POINT OF CARE
TESTING

OMNILINK

Interface Description

Roche

Roche Diagnostics GmbH
D-68298 Mannheim / Germany
www.roche.com

Copyright © 2003 Roche Diagnostics GmbH, all rights reserved

Der Inhalt dieser Publikation darf ohne vorherige schriftliche Zustimmung von Roche Diagnostics weder ganz noch teilweise in irgendeiner Form reproduziert oder an dritte Personen weitergegeben werden. Die Erstellung dieser Publikation wurde mit der nötigen Sorgfalt durchgeführt, sodass für verbleibende Fehler oder Auslassungen sowie für dadurch eventuell entstehende Schäden von Roche Diagnostics keine Haftung übernommen wird. Änderungen vorbehalten.

Rev. 2.0, Oktober 2003

Erstausgabe: Jänner 2003

Copyright © 2003 Roche Diagnostics GmbH, all rights reserved

The contents of this document may not be reproduced in any form or communicated to any third party without the prior written consent of Roche Diagnostics. While every effort is made to ensure its correctness, Roche Diagnostics assumes no responsibility for errors or omissions which may appear in this document. Subject to change without notice.

Rev. 2.0, October 2003

First edition: January 2003

Table of Contents

1. Introduction & General Information 5
2. Message Structure 5
2.1 Explanation 5
2.1.1 Delimiters 6
2.1.2 Null values 7
2.1.3 Record Termination 7
2.2 Header Record 7
2.3 Patient Information Record 9
2.4 Request Record 12
2.5 Test Order Record 13
2.6 Result Record 15
2.7 Comment Record 17
2.8 Message Terminator Record 18
2.9 Note 19
3. Low Level Protocols 19
3.1 TCP/IP Connection 19
3.2 Serial Connection 19
3.2.1 Restricted Characters 20
3.2.2 Control Characters 20
3.2.3 Communication Phases 20
3.2.4 Error Recovery 24
3.2.5 Time-outs 24
3.2.6 State Diagram 25
4. Data Examples 26
4.1 Measurement Report 26
4.2 QC Report 27
4.3 Patient Query 27
5. APPENDIX 29
5.1 TCP/IP Connection Settings 29
5.2 Serial Connection Settings 31
5.3 Record Termination Settings 37

1. Introduction & General Information

The OMNILINK host communication is based upon the ASTM standard E1394, but is not a complete implementation of the standard. The actual implementation of the data transfer is described below.

Data can be transmitted via TCP/IP (following ASTM E1394) as well as via serial connection (following ASTM E1394 and E1381). For a description of the low level protocols used, please see Low Level Protocols, page 19. For information of setting up the connection, please see the APPENDIX, as well as the OMNILINK Instructions for Use.

2. Message Structure

2.1 Explanation

Each message has a number of records. A *message* is a group of records that begins with a Header Record and ends with a Message Terminator Record. Each record has a number of fields. Each field is by default separated by the vertical bar | character (the actual definition of which character is used for field separation is done with the Header Record). Following is a description of the records and the fields within each record:

ID	Record Types		
H	Header Record	R	Result Record
P	Patient Record	C	Comment Record
Q	Request Record	L	Message Terminator Record
O	Test Order Record		

Note: ***The record type ID is*** *not* ***case sensitive; however, it is suggested to always use uppercase characters.***

2.1.1 Delimiters

Delimiters are ASCII characters used to separate fields within a record and to separate components within fields. Below is a description of the delimiters and how they are commonly used:

Character	Name	Used as:
|	vertical bar	Field delimiter
\	backslash	Repeat delimiter
^	caret	Component delimiter
&	ampersand	Escape delimiter
<CR>	carriage return	Record delimiter (settings dependent)
<CR><LF>	carriage return, line feed	Record delimiter (settings dependent)

2.1.1.1 Field delimiter

Must be defined in the message header and is used to separate adjacent fields. |field|

2.1.1.2 Repeat delimiter

Must be defined in the message header and is used to separate various numbers of descriptors for the same field. E.g. a patient has two phone numbers. |555-5555\444-4444|

2.1.1.3 Component delimiter

Must be defined in the message header and is used to separate data elements within a field that has a hierarchical or qualifier nature. E.g. the components of an address field would be separated.
|street^city^state^zip|

2.1.1.4 Escape delimiter

Must be defined in the message header and is used to identify special case operations within a text field. For example, if text were suppose to be highlighted, the field would be |&H&DoctorsName&N&|. The &H& signifies the beginning of highlighting text and the &N& signifies the start of normal text. For a full description of all possible uses of escape characters, please see the ASTM E1394 standards specification.

The application of the escape delimiter is optional and may be ignored; however, all applications must accept the escape delimiter and use it to correctly parse fields within the record.

2.1.2 Null values

All fields are position dependent and are obtained by counting field delimiters by their position starting from the beginning of the record. This means if a field is null (no information available), the field delimiters must be included in the record. This ensures that the n^{th} field can be identified by counting n-1 delimiters. Trailing null fields do NOT need to be included. Delimiters are not needed after the last field containing data.

Null values may be sent for the following reasons:

- The value is not known.
- The sender knows the field is irrelevant to the receiving system.
- The value has not changed since the last transmission.

A field containing only a pair of double quotes "" should be treated by the receiving system as an instruction to delete any existing contents of that field.

Note: ***The receiving system may ignore any field it does not require. However, fields must always be transmitted in the order specified.***

2.1.3 Record Termination

As an extension to the ASTM E1394 definition, records can be terminated with either <CR> or <CR><LF>, depending on the OMNILINK settings. To set up OMNILINK for using either <CR> only or <CR><LF> for record termination, please see the APPENDIX, Record Termination Settings. In the following description {RT} is used for the record termination character(s).

2.2 Header Record

This record must always be the first record in a transmission. This record contains information about the sender and receiver, instruments, and computer system whose records are being exchanged. It also identifies the delimiter characters. The minimum information that must be sent in a Header record is:

H|\^&{RT}

The H corresponds to the record type, H=Header. The | (vertical bar) is used as the field delimiter. The \ (backslash) is the repeat delimiter. The ^ (carat) is the component delimiter. The & (ampersand) is the Escape delimiter. {RT} can be either <CR> or <CR><LF>, depending on the settings and signifies the end of the record.

The entire header record consists of the following fields:

1|2|3|4|5|6|7|8|9|10|11|12|13|14{RT}

H|\^&|||AVL OMNI Ser.# :1234||||||Meas|P|2.2|19940922132041{RT}

Field #	Field Name	Comment
1	Record Type ID	Required, see record types
2	Delimiter definitions	Required, see table and example above. The first character is the field delimiter, the second is the repeat delimiter, the third is the component, and the fourth is the escape character
3	Message Control ID	Not used by OMNILINK.
4	Access Password	Not used by OMNILINK.
5	Sender Name or ID	Name of manufacturer, instrument and instrument serial number.
6	Sender Street Address	Not used by OMNILINK.
7	Reserved Field	Not used by OMNILINK.
8	Sender Telephone #	Not used by OMNILINK.
9	Characteristic of Sender	Not used by OMNILINK.
10	Receiver ID	Not used by OMNILINK.
11	Comment or Special Instructions	Name of the report is sent here: Meas – Patient sample QC – Quality control ReqP – Patient query

Field #	Field Name	Comment
12	Processing ID	Indicates how message should be processed: P – Production, use standard processing (for measurements) Q - Quality Control, sent to identify quality control, quality assurance or regulatory data.
13	ASTM Version #	Required, currently version#2.2
14	Date and Time of message	Required Format=YYYYMMDDHHMMSS Time zone may be sent optionally and appended to the data/time field in the format of +HHMM or -HHMM as appropriate. HHMM is described as time before or after Universal Coordinated Time
{RT}	Record Terminator	Required. Actual termination character(s) settings dependent.

2.3 Patient Information Record

This record contains information about an individual patient. The Patient Information record consists of the following fields:

1|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16|17|18|19|20↵
|21|22|23|24|25|26|27|28|29|30|31|32|33|34|35{RT}

P|1|||321225432|||||||||||||||||||||{RT}

Field #	Field Name	Comment
1	Record Type ID	Required, see record types
2	Sequence#	Required, sequentially generated number identifying the number of each record.

Field #	Field Name	Comment
3	Practice assigned Patient ID	Not used by OMNILINK.
4	Patient ID	Laboratory assigned ID. This is a unique processing number generated by the lab, the LIS, or the HIS (bar code number). Not used with QC messages.
5	Patient ID No. 3	Used for insurance number. Not used with QC messages.
6	Patient Name	This field is the patient's name in the following format: Last^First^Middle. Each component separated by the component delimiter. Not used with QC messages.
7	Mother's Maiden Name	Not used by OMNILINK.
8	Birth date	Format=YYYYMMDD *Note: For this field, time is not sent with the date*. Not used with QC messages.
9	Patient Sex	Format M (male), F (female), or U (unknown), null if not entered. Not used with QC messages.
10	Patient Race	Not used by OMNILINK
11	Patient Address	Not used by OMNILINK
12	Reserved	Not used by OMNILINK
13	Patient Telephone #	Not used by OMNILINK

Field #	Field Name	Comment
14	Attending Physician	Not used by OMNILINK
15	Special field 1	Not used by OMNILINK
16	Special field 2	Not used by OMNILINK
17	Patient Height	Not used by OMNILINK
18	Patient Weight	Not used by OMNILINK
19	Known or suspected diagnosis	Not used by OMNILINK
20	Patient active medications	Not used by OMNILINK
21	Patient diet	Not used by OMNILINK
22	Practice field 1	Not used by OMNILINK
23	Practice field 2	Not used by OMNILINK
24	Admission and discharge data, separated by a ^	Not used by OMNILINK
25	Admission status	Not used by OMNILINK
26	Location	Not used by OMNILINK
27	DRG or AVG	Not used by OMNILINK
28	DRG or AVG #2	Not used by OMNILINK
29	Patient Religion	Not used by OMNILINK
30	Marital Status	Not used by OMNILINK
31	Isolation Status	Not used by OMNILINK
32	Language	Not used by OMNILINK
33	Hospital Service	Not used by OMNILINK

34	Hospital Institution	Not used by OMNILINK
35	Dosage Category	Not used by OMNILINK
{RT}	Record Terminator	Required. Actual termination character(s) settings dependent.

2.4 Request Record

This record contains a request on information about an individual patient. For OMNILINK it is used for querying patient demographics for the connected instruments. It is exclusively used with patient query messages.

The request record consists of the following fields:

1|2|3|4|5{RT}

Q|1|120165||PERS{RT}

Field #	Field Name	Comment
1	Record Type ID	Required, see record types
2	Sequence#	Required, sequentially generated number identifying the number of each record. The first patient transmitted shall be 1; the second patient shall be 2.
3	Starting Range ID Number	Patient ID entered at the instrument. This is a unique processing number generated by the lab, the LIS, or the HIS (bar code number).
4	Ending Range ID Number	Not used by OMNILINK.
5	Universal Test ID	For OMNILINK always contains PERS to indicate, that personal data on the patient is requested.
{RT}	Record Terminator	Required. Actual termination character(s) settings dependent.

2.5 Test Order Record

The order record defines the particular type of tests run or performed for each specimen. The order record for OMNILINK only is transmitted to the host computer as part of a patient sample or QC result message.

The Test Order record consists of the following fields:

1|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16|17|18|19|20|21|22|23|24|25|26|27|28|29|30|31{RT}

O|1|654871351A|MEASUREMENT#^235||||||||||||Blood^Capillary{RT}

Field #	Field Name	Comment
1	Record Type ID	Required, see record types
2	Sequence#	Required, sequential number
3	Specimen ID	Account or bar code number for patient samples, instrument QC sample number for QCs.
4	Instrument Specimen ID	A unique identifier assigned by the instrument.
5	Universal Test ID	Test ID Descriptive
6	Priority	Not used by OMNILINK
7	Requested/ Order Date and Time	Not used by OMNILINK
8	Specimen collection date and time	Date and time the sample was collected. YYYYMMDDHHMM. Not used with QC messages.
9	Collection end time	Not used by OMNILINK
10	Collection volume	Not used by OMNILINK
11	Collector ID	Not used by OMNILINK
12	Action code	Not used by OMNILINK
13	Danger code	Not used by OMNILINK

Field #	Field Name	Comment
14	Relevant clinical information	Not used by OMNILINK
15	Date/Time specimen received	Not used by OMNILINK
16	Specimen descriptor	Includes the specimen type and source, separated by a component delimiter. I.E. BLOOD^ARTERIAL for patient samples. QC material name^QC material level for QCs.
17	Ordering Physician	Not used by OMNILINK
18	Physician's Telephone Number	Not used by OMNILINK
19	User field 1	Not used by OMNILINK
20	User field 28	Not used by OMNILINK
21	Laboratory Field 1	Not used by OMNILINK
22	Laboratory Field 2	Not used by OMNILINK
23	Date/Time Results Reported or Last Modified	Not used by OMNILINK
24	Instrument Charge to Computer System	Not used by OMNILINK
25	Instrument Section ID	Not used by OMNILINK
26	Report Types	Not used by OMNILINK

Field #	Field Name	Comment
27	Reserved Field	Not used by OMNILINK
28	Location or Ward of Specimen Collected	Not used by OMNILINK
29	Nosocomial Infection Flag	Not used by OMNILINK.
30	Specimen Service	Not used by OMNILINK
31	Specimen Institution	Not used by OMNILINK
{RT}	Record Terminator	Required. Actual termination character(s) settings dependent.

2.6 Result Record

The result record is used to send actual patient results that were performed on an instrument. The Result record consists of the following fields:

1|2|3|4|5|6|7|8|9|10|11|12|13|14{RT}

R|1|^ ^ ^#ctHb^M|15.0|g/dL||N||F||20020922153246{RT}

Field #	Field Name	Comment
1	Record Type ID	Required, see record types
2	Sequence#	Required, sequentially generated number identifying the number of each record.

Field #	Field Name	Comment
3	Universal Test ID	Test name^how value was derived. Must be used as shown in example ^^^XX.X^Z XX.X=parameter ^Z=type Type: ^M=Measured ^E=Input ^S=Default ^R=Calculated ^P=Protocol ^C=Calculated ^I=Input With QC messages only measured values are transmitted.
4	Data measurement or value	Results from instruments XX.X=value
5	Units	SI or conventional.
6	Reference ranges	For patient sample messages follows the format: Reference range lower limit to upper limit, repeat delimiter, critical range lower limit to upper limit. For QC messages -2sd to +2sd.
7	Result Abnormal Flags	Errors, etc. Characters identifying these flags are: N Normal A Abnormal
8	Nature of abnormality testing	Not used by OMNILINK

Field #	Field Name	Comment
9	Result Status	Status of the result: F Final
10	Date of Change in Instrument Normative Values	Not used by OMNILINK
11	Operator Identification	First component identifies operator who performed the test (instrument operator), the second component identifies the verifier. *Note: Only transmitted in the first result record.*
12	Date/Time Test Started	Not used by OMNILINK
13	Date/Time Test Completed	The date and time instrument completed the test. *Note: Only transmitted in the first result record.*
14	Instrument Identification	Not used by OMNILINK
{RT}	Record Terminator	Required. Actual termination character(s) settings dependent.

2.7 Comment Record

Comment records may be inserted anywhere except after the message terminator record. Each comment record applies to the first non-comment record preceding it. The Comment record consists of the following fields:

1|2|3|4|5{RT}

C|1|I||G{RT}

Field #	Field Name	Comment
1	Record Type ID	Required, see record types
2	Sequence#	Required, sequentially generated number identifying the number of each record.
3	Comment Source	Always I
4	Comment Text	If comment codes are used, component delimiters ^ are used for separation
5	Comment Type	Used to qualify comment records. G Generic/Free Text I Instrument flag comment
{RT}	Record Terminator	Required. Actual termination character(s) settings dependent.

2.8 Message Terminator Record

This is the last record in the message. A header record may be transmitted after this record to signify the start of another message. The Message Terminator record consists of the following:

1|2|3{RT}

L|1|N{RT}

Field #	Field Name	Comment
1	Record Type ID	Required, see record types

Field #	Field Name	Comment
2	Sequence#	Required, sequentially generated number identifying the number of each record.
3	Termination code	Nil, N Normal termination T Sender aborted R Receiver aborted E Unknown system error Q Error in last request for information I No information available from last query F Last request for information processed
{RT}	Record Terminator	Required. Actual termination character(s) settings dependent.

2.9 Note

For all records, fields up to and including the last field with data needs to be transmitted. Fields not used at the end of the record may be truncated.

3. Low Level Protocols

3.1 TCP/IP Connection

For TCP/IP connection, no specific low level protocol is used. Correct and complete communication is ensured by the TCP/IP protocol itself.

3.2 Serial Connection

For serial communication, the low level protocol as specified with ASTM E1381 is used. A detailed description of the OMNILINK implementation you can find in the following.

3.2.1 Restricted Characters

None of the ten transmission control characters, the form effector control or the four device control characters may appear in message text. The following characters are not permitted to appear in the message text:

Illegal Message Text Characters				
<SOH>	<STX>	<ETX>	<EOT>	<ENQ>
<LF>	<ACK>	<DLE>	<NAK>	<SYN>
<ETB>	<DC1>	<DC2>	<DC3>	<DC4>

3.2.2 Control Characters

Control characters that are used for ASTM communications:

ASCII	Decimal	Hex	Control char.	Comment
<STX>	2	0x2	^B	Start of TeXt
<ETX>	3	0x3	^C	**E**nd of **Te**e**X**t
<EOT>	4	0x4	^D	**E**nd **O**f **T**ransmission
<ENQ>	5	0x5	^E	**ENQ**uiry
<ACK>	6	0x6	^F	**ACK**nowledge
<LF>	10	0xA	^J	**L**ine **F**eed
<CR>	13	0xD	^M	**C**arriage **R**eturn
<NAK>	21	0x15	^U	**N**egative **A**c**K**nowledge
<ETB>	23	0x17	^W	**E**nd of **T**rans. **B**lock

3.2.3 Communication Phases

There are 3 distinct phases to each communication session: The Establishment Phase, the Transfer Phase and the Termination Phase. Each of these phases will be discussed in the following paragraphs.

3.2.3.1 Establishment Phase

When OMNILINK is ready to send data, it transmits an <ENQ> character. After the <ENQ> is sent, the instrument waits for a maximum of 15 seconds for a response from the host. If there is no response from the host within 15 seconds, the <ENQ> is resent. This loop is repeated for a maximum of six times. If there is no response after these six retries, communication is aborted.

Sender	Recipient
<ENQ>	
	<ACK> or <NAK>

If an <ACK> character is received from the host, the establishment phase is successful, and the transfer phase follows. If a <NAK> character is received from the host, the instrument waits a minimum of 10 seconds, and then resends the <ENQ> after receipt of the <NAK> and repeats this loop until an ACK is received. If the host continues to respond with <NAK> after six retries, communication is aborted.

This ends the establishment phase of the communication session.

3.2.3.2 Transfer Phase

During the transfer phase the sender transmits messages to the receiver. The transfer continues until all messages have been sent.

Sender>

<STX>	FN	data	<ETB> or <ETX>	CS	<CR><LF>

Receiver<

<ACK>

Explanation of fields:

<STX>	Start of text, ASCII decimal 2. This control character identifies the starting point of the data that is being sent from the analyzer. This character must accompany all data transmissions.
FN	Frame number. A single digit field distinguishing between new and re-transmitted frames. Legal characters are ASCII '0' to '7'. The frame number must start at 1 with the first frame of the transfer phase. The frame number is incremented by one for every new frame transmitted. After '7', the frame number rolls over to '0', and continues in this fashion.
Data	Data is one of the records described in the Message Structure section, starting page 5.

<ETB> Or <ETX>	The <ETB> character stands for End of Transmission Block and is only sent when there are multiple frames. When a message contains over 240 characters it is broken into two or more frames. The intermediate frame must be terminated with an <ETB> (end of transmission block), CS (checksum), <CR> (carriage return) and <LF> (line feed). The final frame is terminated with an <ETX> (end of text), CS (checksum), <CR> (carriage return) and <LF> (line feed). The frame structure is illustrated below. <STX> FN data <ETB> CS <CR><LF> ⇐ Intermediate frame(s) <STX> FN data <ETX> CS <CR><LF> ⇐ End frame
CS	The CS (checksum) is used for checking data integrity. The checksum is computed by adding the binary values of the character, keeping the lowest significant 8 bits of the result. The checksum is initialized to zero with the <STX> character. The first character used in computing the checksum is the frame number. Each character in the message text is added to the checksum (modulo 256). The calculation of the checksum does not include the <STX>, the checksum characters, or the trailing <CR> and <LF> (the <ETX>/<ETB> is included in the calculation). The checksum is transmitted as two ASCII characters (hexadecimal representation). The two characters are transmitted as the checksum, with the most significant character first (C1). For example, a checksum of 122 can be represented as 0x7A (0x stands for hexadecimal). The checksum is transmitted as the ASCII character '7' followed by the character 'A'.
<CR> <LF>	The <CR> (carriage return) and <LF> (line feed) combination is used as the end termination characters of the message text.

3.2.3.2.1 Acknowledgements

After each frame is sent, the sender waits up to 15 seconds for a reply. The receiver shall transmit one of three replies:

<ACK> (Decimal 06)

The <ACK> reply signifies the last frame was received and processed successfully and it is OK to send another frame. The sender increments the frame number and either sends a new frame or terminates the transmission (see termination phase).

<NAK> (Decimal 21)

The <NAK> reply signifies the last frame was not received successfully and the receiver is prepared to receive it again. The sender will retransmit it with the same frame number.

<EOT> (Decimal 04)

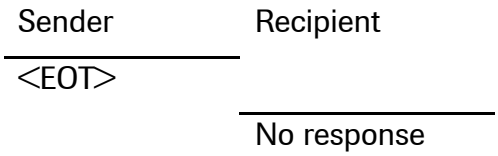
The <EOT> reply signifies the last frame was received successfully and the receiver is prepared to receive another frame, but requests the sender to stop transmitting data. See interrupts below.

3.2.3.2.2 Interrupts

During the transfer phase, if the receiver responds to a frame with an <EOT> in place of an <ACK>, the sender must interpret this as an interrupt request. The <EOT> signifies the last frame was successful, but the receiver is requesting the sender to stop transmitting. If the sender chooses to ignore the <EOT>, the receiver must re-send the <EOT> for the interrupt to remain valid. If the sender chooses to honour the interrupt, the sender must enter the termination phase (See termination phase below). The sender must not enter the establishment phase for at least 15 seconds or until the receiver has finished a message cycle (establishment, transfer, termination).

3.2.3.3 Termination Phase

The termination phase returns the communication link to the clear or neutral state. The sender notifies the receiver that all messages have been sent.



The termination phase is a sequence of conditions that will cause communication between the devices to cease. The termination phase is entered when the sender has no more data to transmit. Termination is accomplished by transmitting an <EOT>. When the <EOT> is sent, no acknowledgement is needed, do not expect an <ACK>. The receiver, upon receiving <EOT>, considers the communication to have ended and sends no further data or acknowledgements.

3.2.4 Error Recovery

A receiver checks every frame for valid data. To check data, the receiver calculates the checksum on the received data and compares this calculated checksum to the checksum that was transmitted by the sender and sent with the data stream. If the checksums match, the data is valid. If the checksums do not match, the data is not valid and the receiver must send a <NAK>. Upon receiving the <NAK>, the sender re-transmits the last frame with the same frame number.

A frame should be rejected for the following errors:

- Any character errors are detected (parity error, framing error, etc.).
- The calculated frame checksum does not match the checksum in the received frame.
- The frame number is not one higher than the last accepted frame.

Upon receiving a <NAK>, or any character except <ACK> or <EOT>, the sender increments a re-transmit counter and re-transmits the same frame (with the same frame number). If the counter shows the frame was not accepted after six times, the sender must abort the message and proceed immediately to the termination phase.

3.2.5 Time-outs

If the reply after sending an <ENQ> is not received within 15 seconds, the sender enters the termination phase.

If the receiver detects contention and no <ENQ> is received within 20 seconds, the receiver regards the data link to be in the neutral state.

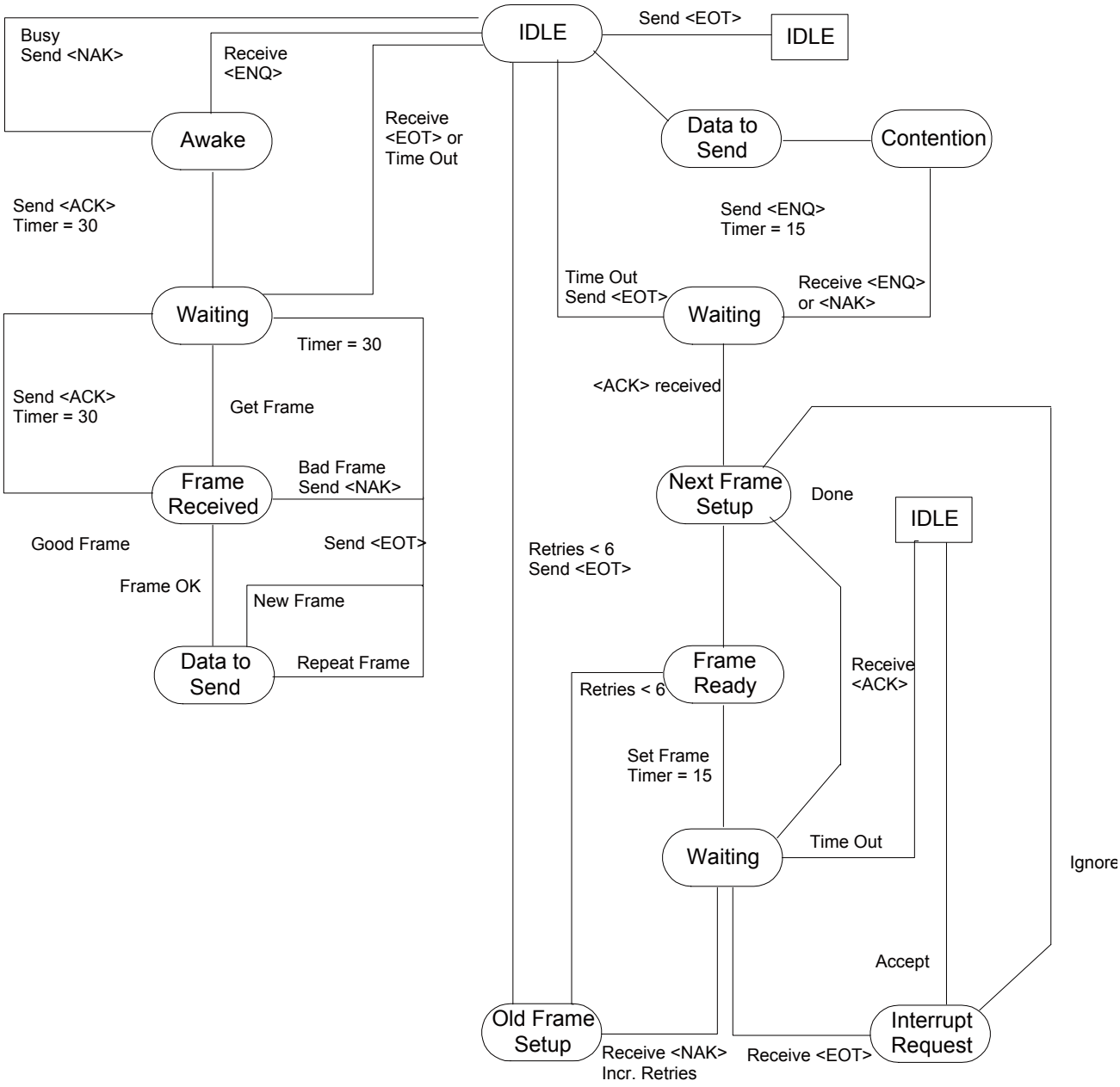
If the sender receives no reply within 15 seconds after transmitting the last character of a frame, it aborts the message by entering the termination phase.

During the transfer phase, the receiver sets a timer when first entering the transfer phase or when replying to a frame. If a frame or an <EOT> is not received within 30 seconds, the receiver discards the incomplete message and regards the line to be in the neutral state.

The receiver can delay its reply for up to 15 seconds. Longer delays cause the sender to abort the message.

3.2.6 State Diagram

Receiving Device **Sending Device**



4. Data Examples

4.1 Measurement Report

```
H|\^&|||Roche OMNI-C Ser.# :999||||||Meas|P|2.2|20021213140305
P|1||2332||GOTTFRIED^WAISE^|||U
O|1||MEASUREMENT^83||||||||||||blood arterial^
C|1|I|schledej (13.12.2002 14:02:46) MyComment|G
R|1|^^^^pH^M|7.420||7.350 to 7.450\7.200 to 7.600|N||F||||20021211141614
R|2|^^^^PCO2^M|42.5|mmHg|35.0 to 45.0\20.0 to 60.0|N||F|
R|3|^^^^PO2^M|108.3|mmHg|80.0 to 100.0\60.0 to 800.0|A||F|
R|4|^^^^Na^M|133.8|mmol/l|135.0 to 148.0\125.0 to 160.0|A||F|
R|5|^^^^K^M|4.54|mmol/l|3.50 to 4.50\2.80 to 6.00|A||F|
R|6|^^^^Cl^M|92.3|mmol/l|98.0 to 107.0\80.0 to 115.0|A||F|
R|7|^^^^iCa^M|1.086|mmol/l|1.120 to 1.320\1.050 to 1.500|A||F|
R|8|^^^^tHb^M|15.1|g/dl|11.5 to 17.4\8.0 to 23.0|N||F|
R|9|^^^^SO2^M|95.0|%|75.0 to 99.0\60.0 to 100.0|N||F|
R|10|^^^^Hct^M|-|%|35.0 to 50.0\25.0 to 65.0|A||F|
R|11|^^^^Temperature^I|37.0|°C||N||F|
R|12|^^^^Baro^I|741.0|mmHg||N||F|
R|13|^^^^cHCO3^C|26.9|mmol/l||N||F|
R|14|^^^^ctCO2(P)^C|28.2|mmol/l||N||F|
R|15|^^^^SO2(c)^C|98.3|%||N||F|
R|16|^^^^BE^C|2.1|mmol/l||N||F|
R|17|^^^^BEecf^C|2.5|mmol/l||N||F|
R|18|^^^^BB^C|50.2|mmol/l||N||F|
R|19|^^^^ctO2^C|20.3|vol%||N||F|
R|20|^^^^ctCO2(B)^C|23.3|mmol/l||N||F|
R|21|^^^^pHst^C|7.437|||N||F|
R|22|^^^^cHCO3st^C|26.0|mmol/l||N||F|
R|23|^^^^HbI^C|0.025|||N||F|
R|24|^^^^PAO2^C|108.3|mmHg||N||F|
R|25|^^^^AaDO2^C|0.0|mmHg||N||F|
R|26|^^^^a/AO2^C|100.0|%||N||F|
R|27|^^^^avDO2^C|-|%||N||F|
R|28|^^^^RI^C|0|%||N||F|
R|29|^^^^niCa^C|1.097|mmol/l||N||F|
R|30|^^^^AG^C|19.1|mmol/l||N||F|
R|31|^^^^pHt^C|7.420|||N||F|
R|32|^^^^H+t^C|38.024|nmol/l||N||F|
R|33|^^^^PCO2t^C|42.5|mmHg||N||F|
R|34|^^^^PO2t^C|108.3|mmHg||N||F|
R|35|^^^^PAO2t^C|108.3|mmHg||N||F|
R|36|^^^^AaDO2t^C|0.0|mmHg||N||F|
R|37|^^^^a/AO2t^C|100.0|%||N||F|
R|38|^^^^RIt^C|0|%||N||F|
R|39|^^^^Hct(C)^C|45.3|%||N||F|
R|40|^^^^MCHC^C|-|g/dl||N||F|
R|41|^^^^BO2^C|-|||N||F|
R|42|^^^^BEact^C|2.5|mmol/l||N||F|
```

```
R|43|^ ^ ^Osm^C|267.4|mOsm/kg||N||F|
R|44|^ ^ ^OER^C|-|%||N||F|
R|45|^ ^ ^Qs/Qt^C|-|%||N||F|
R|46|^ ^ ^Qt^C|-|%||N||F|
R|47|^ ^ ^PFIndex^C|515.7|mmHg||N||F|
R|48|^ ^ ^ALLEN Flag ^I|unknown|||N||F|
R|49|^ ^ ^A/F^I|adult|||N||F|
R|50|^ ^ ^P50^I|26.7|mmHg||N||F|
R|51|^ ^ ^R ^I|0.840|||N||F|
R|52|^ ^ ^FIO2 ^I|0.210|||N||F|
L|1|N
```

4.2 QC Report

```
H|\^&|||Roche OMNI-C Ser.# :999||||||QC|Q|2.2|20021213141842
P|1
O|1|0|QC^8||||||||||||COMBITROL TS^3
C|1|I| (13.12.2002 14:15:19) THE INSTRUMENT schledej (13.12.2002 14:17:58) Plus an additional comment on
OMNILINK.|G
R|1|^ ^ ^Na^M|155.3|mmol/l|150.0 to 158.0|N||F||JDS007||20021213141126
R|2|^ ^ ^Cl^M|122.3|mmol/l|117.0 to 125.0|N||F||
R|3|^ ^ ^pH^M|7.577||7.530 to 7.590|N||F||
R|4|^ ^ ^iCa^M|0.588|mmol/l|0.500 to 0.700|N||F||
R|5|^ ^ ^K^M|6.98|mmol/l|6.80 to 7.20|N||F||
R|6|^ ^ ^PO2^M|125.6|mmHg|137.0 to 161.0|A||F||
R|7|^ ^ ^PCO2^M|24.1|mmHg|22.0 to 28.0|N||F||
R|8|^ ^ ^tHb^M|8.6|g/dl|7.5 to 9.3|N||F||
R|9|^ ^ ^SO2^M|86.4|%|84.0 to 88.0|N||F||
R|10|^ ^ ^Hct^M|26.5|%|24.0 to 34.0|N||F||
L|1|N
```

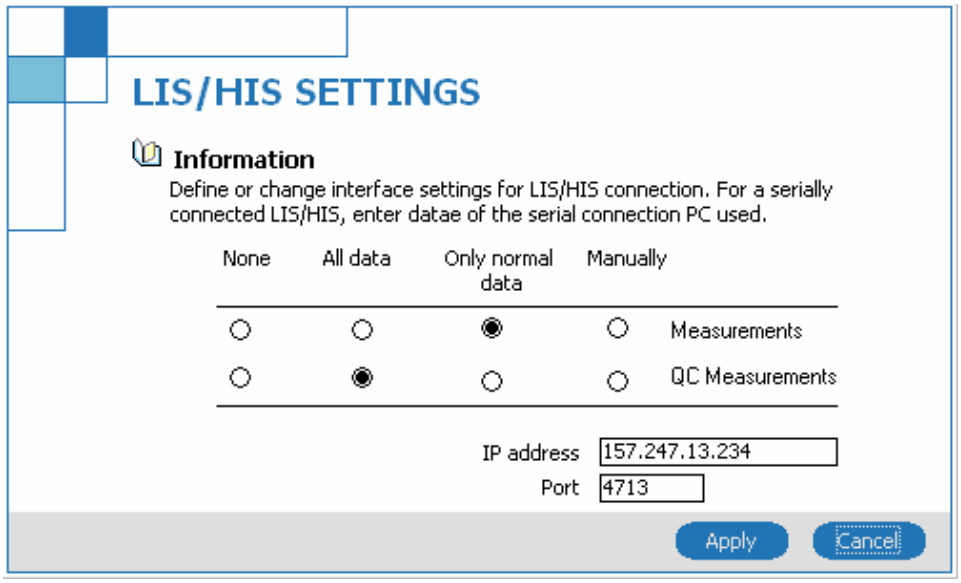
4.3 Patient Query

```
H|\^&|||AVL OMNI Ser.# :1028||||||ReqP|P|2.2|19981027100820
Q|1|120165||PERS
L|1
```

5. APPENDIX

5.1 TCP/IP Connection Settings

In the OMNILINK status overview window, from the header select Setup – LIS/HIS connection.



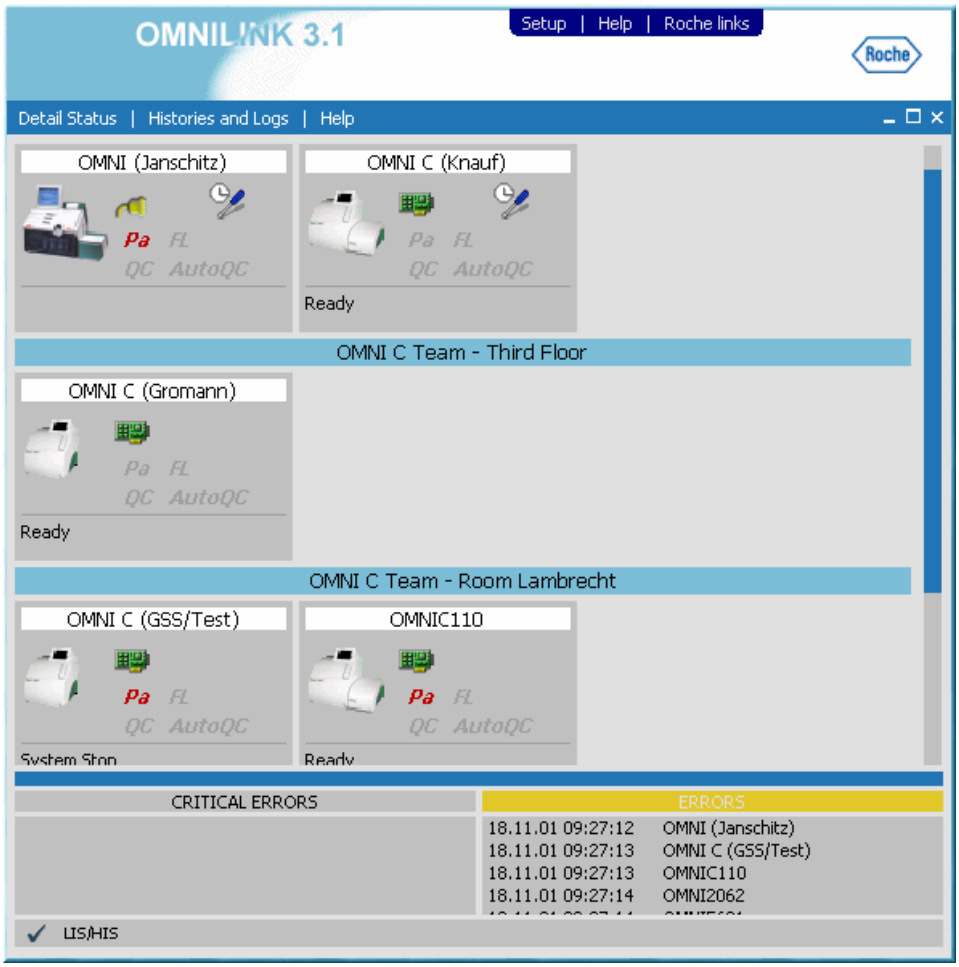
Select how you want to transmit the data:

Option	Meaning
None	Data will not be transmitted.
All data	All data will be transmitted automatically.
Only normal data	Only data marked as normal will be transmitted automatically, data marked as abnormal (values out of range/no values) are sent manually only.
Manually	Data will be transmitted manually only.

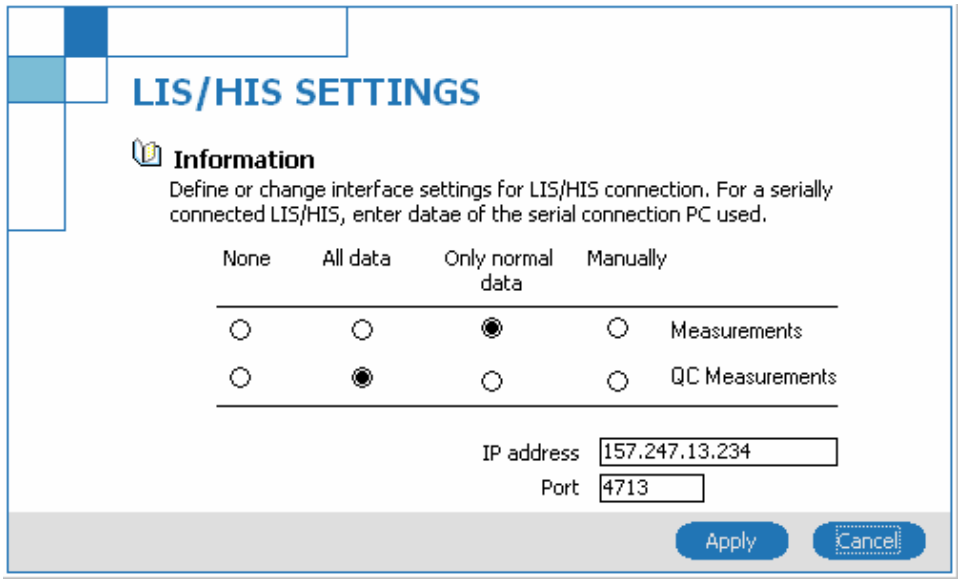
***Note:** To enable the transmission of patient demographic queries and patient demographic data between the connected instruments and the LIS or HIS, please make sure that at least one option button is set to something different than None.*

In the **IP Address** field enter the IP address of the LIS or HIS host, in the **Port** field the IP port number dedicated for the OMNILINK message traffic. After clicking the <Apply> button, the settings are immediately applied. If the IP address and port are correct, the LIS/HIS connection indicator on the Status Overview window will show a checkmark (as shown in the example here).

5.2 Serial Connection Settings



In the OMNILINK status overview window, from the header select Setup – LIS/HIS connection.



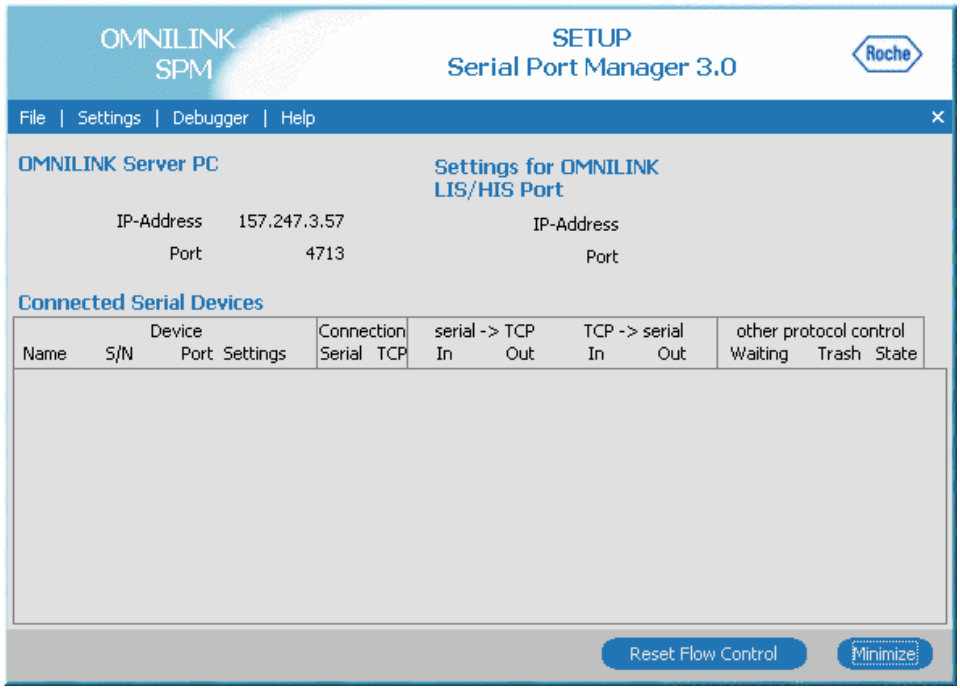
Select how you want to transmit the data:

Option	Meaning
None	Data will not be transmitted.
All data	All data will be transmitted automatically.
Only normal data	Only data marked as normal will be transmitted automatically, data marked as abnormal (values out of range/no values) are sent manually only.
Manually	Data will be transmitted manually only.

***Note:** To enable the transmission of patient demographic queries and patient demographic data between the connected instruments and the LIS or HIS, please make sure that at least one option button is set to something different than None.*

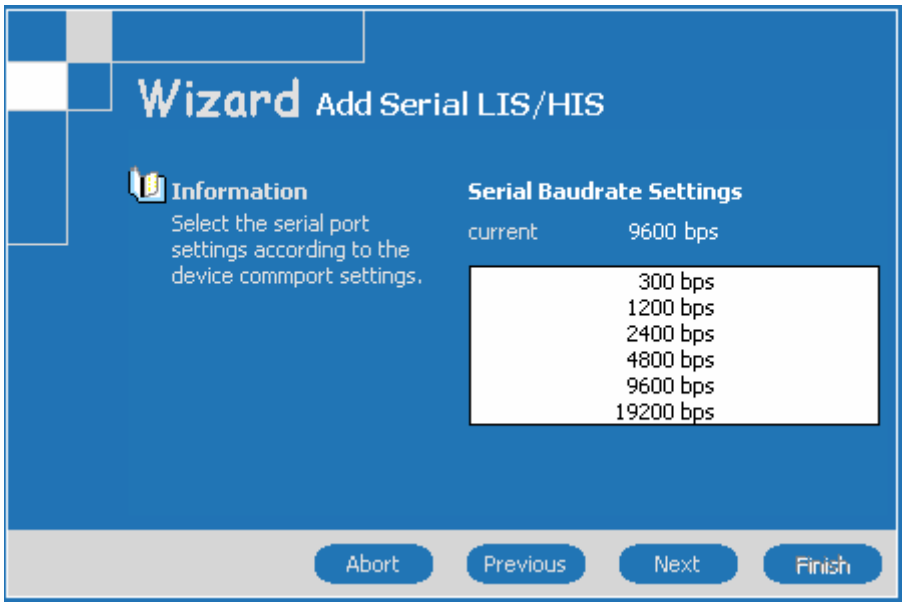
In the **IP Address** field enter the IP address of the PC running the OMNILINK Serial Connection Module dedicated for the LIS or HIS host, in the **Port** field enter 4720. After clicking the <Apply> button, the settings are immediately applied. As the serial connection has not yet been set up on the Serial Connection PC, the LIS/HIS connection indicator on the Status Overview window will show a white cross in a red disc.

At the serial connection PC, double-click the Serial Connection icon. You will see the Serial Port Manager window.

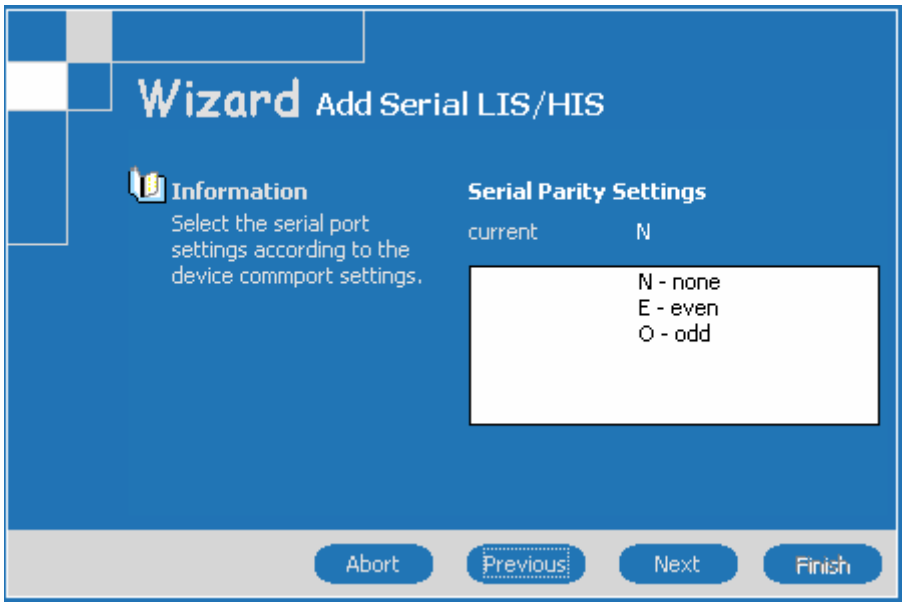


From the menu bar, select Settings – Add serial LIS/HIS.

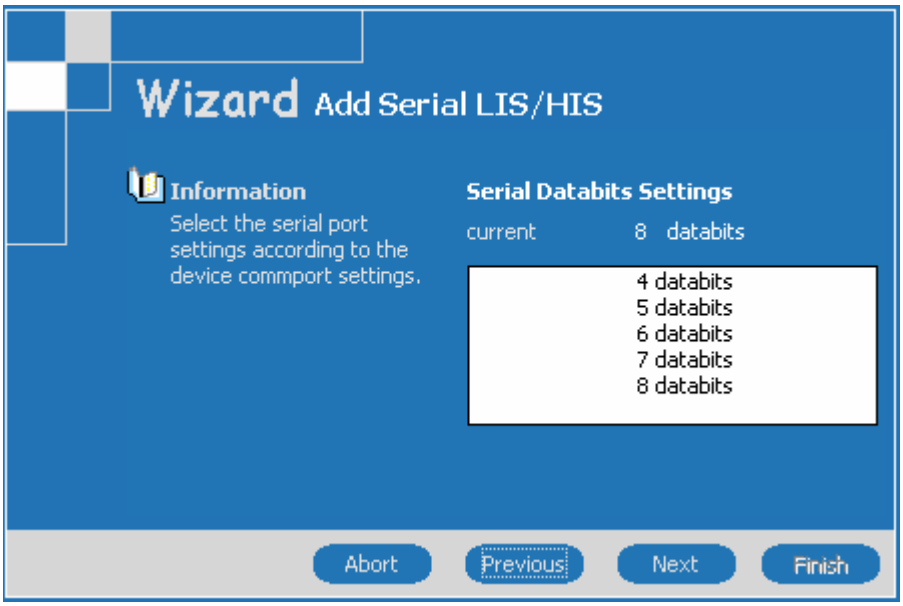
Select one of the available COM ports. Clicking to the <Refresh> button checks Windows' COM port settings and updates the display (only COM ports not otherwise in use are displayed). Then click to the <Next> button.



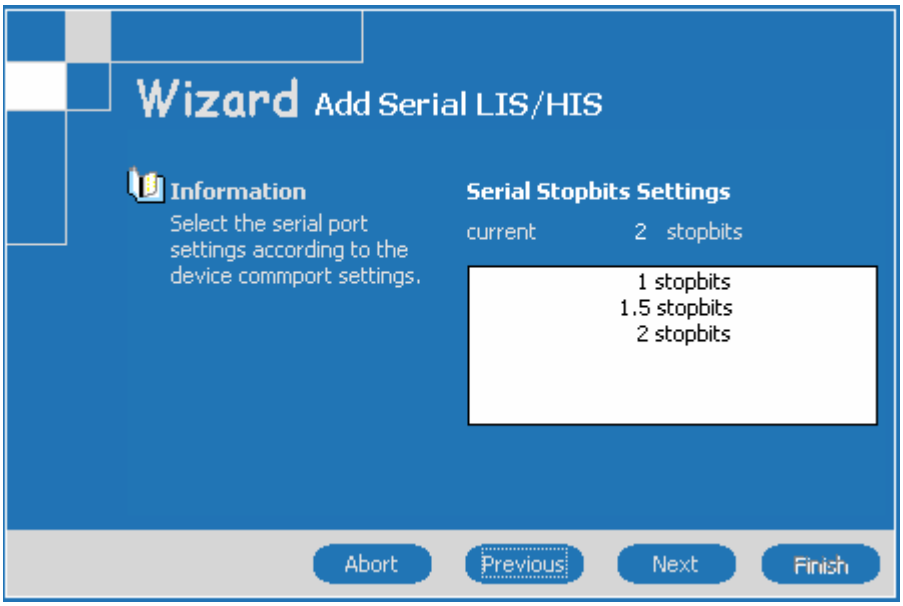
Select a baud rate matching the LIS or HIS host computer COM port baud rate. Then click to the <Next> button.



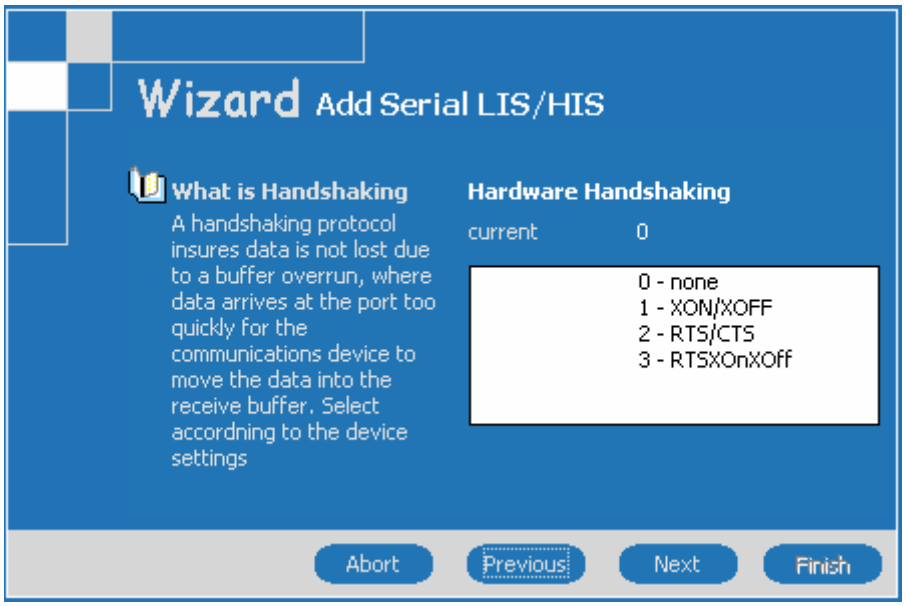
Select parity settings matching the LIS or HIS host computer COM port's. Then click to the <Next> button.



Select a number of data bits matching the LIS or HIS host computer COM port settings. Then click to the <Next> button.

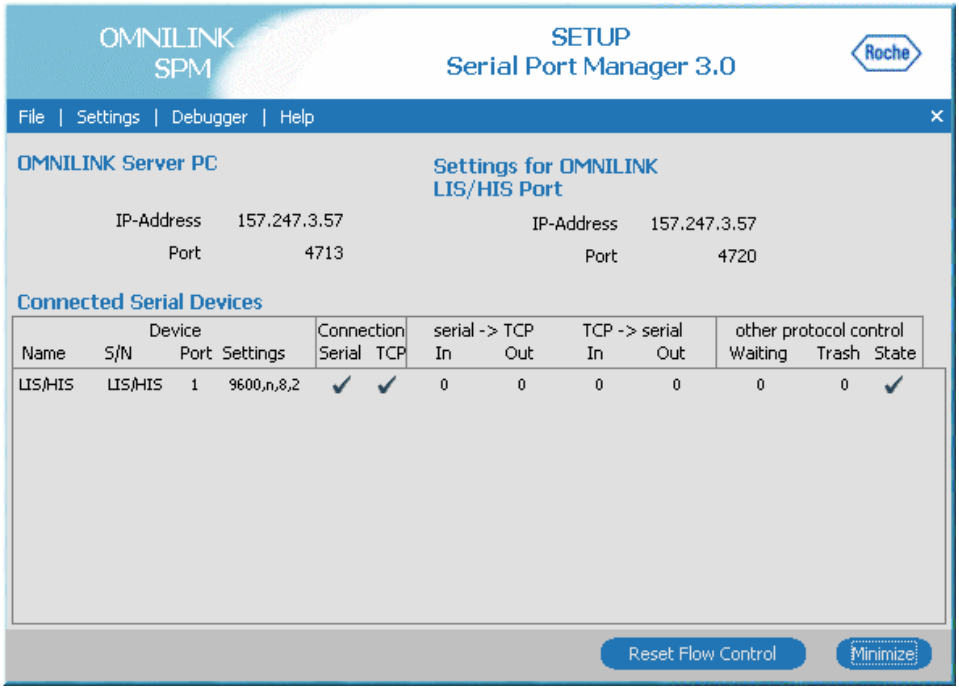


Select a number of stop bits equal to the LIS or HIS host computer COM port settings. Then click to the <Next> button.



Select a handshake type matching the LIS or HIS host computer COM port handshaking. Then click to the <Next> button.

Please make sure, that the settings displayed match the host computer port settings. Apply the settings by clicking to the <Finish> button.



You will see connection statistics and indicators. In case all settings are correct, you will see only checkmark indicators. Also the LIS/HIS connection indicator in the Status Overview window will show a checkmark, when the IP address and port were entered correctly. A red disc with a white cross indicates problems in this element of the transmission chain.

5.3 Record Termination Settings

To change the record termination character(s), open the file **olChaLIS.ini** in C:\Program Files\Roche\OMNILINK 3.0\Data\Ini directory (default installation path for English language Windows) on the Device Connectivity PC. In the [**action**] section, change the value of the **RecordTerminator** entry from CR (<CR> only) to CRLF (<CR><LF>) and save the changes. The new settings will be applied after the Device Connectivity module has been restarted.