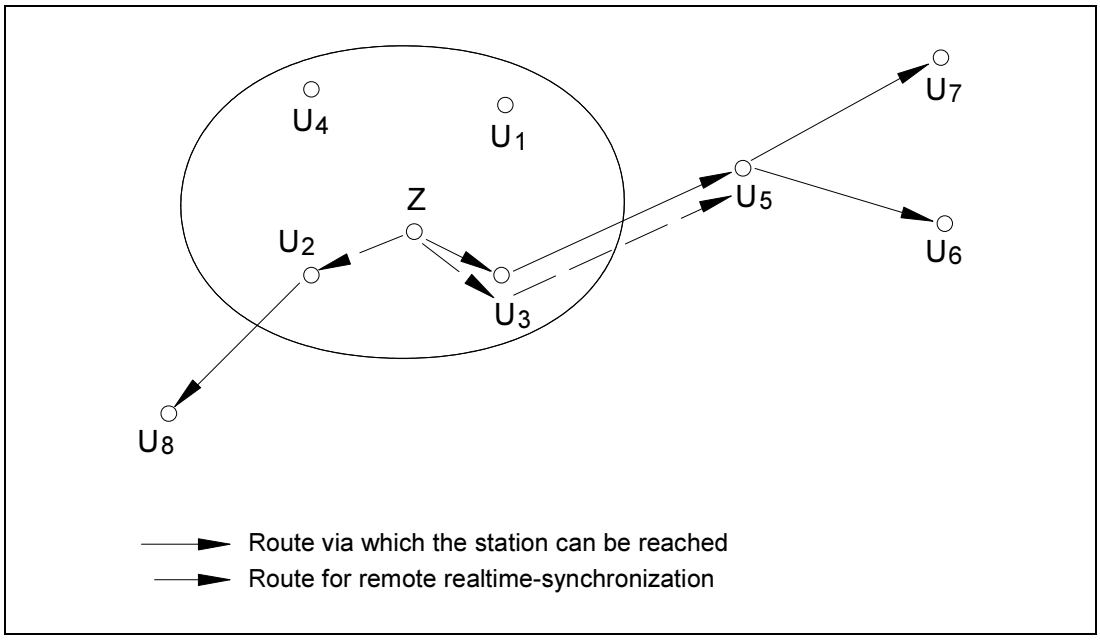
If lower precision of the realtime data is sufficient, the synchronization of the RTUs can also take place via the serial communications line.
Due to the method used for time synchronization, a precision of $\pm$ 10 ms is achieved for the RTUs of the 1st hierarchy level - these are all those stations which can be reached directly by the central station. For RTUs which can only be reached via relay stations, a maximum precision of only $\pm$ 20 ms and an additional 10 ms for each intermediate relay station is achieved.

Due the quartz clocks which are used (Accuracy: 10^{-4}) there is a maximum deviation of 360 ms/h or 6 ms/min.

The resulting maximum deviations arise due to the "minute time synchronization" which cannot be guaranteed to be carried out chronologically.
With an average number of stations and corresponding configuration, at baud rates above 600 Bd a remote synchronization can be carried out about every 2 - 3 minutes.

So that, for a time synchronization, the station interrogation and the time synchronization can be carried out in an appropriate period of time, an optimised time synchronization cycle has been included.
In this cycle, a processing list is created in the start-up phase by the SIP which contains those stations with which the entire network can be remotely realtime-synchronized.

E.g.



In this special case, a time synchronization is sent to stations U_6 and U_8.
Stations U_6 and U_7 can be reached via U_3 and U_5.

The time synchronization message contains the station number for BROADCAST (= 255). In this way, each station which receives the message accepts the data which is contained in it. The EZF5 to stations U_6 and U_7 contains the route via U_3 and U_5. As a result, the stations U_1, U_2, U_3, U_4, U_5, U_6 and U_7 are automatically remotely synchronized.

Initiation time: If there is more than one station in the processing list, the initiation time is defined fixed at 15 seconds.
For only one station or no stations (there are no stations outside the first hierarchy level) the initiation time is calculated on the SIP so as to be as accurate as possible for the minutes pulse.

For the time synchronization, on transmission each data relay station corrects the time information by the times which it knows (e.g. set-up time, message run time, internal processing times).
In addition, a global parameter "Signal runtime per radio device (radio transmitter/receiver)" can be configured in the central station. This correction factor is likewise co-transmitted during the remote realtime-synchronization and is used for correcting the time information on re-transmittal.
By this method, all stations which serve as a "relay station" in a station interrogation are likewise time synchronized.

For the "fine setting" of the time synchronization, a correction time can be directly set in the RTU.

The line delay time with the help of the IEC 870-5-5 function " Acquisition of the message runtime" (Type identifier 106) is not carried out.

2.6. Transmission Device

(Valid as from UMPS00, Rev. 004)

As from Rev. 004 it is possible to use a transmission device with preset time; the use of a "user setting" is also possible.

Default times:

Transmission medium	Operating mode	RTS fixed	tp	tv	tn	tdis	DCD	t-bounce	t-stab	t-duration	t-delay	
4-wire	RS-232	NO	0	30	3 bit	0	NO	0	0	0	0	
2-wire	RS-232	NO	0	30	3 bit	35	YES	5	5	10000	200	
DMS 1)	RS-232	NO	0	1 Bit	5 bit	0	NO	0	0	0	0	
DMS 2)	RS-232	NO	0	50	5 bit	35	YES	5	5	10000	200	
OPTICAL	RS-232	NO	0	1	0	0	NO	0	0	0	0	
RADIO - Digital	RS-232	NO	30	100	11 bit	50	YES	10	5	0	200	
RADIO - Analog	RS-232	NO	50	300	50	100	YES	10	5	0	200	
Direct conn.	RS-485	NO	0	1	0	0	NO	0	0	0	0	
DLC modem	RS-232	NO	0	1 Bit	1 bit	0	NO	0	0	0	0	3)
4-wire SAT CE701	RS-232	NO	0	55	3 bit	0	NO	0	0	0	0	4)
2-wire SAT CE701	RS-232	NO	22	30	3 bit	0	YES	5	5	10000	200	4)

All times are n*1 ms.

1) DMS in ring configuration.
2) DMS with WT in ring configuration.
3) As from UMPS00, Rev. 007
4) As from UMPS00, Rev. 009

A. Appendix: Diagnostic

A.1. ClassInternal

ClassInternal - Record 0 : Internal error in the operating system

Bit	Description
00	RAM error
01	STACK error The defined stack range has been exceeded; Replace system element or notify SAT.
02	Firmware shut down Diagnosis: - Read out system diagnostic ring (command ID R) in ST emulation (possibly store to file)
03	Too little free space There is not enough free RAM memory available for the dynamic memory management; Diagnosis: - Change parameterization of size definitions (e.g. realtime rings, pool size) - Notify SAT.
08	CPU 80186 error Occurs on an internal software error.

ClassInternal - Record 2 : Parameter error ZSE

Bit	Description
00	Parameter error detected by SIP
01	Parameter error of the LOCAL parameter block no. 06
02	Parameter error ZSE general
05	Invalid Parameters for IEC870 link-layer
06	Invalid Parameters for IEC870 application layer

ClassInternal - Record 3 : ZSE format conversion error

Bit	Description
00	Format conversion error in the transmit direction
02	Format conversion error in the receive direction

Bit	Description
15	Conversion error in PST-controll-messages Diagnosis: - Read out system diagnostics ring (command ID R) in ST emulation and notify SAT (possibly store to file)

ClassInternal - Record 4 : Invalid Parameters for protocol specific application layer

Bit	Description
01	Invalid Parameters for master co-ordination or routing function

A.2. ClassCommunication

ClassCommunication - Record 2 : Communication error

Bit	Description
00	Communication failure to the master

A.3. ClassTest

ClassTest - Record 0 : Test mode of the operating and base systems

Bit	Description
00	Memory test disabled

B. Appendix: Bibliography

The following documents are recommended to supplement the " UMPS00" description:

IEC 870-5-1, "Transmission Frame Formats"
(1st issue, February 1990)

DIN EN 60870-5-101 "Fernwirkeinrichtungen und Fernwirksysteme" [Telecommunications equipment and telecommunications systems]
Part 5: Transmission protocol
Main section 101: Application-related standards for basic telecommunications tasks
(IEC 870-5-101: 1995) German version EN 870-5-101: 1995

DIN EN 60870-5-5 "Fernwirkeinrichtungen und Fernwirksysteme" [Telecommunications equipment and telecommunications systems]
Part 5: Transmission protocol
Main section 5: Fundamental application functions
(IEC 870-5-5: 1995) German version EN 870-5-5: 1995

SAT Description: "Ax 1703 Data Formats"
Item number: MA0-000-x.xx

SAT Description: "IEC 60870-5-101 and 104 Interoperability"
Item number: DA0-040-x.xx

DIN 19244 "Fernwirkeinrichtungen und Fernwirksysteme" [Telecommunications equipment and telecommunications systems]
Part 10: Message Formats

DIN 19244 "Fernwirkeinrichtungen und Fernwirksysteme" [Telecommunications equipment and telecommunications systems]
Part 52: Transmission Procedures of the Connection Layer

DIN 19244 "Fernwirkeinrichtungen und Fernwirksysteme" [Telecommunications equipment and telecommunications systems]
Part 53: Transmission Protocol
Main section 3: General Structure of the Application Data

C. Appendix: Parameter Documentation

C.1. Common settings

Parameter	Description	Values/Ranges
Address of the link	Address of the link	Integer [#####] 0 to 65535
baud rate receiver	baud rate in receive direction	[50] 50 [Bd] [75] 75 [Bd] [100] 100 [Bd] [110] 110 [Bd] [134] 134,5 [Bd] [150] 150 [Bd] [200] 200 [Bd] [300] 300 [Bd] [600] 600 [Bd] [1050] 1050 [Bd] [1200] 1200 [Bd] [1800] 1800 [Bd] [2000] 2000 [Bd] [2400] 2400 [Bd] [4800] 4800 [Bd] [9600] 9600 [Bd] [19200] 19200 [Bd] [38400] 38400 [Bd] [56000] 56000 [Bd] [57600] 57600 [Bd] [64000] 64000 [Bd]
baud rate transmitter	baud rate in transmit direction	[50] 50 [Bd] [75] 75 [Bd] [100] 100 [Bd] [110] 110 [Bd] [134] 134,5 [Bd] [150] 150 [Bd] [200] 200 [Bd] [300] 300 [Bd] [600] 600 [Bd] [1050] 1050 [Bd] [1200] 1200 [Bd] [1800] 1800 [Bd] [2000] 2000 [Bd] [2400] 2400 [Bd] [4800] 4800 [Bd] [9600] 9600 [Bd] [19200] 19200 [Bd] [38400] 38400 [Bd] [56000] 56000 [Bd] [57600] 57600 [Bd] [64000] 64000 [Bd]
interface modem	Selection of the interface modem. Most of the parameters for the predefined interface modems are standardized and not changeable.	[0] free defineable [1] SAT Modem "4-wire circuit transmission line" (SAT-VFM,-WT,-WTK,-WTK-S,-

Parameter	Description	Values/Ranges
		CE0700) [2] SAT Modem "2-wire circuit transmission line" (SAT-VFM,-WT,-WTK,-WTK-S,-CE0700) [3] SAT-DMS (ring configuration) [4] SAT-DMS (ring configuration; AU remote via WT) [5] OPTICAL or SATTELLINE 2ASxE time-slot radio modem [6] radio digital [7] radio analogue [8] NULL-Modem interface (RS-485) [9] SAT-DLC-Modem (CE0740,-CE0741,-CE0742,-LA0740,-LA0741) [10] SAT Modem "4-wire circuit transmission line" (SAT-CE0701) [11] SAT Modem "2-wire circuit transmission line" (SAT-CE0701) [15] NULL-Modem interface (RS-232)

C.2. Common settings | SAT-DLC-Modem

SAT-DLC-Modem

Parameter	Description	Values/Ranges
DIP switch S1/1	The internal Baudrate at the DLC-Modem must be parametrized via DIP-Switches direct at the DLC-Modem and must accord to this parametrization.	[0] OFF [1] ON
DIP switch S1/2	The internal Baudrate at the DLC-Modem must be parametrized via DIP-Switches direct at the DLC-Modem and must accord to this parametrization.	[0] OFF [1] ON
DIP switch S1/3	The internal Baudrate at the DLC-Modem must be parametrized via DIP-Switches direct at the DLC-Modem and must accord to this parametrization.	[0] OFF [1] ON
DIP switch S1/4	The internal Baudrate at the DLC-Modem must be parametrized via DIP-Switches direct at the DLC-Modem and must accord to this parametrization.	[0] OFF [1] ON
frequency range		[0] 10-30kHz [1] 30-90kHz

C.3. Common settings | free defineable transmission facility

Free defineable transmission facility

Parameter	Description	Values/Ranges
DCD handling	DCD signal handling. DCD can be used for message synchronization in receive direction.	[0] disabled [1] enabled
Transmission delay if countinous level (tcldly)	If continous level is detected on the line, the next message will be sent after transmission delay.	Float [####.#] 0.1 to 6553.5 [s] 0 [s]
asynchron/isochron	asynchronous (V.24/V.28, 16 x receive-/transmit clock) or isochron (X.24/X.27 1 x receive-/transmit clock)	[0] asynchronous "V.24/V.28" (16 x bit clock) [1] Isochron "X.24/X.27" (1x bit clock)
bounce suppression time (tbounce)	State of DCD signal will be used after bounce suppression time (tbounce).	Integer [#####] 0 to 65535 [ms]
continuous level monitoring time (tcl)	continuous level monitoring time (tcl)	Float [####.#] 0.1 to 6553.5 [s] 0 [s]
disable time "time base" (tdis)	Parametrized times in bits depend on the the baudrate!	[0] Bit [1] ms
disable time (tdis)	disable time of the receiver after a received message. Note: Used for suppressing of bad characters during carrier switching.	Integer [#####] 0 to 32767 [ms / Bit]
electrical interface	electrical interface	[0] RS232 (V.24/V.28) [1] RS422 (V.11) [2] RS485 (V.11)
pause time "time base" (tp)	Parametrized times in bits depend on the the baudrate!	[0] Bit [1] ms
pause time (tp)	Before a message transmission the set pause time is waited before switching on the transmit carrier (RTS).	Integer [#####] 0 to 32767 [ms / Bit]
run-out time "time base" (tn)	Parametrized times in bits depend on the the baudrate!	[0] Bit [1] ms
run-out time (tn)	After message transmission, the transmit carrier (RTS) is switched off after run-out time.	Integer [#####] 0 to 32767 [ms / Bit]
set up time "time base" (tv)	Parametrized times in bits depend on the the baudrate!	[0] Bit [1] ms
set up time (tv)	After switching the carrier to ON (RTS) the message transmission is started after set up time. Note: If "tv=0" no carrier switching is used (RTS=OFF)!	Integer [#####] 0 to 32767 [ms / Bit]
source for receive-/transmit clock (only for "Isochronous")	Source for receive-/transmit clock (only for "Isochronous"). Either external (from RXC-input) or intern (at TXC-output)	[0] extern (bit clock from RXC input) [1] internal (bit clock at the TXC-output)
stability monitoring time (tstab)	stability monitoring time (tstab). The "new" DCD state is utilized after stability monitoring time (DCD can be used for message synchronization).	Integer [#####] 0 to 65535 [ms]

C.4. Redundancy

Parameter	Description	Values/Ranges
Delay time passive=>active	delay time in case of switch over from PASSIVE=>ACTIVE (0 = without delay)	Integer [####] 0 to 2000 [s]
operation if passive	operation if passive	[0] transmitter "tristate", listening mode [1] transmitter "active", listening mode [3] transmitter "active", normal operation

C.5. Advanced parameters

Parameter	Description	Values/Ranges
Repeater function (Routing)	Enabling of the routing function	[0] disabled [1] enabled
radio area identifier/master number	Radio area identifier/Master number is used for coordination of serval masters or optionaly in relay operation mode. 0= no radio area identifier/Master number.	Integer [###] 0 1 to 255

C.6. Advanced parameters | IEC 60870-5-101

IEC 60870-5-101

Parameter	Description	Values/Ranges
ACTCON +/- emulation	Emulation of ACTCON- if unknown CASDU; ACTCON+ for <TI=100,101> if CASDU is present or FFFF; ACTCON+ for <TI=103> if CASDU FFFF	[0] disabled [1] enabled
ACTCON emulation	Emulation of ACTCON for commands received via serial interface on PRE (TI 45, TI46, TI47). Not necessary for ACP 1703, or if this function is supported by BSE.	[0] NO [1] YES
ACTCON for clock sychronization command	ACTCON for clock sychronization command	[0] no send [1] send immediately [2] send to minute change [3] send immediately and ignore
Acknowledgement IEC60870-5-2		[0] single character E5 [1] fixed lenght telegram ACK
Address field of the link (number)	Number of octets for address field of the link	[1] 1 octet [2] 2 octet
GI command "broadcast"	General interrogation commands received via serial interface will be sent with CASDU=FFFF (= broadcast) to BSE.	[0] NO [1] YES

Parameter	Description	Values/Ranges
Monitoring time for GI-data		Integer [###] 0 to 255 [s]
message synchronization	Mode-A: Multiple byte noise strings such as 68,X,Y with no gaps between bytes: Where X . Y the receiver must discard the 68 and continue to check from the X byte for the start of a valid IEC frame.	[0] after 33 bit idle (IEC 60870-5-1) [1] mode-A (68 xx yy)
originator address in transmit direction = 0	All telegrams sent via serial interface are sent with originator address = 0.	[0] NO [1] YES
prioritization of data		[0] class 2 [1] class 1,2
prioritization of data (GI-data)		[0] class 2 [1] class 1

C.7. Advanced parameters | IEC 60870-5-101 | time tag

Time tag

Parameter	Description	Values/Ranges
Day of week (DOW) = 0	day of week DOW = 0 for all telegrams with time tag in transmit direction.	[0] NO [1] YES
summer-time bit (SU) = 0	summer-time bit SU = 0 for all telegrams with time tag in transmit direction.	[0] NO [1] YES

C.8. Advanced parameters | Repeater function (Routing)

Repeater function (Routing)

Parameter	Description	Values/Ranges
routing procedure	With the dynamic routing procedure only the used routing information will be included in the message. With the static routing procedure the total routing information will be included in the message.	[0] Dynamically [1] Statically

C.9. Advanced parameters | Software test points

Software test points

Parameter	Description	Values/Ranges
Handshake RTS,GPB (ASCII-Mode)	The change of this parameter required profoundness communication knowledge. A specialist should be contacted before.	[0] NO [1] YES
Handshake RTS,GPB (HEX-Mode)	The change of this parameter required profoundness communication knowledge. A specialist should be	[0] NO [1] YES

Parameter	Description	Values/Ranges
	contacted before.	
Init-end processing	The change of this parameter required profoundness communication knowledge. A specialist should be contacted before.	[0] NO [1] YES
ZDT-filter	The change of this parameter required profoundness communication knowledge. A specialist should be contacted before.	[0] NO [1] YES
correction time of the time synchr.	The change of this parameter required profoundness communication knowledge. A specialist should be contacted before.	[0] NO [1] YES
data and acknowledgement between BSE	The change of this parameter required profoundness communication knowledge. A specialist should be contacted before.	[0] NO [1] YES
flow control for time-slot radio modem		[0] NO [1] YES
level locking station locking	The change of this parameter required profoundness communication knowledge. A specialist should be contacted before.	[0] NO [1] YES
mask for blocking data pick-up	The change of this parameter required profoundness communication knowledge. A specialist should be contacted before.	[0] NO [1] YES
master-standby switchover	The change of this parameter required profoundness communication knowledge. A specialist should be contacted before.	[0] NO [1] YES
stop_serialtest_after_comm_error	The change of this parameter required profoundness communication knowledge. A specialist should be contacted before.	[0] NO [1] YES

C.10. Advanced parameters | monitoring times

Monitoring times

Parameter	Description	Values/Ranges
Character monitoring time	Maximum possible gap between sequential bytes of a message in receive direction. If a gap is detected, the message is ignored and the idle monitoring time will be started.	Integer [#####] 0 to 32767 [ms / Bit]
Character monitoring time "time base"	Parametrized times in bits depend on the the baudrate!	[0] Bit [1] ms
call monitoring time	If the station call monitoring time expires (SLAVE is no longer called from the MASTER), a failure of the interface is signalled.	Integer [#####] 0 to 65535 [s]
call timeout retrigger	This message is transmitted from the MASTER in the phase of initiation only. With it a possibly communication error in the Slave is reset only, if a message from the Slave is responsed by the MASTER.	[0] YES [1] NO [255] NO

Parameter	Description	Values/Ranges
idle monitoring time	After communication errors,the line is monitored for quiescent state. After expiry of this monitoring time, the resynchronisation of the receiver takes place. By using the DCD input, faster resynchronisation can be achieved.	Integer [#####] 0 to 32767 [ms / Bit]
idle monitoring time "time base"	Parametrized times in bits depend on the the baudrate!	[0] Bit [1] ms