ADVIA® 1650

CHEMISTRY SYSTEM

Communication Connections Between the ADVIA® 1650 Workstation and a Host Computer

ADVIA® 1650 Chemistry System

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Purpose

This document describes the communications between the **ADVIA® 1650** Chemistry System and a host computer (host).

The types of online communications between the **ADVIA 1650** Chemistry System and a host are:

- The **ADVIA 1650** Chemistry System requests a specific workorder or a batch of workorders from the host computer.
- The host computer sends the workorders (item selections) in reply to these requests.
- The **ADVIA 1650** Chemistry System sends the sample results for patient and control samples in real time, or in batch when initiated by the operator.

The **ADVIA 1650** Chemistry System can also communicate with external samplers such as the rack handler and laboratory automation systems (**ADVIA® LabCell™** System). For information about these types of communications, refer to the publication entitled ***ADVIA 1650*** *Chemistry System and Laboratory Automation System Connection Specifications*.

Interconnecting the ADVIA 1650 Chemistry System and the Host Computer

As shown below, the **ADVIA 1650** Chemistry System is connected to the host computer via an RS-232C cable supplied by the laboratory. A 25-pin (RS-232C) to 9-pin adapter is required.

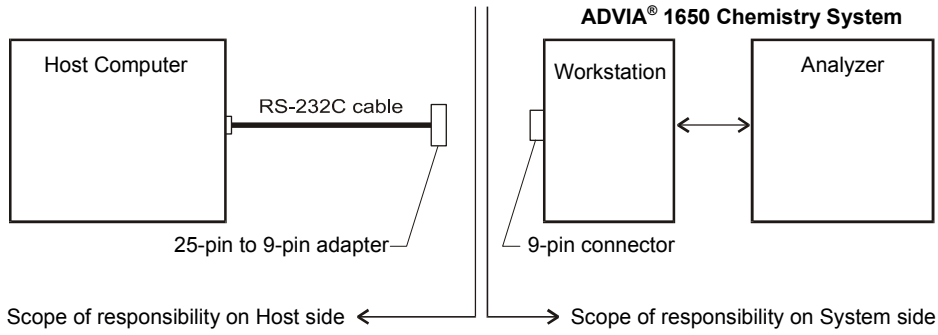

Figure 1 Simplified Interconnection Diagram

Communication Specifications and Parameters

The following specifications and parameters are applicable to the interface between the **ADVIA 1650** Chemistry System and the host computer. The communication parameters are entered in the **On-Line Set** window. The underlined parameter values are the default selections.

Transmission specifications:	RS-232C
Synchronization:	Asynchronous
Communication speed:	4800 bps, 9600 bps, 14400 bps,19200 bps
Coding:	
Parity:	None, Even, Odd
Start bit:	1 bit
Stop bit:	1 bit, 2 bits
Data length:	7 bits, 8 bits
Number of retries:	3
Number of error text skips:	0, 1, 2, 3
	The number of times that online processing of text alone can be skipped without the system going offline, in the event that a normal response cannot be obtained because of an abnormality in the text format.
ADVIA 1650 system connector:	D-SUB 25-pin female (Use a male connector on the cable side.)
Connector signals:	See Table 1 on page 3.
Transmission procedure:	The basic procedure is alternately to transmit a message and to receive an acknowledgment (ACK or NAK).
Online parameters	
Automatic item selection (STT):	No, Yes
Automatic real item selection (Rack Handler or LAS):	No, Yes
Automatic transfer of usual sample results:	No, Yes
Automatic transfer of interruption sample results:	No, Yes
Automatic transfer of pilot sample results:	No, Yes
Automatic transfer of STAT sample results:	No, Yes
Online timeout setting: The following timeout values can be set.	
Automatic item selection: (Timeout time from the start to end of automatic item selection.)	60.0 seconds
Real-time item selecting: (Timeout time from the start to end of real-time item selection.)	3.0 seconds
Frame interval: (Timeout time between frames)	3.0 seconds
Online item setting:	Determines which items (tests) are sent in the real-time output, batch output, and qualitative output. You can use the **ADVIA 1650** processing item numbers (1 - 326) from the **Process Sequence** window, or you can define your own item codes (host numbers) on the **Item Setting** dialog box of the **On-Line Set** window to identify the items (tests). The number that is entered into the code field on the Item Setting Window, must be right justified.

Connector Pin Assignments

Table 1 lists the assignments for the 9-pin female connector attached to the COM1 port of the **ADVIA 1650** workstation.

Table 1 9-Pin Connector Assignments

No.	I/O	Signal Name	Connection Information
1	IN	DCD	not connected
2	IN	SIN	ADVIA data IN
3	OUT	SOUT	ADVIA data OUT
4	OUT	DTR	Connect to pin 6 (DSR).
5		GND	signal ground
6	IN	DSR	Connect to pin 4 (DTR).
7	OUT	RTS	Connect to pin 8 (CTS).
8	IN	CTS	Connect to pin 7 (RTS).
9	IN	RI	not connected

Connect pins **4** (DTR) and **6** (DSR) together, and pins **7** (RTS) and **8** (CTS) together within the 9-pin connector since the **ADVIA 1650** Chemistry System itself does not control these signals.

Use a separate shielded cable. To prevent external noise from entering the system, connect the shield to the connector casing at each end of the cable (if not already done).

Host connector:	Omron	XM2D-2501 XM2Z-0001
9-pin adapter:	Omron	XM2A-2501 (soldered) XM2S-2511 (screw-on case)

When connecting this cable to the COM1 port connector at the rear of the **ADVIA 1650** workstation (Figure 2), be sure to route it away from AC cables and any equipment that generates noise.

Do not try to connect the 25-pin RS-232C connector on the cable directly to the 9-pin COM1 connector.

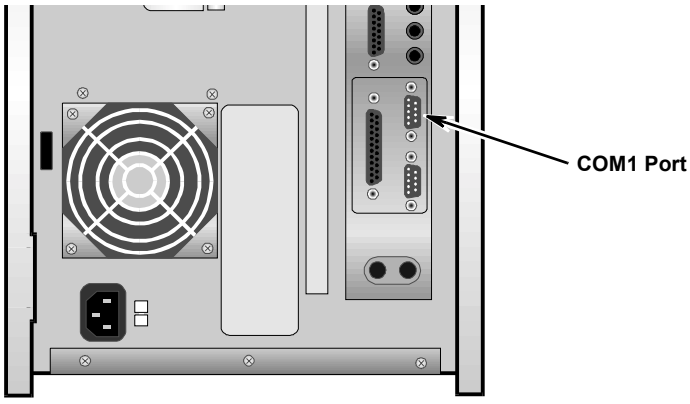

Figure 2 COM1 Port Connector

NOTE

COM1 port locations vary with different models of PC:

PC Model SP6V	COM1 is located on the top.
PC Model SSE350	COM1 is located on the bottom.
PC Model Seattle2	COM1 is located on the bottom.

Message Frame Format

Each message frame exchanged between the **ADVIA 1650** Chemistry System and the host computer contains the following elements:

STX	F# [0-7]	Message Text	ETX or ETB	CSH	CSL	CR	LF

Max frame length (selectable)	256 bytes, 512 bytes
Code used	ASCII, shift JIS
STX (02H)	Frame start code
F# frame number	"1" (31H) to "7" (37H), "0" (30H) cyclically After ENQ transmission, the frame number is incremented beginning with 1, and when the frame number reaches 7, it returns to 0
Message	Text to be transmitted
ETX (03H)	Final-frame code
ETB (17H)	Intermediate-frame code
CSH	Checksum upper
CSL	Checksum lower
CR (0DH) + LF (0AH)	Frame end code

Communication Control Codes

The following control codes provide status information:

ENQ (05H)	Enquire Connection
ACK (06H)	Affirmative acknowledge (acknowledgment)
NAK (15H)	Negative acknowledge (acknowledgment)
EOT (04H)	End of transmission
DC1 (11H)	Sample request skip response (equipment control character)

The communication control codes are sent independently. (They are not enclosed by STX and ETX codes.)

Checksum Test No, Yes

The Checksum test, which is enabled or disabled using the **On-Line Set** window, checks the quality of the message. The sum of the characters, after STX, up to and including ETX or ETB, using modulo 256, is read hexadecimally and expressed as a 2-digit ASCII character. In the case of checksum **No**, a space code (20H) is transmitted, and no check is performed on the system side.

Example: <STX>1ABCDE<ETX><CSH><CSL><CR><LF>

"1" (49D)
"A" (65D)
"B" (66D)
"C" (67D)
"D" (68D)
"E" (69D)
+ ETX (03D)

387D → 183H (hexadecimal) → modulo 256 → 83H

The checksum value 83H is sent as follows: CSH = "8" (38H) and CSL = "3" (33H).

If both the sending and receiving device obtain the same checksum values, the message is considered valid.

Communication Modes

The available modes of communication are determined by the hardware configuration and by the specific options selected by the user.

Hardware Configuration

For communication purposes, the hardware configuration is determined by the sampling and barcode devices installed on your **ADVIA 1650** Chemistry System. This information is contained on the **System Specifications Set** window and is summarized as follows:

Table 2 System Specifications Set Hardware Configuration

Specification	Barcode Option	Sample Delivery Option
Sample Tray (no barcode)	Yes No	Sample Tray / Rack conveyer / External Transport
Sample Tray (with barcode)	Yes No	Sample Tray / Rack conveyer / External Transport
Rack conveyer (no barcode)	Yes No[1]	Sample Tray / Rack conveyer / External Transport
Rack conveyer (with barcode)	Yes No[1]	Sample Tray / Rack conveyer / External Transport
Laboratory automation system	Yes No[2]	Sample Tray / Rack conveyer / External Transport

[1] This setting is not supported. The rack handler used by the **ADVIA 1650** Chemistry System is managed as a laboratory automation device (LAS).

[2] Currently, all external sampling devices, including the rack handler, must have a barcode reader.

System Customization

The operator can customize the following system features:

Table 3 System Customization

Feature	Options	Applicable Window
Sampler for patient samples	on-board sampler external sampler	System Specifications Set
Sample barcode reader	Bar-code cup posi.	System Specifications Set
Automatic Item Select	Yes No	On-Line Set
Results reporting	Auto transfer, User Item Code, Data Clean	On-Line Set

- Sampler Selection for Patient Samples
  Assuming that an external sampler (Rack Handler, LAS) is configured on the **System Specifications Set** window, the **Start Conditions Set** window determines which sampler is used for patient samples in the next run. For example, if the external sampler is unavailable, the operator can use the onboard sampler (STT) to run the patient samples.
- Barcode Selection
  Assuming the sample barcode reader is configured on the **System Specifications Set** window, the **Start Conditions Set** window determines if the barcode mode or the position mode identifies samples on the onboard sampler.

  This option is valid only for the onboard sampler. The barcode mode must be used for the external sampler.

- Automatic Item Select - only applicable to patient samples aspirated from the onboard sampler (STT)
  Choose Yes for the Automatic Item Select option on the **On-Line Set** window to have workorders for the current tray (maximum 84) downloaded automatically from the host computer at the start of the run.

  Choose No when patient samples are going to be aspirated from an external sampler such as the rack handler, or when you are going to create workorders at the **ADVIA 1650** Chemistry System workstation, or when you are going to download workorders created at the host computer in batches.

- Data Output
  Use the **On-Line Set** window (Figure 3) to determine if sample results are sent to the host computer in real time:

  Automatic transfer of general sample results (STT)

  Automatic transfer of interruption sample result (Rack Handler, LAS)

  Automatic transfer of pilot sample results (Controls)

  Automatic transfer of urgent (STAT) sample results (STT)

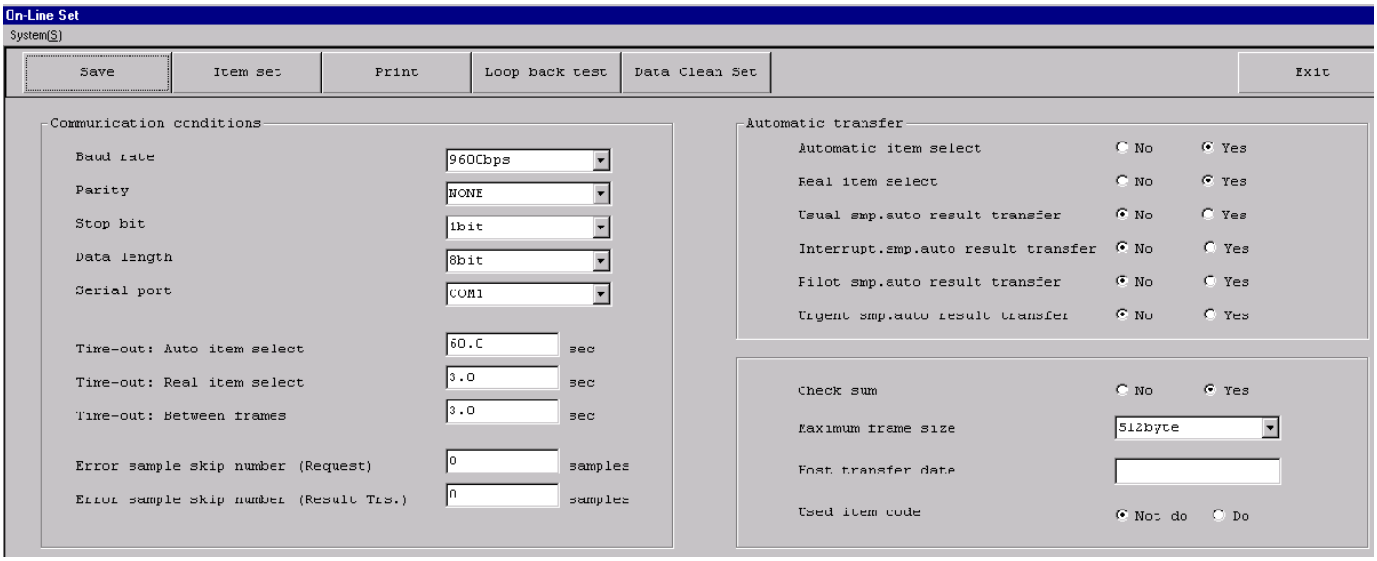

Figure 3 On-Line Set Window

Available Operating Modes

Table 4 Operating Modes

Mode	System Configuration	Case	Sample ID	Sample feed	Order registration	Main purpose
1	Onboard sampler only (no barcode reader)	<1>	TT-CUP	Sample Tray	Auto.	Operation in which a TT-CUP number work sheet is drawn up by the host
2		<2>	TT-CUP	Sample Tray	Batch	When automatic item registration[1] is not possible
3	Onboard sampler only (with barcode reader)	<3>	Barcode	Sample Tray	Auto.	Sample numbers are used as barcodes
4		<4>	Barcode	Sample Tray	Batch	When automatic item registration[1] is not possible
5		<1>	TT-CUP	Sample Tray	Auto.	Processing of a sample that does not permit barcode operation
6		<2>	TT-CUP	Sample Tray	Batch	Processing of a sample that does not permit barcode operation
7	Rack handler (with barcode) These modes are not supported at this time. Instead, the rack handler is managed as an LAS device as described in modes 17 to 24.	<5>	Barcode	Rack option	Real	Sample numbers are used as barcodes
8		<6>	Barcode	Rack option	Batch	When real item registration[1] is not possible
9		<7>	Rack number	Rack option	Real	When barcode operation is not possible
10		<8>	Rack number	Rack option	Batch	When barcode operation is not possible
11		<9>	SEQ number[2]	Rack option	Batch	Sample numbers automatically occurred are used
12		<9 >	SEQ number[2]	Rack option	Real	Sample numbers automatically occurred are used
13		<3>	Barcode	Sample Tray	Auto.	Interruption sample processing
14		<4>	Barcode	Sample Tray	Batch	Interruption sample processing
15		<1>	TT-CUP	Sample Tray	Auto.	Processing of a sample that does not permit barcode operation
16		<2>	TT-CUP	Sample Tray	Batch	Processing of a sample that does not permit barcode operation
17	Laboratory Automation System (LAS) device available including the rack handler	<5>	Barcode	Laboratory automation system	Real	Sample numbers are used as barcodes
18		<6>	Barcode	Laboratory automation system	Batch	When real item registration[1] is not possible
19		<7>	Rack number[3]	Laboratory automation system	Real	When barcode operation is not possible
20		<8>	Rack number[3]	Laboratory automation system	Batch	When barcode operation is not possible
21		<3>	Barcode	Sample Tray	Auto.	Interruption sample processing
22		<4>	Barcode	Sample Tray	Batch	Interruption sample processing
23		<1>	TT-CUP	Sample Tray	Auto.	Processing of a sample that does not permit barcode operation
24		<2>	TT-CUP	Sample Tray	Batch	Processing of a sample that does not permit barcode operation

[1] Refer to page 12 for explanations of the different communication protocols.

[2] Sequential No. analysis

[3] This setting is not presently supported.

In cases <1> and <7>, it is necessary to prepare a loadlist using the host, and also to set the data concerning the position number in the item selection instruction text.

In cases <2> and <8>, it is possible to draw up a loadlist using the **ADVIA 1650** Chemistry System as well as the host.

In case (9), it is necessary to draw up a worksheet using the host, and also to set the data concerning the sample number in the item selection instruction text.

Sample Identification

The **ADVIA 1650** Chemistry System has the following means of identifying samples internally within its own database, during sampling, and during the transfer of data between the system and the host computer or an external sampler (rack handler or other LAS device).

Registration Number

The registration number is a sequence number between 1 and 10000. This number is employed in various **ADVIA 1650** workstation windows, but it cannot be used to identify samples in the communications between the **ADVIA 1650** Chemistry System and the host computer or an external sampler.

Position Number

When not using barcodes, the sample position number is used to identify patient samples aspirated from the onboard sampler (STT). You can also use the position number as a data inquiry key in various **ADVIA 1650** workstation windows.

The STT position number format is: 01-01 TT-CC (TT= tray number, 1 to 97; CC = sample position, 1to 84)

Position numbers are used in online communications messages. The numbers are left-justified, not zero-suppressed, and terminated with an ASCII Space character (20H).

When position numbers are used, the entry of a sample number is still required.

Position numbers cannot be used to identify samples aspirated from an external sampler such the rack handler.

Sample Number

The sample number consists of up to 13 alphanumeric characters. When barcode labels are used, the sample number becomes the barcode ID that identifies patient samples aspirated from the onboard sampler (STT) or an external sampler. You can also use the sample number as a data inquiry key in various **ADVIA 1650** workstation windows.

A sample number is required for all workorders. This includes the position mode as described in the previous paragraph. The **ADVIA 1650** Chemistry System will not accept a workorder that is missing a sample number.

The sample number formats are:

- General samples and interruption samples

  You can use IDs consisting of up to 13 arbitrary characters.

- For STAT samples

  A sample number from E01 to E84 (3 characters, fixed length) is automatically assigned when the operator uses the STAT button on the Operation Panel to run a STAT sample.

- Control samples

  A sample number from PA01 to PJ20 (4 characters, fixed length) is automatically assigned when a control sample is run.

  Pxnn (P = pilot [control], x = control letter assigned on QC Sample Definition window, nn = sequence number)

Sample numbers are used in online communications messages. When transmitted, these sample numbers are left-justified, not zero-suppressed, and terminated with an ASCII Space character (20H). For example: “001” and “1” are recognized as different sample numbers.

Sample Information

The sample information consists of comment 1, comment 2, sex, age, and so on.

Comments 1 and 2 each consist of a maximum of 16 arbitrary characters. They can be used as patient numbers or patient names. They can also be used as search keys for making data inquiries. There is no check for duplicate entries.

In online communications messages, the sample data is treated as character data.

Classification of ADVIA 1650 Samples

Table 5 Sample Types

Sample	Sample ID	Item Registration by the Host	Data Output to the Host	Sample setting[1]	
				Sample Tray	External Sampler
General sample[2]	13 digits	yes[3]	yes	yes[4]	yes[5]
Interruption sample[6]	13 digits	yes[3]	yes	yes	no
STAT sample[7]	E01 – E84	no	yes	yes	no
Control sample[8]	PA01 – PJ20	no	yes	yes	no
Calibration[9]	C0101 – C0110 M980101 – M980110	no	no	yes	no

[1] All samples except general samples must be run on the Sample Tray (onboard sampler).

General samples are run on the Sample Tray or an external sampler such as the rack handler or a laboratory automation system (LAS), if available. When the run is started, the operator uses the **Start Conditions** window to select which sampler is used for general samples. If for any reason multiple samplers are selected, the analysis priority is to use the Sample Tray first and then use the rack handler or LAS.

[2] The **ADVIA 1650** Chemistry System can manage a maximum of 10,000 general samples.

[3] The host computer can create workorders (item registration) for general samples and interruption samples.

[4] The position number for a sample on the Sample Tray (STT) consists of a tray number and a cup number. The tray number (TT) must be from 01 to 97, while the cup number (CUP) must be from 01 to 84.

[5] Currently, rack position numbers are not used for external samplers. Barcode labels are required for the LAS devices including the rack handler. However for reference purposes, the rack position number consists of a rack number and a sample number. The rack number must be from 0001 to 9999, while the sample number must be from 01 to 10.

[6] Interruption samples are treated as general samples; however, these samples are set at the CUP positions preset on the Sample Tray, and are analyzed first.

[7] STAT samples are also set at predetermined positions on the Sample Tray, and are analyzed preferentially. However, STAT item selection cannot be downloaded from the host computer. STAT test selectivity is determined using the **STAT Order Setup** window. The sample IDs E01 to E84 are reserved for STAT samples.

[8] Quality control samples are aspirated from positions on the Sample Tray (CTT). The listed sample IDs are reserved for controls only. Controls cannot be requested from the host computer. Instead, controls are usually requested from the **Start Conditions** window.

[9] Calibration samples are not handled online.

Single-point calibration: Cxxyy xx: Cup No. (01-61) yy: Number of times (01-05)

Multi standard: Mxxyyzz xx: TT No. (98,99) yy: Cup No. (01-84) zz: Number of times (01-05)

Item Order Operation

When the host computer is online, all of the sample orders, regardless of analysis results of the sample, are inquired by the host computer. Then, workorders from the host computer and the **ADVIA 1650** Chemistry System are combined, and the **ADVIA 1650** Chemistry System selects the analysis orders.

The following Table explains how the system manages workorders from the host computer.

Table 6 Managing Workorders from the Host Computer

Host Order	System Order	System Response
New workorder	No	The system registers the sample and runs the tests requested by the host computer as a new workorder.
New workorder	Yes	The sample in the system is deleted, and the tests requested by the host computer are run as a new workorder.
Addition, Re-analysis	No	The sample is registered in the system, and the tests requested by the host computer are run as a new workorder.
Addition, Re-analysis	Yes	If tests requested by the host computer have already been run, they are repeated using the re-analysis conditions. If tests requested by the host computer have not been run, they are run as originals under first-analysis conditions.
No workorder	No	This sample is not analyzed.
No workorder	Yes	The tests in the system-created workorder are run.
Sample deletion	No	This sample is not analyzed.
Sample deletion	Yes	System order information of this sample is deleted. No analysis.

Host Item Code Table

The **ADVIA 1650** Chemistry System can manage a maximum of 326 items:

- 300 test items
- 20 computed result items (ratios)
- 3 serum indices (lipemia, hemolysis and icterus)
- 3 electrolyte tests (Na^+, K^+, and Cl^+)

There are two ways to identify these tests for online communications. You can use the processing item numbers employed by the **ADVIA 1650** Chemistry System, or you can define a separate set of item numbers or host item codes that agree with your laboratory's numbering scheme.

To enter the user-defined item codes, first select **Do** for the Used Item Code option on the **On-Line Set** window, and then enter the required numbers in the Code boxes of the Item Setting dialog box. Thereafter, you can use the host item codes when ordering tests or managing results at the host computer. However, you must use the system processing numbers when working at the **ADVIA 1650** Chemistry System.

The Serum info.item area in the **System Specification Set** window determines if the serum indices are automatically run for each sample or if they must be requested each time using the **Order Entry** window.

When any electrolyte test is ordered, the other two are run automatically.

In the indication of the result of each item, the number of digits to the right the decimal point can be adjusted for each item. Select the number of digits.

Table 7 Host Item Codes

Processing Item No.	Host Item Codes	Item Name	Number of Digits (Indication)	To right of decimal point	Classification
xx1	xx1[1]	(AST, etc.)	8 digits	test specific	photometric test
xx2	xx2	"	8 digits	test specific	photometric test
xxx	xx3	"	8 digits	test specific	photometric test
xxx	xxx	"	8 digits	test specific	photometric test
xxx	xxx	"	8 digits	test specific	photometric test
xxx	xxx	"	8 digits	test specific	photometric test
xxx	xxx	A/G, etc.	8 digits	test specific	ratio
xxx	xxx	"	8 digits	test specific	ratio
xxx	xxx	"	8 digits	test specific	ratio
xxx	xxx	"	8 digits	test specific	ratio
xxx	xxx	"	8 digits	test specific	ratio
xxx	xxx	Lipemia	Qualitative display possible	test specific	Blood serum data
xxx	xxx	Hemolysis	Qualitative display possible	test specific	Blood serum data
xxx	xxx	Icterus	Qualitative display possible	test specific	Blood serum data
xxx	xxx	Na	8 digits	test specific	Electrolyte test
xxx	xxx	K	8 digits	test specific	Electrolyte test
xxx	xxx	Cl	8 digits	test specific	Electrolyte test

[1] Normal item code is zero-suppressed, right-justified.

Communication Protocols

The following communication protocols are available:

- **Batch-item registration**
  Communication starts after the operator uses the Host Request dialog box of the **Order Entry** window to identify a group (batch) of workorders to be downloaded from the host computer.
- **Automatic-item registration (Host Query Mode)**
  When this feature is selected on the **On-Line Select** window, the host computer downloads available workorders for STT patient samples upon request at the start of the run.
- **Real-item registration**
  This communications protocol supports external samplers such as the rack handler or a laboratory automation system. The host computer downloads an available workorder for each sample identification number supplied by the external sampler.
- **Batch-data output**
  Communication starts after the operator uses the Host Transfer dialog box of the **Review / Edit** window to identify a group (batch) of sample results to be sent to the host computer.
- **Real-data output**
  Whenever each sample's assay is completed, the results are sent to the host computer.

The following information is applicable to each of the communication protocols.

- **Time outs**
  The system-side timer value is the maximum time that the **ADVIA 1650** Chemistry Systems waits for a correct response from the host. Similarly, the host-side timer is the maximum time allowed for the **ADVIA 1650** Chemistry System to respond.

  

  IMPORTANT

  The **ADVIA 1650** Chemistry System can analyze individual items at three-second intervals. If the sum of the system-side and host-side values exceeds the analysis time interval, the system sampling time is increased resulting in decreased throughput. To avoid a significant decrease in throughput, the host-side timer value should be less than that of the analyzer, and the host computer should respond as quickly as possible.

  If there are 'n' request items for one sample, the sample analysis interval is 3.0 seconds x 'n'. Consequently, the greater the value of n, the smaller the possibility of decreased throughput during the communication waiting period.

The three-second cycle time of the **ADVIA 1650** imposes some restrictions on the response time of the Host computer program. If one wants to continuously process samples with a single photometric test requested on the work order (single item registration) then the Host computer response time must be less than 3.0 seconds. A response time greater than 3.0 seconds will reduce system throughput. The **ADVIA 1650** must wait for a Host response before sampling can continue.

In addition the **ADVIA 1650** gives priority to the communication of work orders (item registration) over result transfer (data communication). If the item registration is not completed within 3.0 seconds then data will accumulate in the **ADVIA 1650** PC. This accumulation of data can damage the ADVIA PC.

The need for a 3.0 second response is reduced if two or more photometric tests are requested per work order. The Host reponse time should be less than 3.0 seconds times the number of tests requested (3.0 sec x 'n' tests). ISE analysis by the **ADVIA 1650** requires 24 seconds.

NOTE

Table 8 Example of Response Time to Meet 3.0 Second Limitation

On condition of the transmission rate 9600bps					
		Communication Byte	Communciation Time (sec)	ADVIA Typical Response Time (sec)	Host Estimate Response Time (sec)
Item Registration					
ADVIA → HOST	ENQ	1	0.00104		
ADVIA ← HOST	ACK	1	0.00104		0.25
ADVIA → HOST	Item request	30	0.03125	0.13	
ADVIA ←HOST	ACK	1	0.00104		0.25
ADVIA → HOST	EOT	1	0.00104	0.13	
ADVIA ← HOST	ENQ	1	0.00104		0.25
ADVIA → HOST	ACK	1	0.00104	0.13	
ADVIA ← HOST	Item regist.	93	0.09687		0.25
ADVIA → HOST	ACK	1	0.00104	0.13	
ADVIA ← HOST	EOT	1	0.00104		0.25
Data Online					
ADVIA → HOST	ENQ	1	0.00104		
ADVIA ← HOST	ACK	1	0.00104		0.25
ADVIA → HOST	Data online	112	0.11667	0.13	
ADVIA ← HOST	ACK	1	0.00104		0.25
ADVIA → HOST	EOT	1	0.00104	0.13	
		247	0.25729	0.78	1.75
Total Online Time			**2.79**		

- **Required host response to communication initialization**
  The **ADVIA 1650** Chemistry System initiates communications regardless of the receiving condition of the host computer. The first line request (ENQ) of the communication procedure is communicated to identify whether the host computer can receive or not. Regardless of the host process conditions, the host must receive the line request (ENQ) and reply for confirmation.

  If the host computer is temporarily unable to respond, the **ADVIA 1650** Chemistry System will retransmit a line request (ENQ) repeatedly up to the maximum number of times[1], if a negative response (NAK) is returned to the **ADVIA 1650** Chemistry System line request within an analyzer-side time-out. This retransmission can expand the host reception starting time. Note that these processes reduce system performance.

- **Host means of identifying samples**
  The position-mode method (TT-CUP No.) is available for patient samples aspirated from the on-board sampler (STT). For example, a user who operates the **ADVIA 1650** Chemistry System in the barcode mode can request a suitable ID that is different from the barcode ID during analysis, and process interruption samples using the TT-CUP numbers. If, however, the barcode sample is still being analyzed, the **ADVIA 1650** Chemistry System cannot be offline. In this case, the automatic item registration by TT-CUP No. message is transmitted to the host. The ID that the host does not handle is transmitted, and the host must respond as follows:

  To item inquiries: No order response
  To measurement data text: Confirmation response

  If the response is not transmitted, a time-out error occurs on the analyzer side.

[1] Refer to the error processing information on page 22.

Batch Item Registration Protocol

Communication is started from the **Order Entry** window.

The request conditions (sample identification, range and related data) entered by the operator are inserted into the batch item inquiry text which is then transferred to the host computer as a workorder inquiry.

The host sends the item-selection instruction text, under specified conditions, for the samples with items to be analyzed by the **ADVIA 1650** Chemistry System.

If these communications are interrupted by the operator, the **ADVIA 1650** Chemistry System sends an EOT signal to the host, and the transmission is ended.

The event numbers in the following diagram, for example **<1>**, are explained in Table 9.

System	ENQ	→		Host
<1>				
System		←	Acknowledgment	Host
<2>				
System	Batch Item inquiry	→		Host
<3>				
System		←	Acknowledgment	Host
<4>				
System	EOT	→		Host
<5>				
System		←	ENQ	Host
<6>				
System	Acknowledgment	→		Host
<7>				
System		←	Item-selection instruction[1]	Host
<8>				
System	Acknowledgment	→		Host
… (Repetition)				
System		←	Item-selection instruction	Host
<8>				
System	Acknowledgment	→		Host
<7>				
		←	EOT	Host

Figure 4 Batch Item Registration Dialog

[1] Only samples that have item-selection instructions are registered. If the line was finished on this first timing, there is no registration.

Table 9 Batch Item Registration Events

	Timer	Timer Monitoring Interval		Timer Interval	Action
		Start	End		
<1>	ENQ	ENQ sent	Receipt of acknowledgment	5 seconds	EOT is sent, and processing stops.
<2>	System-side processing period	Acknowledgment received	Inquiry sent	(2 seconds)	
<3>	Inquiry acknowledgment	Inquiry sent	Acknowledgment received	3 seconds	EOT is sent, and processing stops.
<4>	System-side processing period	Acknowledgment received	EOT sent	(2 seconds)	
<5>	Response after EOT	EOT sent	ENQ received	5 seconds + a[1] changeable	The system sends EOT, and item selection processing stops.
<6>	System-side processing period	ENQ received	Acknowledgment sent	(2 seconds)	
<7>	Response after an acknowledgment	Acknowledgment sent	Next-frame message received	5 seconds + a changeable	The system sends EOT, and item selection processing is interrupted. The received part is valid.
<8>	System-side processing period	Item selection received	Acknowledgment sent	2 seconds	
<9>	Entire procedure processing time	System ENQ sent	Host EOT sent	Not observed	

[1] a is the time-out value between frames.

Automatic Item Registration Protocol

If the Automatic item select option is selected on the **On-line Set** window, the system requests workorders for the current tray (samples loaded onto the STT). When the Sample Tray-analysis mode starts, communications take place and analysis starts automatically after the workorders are downloaded and registered.

The event numbers in the following diagram, for example **<1>**, are explained in Table 10.

System	ENQ	→		Host
<1>				
System		←	Acknowledgment	Host
<2>				
System	Item inquiry	→		Host
<3>				
System		←	Acknowledgment	Host
<4>				
System	EOT	→		Host
<5>				
System		←	ENQ	Host
<6>				
System	Acknowledgment	→		Host
<7>				
System		←	Item-selection instruction[1]	Host
<8>				
System	Acknowledgment	→		Host
… (Repetition)				
System		←	Item-selection instruction	Host
<8>				
System	Acknowledgment	→		Host
<7>				
		←	EOT	Host

Figure 5 Automatic Item Registration Dialog

[1] Only samples that have item-selection instructions are registered. If the line was finished on this first timing, there is no registration.

Table 10 Automatic Item Registration Events

	Timer	Timer Monitoring Interval		Timer Interval	Action
		Start	End		
<1>	ENQ	ENQ sent	Receipt of acknowledgment	5 seconds	EOT is sent, and processing stops.
<2>	System-side processing period	Acknowledgment received	Inquiry sent	(2 seconds)	
<3>	Inquiry acknowledg-ment	Inquiry sent	Acknowledgment received	3 seconds	EOT is sent, and processing stops.
<4>	System-side processing period	Acknowledgment received	EOT sent	(2 seconds)	
<5>	Response after EOT	EOT sent	ENQ received	5 seconds + a[1] changeable	EOT is sent, and processing stops.
<6>	System-side processing period	ENQ received	Acknowledgment sent	(2 seconds)	
<7>	Response after an acknowledg-ment	Acknowledgment sent	Next-frame mes-sage received	5 seconds + a changeable	EOT is sent, and processing stops.
<8>	System-side processing period	Item selection received	Acknowledgment sent	2 seconds	
<9>	Entire proce-dure processing time	System ENQ sent	Host EOT sent	42 seconds + b[2] changeable	EOT is sent, and processing stops.

[1] a is the time-out value between frames.

[2] Automatic item-selection time-out value

Real Item Registration Protocol

During analysis in which patient samples are aspirated from an external sampler such as the rack handler or LAS device, the external sampler reads the barcode ID for each sample and sends it to the **ADVIA 1650** Chemistry System. If the required workorder is not available, the system queries the host computer.

The event numbers in the following diagram, for example **<1>**, are explained in Table 11.

System	ENQ	→		Host
<1>				
System		←	Acknowledgment	Host
<2>				
System	Item inquiry	→		Host
<3>				
System		←	Acknowledgment	Host
<4>				
System	EOT	→		Host
<5>				
System		←	ENQ	Host
<6>				
System	Acknowledgment	→		Host
<7>				
System		←	Item-selection instruction[1]	Host
<8>				
System	Acknowledgment	→		Host
… (Repetition)				
System		←	Item-selection instruction	Host
<8>				
System	Acknowledgment	→		Host
<7>				
		←	EOT	Host

Figure 6 Real Item Registration Dialog

[1] Only samples that have item-selection instructions are registered. If the line was finished on this first timing, there is no registration.

Table 11 Real Item Registration Events

	Timer	Timer Monitoring Interval		Timer Interval	Action
		Start	End		
<1>	ENQ	ENQ sent	Receipt of acknowledgment	5 seconds	EOT is sent, and processing stops.
<2>	System-side processing period	Acknowledgment received	Inquiry sent	(2 seconds)	
<3>	Inquiry acknowledg-ment	Inquiry sent	Acknowledgment received	3 seconds	EOT is sent, and processing stops.
<4>	System-side processing period	Acknowledgment received	EOT sent	(2 seconds)	
<5>	Response after EOT	EOT sent	ENQ received	5 seconds + a[1] changeable	EOT is sent, and processing stops.
<6>	System-side processing period	ENQ received	Acknowledgment sent	(2 seconds)	
<7>	Response after an acknowledg-ment	Acknowledgment sent	Next-frame mes-sage received	5 seconds + a changeable	EOT is sent, and processing stops.
<8>	System-side processing period	Item selection received	Acknowledgment sent	2 seconds	
<9>	Entire proce-dure processing time	System ENQ sent	Host EOT sent	42 seconds + b[2] changeable	EOT is sent, and processing stops.

[1] a is the time-out value between frames.

[2] Automatic item-selection time-out value

Batch Data Output Protocol

Communication is started from the **Review/Edit** window, where the operator identifies the group of sample results to be sent to the host computer.

You can use the Data Clean Set feature of the **On-Line Set** window to validate the sample results before they are transmitted. Results that fail are not sent. Use the Test Results List dialog box of the **Review / Edit** window to determine which samples failed the data clean check.

If the operator interrupts this communication, the **ADVIA 1650** Chemistry System sends an EOT signal to the host and the transmission is ended.

The event numbers in the following diagram, for example **<1>**, are explained in Table 12.

System	ENQ	→		Host
<1>				
System		←	Acknowledgment	Host
<2>				
System	Sample results	→		Host
<3>				
System		←	Acknowledgment	Host
… (Repetition)				
System	Sample results	→		Host
<3>				
System		←	Acknowledgment	Host
<2>				
System	EOT	→		Host

Figure 7 Batch Data Output Dialog

Table 12 Batch Data Output Events

	Timer	Timer Monitoring Interval		Timer Interval	Action
		Start	End		
<1>	ENQ	ENQ sent	Receipt of acknowledgment	5 seconds	EOT is sent, and processing stops.
<2>	System-side processing period	Acknowledgment received	Sample results sent	(3 seconds)	
<3>	Data acknowledgment	Sample results sent	Acknowledgment received	3 seconds	EOT is sent, and processing stops.
<4>	All processing period			not observed	

Real Data Output Protocol

The results for each sample are automatically sent to the host computer when they are available.

Use the Automatic transfer area on the **On-Line Set** window to designate which kinds of sample results are sent. Use the Data Clean Set feature to validate the sample results before they are transmitted. Results that fail are not sent. Use the Test Results List dialog box of the **Review / Edit** window to determine which samples failed the data clean check.

The event numbers in the following diagram for example **<1>**, are explained in Table 13.

System	ENQ	→		Host
<1>				
System		←	Acknowledgment	Host
<2>				
System	Sample results	→		Host
<3>				
System		←	Acknowledgment	Host
<2>				
System	EOT	→		Host

Figure 8 Real Data Output Dialog

Table 13 Real Data Output Events

	Timer	Timer Monitoring Interval		Timer Interval	Action
		Start	End		
<1>	ENQ	ENQ sent	Receipt of acknowledgment	5 seconds	EOT is sent, and processing stops.
<2>	System-side processing period	Acknowledgment received	Sample results sent	3 seconds	
<3>	Data acknowl-edgment	Sample results sent	Acknowledgment received	3 seconds	EOT is sent, and processing stops.
<4>	All processing period			not observed	

Error Processing

Abnormal Text Format

If the system receives text that is abnormally formatted, the **ADVIA 1650** Chemistry System sends a NAK signal.

The abnormal text-NAK cycle may repeat up to three times.

When the system receives text that is abnormally formatted again, the error-skip counts (by the internal counter) increase, and the number of counts is compared to the set error-sample skip number. Then, either of the following processes takes place (refer to example below).

- If the number of error-skip counts is less than or equal to the number of text error-skip counts:

  System Transmits request-skip response (DC1).

  Host Transmits item-selection instruction for next sample, or EOT.

- If the number of error-skip counts exceeds the number of text error-skip counts:

  System Transmits EOT and Item-selection processing is terminated. Valid workorders are implemented.

  Host Transmission of item-selection instruction is terminated.

[Example]
Responses from the **ADVIA 1650** Chemistry System (when text that has an abnormal format is received while executing an item-selection instruction).

System		←	Item selection-instruction	Host
System	Acknowledgment (ACK)	→		Host
System	Text format abnormal	←	Item selection-instruction	Host
System	Negative acknowledge (NAK)	→		Host
System	Text format abnormal	←	Item selection-instruction	Host
System	Negative acknowledge (NAK)	→		Host
System	Text format abnormal	←	Item selection-instruction	Host
System	Negative acknowledge (NAK)	→		Host
System	Text format abnormal	←	Item selection-instruction	Host
(The number of error-skip counts does not exceed the number of text error-skip counts.)				
System	Sample request skip response (DC1)	→		Host
System		←	Next sample item selection-instruction	Host
		. . .		
System		←	Item selection-instruction	Host
System	Acknowledgment (ACK)	→		Host
System	Text format abnormal	←	Item selection-instruction	Host
System	Negative acknowledge (NAK)	→		Host
System	Text format abnormal	←	Item selection-instruction	Host
System	Negative acknowledge (NAK)	→		Host
System	Text format abnormal	←	Item selection-instruction	Host
System	Negative acknowledge (NAK)	→		Host
System	Text format abnormal	←	Item selection-instruction	Host
(The number of error-skip counts exceeds the number of text error-skip counts.)				
System	Circuit interruption (EOT)	→		Host

Receipt Of Resend Request

If the **ADVIA 1650** Chemistry System receives a negative acknowledgment (NAK) from the host, it resends the same frame three times. At the fourth negative acknowledgment (NAK), the **ADVIA 1650** Chemistry System sends EOT and terminates the processing.

Text Formats

The following text formats specify how workorder and result information will be transmitted.

- batch-item query text
- item-query text
- item-selection instruction text (previous time No/previous time Yes)
- measurement-data text

Typically, this information will require more than one frame:

termination code for intermediate frame = ETB (17H) + checksum + CR + LF

termination code for last frame = ETX (03H) + checksum + CR + LF

Batch-Item Query Text

(from **ADVIA 1650** Order Entry window)

Applicable communication function: Batch-item registration (page 14)

Communication direction: **ADVIA 1650** Chemistry System → Host Computer

Table 14 Batch-Item Query Text (fixed length, 41 bytes)

Data Item	Bytes	Code
Starting code	1	STX
Frame number	1	“1” – “7”, “0”
Text classification	1	‘q’ (71H)
Equipment identification number	1	Not used, space (20H)
Total number of blocks	2	“01” (no zero suppression)
Block number	2	“01” (no zero suppression)
ID classification	1	“0” (30H) Arbitrary sample ID, Barcode ID, Sequential ID “1” (31H) Sample Tray TT No. and cup position No “2” (32H) Rack No. and number indicating position in rack “3” (33H) Independent holder No
Initial sample ID	13	The response to the ID classification (previous item) is as follows: Arbitrary-sample ID: Up to 13 alphanumeric characters, no zero suppression, left-justified, 20H at the end Barcode ID: Up to 13 alphanumeric characters, no zero suppression, left-justified, 20H at the end Sequential ID: Up to 9 digits, no zero suppression, left-justified, 20H at the end Sample Tray: Fixed-length, 5 digits, no zero suppression, left-justified, 20H at the end Rack No.: Fixed-length, 7 digits, no zero suppression, left-justified, 20H at the end Independent holder No.: Fixed-length, 4 digits, no zero suppression, left-justified, 20H at the end

Table 14 Batch-Item Query Text (fixed length, 41 bytes) (Cont)

Data Item	Bytes	Code
Final sample ID	13	The response to the ID classification (previous item) is as follows: Arbitrary-sample ID: Up to 13 alphanumeric characters, no zero suppression, left-justified, 20H at the end Barcode ID: Up to 13 alphanumeric characters, no zero suppression, left-justified, 20H at the end Sequential ID: Up to 9 digits, no zero suppression, left-justified, 20H at the end Sample Tray: Fixed-length, 5 digits, no zero suppression, left-justified, 20H at the end Rack number: Fixed-length, 7 digits, no zero suppression, left-justified, 20H at the end Independent holder No.: Fixed-length, 4 digits, no zero suppression, left-justified, 20H at the end
Spare	1	Not used (20H)
Termination code	5	(ETX or ETB) + checksum + CR + LF

Before communication is initiated, the following information is provided by the operator using the Host request dialog box of the **Order Entry** window:

- The ID classification item indicates the method used to identify the starting sample ID and the final sample.
- The starting sample ID and the final sample ID determine the range of workorders being requested.

The **ADVIA 1650** Chemistry System does not check for the order ID and the number of received samples, relative to the item-selection instruction text of the host.

In the case of transmission without range designation, the ID positions for the initial and final samples are blank spaces.

When inspection without range designation is performed, both the blank spaces and zeros should be taken into account.

Item Request Text

Applicable communication function: Automatic item registration (page 16)
Real item registration (page 18)

Communication direction: **ADVIA 1650** Chemistry System → Host Computer

Maximum frame size	Maximum number of blocks
256 bytes	5 blocks
512 bytes	3 blocks

Table 15 Item Request Text (first block to last block, variable length)

Data Item	Bytes	Code
Starting code	1	STX
Frame number	1	“1” – “7”, “0”
Text classification	1	“Q” (51H)
Equipment identification number	1	Not used, space (20H)
Total number of blocks	2	“01” to “05” (no zero suppression)
Block number	2	“01” to “05” (no zero suppression)
Number of inquiry samples in a block	2	“01” to “99” (no zero suppression)
ID classification	1	“0” (30H) Arbitrary sample ID, Barcode ID, Sequential ID “1” (31H) Sample Tray TT No. and cup position No. “2” (32H) Rack No. and number indicating position in rack “3” (33H) Independent holder No.
Sample ID	13 byte x n[1]	The response to the ID classification (previous item) is as follows: Arbitrary-sample ID: Up to 13 alphanumeric characters, no zero suppression, left-justified, 20H at the end Barcode ID: Up to 13 alphanumeric characters, no zero suppression, left-justified, 20H at the end Sequential ID: Up to 9 digits, no zero suppression, left-justified, 20H at the end Sample Tray: Fixed-length, 5 digits, no zero suppression, left-justified, 20H at the end Rack No.: Fixed-length, 7 digits, no zero suppression, left-justified, 20H at the end Independent holder No.: Fixed-length, 4 digits, no zero suppression, left-justified, 20H at the end
Spare	1	Not used (20H)
Termination code	5	(ETX or ETB) + checksum + CR + LF

[1] When the maximum frame size is 256 bytes, the maximum number of items is n = 18. The maximum number of samples that can be inquired with one text is 84 samples (Sample Tray) and 5 or 10 samples (rack).

When the maximum frame size is 512 bytes, the maximum number of items is n = 38. There is no item inquiry for STAT samples or quality control samples.

Item-Selection Instruction Text

There are two kinds of item-selection instruction text, one with previous data and the other without previous data.

The number of items for which a request can be made for one sample is 326.

Item-selection instruction text – no previous value

Applicable communication function: Batch-item registration (page 14)
Automatic item registration (page 16)
Real item registration (page 18)

Communication direction: **ADVIA 1650** Chemistry System ← Host Computer

Maximum Frame Size	Maximum number of blocks
256 bytes	7 blocks
512 bytes	3 blocks

Table 16 Item-selection Text – No Previous Value (first block, variable length)

Data Item	Bytes	Code
Starting code	1	STX
Frame number	1	“1” – “7”, “0”
Text classification	1	“O” (4FH)
Equipment identification number	1	Not used, space (20H)
Total number of blocks	2	“01” to “07” (no zero suppression)
Block number	2	“01” (no zero suppression)
Number of items in a block	3	“001” to “999” (no zero suppression)
Sample classification	1	“N” (4EH) General sample “I” (49H) Interruption sample
Registration data	1	“0” (30H) New request. (If a registered sample [workorder] already exists, it is overwritten.) “1” (31H) Item addition, re-run. (In case of an unregistered sample, same as a new request.) “2” (32H) No request. (The system does not perform registration.) “3” (33H) Sample deletion. (Deletion of a previously registered sample)
Sample ID	13	Arbitrary-sample ID: Up to 13 alphanumeric characters, no zero suppression, left-justified, 20H at the end. Barcode ID: Up to 13 alphanumeric characters, no zero suppression, left-justified, 20H at the end. Sequential ID: Up to 9 digits, no zero suppression, left-justified, 20H at the end. Be sure to set unique sample numbers, even for an order of position No. designation.

Table 16 Item-selection Text – No Previous Value (first block, variable length) (Cont)

Data Item	Bytes	Code
Position number	7	Filled with blank spaces when not used (20H). Sample Tray: Fixed-length, 5 digits, no zero suppression, left-justified, 20H at the end Rack No.: Fixed-length, 7 digits, no zero suppression, left-justified Independent holder No.: Fixed-length, 4 digits, no zero suppression, left-justified, 20H at the end
Comment 1	16	ASCII or shift JIS. Filled with blank spaces (20H) when not used.
Comment 2	16	ASCII or shift JIS. Filled with blank spaces (20H) when not used.
Sex	1	“M” (4DH) male or “F” (46H) female: When not used, set to “M”.
Age	3	999 (right-justified): When not used, all three characters are 20H. Zero years old is 20H, 20H, “0”.
Blood sampling date	8	YYYYMMDD Example: 19990229 Filled with blank spaces (20H) when not used.
Dilution coefficient	4	Format: 99.9 (right-justified): When not used, be sure to insert Format: ^1.0 (^0.1 - 99.9). ^ : blank space
Sample classification	1	“1” (31H) blood serum, “2” (32H) urine: When not used, be sure to input “1”.
Container classification	1	“1” to “9” : When not used, “1”.
Request item	(3+1)xn[1]	Item number 3 bytes, Format: 999 (right-justified), 0 suppress
		Sample volume and dilution determined via the **Analytical Parameters (Chemistry)** window. One byte “M” or “D” or “U”. Normally set to “M”. “M” = Analytical conditions values “D” or “U” = Reanalysis condition values
Spare	1	Not used (20H)
Termination code	5	(ETX or ETB) + checksum + CR + LF

[1] When the maximum frame size is 256 bytes the maximum number of items is n = 41. When the maximum frame size is 512 bytes the maximum number of items is n = 105.

Table 17 Item-selection Text – No Previous Value (second to last block, variable length)

Data Item	Bytes	Code
Starting code	1	STX
Frame number	1	“1” – “7”, “0”
Text classification	1	“O” (4FH)
Equipment identification number	1	Not used, space (20H)
Total number of blocks	2	“02” to “07” (no zero suppression)
Block number	2	“02” to “07” (no zero suppression)
Number of items in a block	3	“001” to “999” (no zero suppression)
Spare	2	Not used (20H)

Table 17 Item-selection Text – No Previous Value (second to last block, variable length) (Cont)

Data Item	Bytes	Code
Sample ID	13	Arbitrary-sample ID: Up to 13 alphanumeric characters, no zero suppression, left-justified, 20H at the end Barcode ID: Up to 13 alphanumeric characters, no zero suppression, left-justified, 20H at the end Sequential ID: Up to 9 digits, no zero suppression, left-justified, 20H at the end Be sure to set unique sample numbers, even for an order of position No. designation.
Position number	7	Filled with blank spaces when not used (20H). Sample Tray: Fixed-length, 5 digits, no zero suppression, left-justified, 20H at the end Rack No.: Fixed-length, 7 digits, no zero suppression, left-justified Independent holder No.: Fixed-length, 4 digits, no zero suppression, left-justified, 20H at the end
Request item	(3+1)xn[1]	Item number 3 bytes, Format: 999 (right-justified), 0 suppress
		Sample volume and dilution determined via the **Analytical Parameters (C.hemistry)** window. One byte “M” or “D” or “U”. Normally set to “M.” “M” = Analytical conditions values “D” or “U” = Reanalysis condition values
Spare	1	Not used (20H)
Termination code	5	(ETX or ETB) + checksum + CR + LF

[1] When the maximum frame size is 256 bytes, the maximum number of items is n = 54. When the maximum frame size is 512 bytes, the maximum number of items is n = 118.

Operational Notes:

- If the ID is classified as a sample ID for a batch-item inquiry or an item inquiry, set the sample ID in the item-selection instruction text, and leave the position number unused (barcode operation or creation of worksheets using the **ADVIA 1650** Chemistry System).
- If the ID is classified as a Sample Tray ID or rack-number ID for a batch-item inquiry or an item inquiry, set the position number to which the inquiry was addressed, and also set the sample number to be controlled by the host in the sample ID item (creation of worksheet using the host).
- At the start of Sample Tray analysis, the sample classified “I” as an interruption sample on sample classification is analyzed first. The **ADVIA 1650** Chemistry System also has a built-in function to give priority to interruption samples for Sample Tray analysis. When the samples are analyzed on the rack option or conveyor-belt system, analysis begins sequentially as ordered regardless of that function. Therefore, interruption samples for these systems should be set on the Sample Tray.
- Registration data box

  “0” New Request
  A new request is unconditionally registered as a new item selection. In case of an already registered sample, its information is deleted and overwritten, thereby erasing the analysis-result data. If you cannot judge whether it is a new request or registered item on the host side, specify all of the items in the next box as “‘1’ item addition, rerun.”

  “1” Item addition and rerun
  If the sample is an unregistered sample, it is registered as a new request. If the sample is a registered item, the information of the registered item and item selection order from the host are subjected to the “OR” condition and then analyzed. If there is an order for an analyzed item, the item is analyzed again under rerun conditions. If there is an order for an uninspected item, the item is analyzed under initial-inspection conditions.

“2” No request
Applicable when there is no sample information on the host side or no new order for analysis. In this case, the request item box is omitted.

“3” Sample deletion
Sample registration is normally deleted from the system. Use this box when deleting orders by batch item registration from the host.

Item-selection instruction text – previous value exits

Applicable communication function: Batch-item registration (page 14)
Automatic item registration (page 16)
Real item registration (page 18)

Communication direction: **ADVIA 1650** Chemistry System ← Host Computer

Maximum Frame Size	Maximum number of blocks
256 bytes	24 blocks
512 bytes	11 blocks

Table 18 Item-selection Text – Previous Value Exists (first block, variable length)

Data Item	Bytes	Code
Starting code	1	STX
Frame number	1	“1” – “7”, “0”
Text classification	1	“o” (6FH), lowercase alphabetic oh
Equipment identification number	1	Not used, space (20H)
Total number of blocks	2	“01” to “24” (no zero suppression)
Block number	2	“01” (no zero suppression)
Number of items in a block	3	“001” to “999” (no zero suppression)
Sample classification	1	“N” (4EH) General sample “I” (49H) Interruption sample
Registration data	1	“0” (30H) New request. (If a registered sample [workorder] already exists, it is overwritten.) “1” (31H) Item addition, re-run. (In case of an unregistered sample, same as a new request.) “2” (32H) No request. (The **ADVIA 1650** does not perform registration.) “3” (33H) Sample deletion. (Deletion of a previously registered sample)
Sample ID	13	Arbitrary-sample ID: Up to 13 alphanumeric characters, no zero suppression, left-justified, 20H at the end Barcode ID: Up to 13 alphanumeric characters, no zero suppression, left-justified, 20H at the end Sequential ID: Up to 9 digits, no zero suppression, left-justified, 20H at the end Be sure to set unique sample numbers, even for an order of position No. designation.

Table 18 Item-selection Text – Previous Value Exists (first block, variable length) (Cont)

Data Item	Bytes	Code
Position number	7	Filled with blank spaces when not used (20H). Sample Tray: Fixed-length, 5 digits, no zero suppression, left-justified, 20H at the end Rack No.: Fixed-length, 7 digits, no zero suppression, left-justified Independent holder No.: Fixed-length, 4 digits, no zero suppression, left-justified, 20H at the end
Comment 1	16	ASCII or shift JIS. Filled with blank spaces (20H) when not used.
Comment 2	16	ASCII or shift JIS. Filled with blank spaces (20H) when not used.
Sex	1	“M” (4DH) male or “F” (46H) female: When not used, set to “M”.
Age	3	999 (right-justified): When not used, all three characters are 20H. Zero years old is 20H, 20H, “0”.
Blood sampling date	8	YYYYMMDD Example: 19990229 Filled with blank spaces (20H) when not used.
Dilution coefficient	4	Format: 99.9 (right-justified): When not used, be sure to insert Format: ^1.0 (^0.1 - 99.9). ^ : blank space
Sample classification	1	“1” (31H) blood serum, “2” (32H) urine: When not used, be sure to input “1”.
Container classification	1	“1” to “9” : When not used, “1”.
Request item	(3+1+8+3) x n[1]	Item number 3 bytes, “999” (right-justified)
		Sample volume and dilution determined via the **Analytical Parameters (Chemistry)** window. One byte “M” or “D” or “U”. Normally set to “M”. “M” = Analytical conditions values “D” or “U” = Reanalysis condition values
		Previous value: 8 bytes for 8-digit number (including “-” sign) and floating decimal point, right-justified[2] Filled with blank spaces (20H) when not used.
		Mark: 3 bytes Refer to mark specifications, page 36.
Spare	1	Not used (20H)
Termination code	5	(ETX or ETB) + checksum + CR + LF

[1] When the maximum frame size is 256 bytes, the maximum number of items is n = 11. When the maximum frame size is 512 bytes, the maximum number of items is n = 28.

[2] Previous values are as follows.

123.45 → ^^123.45
–6.7 → ^^^^–6.7
^ : Blank space (20H)

Table 19 Item-selection Text – Previous Value Exists (second to last block, variable length)

Data Item	Bytes	Code
Starting code	1	STX
Frame number	1	“1” – “7”, “0”
Text classification	1	“o” (6FH), lowercase alphabetic oh
Equipment identification number	1	Not used, space (20H)
Total number of blocks	2	“02” to “24” (no zero suppression)
Block number	2	“02” to “24” (no zero suppression)
Number of items in a block	3	“001” to “999” (no zero suppression)
Spare	2	Not used (20H)
Sample ID	13	Arbitrary-sample ID: Up to 13 alphanumeric characters, no zero suppression, left-justified, 20H at the end Barcode ID: Up to 13 alphanumeric characters, no zero suppression, left-justified, 20H at the end Sequential ID: Up to 9 digits, no zero suppression, left-justified, 20H at the end Be sure to set unique sample numbers, even for an order of position No. designation.
Position number	7	Filled with blank spaces when not used (20H). Sample Tray: Fixed-length, 5 digits, no zero suppression, left-justified, 20H at the end Rack No.: Fixed-length, 7 digits, no zero suppression, left-justified Independent holder No.: Fixed-length, 4 digits, no zero suppression, left-justified, 20H at the end
Request item	(3+1+8+3)x n[1]	Item number 3 bytes, “999” (right-justified)
		Sample volume and dilution determined via the **Analytical Parameters (Chemistry)** window. One byte “M” or “D” or “U”. Normally set to “M”. “M” = Analytical conditions values “D” or “U” = Reanalysis condition values
		Previous value: 8 bytes for 8-digit number (including “-” sign) and floating decimal point, right-justified[2] Filled with blank spaces (20H) when not used.
		Mark: 3 bytes Refer to mark specifications, page 36.
Spare	1	Not used (20H)
Termination code	5	(ETX or ETB) + checksum + CR + LF

[1] When the maximum frame size is 256 bytes, the maximum number of items is n = 11. When the maximum frame size is 512 bytes, the maximum number of items is n = 28.

[2] Previous values are as follows.

123.45 → ^^123.45
–6.7 → ^^^^–6.7
^ : Blank space (20H)

Operational Notes:

- If the ID is classified as a sample ID for a batch-item inquiry or an item inquiry, set the sample ID in the item-selection instruction text, and leave the position number unused (barcode operation or creation of worksheets using the **ADVIA 1650** Chemistry System)
- If the ID is classified as a Sample Tray ID or rack-number ID for a batch-item inquiry or an item inquiry, set the position number to which the inquiry was addressed, and also set the sample number to be controlled by the host in the sample ID item (creation of worksheet using the host).
- At the start of Sample Tray analysis, the sample classified “I” as an interruption sample on sample classification is analyzed first. The **ADVIA 1650** Chemistry System also has a built-in function to give priority to interruption samples for Sample Tray analysis. When the samples are analyzed on the rack option or conveyor-belt system, analysis begins sequentially as ordered regardless of that function. Therefore, interruption samples for these systems should be set on the Sample Tray.
- Registration data box

  “0” New Request
  A new request is unconditionally registered as a new item selection. In case of an already-registered sample, its information is deleted and overwritten, thereby erasing the analysis-result data. If you cannot judge whether it is a new request or registered item on the host side, specify all of the items in the next box as “‘1’ item addition, rerun.”

  “1” Item addition and rerun
  If the sample is an unregistered sample, it is registered as a new request. If the sample is a registered item, the information of the registered item and item selection order from the host are subjected to the “OR” condition and then analyzed. If there is an order for an analyzed item, the item is analyzed again under rerun conditions. If there is an order for an uninspected item, the item is analyzed under initial-inspection conditions.

  “2” No request
  Applicable when there is no sample information on the host side or no new order for analysis. In this case, the request item box is omitted.

  “3” Sample deletion
  Sample registration is normally deleted from the system. Use this box when deleting orders by batch item registration from the host.

Measurement Data Text

Applicable communication function: Batch data output (page 20)
Real data output (page 21)

Communication direction: **ADVIA 1650** Chemistry System → Host Computer

Maximum Frame Size	Maximum number of blocks
256 bytes	25 blocks
512 bytes	11 blocks

Table 20 Measurement Data Text (first block, variable length)

Data Item	Bytes	Code
Starting code	1	STX
Frame number	1	“1” – “7”, “0”
Text classification	1	“R” (52H)
Equipment identification number	1	Not used, space (20H)
Total number of blocks	2	“01” to “25”
Block number	2	“01” (no zero suppression)
Number of items in a block	3	“001” to “999” (no zero suppression)
Inspection date	8	YYYYMMDD Example: 19990229
Sample classification	1	“N” (4EH) General sample “C” (43H) Control sample “S” (53H) STAT sample[1] “I” (49H) Interruption sample[1]
ID specification	1	“0” (30H) New request. (If a registered sample [workorder] already exists, it is overwritten.) “1” (31H) Item addition, re-run. (In case of an unregistered sample, same as a new request.) “2” (32H) Rack number. (Not used.) “3” (33H) Sample deletion. (Deletion of a previously registered sample.)
Sample ID	13	Arbitrary-sample ID: Up to 13 alphanumeric characters, no zero suppression, left-justified, 20H at the end Barcode ID: Up to 13 alphanumeric characters, no zero suppression, left-justified, 20H at the end Sequential ID: Up to 9 digits, no zero suppression, left-justified, 20H at the end Be sure to set unique sample numbers, even for an order of position No. designation.
Position number	7	Filled with blank spaces when not used (20H). Sample Tray: Fixed-length, 5 digits, no zero suppression, left-justified, 20H at the end Rack No.: Fixed-length, 7 digits, no zero suppression, left-justified Independent holder No.: Fixed-length, 4 digits, no zero suppression, left-justified, 20H at the end

Table 20 Measurement Data Text (first block, variable length) (Cont)

Data Item	Bytes	Code
Comment 1	16	ASCII or shift JIS. Filled with blank spaces (20H) when not used.
Comment 2	16	ASCII or shift JIS. Filled with blank spaces (20H) when not used.
Sex	1	“M” (4DH) male or “F” (46H) female: When not used, set it to “M”.
Age	3	999 (right-justified): When not used, age is always “0.”
Blood sampling date	8	YYYYMMDD Example: 19990229
Dilution coefficient	4	Format: 99.9 (right-justified): When not used, be sure to insert Format: ^1.0 (^0.1 - 99.9). ^ : blank space
Sample classification	1	“1” (31H) blood serum, “2” (32H) urine: When not used, be sure to set “1”.
Container classification	1	“1” to “9” : When not used, “1”.
Request item	(3+1+8+ 3) x n^2	Item number 3 bytes, “999” (right-justified)
		Analysis condition 1 byte “M” or “D” or “U” Normally set to “M”
		Previous value: 8 bytes for 8-digit number (including “-” sign) and floating decimal point, right-justified Filled with blank spaces (20H) when not used.
		Mark: 3 bytes Refer to mark specifications, page 36.
Spare	1	Not used (20H)
Termination code	5	(ETX or ETB) + checksum + CR + LF

[1] STAT samples and control samples are sent with the sample classification and a unique alphanumeric ID assigned by the ADVIA 1650.
STAT ID: 3 characters (E01 to E84), no zero suppression, left justified, 20H at end.
Control ID: 4 characters (PA01 to PJ 20) no zero suppression, left justified, 20H at end.

[2] When the maximum frame size is 256 bytes, the maximum number of items is n = 10. When the maximum frame size is 512 bytes, the maximum number of items is n = 27.

Table 21 Measurement Data text (second to last block, variable length)

Data Item	Bytes	Code
Starting code	1	STX
Frame number	1	“1” – “7”, “0”
Text classification	1	“R” (52H)
Equipment identification number	1	Not used, space (20H)
Total number of blocks	2	“02” to “25” (no zero suppression)
Block number	2	“02” to “25” (no zero suppression)
Number of items in a block	3	“001” to “999” (no zero suppression)
Inspection date	8	YYYYMMDD Example: 19990229
Sample classification	1	“N” (4EH) General sample “C” (43H) Control sample “S” (53H) STAT sample “I” (49H) Interruption sample

Table 21 Measurement Data text (second to last block, variable length) (Cont)

Data Item	Bytes	Code
ID specification	1	"0" (30H) New request. (If a registered sample [workorder] already exists, it is overwritten.) "1" (31H) Item addition, re-run. (In case of an unregistered sample, same as a new request.) "2" (32H) Change attribute. (The system does not perform registration.) "3" (33H) Sample deletion. (Deletion of a previously registered sample.)
Sample ID	13	Arbitrary-sample ID: Up to 13 alphanumeric characters, no zero suppression, left-justified, 20H at the end Barcode ID: Up to 13 alphanumeric characters, no zero suppression, left-justified, 20H at the end Sequential ID: Up to 9 digits, no zero suppression, left-justified, 20H at the end Be sure to set unique sample numbers, even for an order of position No. designation.
Position number	7	Filled with blank spaces when not used (20H). Sample Tray: Fixed-length, 5 digits, no zero suppression, left-justified, 20H at the end Rack No.: Fixed-length, 7 digits, no zero suppression, left-justified Independent holder No.: Fixed-length, 4 digits, no zero suppression, left-justified, 20H at the end
Request item	(3+1+8+3) x n[1]	Item number 3 bytes, "999" (right-justified)
		Analysis condition 1 byte "M" or "D" or "U". Normally set to "M".
		Previous value: 8 bytes for 8-digit number (including "-" sign) and floating decimal point, right-justified[2] Filled with blank spaces (20H) when not used.
		Mark: 3 bytes Refer to mark specifications, page 36.
Spare	1	Not used (20H)
Termination code	5	(ETX or ETB) + checksum + CR + LF

[1] When the maximum frame size is 256 bytes, the maximum number of items is n = 13. When the maximum frame size is 512 bytes, the maximum number of items is n = 31.

[2] Result formats are as follows.

123.45 → ^^123.45
-6.7 → ^^^^-6.7
Overflow → ////////
No measurement value → ^^^^^^^^
^ : Blank space (20H)

Items that are set to output qualitative measurement data are as follows:

- Each of the items is fixed at 8 characters in length. Up to 6 characters are used for analysis-condition settings and they are right-justified. The first 2 characters are used for spaces. Setting 3 two-byte characters is possible, and in this case, SHIFT JIS codes will be output.
- The position-number box of the sample that was subjected to barcode analysis using a sample ID is invalid.

Mark (Result Flag) Specifications

A mark or result flag consists of a total of 3 bytes: judgment, status, and rerun, each 1 byte.

Judgment (first byte)		Status (second byte)				Rerun (third byte)	
		Photometric Flag		Electrolyte Flag			
C	Calibration not possible	s	Insufficient sample	s	Insufficient sample	R	Rerun value
L, H	Abnormal value limit	t	Insufficient diluent liquid	S	Safety error	Space	first run value
l, h	Normal value limit	S	Safety	B	Liquid remaining in dilution cup		
Space	No mark (flag)	r	Insufficient reagent	T	Abnormal thermistor		
		u, d	Light absorption limit	r	Insufficient reagent		
		p	Prozone limit	u	Selectivity abnormal		
		*	Dispersion abnormality	*	CAL allowable value		
		n	Abnormal number of effective points	Space	No mark (flag)		
		N	Cell-blank abnormality				
		U, D	Light absorption limit				
		Space	No mark (flag)				

In the above table, the higher the position in the mark (result flag) column, the higher the degree of priority.