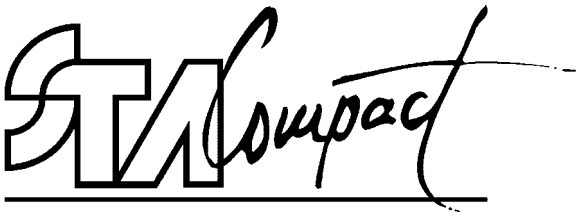
P. HOST INTERFACE 1

Back to Home Page

P. HOST INTERFACE

P.1. ASTM Connection Guide (STA Compact ® ↔ Host Computer)

USER INTERFACE
RS232-C



Cat. No.: 28062

V 1.1 - March 02

Revision Table

Manual Version	Date	List of Modifications
V 1.0	November 95	Original Version
V 1.1.	March 97	Modified Pages: 11, 14, 24 and Table of Contents **Note:** Modifications made to be consistent with software version 104.
V 1.1	March 02	Addition of an automatically incremented sequence number (in the frame Order) transmitted to the host

1. Physical Characteristics

- Interface: Series type, RS232C standard
- Connections: DB-9 male plug on STA Compact ®
  pin 2: reception input
  pin 3: transmission output
  pin 5: ground
- Exchange protocol: no hardware control line is connected;
- Baud Rate*: 300, 600, 1200, 2400, 4800 or 9600 baud;
- Parity*: even, odd or none;
- Data Bit*: 7 or 8;
- Stop Bit*: 1 or 2.

*: parameters to be programmed in the **Global Options** menu in the STA Compact ® software *(see below, chapter* 4.4.4. *of this STA Compact ® User Interface RS232-C).*

2. Standards

The ASTM connection protocol on STA Compact ® is based on the two following standards:

– E 1381-94 : Specification for Low-Level Protocol to transfer messages between Clinical Laboratory Instruments and Computer Systems,
– E 1394-91 : Standard Specification for transferring information between Clinical Instruments and Computer Systems.

3. Terminology

3.1. Global Definitions

Sender: The device that has a message to send and that initiates transmission process.

Upload: Data transmitted from the instrument (STA Compact ®) to the host computer.

Receiver: The device that responds to the sender.

Download: Data transmitted from the host computer to the instrument (STA Compact ®).

Frame: All framing required for transmission of data. This framing will include:
<STX> [Frame Number] [DATA] <ETB> or <ETX> [C1] [C2] <CR> <LF>.

Frame Number: (Fn) Frame number permits the receiver to distinguish between new and retransmitted frames.
ASCII digit ranging from 0 to 7. The frame number begin at 1 with the first frame of transfer phase. It is incremented by one for every new frame transmitted. After 7, the frame number rolls over to 0, and continue in this fashion.

Message: A group of records that begins with a Header record, and ends with a Terminator record.

Record: This is the DATA as described within the frame. If the DATA is longer than 240 characters, then it must be split into two parts and sent in two frames. The intermediate frame will use the <ETB> character, and the ending frame will use the <ETX> character.

For our application:
- in download mode, a frame may include several records, indeed a message;
- in upload mode, one frame is used for sending each record.

List of records selected:

- H (Header);
- P (Patient);
- O (Order);
- R (Result);
- Q (Query);
- L (Terminator);
- M (Manufacturer).

(See description, Chapter 6. *of this STA Compact ® User Interface RS232-C).*

3.2. Definition of Characters

<ACK> (06h)	:	acknowledge without error;
<NACK> (15h)	:	acknowledge with error;
<ETX> (03h)	:	end of text transmission;
<STX> (02h)	:	start of text transmission;
[C1]	:	most significant character of checksum;
[C2]	:	least significant character of checksum;
<ENQ> (05h)	:	request for line (enquiry);
<ETB> (17h)	:	end of transmission block;
<EOT> (04h)	:	end of transmission;
<CR> (0Dh)	:	carriage return;
<LF> (0Ah)	:	line feed.

Calculation of Frame Checksum = the checksum is computed by adding the binary values of the characters (except for <STX>, [C1], [C2], <CR> and <LF>), keeping the least significant eight bits of the result. The checksum is encoded as two characters. (For example a checksum of 122 can be represented as 7A in hexadecimal. The checksum is transmitted as the ASCII character 7 followed by the character A.).

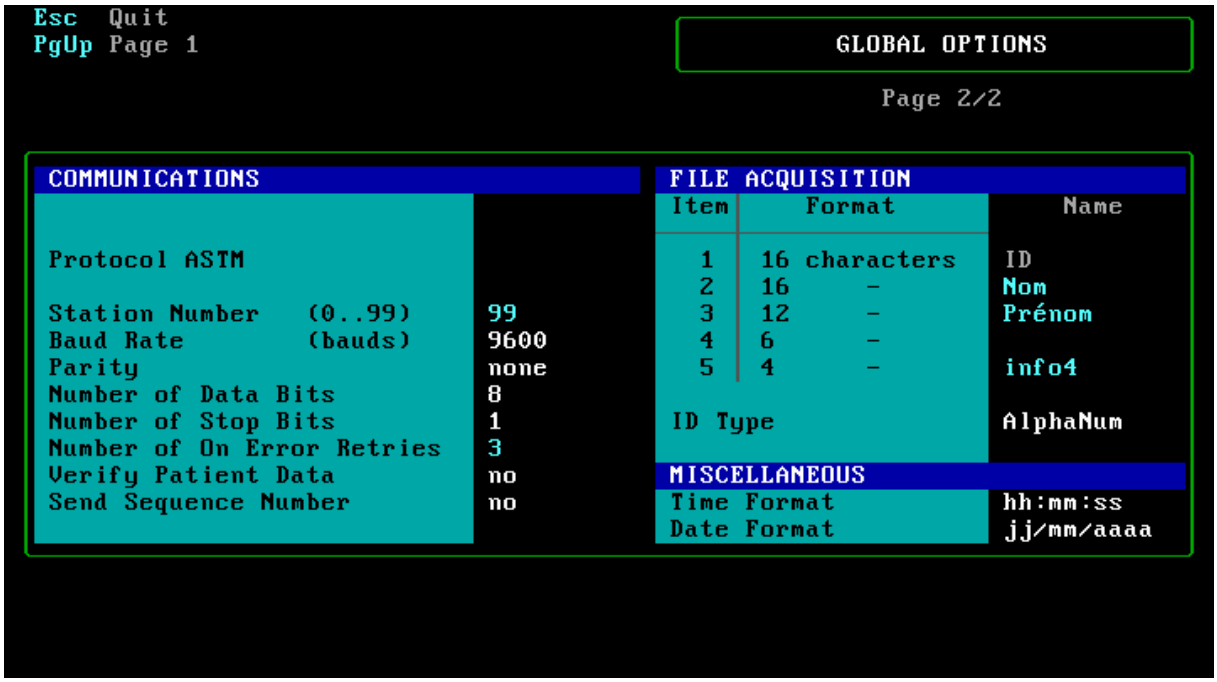
4. Global Options Menu

Access to the Global Options menu:

From the main screen:
- press the **ESC** key to bring up the **Main Menu**;
- select the **Setup** menu, then select the **Global Options** sub-menu from this menu.

This menu in the STA Compact ® program is used, amongst other things, for programming the communication parameters between an STA Compact ® and the host computer. Access is restricted by a code system.

Fig. 1 - **GLOBAL OPTIONS** screen, page 2 of 2 (ASTM Protocol)



Description of Parameters

Parameters for which there is a multiple choice are shown in white (to make the different selections, use the **DELETE** key), and those with free entry in blue.

- *Station Number:* number by which the central site identifies the STA Compact ®; Maximum: 99;
- *Baud Rate:* chosen transmission speed: 300, 600, 1200, 2400, 4800 or 9600 baud;
- *Parity:* type of parity chosen: none, even or odd;
- *Number of Data Bits:* 7 or 8;
- *Number of Stop Bits:* 1 or 2;
- *Number of On Error Retries:* number of times the STA Compact ® returns the frame when it receives a character different from <ACK> or <EOT>. In accordance with the Standard E1381-91, this number has to be set to 6.

– *Verify Patient data:*

possible choices:

- **YES**, when the working list is remotely loaded, the STA Compact ® records 4 patient information fields (a maximum of 38 characters for processing and control) and the operator may check them. These 38 characters are defined on the STA Compact ® as follows:

Information 1	16 characters maximum
Information 2	12 characters maximum
Information 3	6 characters maximum
Information 4	4 characters maximum
Total	38 characters maximum

- **NO**, when the working list is remotely loaded, the STA Compact ® records the 4 patient information fields but the operator cannot check them.

For more the details, *see Chapter 6*.6.2. *of this STA Compact ® User Interface RS232-C.*

- *Send Sequence Number*: automatically incremented number generation (between 1 through 9999, number reset at 9999) located in the **Order** frame, field 4 that is the **Instrument Speciment ID** field (not activated by default).

5. Exchange Protocol

5.1. Definition of Line Modes on the STA Compact ®

– Idle = no communication in progress
– Tx = transmission by STA Compact ®
– Rx = reception by STA Compact ®

5.2. Definition of Phases of Communication

ASTM communication is in three stages:
– Establishment phase: line picked up by the host computer or the STA Compact ®;
– Transfer phase: transmission of the different records making up the message *(see definition of records, chapter* 6. *of the STA Compact ® User Interface RS232-C)*;
– Termination phase: the line is released.

5.3. Host Computer → STA Compact ® Exchanges

STA Compact ® responses to characters transmitted by the host computer:

1. Reception of the <ENQ> character transmitted by the host computer:
   If the STA Compact ® is in the **Idle** line mode, it transmits an <ACK> character (06h) and then changes to reception line mode **Rx**.
   If after 30 seconds, no character is received, then STA Compact ® returns to the **Idle** line mode.

2. Reception of the <EOT> character transmitted by the host computer:
   - If the STA Compact ® is in the **Rx** reception line mode and a header record has been received, the STA Compact ® then changes to **Idle** line mode (releasing the line); the STA Compact ® then analyses the records received;
   - If the STA Compact ® is in **Tx** transmission line mode, the <EOT> character is regarded as an acknowledgement *(see chapter* 5.4. *b. of the STA Compact ® User Interface RS232-C)*.

3. Reception of other characters transmitted by the host computer:
   The STA Compact ® proceeds to enter the characters received. After entering a complete frame, the STA Compact ® verifies the checksum. If this is satisfactory, the STA Compact ® acknowledges by returning an <ACK> character (06h). If not, a <NACK> character (15h) is returned.
   Following the upload of the characters <ACK> or <NACK>, if after 30 seconds, no character is received, then STA Compact ® returns to the **Idle** line mode.

5.4. STA Compact ® → Host Computer Exchanges

a) Establishment Phase

If the line mode is **Idle**, the STA Compact ® sends an <ENQ> character (enquiry).

The following are the possible responses from the host computer:

1. Transmission of an <ACK> Character by the Host Computer:
   The STA Compact ® changes to **Tx** transmission line mode and initiates the record transfer phase if it is in normal mode or the termination phase (transmission of an <EOT> character) if it is in line test mode.

2. Transmission of an <ENQ> Character by the Host Computer:
   The STA Compact ® waits 5 seconds and then returns an <ENQ> character.

3. Transmission of Other Characters by the Host Computer:
   The STA Compact ® waits 10 seconds and then returns the <ENQ> character. When the value of the "Number of On Error Retries" defined in the **Global Options** menu *(see chapter* 4. *of the STA Compact ® User Interface RS232-C)* is reached, the STA Compact ® changes to termination phase (transmission of an <EOT> character) and displays an error message.

4. No Response from the Host Computer:
   The STA Compact ® waits 15 seconds, then changes to termination phase (transmission of an <EOT> character) and displays an error message.

b) Transfer Phase (STA Compact ® → Host Computer)

Transmission of the first record by the STA Compact ®.

The following are the possible responses of the host computer:

1. Transmission of the <ACK> or <EOT> Character by the Host Computer:
   The STA Compact ® sends the next record.

☞ **Caution!** The STA Compact ® regards the <EOT> character as an acknowledgement character and continues to transmit records.

2. Transmission of Other Characters by the Host Computer:
   The STA Compact ® waits 10 seconds before returning the record. If the number of on Error Retries is higher than that defined in the **Global Options** menu *(see chapter* 4. *of the STA Compact ® User Interface RS232-C)*, the STA Compact ® changes to termination phase (transmission of an <EOT> character) and displays an error message.

3. No Response from the Host Computer:
   The STA Compact ® waits 15 seconds and then changes to termination phase (transmission of an <EOT> character) and displays an error message.

c) Termination Phase (STA Compact ® → Host Computer)

The STA Compact ® transmits an <EOT> character and does not wait for any return character. The STA Compact ® changes to **Idle** line mode.

d) Example of Host Computer → STA Compact ® Exchange

STA Compact ®		Host Computer
	<ENQ> ---------->	
	<----------	<ACK> or <EOT>
<STX> 1 [DATA1] <ETX> [C1] [C2] <CR> <LF>	---------->	
	<----------	<ACK> or <EOT>
<STX> 2 [DATA2] <ETX> [C1] [C2] <CR> <LF>	---------->	
	<----------	<ACK> or <EOT>
<STX> 3 [DATA3] <ETX> [C1] [C2] <CR> <LF>	---------->	
	<----------	<ACK> or <EOT>
	<EOT> ---------->	
		No response expected

6. Record Definitions

6.1. Message Header Record

Purpose : To identify the sender.

STA Compact ® implementation example:

H | \ ^ & | | | 99 ^ 2.00 | | | | | | | P | 1.00 | 19941213100400 <CR>

Description of a Message Header Record on STA Compact ®:

PARAGRAPH'S NUMBER OF E 1394-91 STANDARD	CHARACTER	FIELD DESCRIPTION	SUPPORTED	
			UPLOAD (STA COMPACT ® → HOST)	DOWNLOAD (HOST → STA COMPACT ®)
7.1.1	H	**Record Type ID** = header record	Yes	Yes
7.1.2	| \ ^ &	**Delimiter Definition** = defined as field delimiter (7Ch) = defined as repeat field delimiter (5Ch) = defined as component delimiter (5Eh) = defined as Escape delimiter (26h)	Yes	Yes
7.1.3	|	**Message Control ID**	No	No
7.1.4	|	**Access Password**	No	No
7.1.5	| 99 ^ 2.00	**Sender Name or ID** = Instrument ID ❶ (Numeric 1 to 99) = Version level of Stago instrument implementation	Yes Yes	Yes Yes
7.1.6	|	**Sender Street Address**	No	No
7.1.7	|	**Reserved Field**	No	No
7.1.8	|	**Sender Telephone Number**	No	No

PARAGRAPH'S NUMBER OF E 1394-91 STANDARD	CHARACTER	FIELD DESCRIPTION	SUPPORTED	
			UPLOAD (STA COMPACT ® → HOST)	DOWNLOAD (HOST → STA COMPACT ®)
7.1.9	|	**Characteristics of sender**	No	No
7.1.10	|	**Receiver ID**	No	No
7.1.11	|	**Comment or Special Instructions**	No	No
7.1.12	| P	**Processing ID** P = Production Q = Quality Control T = Training D = Debugging	 Yes Yes No No	 No No No No
7.1.13	| 1.00	**Version No.** = Version level of ASTM specifications (E 1394-91)	Yes	No
7.1.14	| 19941213 100400	**Date and Time of Message** Format: yyyymmddhhmmss yyyy = year mm = month dd = day hh = hour mm = minutes ss = seconds	Yes	No
	<CR>	carriage return		

❶ : For STA Compact ®, this parameter is defined within the **Global Options** menu *(see Chapter* 4. *of this STA Compact ® User Interface RS232-C).*

6.2. Patient Information Record

Purpose : To give information on the Patient.

STA Compact ® implementation example:

P | 1 | | | Info1^Info2^Info3^Info4 <CR>

Description of a Patient Information Record on STA Compact ®:

PARAGRAPH'S NUMBER OF E 1394-91 STANDARD	CHARACTER	FIELD DESCRIPTION	SUPPORTED	
			UPLOAD (STA COMPACT ® → HOST)	DOWNLOAD (HOST → STA COMPACT ®)
8.1.1	P	**Record Type ID** = Patient record (50h)	Yes	Yes
8.1.2	| 1	**Sequence Number**	Yes	Yes
8.1.3	|	**Practice Assigned Patient ID**	No	No
8.1.4	|	**Laboratory Assigned Patient ID**	No	No

PARAGRAPH'S NUMBER OF E 1394-91 STANDARD	CHARACTER	FIELD DESCRIPTION	SUPPORTED	
			UPLOAD (STA COMPACT ® → HOST)	DOWNLOAD (HOST → STA COMPACT ®)
8.1.5	| Info1 ^ Info2 ^ Info3 ^ Info4	**Patient ID No.3** = 16 Alphanumeric Characters Max. = 12 Alphanumeric Characters Max. = 6 Alphanumeric Characters Max. = 4 Alphanumeric Characters Max.	Yes	Yes
	<CR>	Carriage Return		

Note: Fields 8.1.6 to 8.1.35 as defined in the ASTM Specifications E 1394-91 are not supported. In downloading (Host → STA Compact ®), if these fields exist, they are ignored. In uploading (STA Compact ® → Host), we use the short record format described above.

6.3. Test Order Record

Purpose: - In downloading (Host → STA Compact ®), this record is used by the host computer to give orders to the instrument (STA Compact ®): list of tests to be run;
- In uploading (STA Compact ® → Host), this record is used by STA Compact ® to give the sample identification.

STA Compact ® implementation example for download (Host → STA Compact ®):

O | 1 | 00120025 | | ^^^10 \ ^^^11 \ ^^^12 | R <CR>

STA Compact ® implementation example for upload (STA Compact ® → Host):

O | 1 | 00120025 | | | R <CR>

Description of a Test Order Record:

PARAGRAPH'S NUMBER OF E 1394-91 STANDARD	CHARACTER	FIELD DESCRIPTION	SUPPORTED	
			UPLOAD (STA COMPACT ® → HOST)	DOWNLOAD (HOST → STA COMPACT ®)
9.4.1	O	**Record Type ID** = Order record	Yes	Yes
9.4.2	| 1	**Sequence Number**	Yes	Yes
9.4.3	| 00120025	**Specimen ID** = 16 Alphanumeric Characters Max.	Yes	Yes

PARAGRAPH'S NUMBER OF E 1394-91 STANDARD	CHARACTER	FIELD DESCRIPTION	SUPPORTED	
			UPLOAD (STA COMPACT ® → HOST)	DOWNLOAD (HOST → STA COMPACT ®)
9.4.4	|	**Instrument Specimen ID** *Send Sequence Number* (in the **Global Options** menu): ⇨ activated ⇨ not activated	 Yes No	 No No
9.4.5	| ^ ^ ^ 10 \ ^ ^ ^ 11 \ ^ ^ ^ 12	**Universal Test ID** Universal Test ID Part 1 Universal Test ID Name Universal Test ID Type Manufacturer's or Local Code = ID of the first requested test ❶ = Repeat field delimiter = ID of the second requested test ❶ = Repeat field delimiter = ID of the third requested test ❶	No	Yes
9.4.6	| R	**Priority** R = Routine S = Stat A = As soon as possible C = Callback P = Preoperative	 Yes Yes No No No	 Yes Yes No No No
	<CR>	Carriage Return		

❶ For STA Compact ®, these identifications are the transmission test numbers defined for each test main units *(see STA Compact ® Operator's Manual, Chapter 3.1.3.1.)*. For each sample, STA Compact ® can accept a maximum of **twelve tests**.

Note: Field 9.4.7 to 9.4.31 as defined in the ASTM Specifications E 1394-91 are not supported. In downloading (Host → STA Compact ®), if these fields exist, they are ignored. In uploading (STA Compact ® → Host), we use the short record format described above.

6.4. Result Record

Purpose: To transmit Results to the host computer.

STA Compact ® implementation example:

R | 1 | ^^^10 | 100 | % | | | | F | | | | 19941213100400 <CR>

Description of a Result Record on STA Compact ®:

PARAGRAPH'S NUMBER OF E 1394-91 STANDARD	CHARACTER	FIELD DESCRIPTION	SUPPORTED	
			UPLOAD (STA COMPACT ® → HOST)	DOWNLOAD (HOST → STA COMPACT ®)
10.1.1	R	**Record Type ID** = Result Record (52h)	Yes	No
10.1.2	| 1	Sequence Number	Yes	No
10.1.3	| ^ ^ ^ 10	**Universal Test ID** Universal Test ID Part 1 Universal Test ID Name Universal Test ID Type Manufacter's or Local Code = ID of the test ❶	Yes	No
10.1.4	| 100	**Data or Measurement Value** = Test result	Yes	No
10.1.5	| %	**Units** = Unit of the test result ❷	Yes	No
10.1.6	|	**Reference Ranges**	No	No
10.1.7	|	**Result Abnormal Flags**	No	No
10.1.8	|	**Nature of Abnormality Testing**	No	No
10.1.9	| F	**Result Status** F = Final results C = Correction of previously transmitted results P = Preliminary results X = Results cannot be done, request will not be honored I = In instrument, results pending S = Partial results M = This result is a MIC level R = This result was previously transmitted	 Yes No No No No No No No	 No No No No No No No No

PARAGRAPH'S NUMBER OF E 1394-91 STANDARD	CHARACTER	FIELD DESCRIPTION	SUPPORTED	
			UPLOAD (STA COMPACT ® → HOST)	DOWNLOAD (HOST → STA COMPACT ®)
		N = This result record contains necessary information to run a new order	No	No
		Q = This result is a response to an outstanding query	No	No
		V = Operator verified/approved result	No	No
10.1.10	|	**Date of Change in Instrument Normative Values or Units**	No	No
10.1.11	|	**Operator Identification**	No	No
10.1.12	|	**Date/Time Test Started**	No	No
10.1.13	| 19941213 100400	**Date/Time Test Completed** Format: yyyymmddhhmmss yyyy = year mm = month dd = day hh = hour mm = minutes ss = seconds	Yes ❸	No
	<CR>	Carriage return		

☞ **Caution**! One record is used for each result. If for a requested test, result can be expressed in 3 different units, then there will be 3 records.

❶ For STA Compact ®, this identification is the transmission test number defined for each related test unit *(see STA Compact ® Operator's Manual, Chapter 3.1.3.1.)*

❷ List of units available on STA Compact ®:

Units	Result Format
sec., Reference Time	xxx.x
%, mg/dl	xxxxx
OD, OD/min	x.xxx
Ratio, INR, g/l, ng/ml, U/ml, IU/ml, µg/ml	xx.xx
UA1, UA2, UA3	0 to 3 decimal

❸ Is only used while uploading quality control results.

☞ **Caution**! On STA Compact ®, a Result Record is **always followed** by a Manufacturer Information Record *(see below, Chapter* 6.7.*).*

Note: Field 10.1.14 as defined in the ASTM Specifications E 1394-91 is not supported. In downloading (Host → STA Compact ®), if this field exist, it is ignored. In uploading (STA Compact ® → Host), we use the short record format described above.

6.5. Request Information Record

Purpose: For instrument (STA Compact ®), to request the working list (tests to be run).

STA Compact ® implementation example:

Q | 1 | ^ 00120025 <CR>

Description of a Request Information Record:

PARAGRAPH'S NUMBER OF E 1394-91 STANDARD	CHARACTER	FIELD DESCRIPTION	SUPPORTED	
			UPLOAD (STA COMPACT ® → HOST)	DOWNLOAD (HOST → STA COMPACT ®)
12.1.1	Q	**Record Type ID** = Request record	Yes	No
12.1.2	| 1	**Sequence Number**	Yes	No
12.1.3	| ^ 00120025	**Starting Range ID Number** Computer System Patient ID Speciment ID = 16 Alphanumeric Characters Max.	Yes	No
	<CR>	Carriage return		

Note: Field 12.1.4 to 12.1.13 as defined in the ASTM Specifications E 1394-91 are not supported. In downloading (Host → STA Compact ®), if these fields exist, they are ignored. In uplaoding (STA Compact ® → Host), we use the short record format described above.

6.6. Message Terminator Record

Purpose: Last record of message.

STA Compact ® implementation example:

L | 1 | N <CR>

Description of a Terminator Record:

PARAGRAPH'S NUMBER OF E 1394-91 STANDARD	CHARACTER	FIELD DESCRIPTION	SUPPORTED	
			UPLOAD (STA COMPACT ® → HOST)	DOWNLOAD (HOST → STA COMPACT ®)
13.1.1	L	**Record Type ID** = Terminator record	Yes	Yes
13.1.2	| 1	**Sequence Number**	Yes	Yes

PARAGRAPH'S NUMBER OF E 1394-91 STANDARD	CHARACTER	FIELD DESCRIPTION	SUPPORTED	
			UPLOAD (STA COMPACT ® → HOST)	DOWNLOAD (HOST → STA COMPACT ®)
13.1.3	| N	**Terminator Code** N = Normal termination T = Sender aborted R = Receiver requested abort E = Unknow system error Q = Error in last request for information I = No information available from last query F = Last request for information processed	 Yes No No No No No No	 No No No No No No No
	<CR>	Carriage return		

6.7. Manufacturer Information Record

Purpose: To transmit result error code and result alarm code.

STA Compact ® implementation example:

M | 1 | A | @ <CR>

Description of a Manufacturer Information Record:

PARAGRAPH'S NUMBER OF E 1394-91 STANDARD	CHARACTER	FIELD DESCRIPTION	SUPPORTED	
			UPLOAD (STA COMPACT ® → HOST)	DOWNLOAD (HOST → STA COMPACT ®)
15.1.1	M	**Record Type ID** = Manufacturer Information Record	Yes	No
15.1.2	| 1	**Sequence Number**	Yes	No
15.1.3	| A	**Error Code** A = Validated (see error code list below)	Yes	No
15.1.4	| @	**Alarm Code** @ = No alarm (see alarm code list below)	Yes	No
	<CR>	Carriage return		

☞ **Caution**! On STA Compact ®, a Manufacturer Information Record **always follows** a Result Record to indicate the Error and the Alarm Codes of the result.

Examples:

R │ 1 │ ^^^10 │ 100 │ % │ │ │ │ F │ │ │ │ 19941213100400 <CR>

M │ 1 │ A │ @ <CR>

R │ 2 │ ^^^11 │ 13.2 │ sec. │ │ │ │ F │ │ │ │ 19941213100400 <CR>

M │ 2 │ A │ @ <CR>

R │ 3 │ ^^^12 │ 1.23 │ INR │ │ │ │ F │ │ │ │ 19941213100400 <CR>

M │ 3 │ A │ @ <CR>
.....

Definition of Error Codes:

Characters	ASCII Code	Error Code Definition
'1'	31h	"to be validated"
'2'	32h	"tech error"
'3'	33h	"> Mmax."
'4'	34h	"< Mmin."
'5'	35h	"diff > tol"
'6'	36h	"QNS", no plasma
'8'	38h	"linearity"
'A'	41h	"Validated"

Definition of Alarm Codes:

Characters	ASCII Code	Alarm Description
'@'	40h	No alarm
'A'	41h	Result : Confirmed with T>max.
'B'	42h	Not used
'C'	43h	Quality Control : out of range or not done
'D'	44h	Quality Control : overridden
'E'	45h	Needle #3 : no level detection
'F'	46h	Needle #2 : no level detection
'G'	47h	Needle #1 : no level detection
'H'	48h	Result : value in primary units skewed
'I'	49h	Result : dilution change
'J'	4Ah	Result : rerun test
'K'	4Bh	Reagent drawer : temperature out of limit
'L'	4Ch	Syringe : maintenance date overdue
'M'	4Dh	Not used
'N'	4Eh	Not used

Note: If there are several alarm codes for a result, then the most priority one is transmitted. Alarm codes are classified from '@' to 'N' with highest priority for code '@'.

7. Typical Contents of Some Messages

7.1. Result Transmission (STA Compact ® → Host)

Each message refers to only one sample:

- Header record;
- Patient record;
- Test Order record;
- Result record;
- Manufacturer Information record;
- Message Terminator record.

7.2. Request for a Working List

Only one sample is dealt with per message:

- Header record;
- Request Information record;
- Message Terminator record.

7.3. Working List Return

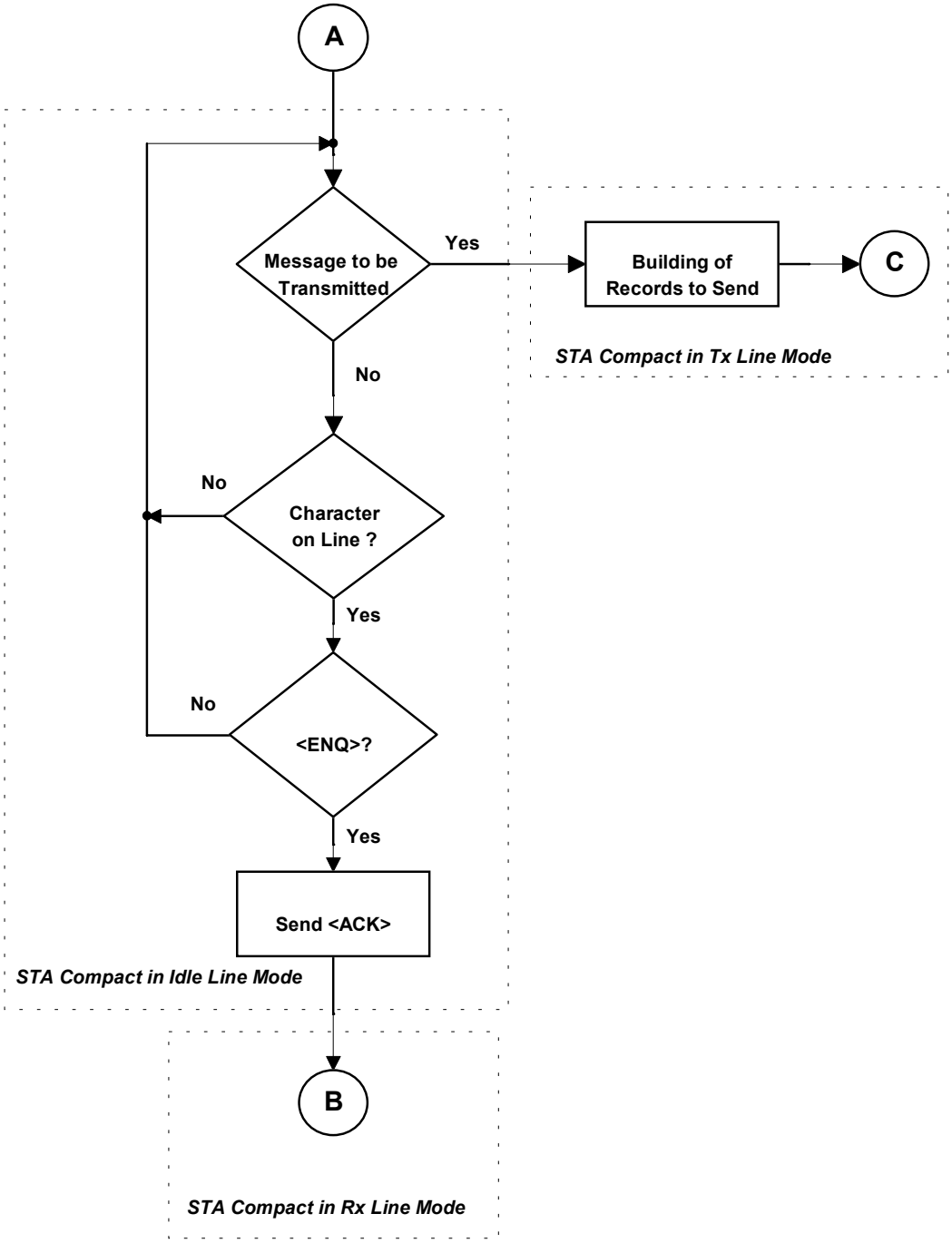
Only one sample is dealt with per message:

- Header record;
- Patient record;
- Test Order record;
- Message Terminator record.

8. Flowcharts (ASTM)

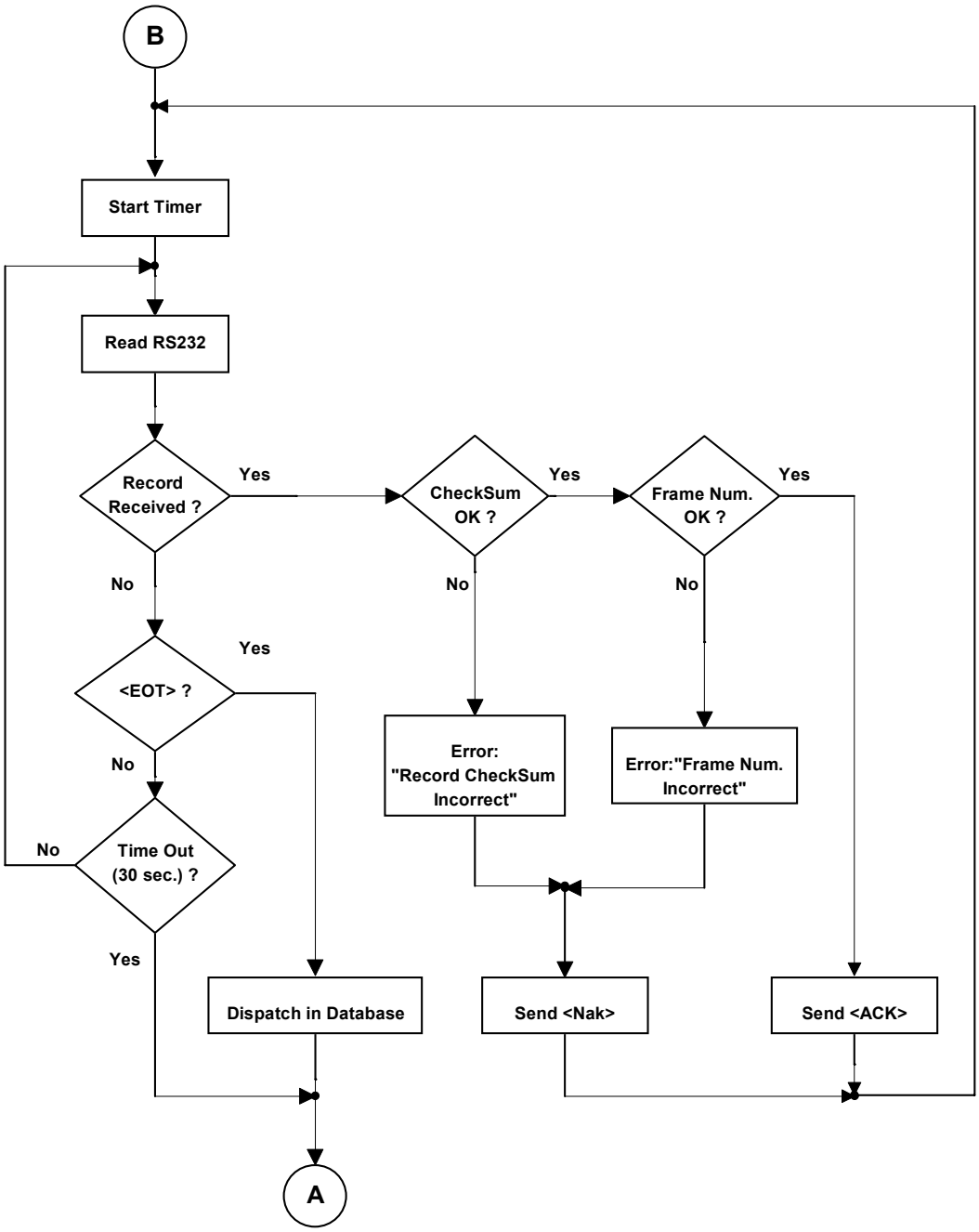
8.1. Sequencing of Reception/Transmission

Fig. 2 - Sequencing of Reception/Transmission



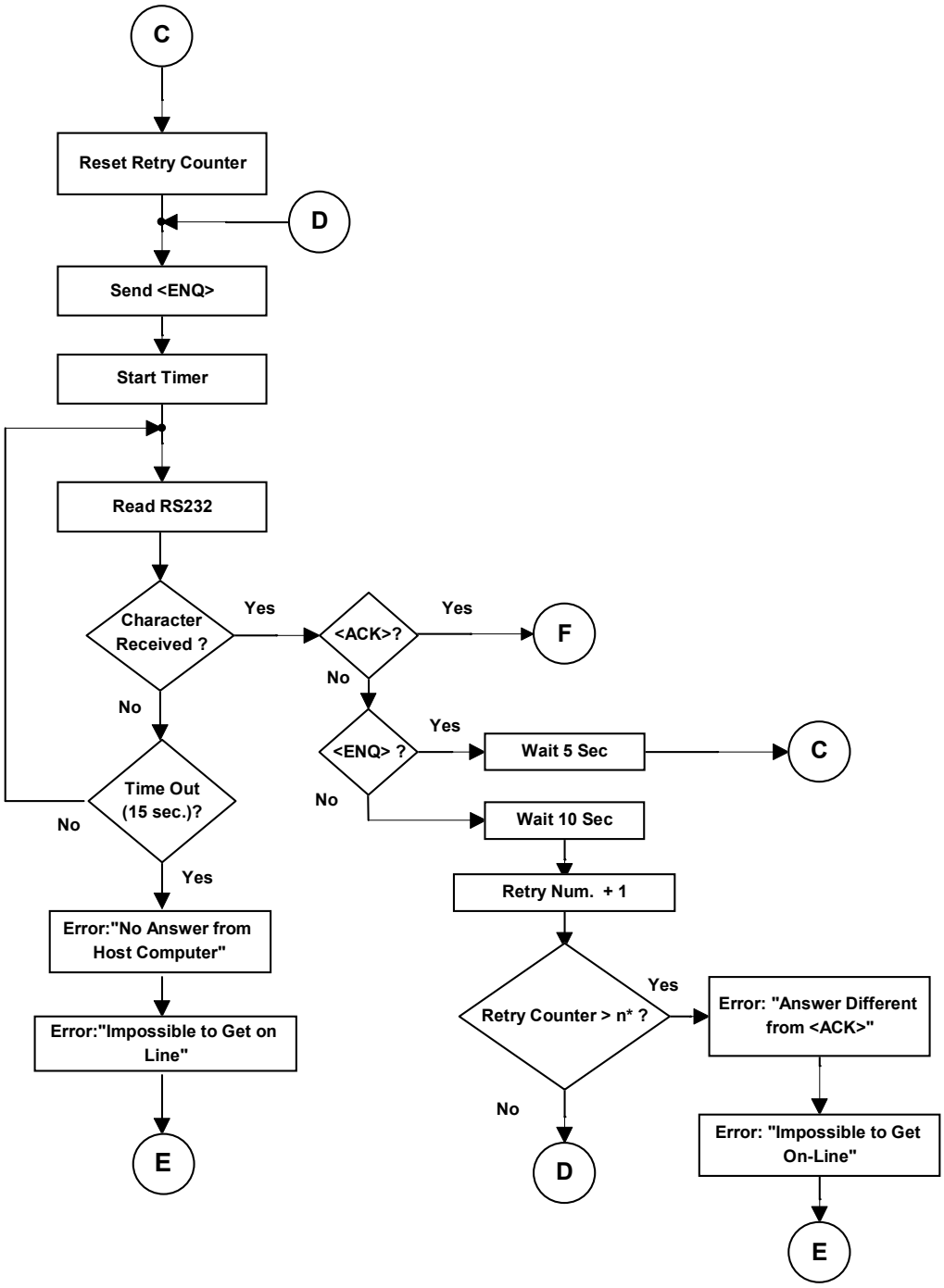
8.2. Acquisition of a Record from the Host Computer

Fig. 3 - Acquisition of a Record from the Host Computer



8.3. Establishment Phase (STA Compact ® → Host Computer)

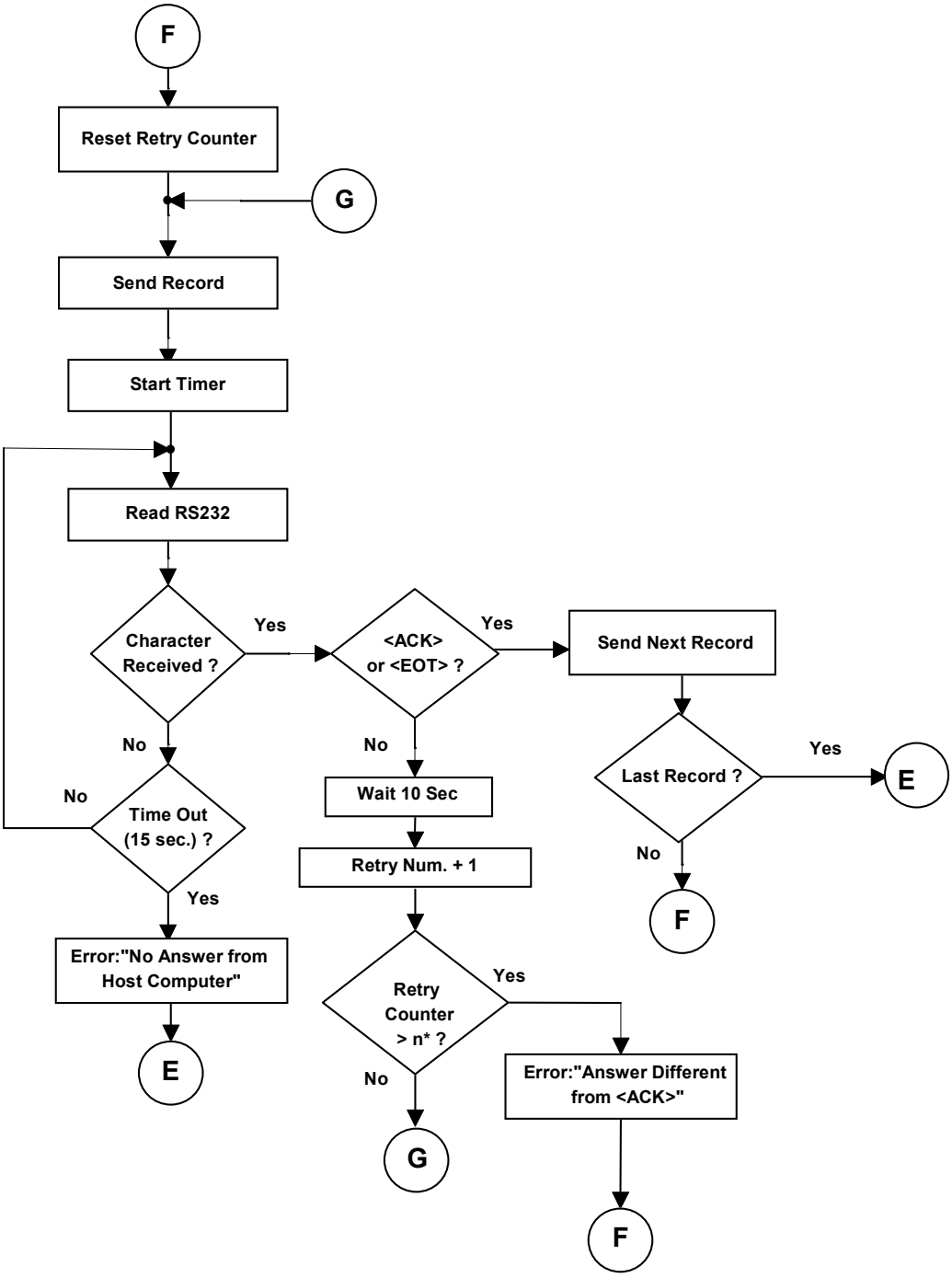
Fig. 4 - Establishment Phase (STA Compact ® → Host Computer)



*** n** : Number of on Error Retries, defined with the **Global Options** menu, *see Chapter* 4. *of the STA Compact ® User Interface RS232-C.*

8.4 Transfer Phase (STA Compact ® → Host Computer)

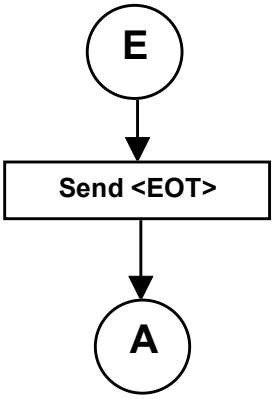
Fig. 5 - Transfer Phase (STA Compact ® → Host Computer)



*** n** : Number of on Error Retries, defined with the **Global Options** menu, *see Chapter* 4. *of the STA Compact ® User Interface RS232-C.*

8.5. Termination Phase (STA Compact ® → Host Computer)

Fig. 6 - Termination Phase (STA Compact ® → Host Computer)



9. Examples of Traces (ASTM)

9.1. Transmission of Patient File (STA Compact ® → Host Computer)

STA Compact ® 16:09:50 <ENQ>	STA Compact ® requests connection.
HOST 16:09:50 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:09:50 <STX>1H|\^&|||99^2.00|||||||P|1.00| 19950227160750<CR><ETX>2A<CR><LF>	The STA Compact ® sends the Header record.
HOST 16:09:50 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:09:50 <STX>2P|1|||GISCARD^Gaston^Serv.1^Gr.A <CR><ETX>5D<CR><LF>	STA Compact ® sends the Patient record.
HOST 16:09:50 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:09:50 <STX>3O|1|6|||R<CR><ETX>B7<CR><LF>	STA Compact ® sends the Test Order record.
HOST 16:09:50 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:09:50 <STX>4R|1|^^^1|100|%||||F||||<CR><ETX> DE<CR><LF>	STA Compact ® sends the first Result record: PT = 100%.
HOST 16:09:51 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:09:51 <STX>5M|1|A|C<CR><ETX>BB<CR><LF>	STA Compact ® sends the Manufacturer Information record for the first result. Error code=Validated, alarm code= Quality Control: out or range or not done.
HOST 16:09:51 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:09:51 <STX>6R|2|^^^10|10.8|sec||||F||||<CR> <ETX>5D<CR><LF>	STA Compact ® sends the second Result record: PT = 10.8 seconds.
HOST 16:09:51 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:09:51 <STX>7M|2|A|C<CR><ETX>BE<CR><LF>	STA Compact ® sends the Manufacturer Information record for the second result. Error code=Validated, alarm code=Quality Control: out or range or not done.
HOST 16:09:51 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:01:51 <STX>0R|3|^^^11|1.00|INR||||F||||<CR> <ETX>FF<CR><LF>	STA Compact ® sends the third Result record: PT, INR=1.00.
HOST 16:01:51 <ACK>	Host answers O.K. (Acknowledge).

STA Compact ® 16:09:51 <STX>1M|3|A|C<CR><ETX>B9<CR><LF>	STA Compact ® sends the Manufacturer Information record for the third result. Error code=Validated, alarm code=Quality Control: out of range or not done.
HOST 16:09:51 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:09:51 <STX>2R|4|^^^12|12.3|Tém.||||F||||<CR> <ETX>90<CR><LF>	STA Compact ® sends the fourth Result record: PT, Reference Time = 12.3 seconds.
HOST 16:09:51 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:09:52 <STX>3M|4|A|C<CR><ETX>BC<CR><LF>	STA Compact ® sends the Manufacturer Information record for the fourth result: Error code=Validated, alarm code=Quality Control: out of range or not done.
HOST 16:09:52 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:09:52 <STX>4R|5|^^^3|4.56|g/l||||F||||<CR><ETX> FD<CR><LF>	STA Compact ® sends the fifth Result record: Fibrinogen = 4.56 g/l.
HOST 16:09:52 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:09:52 <STX>5M|5|A|C<CR><ETX>BF<CR><LF>	STA Compact ® sends the Manufacturer Information record for the fifth result. Error code=Validated, alarm code= Quality Control: out of range or not done.
HOST 16:09:52 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:09:52 <STX>6R|6|^^^30|11.9|sec||||F||||<CR> <ETX>65<CR><LF>	STA Compact ® sends the sixth Result record: Fibrinogen = 11.9 seconds.
Site central 16:09:52 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:09:52 <STX>7M|6|A|C<CR><ETX>C2<CR><LF>	STA Compact ® sends the Manufacturer Information record for the sixth result. Error code=Validated, alarm code= Quality Control: out of range or not done.
HOST 16:09:52 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:09:52 <STX>0L|1|N<CR><ETX>03<CR><LF>	STA Compact ® sends the Message Terminator record.
HOST 16:09:52 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:09:52 <EOT>	STA Compact ® sends an END of Transmission.

9.2. Request for a Working List

STA Compact ® 16:11:52 <ENQ>	STA Compact ® requests connection.
HOST 16:11:52 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:11:52 <STX>1H|\^&|||99^2.00|||||||P|1.00| 19950227160953<CR><ETX>2F<CR><LF>	STA Compact ® sends the Header record.
HOST 16:11:52 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:11:52 <STX>2Q|1|^ESSAI<CR><ETX>8F<CR> <LF>	STA Compact ® sends the Request Information record for patient ESSAI.
HOST 16:11:52 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:11:53 <STX>3L|1|N<CR><ETX>06<CR><LF>	STA Compact ® sends the Message Terminator record.
HOST 16:11:53 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:11:53 <EOT>	STA Compact ® sends an END of Transmission.

Caution : The STA Compact ® can transmit several messages :"Request for a Working List" one after the other without allowing the intermediate return of those (*see chapter* 5.4. *of this STA Compact ® User Interface RS232-C and Standard E1381-91*).

9.3 Working List Return

HOST 16:11:53 <ENQ>	Host requests connection.
STA Compact ® 16:11:53 <ACK>	STA Compact ® answers O.K. (Acknowledge).
HOST 16:11:53 <STX>1H|\^&|||99^2.00|||||||P|1.00| 19950227161153<CR><ETX>28<CR><LF>	Host sends the Header record.
STA Compact ® 16:11:53 <ACK>	STA Compact ® answers O.K. (Acknowledge).
HOST 16:11:53 <STX>2P|1|||BRUN^Didier^Essai^Site <CR><ETX>DF<CR><LF>	Host sends the Patient record for patient ESSAI.
STA Compact ® 16:11:54 <ACK>	STA Compact ® answers O.K. (Acknowledge).
HOST 16:11:54 <STX>3O|1|ESSAI||^^^1\^^^2\^^^3|R<CR> <ETX>92<CR><LF>	Host sends the Test Order record for patient ESSAI.
STA Compact ® 16:11:54 <ACK>	STA Compact ® answers O.K. (Acknowledge).
HOST 16:11:55 <STX>4L|1|N<CR><ETX>07<CR><LF>	Host sends the Message Terminator record.
STA Compact ® 16:11:55 <ACK>	STA Compact ® answers O.K. (Acknowledge).
HOST 16:11:55 <EOT>	Host sends an END of Transmission.

Note : This message "Working List Return" can also be used to add tests, to rerun tests or to modify the priority code.
To add tests, Test Order record has to include the local codes of tests to be added.
To rerun tests, it has to include the local codes of the tests to be rerun.
And, to modifiy only the priority code for a patient file already present in the STA Compact ® Working File, short Test Order records can be used:

- example to modify priority code from "Routine" to "Stat" : O\|1\|ESSAI\|\|\|S<CR>.

9.4. Transmission of a Quality Control Result (STA Compact ® → Host Computer)

STA Compact ® 16:10:48 <ENQ>	STA Compact ® requests connection.
HOST 16:10:48 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:10:48 <STX>1H|\^&|||99^2.00|||||||Q|1.00| 19950227160848<CR><ETX>33<CR><LF>	STA Compact ® sends the Header record with Processing ID=Q for quality control.
HOST 16:10:48 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:10:48 <STX>2P|1|||<CR><ETX>B3<CR><LF>	STA Compact ® sends the Patient record.
HOST 16:10:48 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:10:48 <STX>3O|1|12352|||R<CR><ETX>7E<CR> <LF>	STA Compact ® sends the Test Order record for the STA®-COAG CONT P (12352).
HOST 16:10:48 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:10:48 <STX>4R|1|^^^1|30|%||||F||||19950224085 100<CR><ETX>7E<CR><LF>	STA Compact ® sends the Result record: PT = 30% dated 02/24/95 at 08:51.
HOST 16:10:48 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:10:48 <STX>5M|1|A|@<CR><ETX>B8<CR><LF>	STA Compact ® sends the Manufacturer Information record. Error code=Validated, alarm code=none.
HOST 16:10:48 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:10:48 <STX>6L|1|N<CR><ETX>09<CR><LF>	STA Compact ® sends the Message Terminator record.
HOST 16:10:48 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:10:48 <EOT>	STA Compact ® sends an END of transmission.

9.5. On-Line Test

STA Compact ® 16:08:14 <ENQ>	STA Compact ® requests connection.
HOST 16:08:14 <ACK>	Host answers O.K. (Acknowledge).
STA Compact ® 16:08:14 <EOT>	STA Compact ® sends an END of transmission.

P.2. PID Communication Protocol (Internal to STA Compact ®)

P.2.1. Communication Specifications

- Interface : Serial type, RS-232C
- Connector: DB-9 connector
  Pin 2 = TDIDENT
  Pin 3 = RDIDENT
  Pin 5 = ground
- Handshaking : NONE
- Baud Rate : 9,600 Bauds
- Parity Check : NONE
- Data Bit : 8
- Stop Bit : 1

P.2.2. Message Format Definition

All the Messages are formatted according to the following pattern :

STX	Header	DATA	CHK	ETX

With :

- STX : ASCII Character (02h)
- Header : Message Identifier. (One ASCII Character)
- Data : The Content of the message, if any
- CHK: Checksum (Check Digit)
- ETX : ASCII Character (03h)

CHK is computed by XORing all the characters of the message except STX/ETX and ORing the result with the character 40 hex.

P.2.3 Message Structures : Central PC -----> PID

Open Drawer

D_OPEN :

STX	V	Dn	Chk	ETX

Dn = Drawer (1, 3) (One ASCII Character)

Close Drawer

D_CLOSE :

STX	R	Dn	Chk	ETX

Dn = Drawer (1, 3) (One ASCII Character)

Switch State Request

D_SWREQ :

STX	N	Chk	ETX

Activate Barcode Reader

D_BCON:

STX	G	Chk	ETX

Desactivate Barcode Reader

D_BCOFF :

STX	F	Chk	ETX

Set a New I.D.

D_SETID :

STX	K	Chk	ETX

Cancel Last I.D.

D_DELID :

STX	D	Chk	ETX

Set LED to Blink

D_BPOS :

STX	Z	Cn	Chk	ETX

Set LED On

D_MPOS :

STX	X	Cn	Chk	ETX

Cn = Cell (001,...,243) (3 ASCII Characters)

Set LED Off

D_UPOS :

STX	Y	Cn	Chk	ETX

Cn = Cell (001,...,243) (3 ASCII Characters)

Cell Status Request

D_CLREQ :

STX	J	Cn	Chk	ETX

Cn = Cell (001,...,243) (3 ASCII Characters)

Drawer Cell Block Status Request

D_DBREQ :

STX	W	Dn	Chk	ETX

Dn = Drawer (1, 3) (One ASCII Character)

Date & Time Request

U_TREQ :

STX	H	Chk	ETX

Date & Time Set

U_TSET :

STX	Q	D	D	M	M	Y	Y	H	H	N	N

Chk	ETX

DD : Day, MM : Month, YY : Year, HH : Hour, NN : Minute
(2 ASCII Characters for each)

Enter Test Mode Request

U_ETEST :

STX	T	Chk	ETX

Exit Test Mode Request

U_XTEST :

STX	O	Chk	ETX

Enter Shift Mode / Line Shift Request

U_ESHFT :

STX	I	Chk	ETX

Exit Shift Mode Request

U_XSHFT :

STX	E	Chk	ETX

PID Status Request

U_STAT :

STX	B	Chk	ETX

Clear Memory Request

U_CLEAR :

STX	P	Chk	ETX

IDP Reset Request

U_RESET :

α	β	π

P.2.4 Message Structures : PID -----> Central PC

Drawer Open

D_ISOPEN:

STX	O	Dn	Chk	ETX

Dn = Drawer (1, 3) (One ASCII Character)

Drawer Closed

D_ISCLOSED:

STX	C	Dn	Chk	ETX

Dn = Drawer (1, 3) (One ASCII Character)

Drawer Failure

D_ISFAIL:

STX	F	Dn	Chk	ETX

Dn = Drawer (1, 3) (One ASCII Character)

Drawer Switch Failure

D_SWFAIL:

STX	E	Dn	Chk	ETX

Dn = Drawer (1, 3) (One ASCII Character)

Identified Tube Put in a Cell

D_IDCELL :

STX	P	Cn	Chk	ETX

Cn = Cell (001,...,243) 3 ASCII Characters

Identified Tube Removed

D_FCELL :

STX	X	Cn	Chk	ETX

Cn = Cell (001,...,243) 3 ASCII Characters

Non Identified Tube Put in a Cell

D_NCELL :

STX	U	Cn	Chk	ETX

Cn = Cell (001,...,243) 3 ASCII Characters

Non Identified Tube Removed

D_QCELL :

STX	G	Cn	Chk	ETX

Cn = Cell (001,...,243) 3 ASCII Characters

Cell Status

D_CLSTAT :

STX	D	Cn	STS	Chk	ETX

Cn = Cell (001,...,243) 3 ASCII Characters
STS : Cell Status :
L (Free Cell)
O (Unidentified Occupied Cell)
I (Identified Occupied Cell)
M (Cell in Manual Mode)

Drawer Cell Block Status

D_DBSTAT :

STX	A	Dn	S1....Sn	Chk	ETX

Dn = Drawer (1, 3) S1 .. Sn Tube Status

Bar Code Read I.D.

D_IDENT :

STX	I	ID	Chk	ETX

ID = Identity (String of 16 ASCII Characters Max)

Drawer Switch State

D_SWSTAT :

STX	Z	O1	C1	O2	C2	O3	C3

Chk	ETX

O/C = Open /Closed (0/1) Drawer (1, 3) (One ASCII Character each)

Date & Time

U_TIME :

STX	T	D	D	M	M	Y	Y	H	H	N	N

Chk	ETX

DD : Day, MM : Month, YY : Year, HH : Hour, NN : Minute
(2 ASCII for each)

PID Status

U_IDSTAT :

STX	V	Vs	Ram	Rom	New	Chk	ETX

Vs = Version Number (3 ASCII Characters)
Ram / Rom = Result of Autotest (1=OK / 0=Fail)
New = Reagent Drawer Type (1=New / 0=Old, 1 by default))

P.3. Measurement Communication Protocol (Internal to STA Compact ®)

P.3.1. Communication Specifications

- Interface : Serial type, RS-232C
- Connector: DB-9 connector
  Pin 2 = TDmesure
  Pin 3 = RDmesure
  Pin 5 = ground
- Handshaking : NONE
- Baud Rate : 9,600 Bauds
- Parity Check : NONE
- Data Bit : 8
- Stop Bit : 1

P.3.2. Message Format Definition

All the messages are formatted according to the following pattern :

STX	Header	DATA	CHK	ETX

With :

- **STX** : ASCII Character (02h)
- **Header** : Message Identifier (One ASCII Character)
- **Data** : The Content of the message.
- **CHK** : Checksum (Check Digit)
- **ETX** : ASCII Character (03h)

CHK is computed by XORing all the characters of the message except STX/ETX and ORing the result with the character 40 hex.

P.3.3 Message Structures : Central PC -----> Measurement

Start Motorisation

C_STMT :

STX	A	Cn	Chk	ETX

Cn : Channel (1..4)

Start Analysis

C_STAN :

STX	Ç	Cn	Rg	Chk	ETX

Cn : Channel (1..4)
Rg : Analysis Rank (3 ASCII Characters)

Stop Analysis

C_SPAN :

STX	@	Cn	Chk	ETX

Cn : Channel (1..4)

Activ. Photometric system

C_STCO :

STX	)	Chk	ETX

Stop Photometric system

C_KLCO :

STX	*	Chk	ETX

Start Photometric Measurement - Real Time Mode

C_RTCO :

STX	(	Cn	Np	Chk	ETX

Cn : Channel (1..4)
Np : Measurement point number (3 ASCII Characters)

Start Photometric Measurement - Delayed Mod 1 & 2

C_RTCO :

STX	s	Cn	Np	Chk	ETX

Cn : Channel (1..4)
Np : Measurement point number (3 ASCII Characters)

Photometric Data Bloc Request - Delayed Mode 1

C_D1CO :

STX	r	Cn	Wl	Nb	Chk	ETX

Cn : Channel (1..4)
Wl : Wavelength (0= 405 nm, 1= 540 nm)
Nb : Data Bloc Index (3 ASCII Characters)

Photometric Data Bloc Request - Delayed Mode 2

C_D2CO :

STX	t	Cn	Wl	Nb	Chk	ETX

Cn : Channel (1..4)
Wl : Wavelength (0= 405 nm, 1= 540 nm)
Nb : Data Bloc Index (3 ASCII Characters)

Stop Photometric Measurements

C_SPCO :

STX	+	Cn	Chk	ETX

Cn : Channel (1..4)

Initialize Test

C_ITST :

STX	0	Rg	Ct	Tm	TM	Chk

ETX

Rg : Analysis Rank (3 ASCII Characters)
Ct : Clot Type (3 ASCII Characters)
Tm : Min Time (3 ASCII Characters)
TM : Max Time (3 ASCII Characters)

Initialize Calibrations

C_ICAL :

STX	1	Chk	ETX

Initialize Motorisation Values

C_IMVL :

STX	2	V1	V2	V3	V4

V5	V6	V7	V8	Chk	ETX

V1..V4 : Motorisation Values (msx2 3 ASCII Characters)

Initialize Boost Values

C_IBVL :

STX	3	Ct	Bv	Chk	ETX

Ct : Clot Type (3 ASCII Characters)
Bv : Boost Strength Value (3 ASCII Characters)

Initialize Rx Tx ACK/NACK Time Out Value

C_ITRX :

STX	4	To	Chk	ETX

To : Time Out Value (1/10 s 3 ASCII Characters)

Initialize Min Lamp Level

C_LEVEL :

STX	L	Lv	Chk	ETX

Lv : Min Lamp level (0..255 3 ASCII Characters)

Motorisation Value Request

C_MTRQ:

STX	$	Chk	ETX

Boost Value Request

C_BSRQ :

STX	%	Chk	ETX

Channel Calibration Value Request

C_CVRQ :

STX	&	Chk	ETX

Temperature Request

C_TPRQ :

STX	#	Chk	ETX

Actual Lamp Level Request

C_LLRQ :

STX	N	Chk	ETX

Min Lamp Level Request

C_MLRQ :

STX	U	Chk	ETX

Test Initialization Value Request

C_CFRQ :	STX	Spce	Rg	Chk	ETX

Rg : Analysis Rank (3 ASCII Characters)

Version Number Request / Status

C_VNRQ :	STX	!	Chk	ETX

Channel Calibration Request

C_CLRQ :	STX	"	Chk	ETX

Photometric System Autotest Request

C_ATRQ :	STX	T	Chk	ETX

Photometric System Status Request

C_ CSRQ :	STX	S	Chk	ETX

Measurement System Partial Reset

C_RESET :	α	β	Π

Lamp Level Self-Adjustment Request

C_LPADJ :	STX	J	Chk	ETX

Lamp Adjustment Value Request

C_LPVAL :	STX	M	Chk	ETX

Pipetting (by software) Request

C_SFTPIP :	STX	P	Chk	ETX

(used only during test)

P.3.4. Message Structures : Measurement -----> Central PC

Chronometric Measurement Result

C_ CRES:

STX	B	Cn	Rg	Result	Chk	ETX

Cn : Channel (1..4)
Rg : Analysis Rank (3 ASCII Characters)
Result : Coagulation Time in sec (9 ASCII Characters)

Version Number / Status

C_VNDT

STX	!	Vm	Ram	Rom	Vg	Ram

Rom	Cs	Chk	ETX

Vm : MSTA Version Number (8 ASCII Characters)
Vg : GSTA Version Number (8 ASCII Characters)
Ram/Rom : Result of Autotest (1=OK / 0 = Fail)
Cs : Instrument type : (1 = Clotting + Photometry
0 = Clotting Only)

Photometric Measurement Result - Real time mode

C_RTRS :

STX	-	Sb1	B1	Sb22	B2	Sb3

B3	Sb4	B4	Sg1	G1	Sg2	G2

Sg3	G3	Sg4	G4	S1	S2	Od

Chk	ETX

1,2,3,4 : Channel
B1..B4 : 405 nm O.D. Result (5 ASCII Characters)
G1..G4 : 540 nm O.D. Result (5 ASCII Characters)
Sb1..Sb4 : Channel (405 nm) Measurement Status Byte
Sg1..Sg4 : Channel (540 nm) Measurement Status Byte
S1, S2 : Photometric system status Bytes
Od : Order from 0 to 9 cyclic (1 ASCII Character)

Photometric Data Bloc - Delayed Mode 1

C_D1RS :

STX	b	Cn	Res1	Res2	.....	Res32

Chk	ETX

Cn : Channel (1..4)
Res1 .. Res32 : Measurement Results (O.D.)

Photometric Measurement Result - Delayed Mode 2

C_D1RS :

STX	t	Cn	Nb	Res1	Res2	.....

Res32	Chk	ETX

Cn : Channel (1..4)
Nb : Bloc Index
Res1 .. Res32 : Measurement Results (O.D.)

Photometric Measurement Real Time Mode End

C_DEND :

STX	'.'	Cn	Chk	ETX

Cn : Channel (1..4)

Photometric Measurement Delayed Mode End

C_DEND :

STX	'f'	Cn	S1	Chk	ETX

Cn : Channel (1..4)
S1: Photometric System Status Byte

Start Reagent Pipetting (Trig)

C_PIPT :

STX	P	Chk	ETX

Measurement Start Error

C_MERR :

STX	C	Chk	ETX

Lamp Level

C_LPLEV :

STX	N	LvB	LvG	Chk	ETX

Lv B: 405 nm Lamp Level (0.. 999, 3 ASCII Characters)
Lv G: 540 nm Lamp Level (0.. 999, 3 ASCII Characters)

Photometric System Status

C_CMST :

STX	S	S1	S2	Chk	ETX

S1, S2 : Photometric System Status Bytes

Motorisation Values

C_MTDT :

STX	$	V1	V2	V3	V4	V5
V6	V7	V8	Chk	ETX		

V1..V8 : Motorisation Value (3 ASCII Characters)

Boost Values

C_BSDT :

STX	%	Bs1	Bs2	Chk	ETX

Bs1, Bs2 : Boost Strength Values for weak/Normal Clot
(3 ASCII Characters)

Channel Calibration

C_CVDT :

STX	&	V1	V2	V3	V4
V5	V6	V7	V8	Chk	ETX

V1..V8 : ADC Reference Values (3 ASCII Characters)

Test Initialization Values

C_CFDT :

STX	Spce	Ct	Tm	TM	Chk	ETX

Ct : Clot Type (3 ASCII Characters)
Tm : Min Time (3 ASCII Characters)
TM : Max Time (3 ASCII Characters)

Temperatures

C_ TPDT :

STX	%	Tb	Tt	St	Chk	ETX

Tb : Measurement Block Temperature (3 ASCII Characters)
Tb : Pipetting Head Temperature (3 ASCII Characters)
St : Temperature Measurement Status Byte (1 = Error , 0 = OK)

Channel Calibration status

C_CLST :

STX	"	OK	Chk	ETX

OK : 1 : Calibration OK 0: Calibration Failure

µMes Reset

C_MRES :	STX	RAZM	Chk	ETX

µSys. Reset

C_SRES :	STX	RAZG	Chk	ETX

Lamp Adjustment Values

C_ADLP :	STX	J	V_{405}	V_{540}	Chk	ETX

V_{405}: Adjustment Value at 405 nm (3 ASCII Characters)
V_{540}: Adjustment Value at 540 nm (3 ASCII Characters)

Back to Home Page