# UniCel® DxC
# Synchron® Clinical Systems

# Host Interface Specifications

This manual is intended for use with
UniCel® DxC 600
UniCel® DxC 800
UniCel® DxC 600i

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# CHAPTER 1  Host Interface Specifications

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## Table of Contents

# Host Interface Specifications

## Overview

### Introduction

These instructions to the Host Interface Specification provide the necessary information to interface the UniCel DxC System to a Laboratory Information System (LIS). Use this computer communications specification with software version 1.0 or higher. This manual has four chapters:

1. Host Interface Specifications
2. LX20/DxC Interface
3. CX7 Compatible Interface
4. Tables/Codes

*Host Interface Specifications and Tables/Codes* are general sections. *LX20/DxC Interface* and *CX7 Compatible Interface* are specific sections; refer to the section that describes the interface of your system.

### UniCel LX20/DxC/CX7 Compatible

The following table describes the differences between the LX20/DxC Interface and the CX7 Compatible Interface on a UniCel DxC system. It also lists the results if you use the CX7 Compatible Interface.

Table 1.1     LX20/DxC/CX7 Compatible

| Feature | LX20/DxC Interface Specification | CX7 Compatible Interface Specification |
|---|---|---|
| Patient ID | 15 Alphanumeric | 12 Alphanumeric<br><br>*The sample result is not transmitted if the Patient ID is more than 12 characters.* |
| Sex | M, F, B<br><br>*Converts M/F to B* | M, F<br><br>*Converts M/F to M* |
| Patient Comment | 45 Alphanumeric | 25 Alphanumeric<br><br>*If more than 25 characters are used, only the first 25 are sent.* |
| Sample ID | 15 Alphanumeric | 11 Alphanumeric<br><br>*The Sample result is not transmitted if the Sample ID exceeds 11 characters.* |

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Table 1.1    LX20/DxC/CX7 Compatible, continued

| Feature | LX20/DxC Interface Specification | CX7 Compatible Interface Specification |
|---|---|---|
| Control Lot Numbers | 12 Characters | Not Supported |
| Sector/Rack Number | 4 digits<br><br>*0000 to 0999 can be accepted from the host (LIS). Up to 9999 can be sent from the instrument.* | 2 digits<br><br>*If the 3 digit check box is selected, 1 character field reserved for the cup data is used as a place to store the third digit of the rack number.  E.g. rack 123, position 4 is represented as 23 in rack field and 14 in cup field.* |
| Cuvette Number | 3 Numeric | 2 Hexadecimal<br><br>*The cuvette number is reported in hexadecimal notation. For example, cuvette 100 is reported as 64; cuvette 109 is reported as 6D.* |
| Sample Comment Code 1 | 25 Alphanumeric | 25 Alphanumeric |
| Sample Comment Code 2 | Not Supported | 25 Alphanumeric<br><br>*Not Used* |
| Dates | 8 digits<br><br>*Long date.*<br>*Format is*<br>*LDATE (ddmmyyyy)* | 6 digits<br><br>*Format is*<br>*DATE (ddmmyy)* |
| Clear Rack/ Sample IDs | Stream 801 - Function 3<br><br>*Rack number field supports any rack to be cleared.* | Stream 701 - Function 3<br><br>*Samples in racks above rack 99 must be cleared with Sample ID, or manually cleared.* |

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## Definitions

The following terms and definitions are useful in understanding this interface specification.

Table 1.2        Interface Specification Terms

| Term | Definition |
|---|---|
| UniCel DxC | UniCel DxC 600 or UniCel DxC 800 |
| DxC 600i or DxC 800i | UniCel DxC 600i or UniCel DxC 800i |
| DxC | UniCel DxC 600 or UniCel DxC 800 analyzer |
| Host | Clinical laboratory computer system |
| ALPHA | Alphanumeric |
| DATE | Date.  The format is ddmmyy. |
| Download[a] | The process of the host sending sample/rack programming to the UniCel DxC System. |
| Handshake[a] | The process of the UniCel DxC System and the host communicating with each other. Permission to transmit is requested, permission is granted, and receipt of transmission is acknowledged (ACK – NAK protocol). |
| LDATE | Long Date. The format is ddmmyyyy. |
| Message | A collection of related information, in the form of records, on a single patient, sent at one time. |
| Null Component | A message component that contains no data.  Null components are represented by two component delimiters with no character in between. |
| Null Field | A message field that contains no data.  Null fields are represented by two field delimiters with no character in between. |
| Text | The set of displayable characters, from ASCII characters decimal 32 to decimal 126. |

[a]  Bidirectional only

## Interface Protocol Options

The UniCel DxC System provides four interface protocol options which are established using the Host Communications option in *Setup*. These protocol options are defined in the table below.

Table 1.3          Interface Protocol Options

| Protocol | Description |
|---|---|
| Unidirectional | Information is transmitted from the UniCel DxC System to the host computer. The host uses flow control to control incoming data. The three flow control options are:<br><br>• Software Flow Control (XON/XOFF)<br>• Hardware Flow Control (RTS/CTS) or<br>• No Flow |
| Bidirectional | Information is transmitted from the UniCel DxC System to the host computer and from the host computer to the UniCel DxC System. The two systems use a software handshake to communicate with each other to request permission to send information and to acknowledge receipt of information (ACK-NAK protocol). |
| Bidirectional with Query | Follows the same protocol as bidirectional interface, with the added capability to request sample programs from the host.<br><br>"Double host query" is not supported. (That is, the DxC queries the Datalink and the Datalink queries the LIS.)<br><br>"Requery" allows the DxC to Query the Host when a sample is loaded and has a "Complete" status at the DxC. |
| Off | No information is sent or received by the UniCel DxC System. |

# Hardware Interface

## Introduction

The hardware interface to the UniCel DxC System external communication port uses a standard RS-232-C 9-pin or 25-pin D-connector (male).  Communication is done with asynchronous byte transmission.

## Connector Pin Assignments

Connector pin assignments are shown below.

Table 1.4        Connector Pin Assignments

| 25-Pin | 9-Pin | Signal | Direction |
|---|---|---|---|
| 1 | - | Protected ground – used on one side only | |
| 2 | 3 | Transmit data | Out |
| 3 | 2 | Receive data | In |
| 4[a] | 8[a] | Clear to send (CTS) | In |
| 5[b] | 7[b] | Request to send (RTS) | Out |
| 6[c] | 4[c] | Data terminal ready (DTR) | Out |
| 7 | 5 | Signal ground | |
| 20[c] | 6[c] | Data set ready (DSR) | In |
| - | 1 | Data Carrier Detect (DCD) | In |
| - | 9 | Ring Indicator (RI) | |

[a] CTS is required before data will be transmitted.
[b] RTS is turned on when operational.
[c] Pins 6 and 20 and 4 and 6 are only needed when a modem is used.

Note:  Pins 4 (CTS) and 5 (RTS) and 7 (RTS) and 8 (CTS) are enabled only in unidirectional mode.

## th

Use a cable length of 40 feet (12 m) or less with the RS-232-C interface.

# Data Transmission

## Introduction

The UniCel DxC System uses 7-bit ASCII (provides the 128 character ASCII set when 7 data bits are selected). For local languages, 8-bit ASCII must be used (provides the 256-character ASCII set).

## Transmission Format

The serial transmission format is configured from the UniCel DxC System console using the Host Communications option as outlined in CHAPTER 4, *System Setup* of the UniCel DxC Synchron Clinical Systems *Instructions for Use* manual and detailed in the UniCel DxC Synchron Clinical Systems *Reference Manual*. The following options are available.

Table 1.5        Serial Transmission Format

| Parameter | Options | Default |
|---|---|---|
| Data Transmission Mode | Unidirectional, Bidirectional, Bidirectional with Query, Off | Unidirectional |
| Data Bits | 7, 8[a] | 8 |
| Stop Bits | 1, 2 | 1 |
| Parity | Even, Odd, None | None |
| Flow control | Software (XON/XOFF), Hardware (RTS/CTS), None | Software (XON/XOFF) |
| Device ID | 00-99 | 00 |
| Baud Rates | 300, 1200, 2400, 4800, 9600, 19200 | 9600 |
| Re-query | Selected, Not Selected | Not Selected |

[a] For use with non-English keyboards, select 8-bit ASCII for the host interface in order to send and receive special characters (for key code conversion information, refer to Figure 4.1 Key Code Conversion Chart).

# Unidirectional Protocol

## Introduction

In unidirectional transmission, information is transmitted in one direction only from the UniCel DxC System to the host computer. This information is transmitted as soon as it is available.

## Transmitted Information

The information transmitted includes:

> **NOTICE**
> The 800 stream below is referenced to the LX20/DxC Interface. The CX7 compatible interface is similar in data streams and should be interpreted as a 700 stream where an 800 stream is displayed.

Table 1.6    Transmitted Information

| Information | Description |
|---|---|
| Cup Header | The Cup Header information for each cup in the rack is transmitted when a cup has finished and results are ready to send to the host.<br>(Stream 802 - Function 1) |
| Test Results | A Test Result message is transmitted as each test is completed.<br>(Stream 802 - Functions 3, 11, 13, 81) |
| End of Cup | An End-of-Cup message is transmitted when all tests programmed for a sample are completed.<br>(Stream 802 - Function 5) |
| End of Run | An End-of-Run message is transmitted when all tests programmed have been completed and the DxC has gone into the *Standby mode*.<br>(Stream 803 - Function 17) |
| Power Up | The Power Up message is transmitted when the DxC is booted.<br>(Stream 803 - Function 1) |
| Host Setup | The Host Setup message is transmitted when the DxC is booted and when there are changes in the Host Communications in System Setup.<br>(Stream 800 - Function 2) |

Output field width is dependent on the units and decimal precision selected. This should not exceed the fixed field width specified in this document.

## Unidirectional Software Control

The flow of information from the UniCel DxC System can be controlled by the host through an XON/XOFF protocol. The sequence of events is:

• The host transmits the character XOFF prior to its buffer overflowing.
• The DxC immediately suspends transmission.
• When the host's buffer is ready to accept information again, the character XON is transmitted.
• The DxC then resumes transmission.
• The host should transmit the XON character after power up to indicate it is ready to receive data.

## Protocol Control Characters

The software protocol control characters follow:

Table 1.7        Protocol Control Characters

| Character | Name | ASCII | HEX |
|-----------|------|-------|-----|
| XON | Resume transmission | DL1 | 11 |
| XOFF | Suspend transmission | DL3 | 13 |

## Unidirectional Hardware Control

The flow of information from the UniCel DxC System can be controlled by the host through the CTS hardware signal.  When the CTS signal is brought negative, the DxC will suspend transmission.  The DxC will resume transmission when the CTS signal is brought positive.  Examples of Unidirectional Transmission are cited below.

> NOTICE
> Do not select the Hardware option for flow control. With the Hardware option, ESD interference can affect the performance.

## Unidirectional Transmission Example 1

Unidirectional mode is selected and the host is not using software control of transmission.  The accession number is 168, the rack is 12, the position is 1, and the chemistries are Sodium (01A), Potassium (01B), and Chloride (04A).  An operator-defined special calculation (SPC_CALC) is transmitted.

```
[-0,802,01,25091998,080534,--168,RE,--12,-1,RO,########,SE,121------------,-------------------,
-----------------------,Harris------------,Maria----------,J,100A10B100-----,Bond-------------,
25091998,0100,ER-----------------,-47,5,26051951,B,Lipemic------------------------------------,
#######,####,####,######,--3,01A-,01B-,04A-]C2<CR><LF>
[-0,802,03,25091998,080812,--168,------116,--12,-1,121------------,01A-,###,######,###,-1,
----104.7,#########,2,0,04,LO,NR,0,NA,104.65540,---------,
NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,1.0000,#######################]0D
<CR><LF>
[-0,802,03,25091998,080811,--168,------116,--12,-1,121------------,01B-,###,######,###,-1,
-----2.45,#########,2,0,04,LO,NR,0,NA,2.4467065,---------,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,
NO,NO,NO,1.0000,#######################]13<CR><LF>
[-0,802,03,25091998,080812,--168,------116,--12,-1,121------------,04A-,###,######,###,-1,
-----77.8,#########,2,0,04,LO,NR,0,NA,77.755951,---------,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,
NO,NO,NO,1.0000,#######################]FB<CR><LF>
[-0,802,11,25091998,080534,--168,--12,-1,121------------,-1,SPC_CALC------------,OK,19.017143,
--------]B9<CR><LF>
[-0,802,05,25091998,082242,--168,121------------,--12,-1]D5<CR><LF>
```

(- Indicates space holder)

## Unidirectional Transmission Example 2

The same information is transmitted as in *Example 1*, but software flow control has been implemented by the host, selected by the DxC operator, and used by the Host where indicated.

**UniCel DxC**                                                                **HOST**

```
<==================================================================== XON

[-0,802,01,25091998,080534,--168,RE,--12,-1,RO,########,SE,121------------,
-------------------,-----------------------,Harris------------,
Maria----------,J,100A10B100-----,Bond-------------,25091998,0100,
ER-----------------,-47,5,26051951,B,Lipemic------------------------------------,
#######,####,####,######,--3,01A-,01B-,04A-]C2<CR><LF>

<==================================================================== XOFF

<==================================================================== XON


[-0,802,03,25091998,080812,--168,------116,--12,-1,121------------,01A-,###,
######,###,-1,----104.7,#########,2,0,04,LO,NR,0,NA,104.65540,
---------,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,1.0000,
#######################]0D<CR><LF>
[-0,802,03,25091998,080811,--168,------116,--12,-1,121------------,01B-,###,
######,###,-1,-----2.45,#########,2,0,04,LO,NR,0,NA,2.4467065,---------,
NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,1.0000,
#######################]13<CR><LF>
[-0,802,03,25091998,080812,--168,------116,--12,-1,121------------,04A-,###,
######,###,-1,-----77.8,#########,2,0,04,LO,NR,0,NA,77.755951,---------,
NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,1.0000,
#######################]FB<CR><LF>
[-0,802,11,25091998,080534,--168,--12,-1,121------------,-1,
SPC_CALC------------,OK,19.017143,--------]B9<CR><LF>
[-0,802,05,25091998,082242,--168,121------------,--12,-1]D5<CR><LF>
```

(- Indicates space holder)

# Bidirectional

## Introduction

In bidirectional transmission, information is transmitted from the UniCel DxC System to the host, and from the host to the DxC System. The two systems communicate with each other using a software handshake. Permission to send information is requested, permission is granted, and receipt of information is acknowledged (ACK - NAK protocol). Table 1.8 describes the bidirectional protocol control characters that are referred to throughout this section.

## Bidirectional Protocol Control Characters

Bidirectional protocol control characters are listed below.

Table 1.8    Bidirectional Protocol Control Characters

| Acronym | Name | ASCII | HEX |
|---------|------|-------|-----|
| LB | Line Bid | SOH | 01 |
| LBO | Line Bid Override Request | STX | 02 |
| LF | Line Feed | LF | 0A |
| ENQ | Enquiry (used to re-establish communications) | ENQ | 05 |
| EOT | End of Transmission | EOT | 04 |
| ACK-0 | Even Acknowledgment | ACK | 06 |
| ACK-1 | Odd Acknowledgment | ETX | 03 |
| NAK | Negative Acknowledgment | NAK | 15 |

## Line Bidding

Before either the UniCel DxC System or the host transmits a message, they must bid for the communication line. Line bidding uses the LB, LBO, EOT, ACK-0, and NAK characters.

| Stage | Description |
|-------|-------------|
| 1 | To bid for the line, <EOT> <LB> is transmitted when the line is idle. |
| 2 | The EOT clears the line. |
| 3 | The receiving system responds by transmitting ACK-0 to acknowledge the line bid and allow message transmission, or by transmitting NAK to deny the line bid. |
| 4 | If the line bid is denied, the originator waits a short period of time (e.g., one second) then bids for the line again. |

- LINE BID – When the DxC is very busy, the response to a LINE BID may take up to 15 seconds.

1. When the DxC has some messages in the output queue, it does a LINE BID. When the LINE BID is accepted by the host, the instrument sends one set of messages at a time. It then gives up the line and waits for 2 seconds before continuing with the other messages.
2. If the host has messages to transmit, it can do a LINE BID (EOT LB) even if the instrument is busy transmitting messages (after sending a message, the DxC looks for a NAK, ACK, or LB). When the DxC sends a message, the host can respond with a line bid <EOT><SOH>. The message in progress will be saved by the DxC. The line will be granted to the host by sending an <ACK>.

---

NOTICE
Do not activate the LINE BID while the instrument is transmitting messages because it would stop the collation of results.

---

- LINE BID TIME OUT occurs if the receiving system does not respond to the EOT LB within 15 seconds, or responds with something other than an ACK-0 or LBO. After 7 consecutive time outs, or unrecognizable responses (i.e., not ACK-0 or NAK), the originator considers the line DOWN. The originator waits 20 seconds and tries the line bid again.

- CONTENTION occurs when both systems bid for the line at the same time. The DxC will be considered the master and the host should respond with ACK-0. However, the host may override the DxC line bid by transmitting LBO in response. The DxC will respond by transmitting ACK-0 to acknowledge the line bid override and allow message transmission, or it will ignore the message if DxC was not bidding for the line when the message was sent.

## Data Transfer

After successfully bidding for the line, the originator or sending system transmits its message. If the sending device does not transmit a message within 20 seconds, the receiving device times out. Further communication will require another line bid.

## Successful Data Transfer

A successful data transfer consists of: `[<MESSAGE>]<CS><CR><LF>`.

- CS – Check sum. It is two hexadecimal digits.
    256 - ((Sum of ASCII value of all characters in `<MESSAGE>`,
    including spaces, commas, ' [ ' and ' ] ' ) MODULE 256) = CS
- CR – Carriage return
- LF – Line feed

If the checksum is incorrect or if any element is missing, the data transfer is unsuccessful.

After data transmission, the receiving system acknowledges transmission as follows:

| Stage | Description |
|-------|-------------|
| 1 | If data transfer was successful, the receiving system alternately returns ACK-1 and ACK-0 after each message.  Since the receiving system responded ACK-0 to the line bid, ACK-1 is the correct acknowledgment to the first message, ACK-0 to the second message, ACK-1 to the next message, and so forth.  When data transfer is complete, the sending system transmits EOT. |
| 2 | If data transfer was unsuccessful due to a bad checksum or other problem, the receiving system responds NAK.  The sending system re-transmits the message. |
| 3 | If the sending system does not receive an acknowledgment within 15 seconds after data transfer, or if an incorrect acknowledgment is received, it transmits ENQ.  The receiving system retransmits its last acknowledgment (e.g., ACK-0, ACK-1, or NAK).  The sending system responds to that acknowledgment in one of the following manners:<br><br>• If the correct acknowledgment is transmitted, the sending system transmits the next message or EOT.<br>• If an incorrect acknowledgment or NAK is transmitted, the sending system retransmits the last message. |

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| Stage | Description |
|-------|-------------|
| 4 | TIME OUT occurs:<br><br>• If the sending system does not transmit data in 20 seconds after successfully bidding for the line, the receiving system times out and returns to idle.<br><br>• If the sending system does not receive an acknowledgment within 15 seconds after data transfer, or if an incorrect acknowledgment is received, it then transmits ENQ.  If an acknowledgment is not received after seven consecutive ENQ transmissions, the DxC waits 20 seconds before it attempts a line bid and continues to do so until an acknowledgment is received. |

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Examples of data transfer (These examples are also correct if the labels UniCell DxC and HOST are reversed):

## NAK Example

**UniCel DxC**　　　　　　　　　　　　　　　　　　　　　　　　　　　　**HOST**
**(Sending System)**　　　　　　　　　　　　　　　　　　　　　**(Receiving System)**

```
        EOT SOH    ------------------------------------------------------>
                   <-----------------------------------------------------    ACK
        Message 1  ------------------------------------------------------>
                   <-----------------------------------------------------    ETX
        Message 2  ------------------------------------------------------>
                   <-----------------------------------------------------    ACK
        Message 3  ------------------------------------------------------>
                   <-----------------------------------------------------    NAK
        Message 3  ------------------------------------------------------>
                   <-----------------------------------------------------    ETX
        EOT        ------------------------------------------------------>
```

## No Response

**UniCel DxC**　　　　　　　　　　　　　　　　　　　　　　　　　　　　**HOST**
**(Sending System)**　　　　　　　　　　　　　　　　　　　　　**(Receiving System)**

```
EOT SOH            ------------------------------------------------------>
                   <=====================================================    ACK
Message 1          ======================================================>
                   <=====================================================    ETX
Message 2          ======================================================>
                                                                            No Response
                                                                            (15 secs)
ENQ                ======================================================>
                   <=====================================================    ETX
Message 2          ======================================================>
                   <=====================================================    ACK
EOT                ======================================================>
```

**No Response Return to Idle**

**UniCel DxC**                                                    **HOST**
**(Sending System)**                                            **(Receiving System)**

```
                 <=======================================================      EOT SOH
ACK              =======================================================>
                                                                          No Response
                                                                          (>20 secs)
IN IDLE STATE
                 <=======================================================      MESSAGE 1
MESSAGE 1 IGNORED
                 <=======================================================      EOT SOH
ACK              =======================================================>
                 <=======================================================      MESSAGE 1
ETX              =======================================================>
                 <=======================================================      EOT
```

**Request for Idle State**

**UniCel DxC**                                                    **HOST**
**(Sending System)**                                            **(Receiving System)**

```
EOT SOH          =======================================================>
                 <=======================================================      ACK
Message 1        =======================================================>
                 <=======================================================      ETX
Message 2        =======================================================>
                 <=======================================================      ACK
EOT              =======================================================>
IN IDLE STATE                                                                  IN IDLE STATE
```

## Unsolicited Messages

Unsolicited messages are those messages which are automatically transmitted by the UniCel DxC System as the information becomes available. The following unsolicited messages are transmitted in the bidirectional mode.

---

**NOTICE**
The 800 stream below is referenced to the LX20/DxC Interface. The CX7 compatible interface is similar in data streams and should be interpreted as a 700 stream where an 800 stream is displayed.

---

Table 1.9         Unsolicited Messages

| Message | Description |
|---------|-------------|
| Cup Header | The Cup Header information for each cup in the rack is transmitted when a rack is loaded and accepted. (Stream 802 - Function 1) |
| Test Results | A Test Result message is transmitted as each test is completed. (Stream 802 - Functions 3, 11, 13, 81) |
| End of Cup | An End-of-Cup message is transmitted when all tests programmed for a sample are completed. (Stream 802 - Function 5) |

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Table 1.9        Unsolicited Messages, continued

| Message | Description |
|---------|-------------|
| End of Run | An End-of-Run message is transmitted when all tests programmed have been completed and the DxC has gone into the *Standby* mode.<br>(Stream 803 - Function 17) |
| Power Up | The Power Up message is transmitted when the DxC is booted.<br>(Stream 803 - Function 1)<br><br>Note:  Undefined characters may be transmitted during system boot-up. |
| Bidirectional Startup | The Bidirectional message is transmitted when the bidirectional or bidirectional with query interface option is enabled.<br>(Stream 803 - Function 2) |
| Host Setup | The Host Setup message is transmitted when the DxC is booted and when the operator enters and exits Host Communications in System Setup.  This is transmitted immediately after the interface is changed in the System Setup.<br>(Stream 800 - Function 2) |

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## Unsolicited Message Transmission Example

The following message is an example of an unsolicited message transmission.

**UniCel DxC**                                                                    **HOST**

```
EOT SOH   =======================================================================>
          <=======================================================================  ACK
[-0,802,01,25091998,080534,--168,RE,--12,-1,RO,########,SE,121------------,
------------------,-----------------------,Harris------------,Maria----------,
J,100A10B100-----,Bond--------------,25091998,0100,ER-----------------,-47,5,26051951,
B,Lipemic------------------------------------,#######,####,####,######,--3,01A-,01B-,
04A-]C2<CR><LF>
          <=======================================================================  ETX
[-0,802,03,25091998,080812,--168,------116,--12,-1,121------------,01A-,###,######,###,
-1,----104.7,########,2,0,04,LO,NR,0,NA,104.65540,---------,NO,NO,NO,NO,NO,NO,NO,NO,NO,
NO,NO,NO,NO,NO,NO,NO,1.0000,#######################]0D<CR><LF>
          <=======================================================================  ACK
[-0,802,03,25091998,080811,--168,------116,--12,-1,121------------,01B-,###,######,###,
-1,-----2.45,########,2,0,04,LO,NR,0,NA,2.4467065,---------,NO,NO,NO,NO,NO,NO,NO,NO,NO,
NO,NO,NO,NO,NO,NO,NO,1.0000,#######################]15<CR><LF>
          <=======================================================================  ETX
[-0,802,03,25091998,080812,--168,------116,--12,-1,121------------,04A-,###,######,###,
-1,-----77.8,########,2,0,04,LO,NR,0,NA,77.755951,---------,NO,NO,NO,NO,NO,NO,NO,NO,NO,
NO,NO,NO,NO,NO,NO,NO,1.0000,#######################]FB<CR><LF>
          <=======================================================================  ACK
[-0,802,11,25091998,080534,--168,--12,-1,121------------,-1,SPC_CALC------------,OK,
19.017143,--------]B9<CR><LF>
[-0,802,05,25091998,082242,--168,121------------,--12,-1]D5<CR><LF>
          <=======================================================================  ETX
[ 0,803,17,06101998,100137]4C<CR><LF>
          <=======================================================================  ACK
EOT =======================================================================>
```

(- Indicates space holder)

## Solicited Messages

Solicited messages are transmitted by the host to request information from the UniCel DxC System.  Solicited messages are used by the host to:

- Confirm that a bidirectional system is attached to the host serial port. (Stream 800 - Function 1)
- Obtain DxC instrument status information.  (Stream 803 - Function 3)
- Obtain a list of the DxC installed chemistries.  (Stream 804 - Functions 7)

## Solicited Message Transmission Example

The following message is an example of a solicited message transmission.

**UniCel DxC**                                                                    **HOST**

```
          <==================================================   EOT SOH
ACK       ==================================================>
          <==================================================   [00,803,03]<CS><CR><LF>
ETX       ==================================================>
          <==================================================   EOT
EOT SOH   ==================================================>
          <==================================================   ACK
[-0,803,04,07101998,111246,DxC-,02,15,#####]<CS><CR><LF>=>
          <==================================================   ETX
EOT       ==================================================>
```

(<CS> Indicates checksum)
(- Indicates space holder)

## Downloading Sample Programming from Host to UniCel DxC

- Sample programming may be transmitted directly from the host to the UniCel DxC Systems.  The information that can be programmed includes:
  - Rack and cup number
  - Sample ID
  - Test type
  - Fluid type
  - Demographics
  - Chemistry requests (Stream 801 - Function 1)
- The host, after sending a single sample/cup must release the line by sending an EOT and then wait for the DxC to send the sample/cup return status.  (Stream 801 - Function 2) This response by the DxC is used to notify the host whether or not the program was accepted (e.g., a BUSY response may indicate programming is being done at the DxC console).  There is an interlock prohibiting simultaneous programming of a single sample from the host and the UniCel DxC System console.
- After the DxC releases the line (sends an EOT), the host may then repeat the process for as many sample/cups as necessary for completion of the download.  If this protocol is not followed, improper chemistry requests may be downloaded to the DxC.
- In addition, the host can clear previous rack programming before transmitting the new sample programming.  (Stream 801 - Function 3)

- In response to the clear rack message transmitted by the host, the DxC transmits an OK, BUSY, or SYNTAX ERROR message. (Stream 801 - Function 4) This response by the DxC is used to notify the host as to whether the rack was cleared (e.g., A BUSY response may indicate programming is being done at the DxC console or the rack is on the sample carousel.)
- There is an interlock prohibiting simultaneous clearing from the host and clearing or programming from the DxC System console.

## Host Downloading Sample Program Example

The following is an example of a host downloading a sample program.

**UniCel DxC**                                                                      **HOST**

```
        <==================================================          EOT SOH
ACK     ==================================================>
        <=========================
[00,801,01,0401,01,0,RO,TU,RSG0001--------,--------------------,------------,
Sample-has-been-hemolyzed,Rosenthel---------,Robert---------,R,PID456789012345,
Dr.-H.-Schwartz---,08041998,1134,Humana-Hospital-Brea,-35,5,12041963,M,
Chronic-asmatic-activity-27293133353739414345,111.1--,22.2,33.3,03,4.4444,003,
01A-,0,01B-,0,02A-,0]<CS><CR><LF>
ETX     ==================================================>
        <==================================================          EOT
EOT SOH ==================================================>
        <==================================================          ACK
[-0,801,02,-0,--306,-401,-1,RSG0001--------]<CS><CR><LF>=>
        <==================================================          ETX
EOT     ==================================================>
```

(<CS> Indicates checksum)
(- Indicates space holder)

# CHAPTER 2  LX20/DxC Interface

---

## Table of Contents

# LX20/DxC Interface

## LX20/DxC Messages

### Introduction

The data record format for all messages transmitted to and from the UniCel DxC System is:

```
'['<MESSAGE>']'<CS><CR><LF>
```

This section describes the information contained in the <MESSAGE> portion.

### Message Format

The format of the <MESSAGE> is:

```
<DEVICEID>,<STREAM>,<FUNCTION>,<FIELD1>,...,<FIELDN> where:
```

- <DEVICE ID> is a number between 0 and 99.  The default UniCel DxC ID is 0 but can be changed using the Host Communications Setup procedure.  All messages which have a different Device ID than the Host Communications Screen will not be processed.
- <STREAM> is a number between 800 and 899.
- <FUNCTION>  is a number between 1 and 99.
- <FIELD1>,...,<FIELDN> are data fields associated with the <STREAM> and <FUNCTION>.
- All data fields <FIELDN> are fixed lengths.
- Numeric fields, excluding function numbers, are right justified and blank filled to the maximum length.
- Character and string fields are left justified and right blank filled to the maximum length.
- If numeric data exceeds the maximum field length, the field will be filled with asterisks (*).  If a field does not apply in a record, it will be filled with pound signs (#).
- Alphanumeric fields received from the host cannot contain commas (,).  Commas received in an alphanumeric field will generate an HCP error.  A comma entered in an alphanumeric field at the instrument is transmitted as a semicolon (;).  A semicolon received from the host is converted to a comma.
- Valid and Invalid characters for entries are listed in the table below:

Table 2.1        ASCII Codes

| Type of Entry | THESE ARE VALID ASCII Character Codes… | EXCEPT FOR THESE INVALID Characters and Character Codes… |
|---|---|---|
| Sample ID | 33 thru 126 | A *space* and $ , ; * ? [ ] \^ | & |
| Other Entries | 32 thru 175 | ASCII Character Codes 44 and 127 |

- **Alpha:** Any printable ASCII string (Commas are translated into semicolons when sent to the host.  Semicolons are translated into commas when received from the host.)
- **LDATE:** Long Date. Format is ddmmyyyy.

## Message Streams

Messages sent to and from the UniCel DxC System are divided into streams.

- Each stream corresponds to one group of related operations within the interface.  Within each stream are one or more functions.  For each stream only one function can be active at a time.
- Multiple streams can be active at the same time.

Stream transmission options are outlined in CHAPTER 4, *System Setup* of the UniCel DxC Synchron Clinical Systems *Instructions for Use* manual.

# Stream 800 - Special Functions

## Stream 800 - Function 1: Are You There?

**Sent by:** Host

**Purpose:** To make sure that a bidirectional system is attached to the host port. Upon receipt of the message 800-01, the UniCel DxC responds with the message 800-02, *Host Setup*.

Table 2.2    Are You There

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 800 | |
| Function | 2 | 01 | |

Example:

```
[00,800,01]97<CR><LF>
```

## Stream 800 - Function 2: Host Setup

**Sent by:** UniCel DxC

**Purpose:** Sent by the UniCel DxC in response to message 800-01. Also sent unsolicited upon power up and whenever there are changes to the Host Communications in *System Setup*.

Table 2.3    Host Setup

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 800 | |
| Function | 2 | 02 | |
| Date | 8 | LDate | |
| Time | 6 | Time | |
| Software Revision | 10 | ALPHA | Rev NNN.N |
| Driver Mode | 1 | B or U | B = Bidirectional<br>U = Unidirectional |
| Stream 800 Function 2 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 801 Function 6 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 802 Function 3 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |

*(1 of 2)*

Table 2.3        Host Setup, continued

| Field | Length | Format | Notes |
|---|---|---|---|
| Stream 802 Function 7 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 802 Function 9 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 802 Function 11 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 802 Function 23 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 802 Function 25 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 802 Function 81 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 802 Function 83 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 803 Function 1 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 803 Function 2 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 803 Function 5 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 803 Function 7 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 803 Function 13 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 803 Function 17 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 802 Function 13 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |

*(2 of 2)*

Example:
```
[-0,800,02,07101998,084523,1.05.48X--,U,1,0,1,0,0,1,0,0,1,0,1,1,0,0,0,1,1,
0,0,0,0,0,0,0]2A<CR><LF>
```

(- Indicates space holder)

# Stream 801 - Sample/Cup Program

## Stream 801 - Function 1: Sample/Cup Program

**Sent by:** Host
**Purpose:** To inform UniCel DxC what tests to perform for a given sample. The DxC responds with an 801-02, *Sample/Cup Return Status*, which shows whether or not the program was accepted.

Table 2.4     Sample/Cup Program

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 00-99 | Operator assigned |
| Stream | 3 | 801 | |
| Function | 2 | 01 | |
| Rack Number | 4 | 0000-0999 | 0 = No rack number assigned (Cup Number must also be 0).<br><br>Rack numbers greater than 999 will result in a Rack Number Too Large return code.<br><br>Refer to Note 3 after this table. |
| Cup Number | 2 | 0-4 | 0 = No cup number assigned (Rack Number must also be 0).<br><br>A cup number greater than 4 will result in a BAD MESSAGE return code.<br><br>Refer to Note 3 after this table. |
| Update Flag | 1 | FLAG | 0 = Replace all programming and patient demographics<br><br>1 = Add to existing program<br><br>Refer to Note 2 and Note 4 after this table. |
| Test Type | 2 | TEST CODE | Refer to Table 4.1 Test Type Codes.<br><br>Refer to Note 4 after this table. |
| Sample Type | 2 | FLUID CODE | Refer to Table 4.2 Sample Type Codes. |

*(1 of 3)*

Table 2.4       Sample/Cup Program, continued

| Field | Length | Format | Notes |
|---|---|---|---|
| Sample ID | 15 | ALPHA | Must be present in all modes.<br><br>All lower case letters are converted to upper case.<br><br>Refer to Note 4 after this table. |
| Control Name | 20 | ALPHA | Refer to Note 1 after this table. |
| QC Lot Number | 12 | ALPHA | Not used. |
| Sample Comment Code 1 | 25 | ALPHA | |
| Name Last | 18 | ALPHA | |
| Name First | 15 | ALPHA | |
| Name Middle Initial | 1 | ALPHA | |
| Patient ID | 15 | ALPHA | |
| Doctor | 18 | ALPHA | |
| Draw Date | 8 | LDATE | Refer to Note 7 and Note 9 after this table. |
| Draw Time | 4 | TIME | |
| Location | 20 | ALPHA | |
| Age | 3 | NUMERIC | Default = 0 |
| Age Units | 1 | NUMERIC | Default = 5<br><br>Refer to Table 4.3 Age Unit Codes. |
| Birth Date | 8 | LDATE | Refer to Note 9 after this table. |
| Sex | 1 | ALPHA | M, F, B |
| Patient Comments | 45 | ALPHA | |
| Timed Urine Volume | 7 | NUMERIC | 0-99999.0 |
| Timed Urine Period | 4 | NUMERIC | Collection period 0-99.0 |
| Timed Urine Creatinine | 4 | NUMERIC | Serum creatinine 0-99.0 |

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Table 2.4 Sample/Cup Program, continued

| Field | Length | Format | Notes |
|---|---|---|---|
| Timed Urine Creatinine Units | 2 | UNIT CODE | Blank is only valid if the Timed Urine Creatinine field is zero or blank.<br><br>Refer to Note 8 after this table. |
| Timed Urine Area | 6 | NUMERIC | Surface area 0 – 9.9900<br><br>Blank is OK. |
| Number Tests | 3 | NUMERIC | 1-999 |
| Test-1 Chem | 4 | CHEM CODE | Refer to Note 5 and Note 6 after this table. |
| Test-1 ORDAC | 1 | FLAG | 1 = ORDAC |
| Test-2 Chem | 4 | CHEM CODE | Refer to Note 5 and Note 6 after this table. |
| Test-2 ORDAC | 1 | FLAG | 1 = ORDAC |
| Test-N[a] Chem | 4 | CHEM CODE | Refer to Note 5 and Note 6 after this table. |
| Test-N ORDAC | 1 | FLAG | 1 = ORDAC |

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[a]  N = Value from Number Tests Field

Note 1:  The Control Name uniquely identifies the control of this result.  Only the selected fluid type for the control can be used.  Any other fluid type is a syntax error. All lower case letters are converted to upper case.  If a control name is included in the message, the system will address the sample program as a control sample program.

Note 2:  A new program will be entered if no program exists for the specified sample/ cup.  Duplicate chemistries will not be added to an existing program.

Updates consist of chemistry additions only and are allowed only under the following conditions:

• Sample Type and Program Type of program to be updated match Fluid Type and Test Type (respectively) of sample program sent by the host.

• Sample Status of the program to be updated is *Sample Required, In-Progress, Removed, Manual Assign*, or *Rerun*; and Control Name of the sample program sent by the host is blank for patient samples, or matches the Control Name of the existing control sample program.

Overwrites are allowed under the following conditions:

• Sample Status of the program to be overwritten is *Sample Required, Incomplete, Complete, Manual Assign,* or *Rerun.*

Note 3:  Rack numbers greater than 999 will result in a Rack Number too Large (15) return code in the 801:2 message.

A cup number greater than 4 will result in a BAD MESSAGE return code in the 801:2 message.

If the Rack Number is 0, the Cup Number must also be 0.

If the Cup Number is 0, the Rack Number must also be 0.

Note 4:  If the Test Type is ST (STAT) or RO (Routine), the sample program will be rejected if the Sample ID matches a defined control ID on the system.

Note 5:  The system will accept control sample programs even if they contain chemistries not defined for the control on the instrument.  It is assumed that the host will handle the extra chemistry results.

Note 6:  If the host stream contains at least one of the Chem Codes used for serum index chemistries, the system will select to run all serum indices tests.  The system will treat a serum index test selection as an exception to the requirement that chemistry selections in the host stream have to be configured on the instrument.

Note 7:  If the host stream contains a Draw Time but does not contain a Draw Date, the system will clear the Draw Time to zero and log an event, indicating it has done so.

Note 8: In order for the Timed Urine Results Message to be sent back to the host, unit codes that are sent by the host must translate into one of the selectable CREm or CREA system (DxC) setup units.

The Timed Urine Results Message is *not* sent back to the host if Timed Urine Creatinine units sent by the host

• are blank
• do not translate into one of the selectable CREm or CREA system setup units or
• are not recognized by the instrument.

For this case, an event is logged which indicates that the data in the Timed Urine Creatinine Field has been cleared and that the Timed Urine Results will not be run.

Note 9:  The DxC will reject a 2-digit year field.  If the DxC receives a 2-digit field for the year, the DxC will log the event, indicating a problem was detected.  The field will be cleared and process the sample with a blank date.

Example:

```
[00,801,01,0401,01,0,RO,TU,RSG0001--------,--------------------,
------------,Sample-has-been-hemolyzed,Rosenthel---------,
Robert---------,R,PID456789012345,Dr.-H.-Schwartz---,08041998,
1134,Humana-Hospital-Brea,-35,5,12041963,M,Chronic-asmatic-activity-
27293133353739414345,111.1--,22.2,33.3,03,4.4444,003,01A-,0,01B-,0,
02A-,0]<CS><CR><LF>
```

(- Indicates space holder)

## Stream 801 - Function 2: Sample/Cup Return Status

**Sent by:**  UniCel DxC
**Purpose:**  Sent in response to an 801-01 message from the host.  801-02 indicates if the sample/cup program was accepted, or why it was not accepted.

Table 2.5        Sample/Cup Return Status

| Field | Length | Format | Notes |
|---|---|---|---|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 801 | |
| Function | 2 | 02 | |
| Return Code | 2 | 00-99 | 0 = OK<br>1 = BAD MESSAGE – There is something wrong with the message syntax.<br>2 = BUSY – The cup is running or sample is being programmed.<br>3 = NOT CONFIGURED – Message contains at least one non –configured chemistry.<br>4 = NON ORDAC – Message contains at least one non-ORDAC chemistry, required for ORDAC.<br>5 = DILUTION ERROR – Message contains chemistries with different dilution factors.<br>6 = CONTROL NOT CONFIGURED<br>7 = CALIBRATOR Rack ONLY |

*(1 of 2)*

Table 2.5        Sample/Cup Return Status, continued

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Return Code, continued | 2 | 0-99 | 8 = Not used<br>9 = DxC ERROR – An internal logical error has occurred.<br>10 = Completed sample (Program update only)<br>11 = Incompatible fluid types.  Used for program update or control sample program.<br>12 = Incompatible test types.  (Program update only)<br>13 = Incompatible patient name. (Program update only)<br>14 = Sample ID matches existing Control ID.<br>15 = Rack Number too large.  Rack Number must be between 0 and 1 and 0999.<br>16 = Too many tests programmed for sample.<br>17-20 = Future use |
| Accession Number | 5 | NUMERIC | 1-65535, supplied by DxC |
| Rack Number | 4 | 0000-0999 | 0 = No rack number assigned |
| Cup  Number | 2 | 00-4 | |
| Sample ID | 15 | ALPHA | |

*(2 of 2)*

Example:
`[-0,801,02,-0,--306,-401,-1,RSG0001--------]<CS><CR><LF>`

(- Indicates space holder)

## Stream 801 - Function 3: Clear Rack/Sample IDs

**Sent by:** Host

**Purpose:** Sent by the host prior to programming samples to clear the program for a rack or a group of samples. It is not necessary for the host to send this message as each sample is cleared if the update flag is not set in the 801-01, Sample/Cup Program message.

- Receipt of this message causes the DxC to clear the program(s) for the rack or Sample IDs specified in the message.
- 801-03 messages that include both rack number and Sample IDs are rejected by sending an 801-04 message with a BAD MESSAGE status.
- DxC responds to the 801-03 message with an 801-04, Clear Rack/Sample IDs Status message indicating whether the clear command was accepted.
- If the DxC aspirated reagent for a rack or Sample ID, an 801-03 request to clear that rack or Sample ID receives an 801-04 message indicating the rack or Sample ID is busy.

Table 2.6       Clear Rack/Sample IDs

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 801 | |
| Function | 2 | 03 | |
| Rack Number | 4 | 0000-0999 | 0 = No rack number assigned. Refer to Note 1 and Note 2 after this table. |
| Sample ID 1 | 15 | ALPHA | Sample ID for a cup |
| Sample ID 2 | 15 | ALPHA | Sample ID for a cup |
| Sample ID 3 | 15 | ALPHA | Sample ID for a cup |
| Sample ID 4 | 15 | ALPHA | Sample ID for a cup |

Note 1:  If one or more Sample IDs are specified, rack number must be zero. Specification of a non-zero rack number with non-blank Sample IDs will result in a 801-04 being returned with a rack return code of BAD MESSAGE.

Note 2:  Rack numbers greater than 999 result in a rejected Clear Rack/Sample ID Message and cause the Clear Rack/Sample ID Status rack return code to be set to 5 - Rack Number too large.

Example:
```
[00,801,03,0000,SAMP1------,SAMP2------,SAMP3------,SAMP4------]6A<CR><LF>
```

(- Indicates space holder)

## Stream 801 - Function 4: Clear Rack/Sample IDs Status

**Sent by:** UniCel DxC
**Purpose:** Sent in response to the 801-03 message. The host is informed if the clear command was accepted.

Table 2.7        Clear Rack/Sample IDs Status

| Field | Length | Format | Notes |
|---|---|---|---|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 801 | |
| Function | 2 | 04 | |
| Rack Number | 4 | 0000-0999 | 0 = No rack number assigned |
| Rack Return Code | 2 | 0-99 | 0 = Complete rack or all Sample IDs cleared.<br>1 = BAD MESSAGE<br>2 = BUSY The rack or one of the Sample IDs was running.<br>3 = DxC error<br>4 = Non-existent error<br>5= Rack Number too large |
| Sample ID 1 Return Code | 2 | 0-99 | 0 = Cleared.<br>2 = BUSY - Not cleared<br>3 = DxC Error<br>4 = Non-existent error |
| Sample ID 2 Return Code | 2 | 0-99 | 0 = Cleared<br>2 = BUSY - Not cleared<br>3 = DxC Error<br>4 = Non-existent error |
| Sample ID 3 Return Code | 2 | 0-99 | 0 = Cleared<br>2 = BUSY - Not cleared<br>3 = DxC Error<br>4 = Non-existent error |
| Sample ID 4 Return Code | 2 | 0-99 | 0 = Cleared<br>2 = BUSY - Not cleared<br>3 = DxC Error<br>4 = Non-existent error |

Example:
```
[-0,801,04,-0,-0,-4,-4,-4,-4]6B<CR><LF>
```

(- Indicates space holder)

## Stream 801 - Function 6: Host Query Rack/Sample IDs

**Sent by:** UniCel DxC

**Purpose:** To request the program for the Sample IDs, specified in the message from the host. This message is used in the bidirectional with query mode and finds samples for which it has no program. The host has 2.5 minutes to respond with first sample program.

Table 2.8        Host Query Rack/Sample IDs

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 801 | |
| Function | 2 | 06 | |
| Sample ID 1 | 15 | ALPHA | Refer to Note 1 after this table. |
| Sample ID 2 | 15 | ALPHA | Refer to Note 1 after this table. |
| Sample ID 3 | 15 | ALPHA | Refer to Note 1 after this table. |
| Sample ID 4 | 15 | ALPHA | Refer to Note 1 after this table. |

Note 1:  The message stream maintains the sample cup position of a rack.  For example, if "samp 4" is in cup position 4, it will remain in the 7th field of the 801, 06 stream.

Example:
```
[-0,801,06,samp1------,samp2------,samp3------,samp4 ------]EB<CR><LF>
```

(- Indicates space holder)

# Stream 802 - Results

## Stream 802 - Function 1: Cup Header

**Sent by:**  UniCel DxC
**Purpose:**  Sent before sending any test results because the header contains identification and demographic information about a sample.

Table 2.9        Cup Header

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 00-99 | Operator assigned |
| Stream | 3 | 802 | |
| Function | 2 | 01 | |
| Start Date | 8 | LDATE | |
| Start Time | 6 | TIME | |
| Accession Number | 5 | NUMERIC | 1-65535, supplied by DxC |
| Print Type | 2 | CODE | RG = Regular<br>RE = Recall<br>IN = Incomplete |
| Rack Number | 4 | 1-0999 | The rack number in which the sample was run. |
| Cup Number | 2 | 1-4 | The cup number in which the sample was run. |
| Test Type | 2 | TEST CODE | Refer to Table 4.1 Test Type Codes. |
| Future Use Space | 9 | ALPHA | |
| Sample Type | 2 | FLUID CODE | Refer to Table 4.2 Sample Type Codes. |
| Sample ID | 15 | ALPHA | |
| Control Name | 20 | ALPHA | Refer to Note 1 after this table. |
| Sample Comment Code 1 | 25 | ALPHA | |
| Name Last | 18 | ALPHA | |
| Name First | 15 | ALPHA | |
| Name Middle Initial | 1 | ALPHA | |
| Patient ID | 15 | ALPHA | |

*( 1 of 2)*

Table 2.9    Cup Header, continued

| Field | Length | Format | Notes |
|---|---|---|---|
| Doctor | 18 | ALPHA | |
| Draw Date | 8 | LDATE | |
| Draw Time | 4 | TIME | |
| Location | 20 | ALPHA | |
| Age | 3 | NUMERIC | Default = 0 |
| Age Units | 1 | NUMERIC | Default = 5 |
| Birth Date | 8 | LDATE | |
| Sex | 1 | ALPHA | M, F, B |
| Patient Comments | 45 | ALPHA | |
| Timed Urine Volume | 7 | REAL | 0.0 - 99999.0<br><br>Blank is OK.<br><br>Refer to Note 2 after this table. |
| Timed Urine Period | 4 | REAL | Collection period 0-99.0<br><br>Refer to Note 2 after this table. |
| Timed Urine Creatinine | 4 | REAL | Serum creatinine 0-99.0<br><br>Refer to Note 2 after this table. |
| Timed Urine Area | 6 | REAL | Surface area 1-9.9900<br><br>Refer to Note 2 after this table. |
| Number Chems Programmed | 3 | NUMERIC 000-999 | Does not include replicates |
| Com Chem ID 1 | 4 | CHEM CODE | |
| Com Chem ID 2 | 4 | CHEM CODE | |
| Com Chem ID N | 4 | CHEM CODE | $N \leq 999$ |

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Note 1:  The Control Name uniquely identifies the control of this result.

Note 2:  The number of decimal places is adjusted so the number can fit in this field.

Example:
```
[-0,802,01,25091998,080534,--168,RE,--12,-1,RO,#########,SE,121------------,
------------------,-----------------------,Harris------------,
Maria----------,J,100A10B100-----,Bond--------------,25091998,0100,
ER-----------------,-47,5,26051951,B,
Lipemic-------------------------------------,#######,####,####,######,
--3,01A-,01B-,04A-]C2<CR><LF>
```

(- Indicates space holder)

## Stream 802 - Function 3: Test Results

**Sent by:** UniCel DxC
**Purpose:** Sent when all chemistry results for a cup have been completed and calculated. 802-03 can be turned off in the host setup option.

Table 2.10     Test Results

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 00-99 | Operator assigned |
| Stream | 3 | 802 | |
| Function | 2 | 03 | |
| Completion Date | 8 | LDATE | |
| Completion Time | 6 | TIME | |
| Accession Number | 5 | NUMERIC | 1-65535, supplied by DxC |
| Result Record Number | 9 | NUMERIC | 1-10000 |
| Rack Number | 4 | 1-0999 | |
| Cup Number | 2 | 1-4 | |
| Sample ID | 15 | ALPHA | |
| Com Chem ID | 4 | CHEM CODE | Refer to Table 4.4 and Table 4.5 for Chemistry (Chem) Codes. |
| Reagent Serial Number | 3 | ALPHA | |
| Reagent Lot Number | 6 | ALPHA | |
| Cuvette Number | 3 | NUMERIC | |
| Replicate Number | 2 | NUMERIC | |
| Results in Selected Units | 9 | ALPHA NUMERIC | Refer to Note 2 and Note 3 after this table. |
| Calibration Rate | 9 | REAL | Refer to Note 2 and Note 3 after this table. |

*(1 of 3)*

Table 2.10     Test Results, continued

| Field | Length | Format | Notes |
|---|---|---|---|
| Positive or Negative | 1 | CODE | 0 = Negative<br>1 = Positive<br>2 = Not applicable<br>3 = Equivocal (DxC 600i or 800i only)<br>4 = Non-reactive (DxC 600i or 800i only)<br>5 = Reactive (DxC 600i or 800i only)<br>6 = Not confirmed (DxC 600i or 800i only)<br>7 = Confirmed (DxC 600i or 800i only)<br>8 = Gray zone flag (DxC 600i or 800i only)<br>9 = Access® 2 LOW flag (DxC 600i or 800i only)<br><br>Refer to Note 4 after this table. |
| Suppress Value | 1 | FLAG | 1 = Suppress value |
| Units | 2 | CODE | Refer to Table 4.6 Unit Codes. |
| Normal Range | 2 | CODE | Refer to range codes after this table. |
| Critical Range | 2 | CODE | Refer to range codes after this table. |
| ORDAC | 1 | FLAG | 1 = ORDAC used |
| Control Range | 2 | FLAG | NA = Not applicable<br>NR = Within 2 SD of mean<br>H2 = 2 to 3 SD above mean<br>H3 = Greater than 3 SD above mean<br>H4 = Greater than 4 SD above mean<br>L2 = 2 to 3 SD below mean<br>L3 = Greater than 3 SD below mean<br>L4 = Greater than 4 SD below mean<br>IC = Incomplete<br>CD = Control or chemistry deleted |
| Calculated Result | 9 | ALPHA NUMERIC | Refer to Note 1 and Note 3 after this table.<br><br>Note:  Result field reporting the results for TDM'S may contain a < (less than) or a > (greater than) sign. |

*(2 of 3)*

Table 2.10       Test Results, continued

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Instrument Codes | 9 | ALPHA | Refer to Table 4.7 Instrument Codes with Remarks. |
| Result Error 1 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 2 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 3 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 4 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 5 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 6 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 7 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 8 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 9 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 10 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 11 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 12 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 13 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 14 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 15 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 16 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Dilution Factor | 6 | REAL | 0.0 – 1000.0 |
| Spare | 25 | ALPHA | Future use |

*(3 of 3)*

**RANGE CODES:**
HI = above normal range
LO = below normal range
NR = within normal range
OR = out of range
NA = not applicable

Note 1:  The number of decimal places is adjusted so the number can fit into this field.

Note 2:  The number of decimal places in this field is the number in the selected precision for the selected units field in the chemistry database.

Note 3:  If Suppress Value = 1, this field will be filled with #.

Note 4: For DxC chemistries, 0 and 1 are used only for drugs of abuse (DAT). On DxC 600i or DxC 800i, values from the range 0, 1, 3-9, are used by some Access 2 results, depending on the specific chemistry. Refer to the *Access Immunoassay System Manual* for additional information. All other chemistries use 2.

Example:

```
[-0,802,03,25091998,080812,--168,------116,--12,-1,121-----------,
01A-,###,######,###,-1,----104.7,#########,2,0,04,LO,NR,0,NA,104.65540,
---------,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,1.0000,
#########################]0D<CR><LF>
```

(- Indicates space holder)

### Stream 802 - Function 5: End of Cup

**Sent by:** UniCel DxC
**Purpose:** To indicate the end of a stream of test result messages for a specific cup.

Table 2.11    End of Cup

| Field | Length | Format | Notes |
|---|---|---|---|
| Device ID | 2 | 00-99 | Operator assigned |
| Stream | 3 | 802 | |
| Function | 2 | 05 | |
| Date | 8 | LDATE | |
| Time | 6 | TIME | |
| Accession Number | 5 | NUMERIC | 1-65535, supplied by DxC |
| Sample ID | 15 | ALPHA | |
| Rack number | 4 | 1-0999 | |
| Cup number | 2 | 1-4 | |

Example:
```
[-0,802,05,25091998,082242,--168,121------------,--12,-1]D5<CR><LF>
```

(- Indicates space holder)

### Stream 802 - Function 11: Special Calculations Results

**Sent by:** UniCel DxC
**Purpose:** Contains the result of a special calculation. This message contains accession number, rack number, cup number, and Sample ID. This message can be turned OFF in the Host Communication parameters screen in system setup.

Table 2.12    Special Calculations Results

| Field | Length | Format | Notes |
|---|---|---|---|
| Device ID | 2 | 00-99 | Operator assigned |
| Stream | 3 | 802 | |
| Function | 2 | 11 | |
| Date | 8 | LDATE | |
| Time | 6 | TIME | |
| Accession Number | 5 | NUMERIC | 1-65535, supplied by DxC |
| Rack Number | 4 | 1-0999 | |
| Cup Number | 2 | 1-4 | |
| Sample ID | 15 | ALPHA | |

*(1 of 2)*

Table 2.12     Special Calculations Results, continued

| Field | Length | Format | Notes |
|---|---|---|---|
| Replicate Number | 2 | NUMERIC | |
| Special Calc Name | 20 | ALPHA | Operator assigned |
| Special Calc Status | 2 | CODE | OK = Result is valid<br>AB = One of the involved chemistries was programmed but not run.<br>ZD = Denominator of a Ratio is zero |
| Special Calc Results | 9 | REAL | Refer to Note 1 after this table. |
| Special Unit String | 8 | ALPHA | |

*(2 of 2)*

Note 1:  The number of decimal places is adjusted to fit the number into this field.

Example:
```
[-0,802,11,25091998,080534,--168,--12,-1,121------------,-1,
SPC_CALC------------,OK,50.367081,mmol----]34<CR><LF>
```

(- Indicates space holder)

## Stream 802 - Function 13: Timed Urine Results

**Sent by:** UniCel DxC
**Purpose:** Contains the result of a timed urine test. This message can be turned off on the host setup option.

Table 2.13      Timed Urine Results

| Field | Length | Format | Notes |
|---|---|---|---|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 802 | |
| Function | 2 | 13 | |
| Date | 8 | LDATE | |
| Time | 6 | TIME | |
| Accession Number | 5 | NUMERIC | 1-65535, supplied by DxC |
| Rack number | 4 | 1-0999 | |
| Cup Number | 2 | 1-4 | |
| Sample ID | 15 | ALPHA | |
| Replicate Number | 2 | NUMERIC | |
| TU Calc Name | 20 | ALPHA | Operator assigned |
| TU Calc Status | 2 | CODE | OK = Result is valid<br>AB = One of the involved chemistries was programmed but not run.<br>ZD = Denominator of a Ratio is zero |
| TU Calc results | 9 | REAL | Refer to Note 1 after this table. |
| TU Unit String | 8 | ALPHA | |

Note 1: The number of decimal places is adjusted to fit the number into this field.

Example:
```
[-0,802,13,10041998,135429,---88,22,-1,S221-------,-1,NA-----------------,
OK,244.00033,mmol/24.]6B<CR><LF>
```

(- Indicates space holder)

---

## Stream 802 - Function 81: Expanded Results

**Sent by:** UniCel DxC
**Purpose:** Contains the expanded result of a test. This message can be turned off in the host setup option. Do not run the system with expanded results turned on unless directed by a Beckman Coulter representative.

Table 2.14     Expanded Results

| Field | Length | Format | Notes |
|---|---|---|---|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 802 | |
| Function | 2 | 81 | |
| Date | 8 | LDATE | |
| Time | 6 | TIME | |
| Accession Number | 5 | NUMERIC | 1-65535, supplied by DxC |
| Sample Record Number | 9 | NUMERIC | |
| Result Record Number | 9 | NUMERIC | |
| Sample ID | 15 | ALPHA | |
| Rack Number | 4 | 1-0999 | |
| Cup Number | 2 | 1-4 | |
| Reagent Record Number | 9 | NUMERIC | |
| Replicate Number | 2 | NUMERIC | |
| Com Chem ID | 4 | CHEM CODE | Refer to Table 4.4 Chemistry (Chem) Codes. |
| Cuvette Number | 3 | NUMERIC | |
| Cal Level | 1 | 0-6 | Not used |
| Suppressed Answer | 1 | FLAG | 1 = Answer suppressed |
| ORDAC Result | 1 | FLAG | 1 = ORDAC |
| Noise Maximum | 5 | NUMERIC | |
| Outlier Maximum | 5 | NUMERIC | |
| Noise Threshold Total | 3 | NUMERIC | |
| Outlier Threshold Total | 3 | NUMERIC | |

*(1 of 4)*

Table 2.14     Expanded Results, continued

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Initial Absorbance | 9 | REAL | Refer to Note 1 after this table. |
| Final Absorbance | 9 | REAL | Refer to Note 1 after this table. |
| Water Blank-Rate | 9 | REAL | Refer to Note 1 after this table. |
| Water Blank-Abs | 9 | REAL | Refer to Note 1 after this table. |
| Water Blank-Mean Deviation | 9 | REAL | Refer to Note 1 after this table. |
| Water Blank-Maximum Deviation | 9 | REAL | Refer to Note 1 after this table. |
| Blank-Rate | 9 | REAL | Refer to Note 1 after this table. |
| Blank-Abs | 9 | REAL | Refer to Note 1 after this table. |
| Blank-Mean Deviation | 9 | REAL | Refer to Note 1 after this table. |
| Blank-Maximum Deviation | 9 | REAL | Refer to Note 1 after this table. |
| Reaction-Rate | 9 | REAL | Refer to Note 1 after this table. |
| Reaction-Abs | 9 | REAL | Refer to Note 1 after this table. |
| Reaction-Mean Deviation | 9 | REAL | Refer to Note 1 after this table. |
| Reaction-Maximum Deviation | 9 | REAL | Refer to Note 1 after this table. |
| Raw Result | 9 | ALPHA | Refer to Note 1 after this table.<br><br>Note:  Result field reporting the results for TDM's may contain a < (less than) or > (greater than) sign. |
| Calculated Result | 9 | ALPHA | Refer to Note 1 after this table.<br><br>Note:  Result field reporting the results for TDM's may contain a < (less than) or > (greater than) sign. |
| Calibration Rate | 9 | REAL | Refer to Note 1 after this table. |

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Table 2.14     Expanded Results, continued

| Field | Length | Format | Notes |
|---|---|---|---|
| Positive or Negative | 1 | FLAG | 0 = Negative<br>1 = Positive<br>2 = Not applicable<br>3 = Equivocal (DxC 600i or DxC 800i only)<br>4 = Non-reactive (DxC 600i or DxC 800i only)<br>5 = Reactive (DxC 600i or DxC 800i only)<br>6 = Not confirmed  (DxC 600i or DxC 800i only)<br>7 = Confirmed (DxC 600i or DxC 800i only)<br>8 = Gray zone flag  (DxC 600i or DxC 800i only)<br>9 = Access 2 LOW flag (DxC 600i or DxC 800i only)<br><br>Refer to Note 2 after this table. |
| Units | 2 | CODE | Refer to Table 4.6 Unit Codes. |
| Instrument Codes | 9 | ALPHA | Refer to Table 4.7 Instrument Codes with Remarks. |
| Result Error 1 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 2 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 3 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 4 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 5 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 6 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 7 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 8 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |

*(3 of 4)*

Table 2.14     Expanded Results, continued

| Field | Length | Format | Notes |
|---|---|---|---|
| Result Error 9 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 10 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 11 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 12 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 13 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 14 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 15 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 16 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Intermediate ADC 1 | 5 | NUMERIC | |
| Intermediate ADC 2 | 5 | NUMERIC | |
| Intermediate ADC 3 | 5 | NUMERIC | |
| Intermediate ADC 4 | 5 | NUMERIC | |
| Intermediate ADC 5 | 5 | NUMERIC | |
| Dilution Factor | 6 | REAL | 0.0-1000.0 |
| Future Use Space | 23 | ALPHA | |

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Note 1:  The number of decimal places is adjusted to fit the number into this field.

Note 2:  For DxC chemistries, 0 and 1 are used only for drugs of abuse (DAT). On UniCel DxC 600i or UniCel DxC 800i, values from the range 0, 1, 3-9, are used by some Access 2 results, depending on the specific chemistry. Refer to the *Access Immunoassay System Manual* for additional information. All other chemistries use 2.

Example:

```
[-0,802,81,25091998,080812,--168,########,------116,121------------,--12,
-1,385875973,-1,01A-,###,#,0,0,#####,#####,###,###,########,########,
########,########,########,########,########,########,########,
########,########,########,########,########,-3882.800,104.65540,
########,2,04,---------,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,
--538,-3344,-3882,----6,----3,1.0000,####################]71<CR><LF>
```

(- Indicates space holder)

## Stream 803 - Instrument Status

### Stream 803 - Function 1: Power Up

**Sent by:** UniCel DxC
**Purpose:** Sent upon DxC power up or reset. This message can be turned off in the host setup option.

Table 2.15      Power Up

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 803 | |
| Function | 2 | 01 | |
| Date | 8 | LDATE | |
| Time | 6 | TIME | |
| Software Set | 10 | ALPHA | Console Master Program Version Number |
| CV ICC BOOT | 10 | ALPHA | |
| CV ICC APP | 10 | ALPHA | |
| CV MSMC1 BOOT 1 | 10 | ALPHA | |
| CV MSMC1 BOOT 2 | 10 | ALPHA | |
| CV MSMC1 APP | 10 | ALPHA | |
| CV MSMC2 BOOT 1 | 10 | ALPHA | |
| CV MSMC2 BOOT 2 | 10 | ALPHA | |
| CV MSMC2 APP | 10 | ALPHA | |
| CV SM BOOT | 10 | ALPHA | |
| CV SM APP 21 | 10 | ALPHA | |
| CV SM APP 11 | 10 | ALPHA | |
| CV SM APP 12 | 10 | ALPHA | |
| CV SM APP 13 | 10 | ALPHA | |
| CV SM APP 14 | 10 | ALPHA | |
| CV SM APP 31 | 10 | ALPHA | |
| CV SM APP 41 | 10 | ALPHA | |

*(1 of 3)*

Table 2.15    Power Up, continued

| Field | Length | Format | Notes |
|---|---|---|---|
| CV SM APP 42 | 10 | ALPHA | |
| CV SM APP 43 | 10 | ALPHA | |
| CV SM APP 51 | 10 | ALPHA | |
| CV SM APP 52 | 10 | ALPHA | |
| CV SM APP 61 | 10 | ALPHA | |
| CV SM APP 62 | 10 | ALPHA | |
| CV SM APP 63 | 10 | ALPHA | |
| CV SM APP 71 | 10 | ALPHA | |
| CV SM APP 81 | 10 | ALPHA | |
| CV SM APP 82 | 10 | ALPHA | |
| CV SM APP 91 | 10 | ALPHA | |
| CV SM APP A1 | 10 | ALPHA | |
| CV SM APP A2 | 10 | ALPHA | |
| CV SM APP B1 | 10 | ALPHA | |
| CV SM APP B2 | 10 | ALPHA | |
| CV SM APP B3 | 10 | ALPHA | |
| CV SM APP C1 | 10 | ALPHA | |
| CV SM APP C2 | 10 | ALPHA | |
| CV SM APP C3 | 10 | ALPHA | |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |

*(2 of 3)*

Table 2.15    Power Up, continued

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| SPARE | 10 | ALPHA | All "#"s |

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Example:
```
[-0,803,01,10041998[-0,703,01,100497,164320, v01.00----,v00.00----,
v00.00----,v00.00----,v00.00----,v00.00----,v00.00----,v00.00----,
v00.00----,v01.06----,v00.13----,v04.54----,v04.54----,v04.54----,
v04.54----,v01.30----,v00.89----,v00.89----,v00.89----,v00.89----,
v00.89----,v04.54----,v04.54----,v04.54----,v00.89----,v00.1B----,
##########,v00.30----,v00.89----,v00.89----,v00.89----,v00.89----,
v00.89----,v00.89----,v00.89----,v00.89----,##########,##########,
##########,##########,##########,##########,##########,##########,
##########,##########,##########,##########]5E<CR><LF>
```

(- Indicates space holder)

## Stream 803 - Function 2: Bidirectional On

**Sent by:**  UniCel DxC
**Purpose:**  This message is sent to the host when bidirectional communication is enabled.  This message can be disabled in the host setup option.

Table 2.16    Bidirectional On

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 803 | |
| Function | 2 | 02 | |
| Date | 8 | LDATE | |
| Time | 6 | TIME | |
| Software Set | 10 | ALPHA | DxC Software Version |

Example:
```
[-0,803,02,10041998,203332,A4.4.54---]F0<CR><LF>
```

(- Indicates space holder)

## Stream 803 - Function 3: Request Instrument State

**Sent by:** Host
**Purpose:** Sent to obtain the state of the UniCel DxC.

Table 2.17     Request Instrument State

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 803 | |
| Function | 2 | 03 | |

Example:

```
[-0,803,03]92<CR><LF>
```

(- Indicates space holder)

## Stream 803 - Function 4: Instrument State

**Sent by:** UniCel DxC
**Purpose:** Sent in response to a Request Instrument State, 803-03 message from the host.

Table 2.18     Instrument State

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 803 | |
| Function | 2 | 04 | |
| Date | 8 | LDATE | |
| Time | 6 | TIME | |
| Configuration | 5 | ALPHA | DxC |
| MC State | 2 | CODE | Refer to Table 4.11 Instrument Status Codes. |
| CC State | 2 | CODE | Refer to Table 4.11 Instrument Status Codes. |
| Future Use | 5 | ALPHA | |

Example:

```
[-0,803,04,11041998,105150,DxC-,02,15,##,-1]85<CR><LF>
```

(- Indicates space holder)

### Stream 803 - Function 17: End of Run

**Sent by:** UniCel DxC

**Purpose:** Sent when the DxC completes all programmed tests. This message can be turned off in the host setup option.

Table 2.19      End of Run

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 803 | |
| Function | 2 | 17 | |
| Date Queued | 8 | LDATE | |
| Time Queued | 6 | TIME | |

Example:

`[-0,803,17,06101998,100137]4C<CR><LF>`

(- Indicates space holder)

# Stream 804 - Setup Status

## Stream 804 - Function 7: Request Installed Chemistries

**Sent by:** Host
**Purpose:** Sent to obtain the list of installed chemistries from the DxC database.

Table 2.20 Request Installed Chemistries

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 804 | |
| Function | 2 | 07 | |

Example:
```
[00,804,07]8F<CR><LF>
```

## Stream 804 - Function 8: Installed Chemistries

**Sent by:** UniCel DxC
**Purpose:** This message is sent in response to a Request Installed Chemistries, 804-07 message from the host.

Table 2.21 Installed Chemistries

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 804 | |
| Function | 2 | 08 | |
| Date | 8 | LDATE | |
| Time | 6 | TIME | |
| Com Chem ID 1 | 4 | CHEM CODE | Refer to Table 4.4 and Table 4.5 for Chemistry (Chem) Codes. |
| Com Chem ID N | 4 | CHEM CODE | Refer to Table 4.4 and Table 4.5 for Chemistry (Chem) Codes.

N is incremented for each Com Chem ID that is configured. |

Note: Only chemistry codes of chemistries that are configured on the DxC will be included in the message. The last chemistry code transmitted will be 0000 to indicate that no more chemistry codes follow. If no chemistries are configured on the instrument, only 0000 chemistry code will be listed.

Example:

```
[-0,804,08,11041998,105518,01A-,01B-,04A-,02A-,09D-,08D-,05D-,03E-,
06D-,43D-,07D-,14B-,56B-,35A-,31A-,31B-,54A-,84A-,10A-,24C-,24B-,93B-,
30A-,30B-,85A-,86A-,05A-,98A-,59A-,44A-,32A-,32B-,40A-,87A-,89A-,12A-,
62A-,46B-,72C-,36A-,06A-,14A-,83A-,79B-,52B-,51B-,53B-,55A-,33A-,50A-,
50B-,07B-,64A-,63A-,48A-,92A-,66A-,67C-,68C-,65A-,93C-,94A-,91A-,11A-,
42B-,42C-,88A-,88B-,41A-,69C-,70C-,71B-,0000]BE<CR><LF>
```

(- Indicates space holder)

# CHAPTER 3  CX7 Compatible Interface

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# CX7 Compatible Interface

## CX7 Compatible Messages

### Introduction

The data record format for all messages transmitted to and from the UniCel DxC System is:

'['<MESSAGE>']'<CS><CR><LF>

This section describes the information contained in the <MESSAGE> portion.

### Message Format

The format of the <MESSAGE> is:

<DEVICEID>,<STREAM>,<FUNCTION>,<FIELD1>,...,<FIELDN> where:

- <DEVICE ID> is a number between 0 and 99. The default UniCel DxC ID is 0 but can be changed using the Host Communications Setup procedure. All messages which have a different Device ID than the Host Communications Screen will not be processed.
- <STREAM> is a number between 700 and 799.
- <FUNCTION> is a number between 1 and 99.
- <FIELD1>,...,<FIELDN> are data fields associated with the <STREAM> and <FUNCTION>.
- All data fields <FIELDN> are fixed lengths.
- Numeric fields, excluding function numbers, are right justified and blank filled to the maximum length.
- Character and string fields are left justified and right blank filled to the maximum length.
- If numeric data exceeds the maximum field length, the field will be filled with asterisks (*). If a field does not apply in a record, it will be filled with pound signs (#).
- Alphanumeric fields received from the host cannot contain commas (,). Commas received in an alphanumeric field will generate an HCP error. A comma entered in an alphanumeric field at the instrument is transmitted as a semicolon (;). A semicolon received from the host is converted to a comma.
- Valid and Invalid characters for entries are listed in the table below:

Table 3.1        ASCII Codes

| Type of Entry | THESE ARE VALID ASCII Character Codes… | EXCEPT FOR THESE INVALID Characters and Character Codes… |
|---|---|---|
| Sample ID | 33 thru 126 | A *space* and $ , ; * ? [ ] \^ \| & |
| Other Entries | 32 thru 175 | ASCII Character Codes 44 and 127 |

- **Alpha:** Any printable ASCII string (Commas are translated into semicolons when sent to the host.  Semicolons are translated into commas when received from the host.)

## Message Streams

Messages sent to and from the UniCel DxC System are divided into streams.

- Each stream corresponds to one group of related operations within the interface.  Within each stream are one or more functions.  For each stream only one function can be active at a time.
- Multiple streams can be active at the same time.

Stream transmission options are outlined in CHAPTER 4, *System Setup,* of the UniCel DxC Synchron Clinical Systems *Instructions for Use* manual.

# Stream 700 - Special Functions

## Stream 700 - Function 1: Are You There?

**Sent by:** Host
**Purpose:** To make sure that a bidirectional system is attached to the host port. Upon receipt of the message 700-01, the UniCel DxC responds with the message 700-02, *Host Setup*.

Table 3.2        Are You There

| Field | Length | Format | Notes |
|---|---|---|---|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 800 | |
| Function | 2 | 01 | |

Example:
`[00,700,01]98<CR><LF>`

## Stream 700 - Function 2: Host Setup

**Sent by:** UniCel DxC
**Purpose:** Sent by the UniCel DxC in response to message 700-01. Also sent unsolicited upon power up and whenever there are changes to the Host Communications in *System Setup*.

Table 3.3        Host Setup

| Field | Length | Format | Notes |
|---|---|---|---|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 700 | |
| Function | 2 | 02 | |
| Date | 6 | Date | |
| Time | 6 | Time | |
| Software Revision | 10 | ALPHA | Rev NNN.N |
| Driver Mode | 1 | B or U | B = Bidirectional U = Unidirectional |
| Stream 700 Function 2 | 1 | 0 or 1 | 0 = OFF 1 = ON |
| Stream 701 Function 6 | 1 | 0 or 1 | 0 = OFF 1 = ON |
| Stream 702 Function 3 | 1 | 0 or 1 | 0 = OFF 1 = ON |

*(1 of 2)*

Table 3.3        Host Setup, continued

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Stream 702 Function 7 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 702 Function 9 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 702 Function 11 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 702 Function 23 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 702 Function 25 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 702 Function 81 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 702 Function 83 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 703 Function 1 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 703 Function 2 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 703 Function 5 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 703 Function 7 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 703 Function 13 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 703 Function 17 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |
| Stream 702 Function 13 | 1 | 0 or 1 | 0 = OFF<br>1 = ON |

*(2 of 2)*

Example:

```
[-0,700,02,100497,163322,v0.0.04.07,B,1,0,1,1,1,1,1,1,0,1,1,1,1,1,1,1,1,1,
1,1,1,1,1,1]6E<CR><LF>
```

(- Indicates space holder)

# Stream 701 - Sample/Cup Program

## Stream 701 - Function 1: Sample/Cup Program

**Sent by:** Host

**Purpose:** To inform UniCel DxC what tests to perform for a given sample. The DxC responds with a 701-02, *Sample/Cup Return Status*, that shows whether or not the program was accepted.

Table 3.4 Sample/Cup Program

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 00-99 | Operator assigned. |
| Stream | 3 | 701 | |
| Function | 2 | 01 | |
| Rack Number | 2 | 0000-0999 | 0 = No rack number in bar code mode. (Cup Number must also be 0)<br><br>Refer to Note 3 after this table. |
| Cup Number | 2 | 0-4 | 0 = No cup number in bar code mode.<br><br>A cup number greater than 4 will result in a BAD MESSAGE return code in the 701-02 message.<br><br>Refer to Note 3 after this table. |
| Update Flag | 1 | FLAG | 0 = Replace all programming and patient demographics.<br><br>1 = Add to existing program.<br><br>Refer to Note 2 and Note 4 after this table. |
| Test Type | 2 | TEST CODE | Refer to Table 4.1 Test Type Codes.<br><br>Refer to Note 4 after this table. |
| Sample Type | 2 | FLUID CODE | Refer to Table 4.2 Sample Type Codes. |

*(1 of 3)*

Table 3.4    Sample/Cup Program, continued

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Sample ID | 11 | ALPHA | Must be present in all modes.<br><br>All lower case letters are converted to upper case.<br><br>Refer to Note 4 after this table. |
| Control Name | 20 | ALPHA | Refer to Note 1 after this table. |
| Sample Comment Code 1 | 25 | ALPHA | |
| Sample Comment Code 2 | 25 | ALPHA | Not Used by DxC |
| Name Last | 18 | ALPHA | |
| Name First | 15 | ALPHA | |
| Name Middle Initial | 1 | ALPHA | |
| Patient ID | 12 | ALPHA | |
| Doctor | 18 | ALPHA | |
| Draw Date | 6 | DATE | Refer to Note 7 after this table. |
| Draw Time | 4 | TIME | |
| Location | 20 | ALPHA | |
| Age | 3 | NUMERIC | Default = 0 |
| Age Units | 1 | NUMERIC | Default = 5<br><br>Refer to Table 4.3 Age Unit Codes. |
| Birth Date | 6 | DATE | |
| Sex | 1 | ALPHA | M, F, B |
| Patient Comments | 25 | ALPHA | |
| Timed Urine Volume | 7 | NUMERIC | 0-99999.0 |
| Timed Urine Period | 4 | NUMERIC | Collection period 0-99.0 |
| Timed Urine Creatinine | 4 | NUMERIC | Serum creatinine 0-99.0 |
| Timed Urine Area | 6 | NUMERIC | Surface area 1 – 9.9900 |

*(2 of 3)*

Table 3.4        Sample/Cup Program, continued

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Number Tests | 3 | NUMERIC | 1-999 |
| Test-1 Chem | 4 | CHEM CODE | Refer to Note 5 and Note 6 after this table. |
| Test-1 ORDAC | 1 | FLAG | 1 = ORDAC |
| Test-2 Chem | 4 | CHEM CODE | Refer to Note 5 and Note 6 after this table. |
| Test-2 ORDAC | 1 | FLAG | 1 = ORDAC |
| Test-N[a] Chem | 4 | CHEM CODE | Refer to Note 5 and Note 6 after this table. |
| Test-N ORDAC | 1 | FLAG | 1 = ORDAC |

*(3 of 3)*

[a] N = Value from Number Tests Field

Note 1:  The Control Name uniquely identifies the control of this result.  Only the selected fluid type for the control can be used.  Any other fluid type is a syntax error.  All lower case letters are converted to upper case.  If a control name is included in the message, the system will address the sample program as a control sample program.

Note 2:  A new program will be entered if no program exists for the specified sample/cup.  Duplicate chemistries will not be added to an existing program.

Updates consist of chemistry additions only.

Updates are allowed only under the following conditions:

• Sample Type and Program Type of program to be updated match Fluid Type and Test Type (respectively) of sample program sent by the host.

• Sample Status of the program to be updated is *Sample Required, In-Progress, Removed, Manual Assign*, or *Rerun*; and Control Name of the sample program sent by the host is blank for patient samples, or matches the Control Name of the existing control sample program.

Overwrites are allowed under the following conditions:

• Sample Status of the program to be overwritten is *Sample Required, Incomplete, Complete, Manual Assign,* or *Rerun.*

Note 3:  The most significant character of the range of the Rack Number field will be located in the most significant character position of the Cup Number field.

Example:  Rack 345, Cup 1 would be 45, 31.

Note 4:  If the Test Type is ST (STAT) or RO(Routine), the sample program will be rejected if the Sample ID matches a defined control ID on the system.

Note 5:  The system will accept control sample programs even if they contain chemistries not defined for the control on the instrument.  It is assumed that the host will handle the extra chemistry results.

Note 6:  If the host stream contains at least one of the Chem Codes used for serum index chemistries, the system will select to run all serum indices tests.  The system will treat a serum index test selection as an exception to the requirement that chemistry selections in the host stream have to be configured on the instrument.

Note 7 : If the host stream contains a Draw Time but does not contain a Draw Date, the system will clear the Draw Time to zero and log an event, indicating it has done so.

Example:
```
[00,701,01,01,03,1,CO,SE,samp3------,CONTROL_NAME_____,
------------------------,SAMPLE_COMMENT_TWO_____,------------------,
PATIENT_F_NAME_,M,------------,------------------,------,----,
-------------------,000,4,------,M,------------------------,-------,
----,----,------,001,01B-,0]2F<CR><LF>
```

(- Indicates space holder)

## Stream 701 - Function 2: Sample/Cup Return Status

**Sent by:**  UniCel DxC
**Purpose:**  Sent in response to a 701-01 message from the host.  701-02 indicates if the sample/cup program was accepted, or why it was not accepted.

Table 3.5        Sample/Cup Return Status

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream7 | 3 | 701 | |
| Function | 2 | 02 | |

*(1 of 3)*

Table 3.5      Sample/Cup Return Status, continued

| Field | Length | Format | Notes |
|---|---|---|---|
| Return Code | 2 | 00-99 | 0 = OK<br>1 = BAD MESSAGE – There is something wrong with the message syntax.<br>2 = BUSY – The cup is running or sample is being programmed.<br>3 = NOT CONFIGURED – Message contains at least one non – configured chemistry.<br>4 = NON ORDAC – Message contains at least one non-ORDAC chemistry, required for ORDAC.<br>5 = DILUTION ERROR – Message contains chemistries with different dilution factors.<br>6 = CONTROL NOT CONFIGURED<br>7 = CALIBRATOR Rack ONLY<br>8 = Not used<br>9 = DxC ERROR – An internal logical error has occurred.<br>10 = Completed sample (Program update only)<br>11 = Incompatible fluid types. Used for program update or control sample program.<br>12 = Incompatible test types. (Program update only)<br>13 = Incompatible patient name. (Program update only)<br>14 = Patient Sample Program Sample ID matches existing DxC Control ID.<br>15 = Not used by CX7 I/F messages.<br>16 = Too many tests programmed for sample.<br>17-20 = Future use.<br><br>Refer to Note 1 and Note 2 after this table. |
| Accession Number | 5 | NUMERIC | 1-65535, supplied by DxC |
| Rack Number | 2 | 0000-0999 | 0 = No rack number assigned.<br>Refer to Note 1 and Note 2 after this table. |

*(2 of 3)*

Table 3.5        Sample/Cup Return Status, continued

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Cup Number | 2 | 0-4 | Refer to Note 1 and Note 2 after this table. |
| Sample ID | 11 | ALPHA | |

*(3 of 3)*

Note 1:  The cup number and rack number must be filled in when the instrument is in non-bar code mode.

Note 2:  The most significant character of the Rack Number field's range will be located in the most significant character position of the Cup Number field.

Example:  Rack 345, Cup 1 would be 45, 31.

Example:
`[-0,701,02,-0,--230,-1,-3,samp3------]5D<CR><LF>`

(- Indicates space holder)

## Stream 701 - Function 3: Clear Rack/Sample IDs

**Sent by:**  Host
**Purpose:**  Sent by the host prior to programming samples to clear the program for a rack or a group of samples.  It is not necessary for the host to send this message as each sample is cleared if the update flag is not set in the 701-01, Sample/Cup Program message.

- Receipt of this message causes the DxC to clear the program(s) for the rack or Sample IDs specified in the message.
- 701-03 messages that include both rack number and Sample IDs are rejected by sending a 701-04 message with a BAD MESSAGE status.
- DxC responds to the 701-03 message with a 701-04, Clear Rack/Sample IDs Status message indicating whether the clear command was accepted.
- If the DxC aspirated reagent for a rack or Sample ID, a 701-03 request to clear that rack or Sample ID receives a 701-04 message indicating the rack or Sample ID is busy.

Table 3.6        Clear Rack/Sample IDs

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 701 | |
| Function | 2 | 03 | |

*(1 of 2)*

Table 3.6        Clear Rack/Sample IDs, continued

| Field | Length | Format | Notes |
|---|---|---|---|
| Rack Number | 2 | 0000-0999 | 0 = No rack number in bar code mode<br><br>Refer to Note 1 and Note 3 after this table. |
| Sample ID 1 | 11 | ALPHA | Sample ID for a cup<br><br>Refer to Note 2 after this table. |
| Sample ID 2 | 11 | ALPHA | Sample ID for a cup<br><br>Refer to Note 2 after this table. |
| Sample ID N | 11 | ALPHA | Sample ID for a cup.  N = 3 thru 7. |

*(2 of 2)*

Note 1: The most significant character of the Rack Number field's range will be located in the most significant character position of the Cup Number field.

Example:  Rack 345, Cup 1 would be 45, 31.

Example:
```
[-0,701,02,-0,--230,-1,-3,samp3------]5D<CR><LF>
```

(- Indicates space holder)

Note 2:  If one or more Sample IDs are specified, rack number must be zero. Specification of a non-zero rack number with non-blank Sample IDs will result in a 701-04 being returned with a rack return code of BAD MESSAGE.

Note 3:  Only rack numbers less than or equal to 99 may be cleared by rack number. All other racks must be cleared by Sample ID.

Example:
```
[00,701,03,00,SAMP1------,SAMP2------,SAMP3------,SAMP4------,SAMP5------,
SAMP6------,SAMP7------]D2<CR><LF>
```

(- Indicates space holder)

## Stream 701 - Function 4: Clear Rack/Sample IDs Status

**Sent by:** UniCel DxC
**Purpose:** Sent in response to the 701-03 message. The host is informed if the clear command was accepted.

Table 3.7        Clear Rack/Sample IDs Status

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 701 | |
| Function | 2 | 04 | |
| Rack Number | 2 | 0000-0999 | 0 = No rack number in bar code mode<br><br>Refer to Note 1 after this table. |
| Rack Return Code | 2 | 0-99 | 0 = Complete rack or all Sample IDs cleared.<br>1 = BAD MESSAGE<br>2 = BUSY The rack or one of the Sample IDs was running.<br>3 = DxC error<br>4 = Non-existent error |
| Sample ID 1 Return Code | 2 | 0-99 | 0 = Cleared.<br>2 = BUSY - Not cleared<br>3 =  DxC Error<br>4 = Non-existent error |
| Sample ID 2 Return Code | 2 | 0-99 | 0 = Cleared<br>2 = BUSY - Not cleared<br>3 = DxC Error<br>4 = Non-existent error |
| Sample ID N Return Code | 2 | 0-99 | 0 = Cleared<br>2 = BUSY - Not cleared<br>3 = DxC Error<br>4 = Non-existent error<br>N = 3 thru 7. |

Note 1: The most significant character of the Rack Number field's range will be located in the most significant character position of the Cup Number field.

Example:  Rack 345, Cup 1 would be 45, 31.

Example:
```
[-0,701,02,-0,--230,-1,-3,samp3------]5D<CR><LF>
```

Example:
```
[-0,701,04,-0,-4,-4,-4,-4,-4,-4,-4,-4]28<CR><LF>
```

(- Indicates space holder)

## Stream 701 - Function 6: Host Query Rack/Sample IDs

**Sent by:** UniCel DxC

**Purpose:** To request the program for the Sample IDs, specified in the message from the host. This message is used in the bidirectional with query mode and finds samples for which it has no program. The host has 2.5 minutes to respond with first sample program.

Table 3.8        Host Query Rack/Sample IDs

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 701 | |
| Function | 2 | 06 | |
| Sample ID 1 | 11 | ALPHA | Refer to Note 1 after this table. |
| Sample ID 2 | 11 | ALPHA | Refer to Note 1 after this table. |
| Sample ID 3 | 11 | ALPHA | Refer to Note 1 after this table. |
| Sample ID 4 | 11 | ALPHA | Refer to Note 1 after this table. |

Note 1: The message stream maintains the sample cup position of a rack. For example, if "samp 4" is in cup position 4, it will remain in the 7th field of the 701,06 stream.

Example:
```
[-0,701,06,samp1------,samp2------,samp3------,samp4------,samp5------,
samp6------,samp7------]EB<CR><LF>
```

(- Indicates space holder)

# Stream 702 - Results

## Stream 702 - Function 1: Cup Header

**Sent by:** UniCel DxC
**Purpose:** Sent before sending any test results because the header contains identification and demographic information about a sample.

Table 3.9        Cup Header

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 702 | |
| Function | 2 | 01 | |
| Start Date | 6 | DATE | |
| Start Time | 6 | TIME | |
| Accession Number | 5 | NUMERIC | 1-65535, supplied by DxC |
| Print Type | 2 | CODE | RG = Regular <br> RE = Recall <br> IN = Incomplete |
| Rack Number | 2 | 1-0999 | The rack number in which the sample was run <br><br> Refer to Note 1 after this table. |
| Cup Number | 2 | 1-4 | The cup number in which the sample was run <br><br> Refer to Note 1 after this table. |
| Test Type | 2 | TEST CODE | Refer to Table 4.1 Test Type Codes. |
| Future Use Space | 9 | ALPHA | |
| Sample Type | 2 | FLUID CODE | Refer to Table 4.2 Sample Type Codes. |
| Sample ID | 11 | ALPHA | |
| Control Name | 20 | ALPHA | |
| Sample Comment Code 1 | 25 | ALPHA | |
| Sample Comment Code 2 | 25 | ALPHA | |
| Name Last | 18 | ALPHA | |

*(1 of 2)*

Table 3.9       Cup Header, continued

| Field | Length | Format | Notes |
|---|---|---|---|
| Name First | 15 | ALPHA | |
| Name Middle Initial | 1 | ALPHA | |
| Patient ID | 12 | ALPHA | |
| Doctor | 18 | ALPHA | |
| Draw Date | 6 | DATE | |
| Draw Time | 4 | TIME | |
| Location | 20 | ALPHA | |
| Age | 3 | NUMERIC | Default = 0 |
| Age Units | 1 | NUMERIC | Default = 5 |
| Birth Date | 6 | DATE | |
| Sex | 1 | ALPHA | M, F |
| Patient Comments | 25 | ALPHA | |
| Timed Urine Volume | 7 | REAL | 0.0 - 99999.0 mL<br><br>Refer to Note 2 after this table. |
| Timed Urine Period | 4 | REAL | Collection period 0-99.0<br><br>Refer to Note 2 after this table. |
| Timed Urine Creatinine | 4 | REAL | Serum creatinine 0-99.0<br><br>Refer to Note 2 after this table. |
| Timed Urine Area | 6 | REAL | Surface area 1-9.9900<br><br>Refer to Note 2 after this table. |
| Number Chems Programmed | 3 | NUMERIC 001-999 | 1-999 Does not include replicates |
| Com Chem ID 1 | 4 | CHEM CODE | |
| Com Chem ID 2 | 4 | CHEM CODE | |
| Com Chem ID N | 4 | CHEM CODE | $N \leq 999$ |

*(2 of 2)*

Note 1:  The most significant character of the Rack Number field will be located in the most significant character position of the Cup Number field.

Example:  Rack 345, Cup 1 would be 45,31.

Note 2:  The number of decimal places is adjusted so the number can fit in this field.

Example:
```
[-0,702,01,100497,135429,---88,RG,22,-1,RO,########,TU,S221-------,
-------------------,----------------------,-----------------------,
White-------------,Allen----------,B,S221-------,Nelson-----------,
100497,1500,--------------------,-17,5,190280,M,-----------------------,
1400.00,24.0,2.30,1.7300,--3,01A-,01B-,04A-]3A<CR><LF>
```

(- Indicates space holder)

## Stream 702 - Function 3: Test Results

**Sent by:**  UniCel DxC
**Purpose:**  Sent when all chemistry results for a cup have been completed and calculated.  702-03 can be turned off in the host setup option.

Table 3.10      Test Results

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 00-99 | Operator assigned |
| Stream | 3 | 702 | |
| Function | 2 | 03 | |
| Completion Date | 6 | DATE | |
| Completion Time | 6 | TIME | |
| Accession Number | 5 | NUMERIC | 1-65535, supplied by DxC |
| Result Record Number | 9 | NUMERIC | 1-10000 |
| Rack Number | 2 | 1-0999 | Refer to Note 5 after this table. |
| Cup Number | 2 | 1-4 | Refer to Note 5 after this table. |
| Sample ID | 11 | ALPHA | |
| Com Chem ID | 4 | CHEM CODE | Refer to Table 4.4 and Table 4.5 for Chemistry (Chem) Codes. |
| Reagent Serial Number | 3 | ALPHA | |
| Reagent Lot Number | 6 | ALPHA | |
| Cuvette Number | 2 | HEX | |

*(1 of 4)*

Table 3.10     Test Results, continued

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Replicate Number | 2 | NUMERIC | |
| Results in Selected Units | 9 | ALPHA NUMERIC | Refer to Note 2 and Note 3 after this table.<br><br>Note:  Result field reporting the results for TDMs may contain a < (less than) or a > (greater than) sign. |
| Calibration Rate | 9 | REAL | Refer to Note 2 and Note 3 after this table. |
| Positive or Negative | 1 | CODE | 0 = Negative<br>1 = Positive<br>2 = Not applicable<br>3 = Equivocal (DxC 600i or DxC 800i)<br>4 = Non-reactive (DxC 600i or DxC 800i)<br>5 = Reactive (DxC 600i or DxC 800i)<br>6 = Not confirmed (DxC 600i or DxC 800i)<br>7 = Confirmed (DxC 600i or DxC 800i)<br>8 = Gray zone flag (DxC 600i or DxC 800i)<br>9 = Access 2 LOW flag (DxC 600i or DxC 800i)<br><br>Refer to Note 4 after this table. |
| Suppress Value | 1 | FLAG | 1 = Suppress value |
| Units | 2 | CODE | Refer to Table 4.6 Unit Codes. |
| Normal Range | 2 | CODE | Refer to range codes after this table. |
| Instrument Range | 2 | CODE | Refer to range codes after this table. |
| Critical Range | 2 | CODE | Refer to range codes after this table. |
| ORDAC | 1 | FLAG | 1 = ORDAC used |

*(2 of 4)*

Table 3.10     Test Results, continued

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Control Range | 2 | FLAG | NA = Not applicable<br>NR = Within 2 SD of mean<br>H2 = 2 to 3 SD above mean<br>H3 = Greater than 3 SD above mean<br>H4 = Greater than 4 SD above mean<br>L2 = 2 to 3 SD below mean<br>L3 = Greater than 3 SD below mean<br>L4 = Greater than 4 SD below mean<br>IC = Incomplete<br>CD = Control or chemistry deleted |
| Calculated Result | 9 | ALPHA NUMERIC | Refer to Note 1 and Note 3 after this table.<br><br>Note:  Result field reporting the results for TDM'S may contain a < (less than) or a > (greater than) sign. |
| Instrument Codes | 9 | ALPHA | Refer to Table 4.7 Instrument Codes with Remarks. |
| Result Error 1 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 2 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 3 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 4 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 5 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 6 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 7 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 8 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 9 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 10 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 11 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 12 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 13 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 14 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 15 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Result Error 16 | 2 | ALPHA | Refer to Table 4.8 Result Error Codes. |
| Dilution Factor | 6 | REAL | 0.0 – 1000.0 |

*(3 of 4)*

Table 3.10     Test Results, continued

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Reportable Range | 2 | CODE | Refer to range codes after this table. |
| Spare | 20 | ALPHA | Future use |

*(4 of 4)*

**RANGE CODES:**
HI = above normal range
LO = below normal range
NR = within normal range
OR = out of range
NA = not applicable

Note 1:  The number of decimal places is adjusted so the number can fit into this field.

Note 2:  The number of decimal places in this field is the number in the selected precision for the selected units field in the chemistry database.

Note 3:  If Suppress Value = 1, this field will be filled with #.

Note 4:  For DxC chemistries, 0 and 1 are used only for drugs of abuse (DAT). On UniCel DxC 600i or DxC 800i, values from the range 0, 1, 3-9, are used by some Access 2 results, depending on the specific chemistry. Refer to the *Access Immunoassay System Manual* for additional information.  All other chemistries use 2.

Note 5:  The most significant character of the range of the Rack Number field is located in the most significant character position of the Cup Number field.

Example:  Rack 345, Cup 1 would be 45, 31.

Example:
```
[-0,702,03,100497,135610,---88,---916097,22,-1,S221-------,01A-,###,
######,##,-1,----174.3,#########,2,0,-4,NA,HI,NA,0,NA,136.20541,
---------,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,1.0000,NR,
###################]48<CR><LF>
```

(- Indicates space holder)

## Stream 702 - Function 5: End of Cup

**Sent by:** UniCel DxC
**Purpose:** To indicate the end of a stream of test result messages for a specific cup.

Table 3.11      End of Cup

| Field | Length | Format | Notes |
|---|---|---|---|
| Device ID | 2 | 00-99 | Operator assigned |
| Stream | 3 | 702 | |
| Function | 2 | 05 | |
| Date | 6 | DATE | |
| Time | 6 | TIME | |
| Accession Number | 5 | NUMERIC | 1-65535, supplied by DxC |
| Sample ID | 11 | ALPHA | |
| Rack number | 2 | 1-0999 | Refer to Note 1 after this table. |
| Cup number | 2 | 1-4 | Refer to Note 1 after this table. |

Note 1: The most significant character of the Rack Number field's range will be located in the most significant character position of the Cup Number field.

Example: Rack 345, Cup 1 would be 45, 31.

Example:
`[-0,702,05,100497,140240,---88,S221-------,22,-1]ED<CR><LF>`

(- Indicates space holder)

## Stream 702 - Function 11: Special Calculations Results

**Sent by:** UniCel DxC

**Purpose:** Contains the result of a special calculation. This message contains accession number, rack number, cup number, and Sample ID. This message can be turned OFF in the Host Communication parameters screen in system setup.

Table 3.12    Special Calculations Results

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 00-99 | Operator assigned |
| Stream | 3 | 702 | |
| Function | 2 | 11 | |
| Date | 6 | DATE | |
| Time | 6 | TIME | |
| Accession Number | 5 | NUMERIC | 1-65535, supplied by DxC |
| Rack Number | 2 | 1-0999 | Refer to Note 2 after this table. |
| Cup Number | 2 | 1-4 | Refer to Note 2 after this table. |
| Sample ID | 11 | ALPHA | |
| Replicate Number | 2 | NUMERIC | |
| Special Calc Name | 20 | ALPHA | Operator assigned |
| Special Calc Status | 2 | CODE | OK = Result is valid<br>AB = One of the involved chemistries was programmed but not run.<br>ZD = Denominator of a Ratio is zero |
| Special Calc Results | 9 | REAL | Refer to Note 1 after this table. |
| Special Unit String | 8 | ALPHA | |

Note 1:  The number of decimal places is adjusted to fit the number into this field.

Note 2:  The most significant character of the range of the Rack Number field will be located in the most significant character position of the Cup Number field.

Example:  Rack 345, Cup 1 would be 45, 31.

Example:
```
[-0,702,11,100497,135429,---88,22,-1,S221-------,-1,SPC_CALC------------,
OK,50.367081,mmol----]B5<CR><LF>
```

(- Indicates space holder)

## Stream 702 - Function 13: Timed Urine Results

**Sent by:** UniCel DxC
**Purpose:** Contains the result of a timed urine test. This message can be turned off on the host setup option.

Table 3.13      Timed Urine Results

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 00-99 | Operator assigned |
| Stream | 3 | 702 | |
| Function | 2 | 13 | |
| Date | 6 | DATE | |
| Time | 6 | TIME | |
| Accession Number | 5 | NUMERIC | 1-65535, supplied by DxC |
| Rack number | 2 | 1-0999 | Refer to Note 2 after this table. |
| Cup Number | 2 | 1-4 | Refer to Note 2 after this table. |
| Sample ID | 11 | ALPHA | |
| Replicate Number | 2 | NUMERIC | |
| TU Calc Name | 20 | ALPHA | Operator assigned |
| TU Calc Status | 2 | CODE | OK = Result is valid<br>AB = One of the involved chemistries was programmed but not run.<br>ZD = Denominator of a Ratio is zero<br>Refer to Table 4.10. |
| TU Calc results | 9 | REAL | Refer to Note 1 after this table. |
| TU Unit String | 8 | ALPHA | |

Note 1:  The number of decimal places is adjusted to fit the number into this field.

Note 2:  The most significant character of the range of the Rack Number field will be located in the most significant character position of the Cup Number field.

Example:  Rack 345, Cup 1 would be 45, 31

Example:
```
[-0,702,13,100497,135429,---88,22,-1,S221-------,-1,NA-----------------,
OK,244.00033,mmol/24.]0B<CR><LF>
```

(- Indicates space holder)

## Stream 702 - Function 81: Expanded Results

**Sent by:** UniCel DxC

**Purpose:** Contains the expanded result of a test. This message can be turned off in the host setup option. Do not run the system with expanded results turned on unless directed by a Beckman Coulter representative.

Table 3.14    Expanded Results

| Field | Length | Format | Notes |
|---|---|---|---|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 702 | |
| Function | 2 | 81 | |
| Date | 6 | DATE | |
| Time | 6 | TIME | |
| Accession Number | 5 | NUMERIC | 1-65535, supplied by DxC |
| Sample Record Number | 9 | NUMERIC | |
| Result Record Number | 9 | NUMERIC | |
| Sample ID | 11 | ALPHA | |
| Rack Number | 2 | 1-0999 | Refer to Note 2 after this table. |
| Cup Number | 2 | 1-4 | Refer to Note 2 after this table. |
| Reagent Record Number | 9 | NUMERIC | |
| Replicate Number | 2 | NUMERIC | |
| Com Chem ID | 4 | CHEM CODE | Refer to Table 4.4 and Table 4.5 for Chemistry (Chem) Codes. |
| Cuvette Number | 2 | HEX | |
| Cal Level | 1 | 0-6 | Not used |
| Suppressed Answer | 1 | FLAG | 1 = Answer suppressed |
| ORDAC Result | 1 | FLAG | 1 = ORDAC |
| Noise Maximum | 5 | NUMERIC | |
| Outlier Maximum | 5 | NUMERIC | |
| Noise Threshold Total | 3 | NUMERIC | |
| Outlier Threshold Total | 3 | NUMERIC | |
| Initial Absorbance | 9 | REAL | Refer to Note 1 after this table. |

*(1 of 4)*

Table 3.14       Expanded Results, continued

| Field | Length | Format | Notes |
|---|---|---|---|
| Final Absorbance | 9 | REAL | Refer to Note 1 after this table. |
| Water Blank-Rate | 9 | REAL | Refer to Note 1 after this table. |
| Water Blank-Abs | 9 | REAL | Refer to Note 1 after this table. |
| Water Blank-Mean Deviation | 9 | REAL | Refer to Note 1 after this table. |
| Water Blank-Maximum Deviation | 9 | REAL | Refer to Note 1 after this table. |
| Blank-Rate | 9 | REAL | Refer to Note 1 after this table. |
| Blank-Abs | 9 | REAL | Refer to Note 1 after this table. |
| Blank-Mean Deviation | 9 | REAL | Refer to Note 1 after this table. |
| Blank-Maximum Deviation | 9 | REAL | Refer to Note 1 after this table. |
| Reaction-Rate | 9 | REAL | Refer to Note 1 after this table. |
| Reaction-Abs | 9 | REAL | Refer to Note 1 after this table. |
| Reaction-Mean Deviation | 9 | REAL | Refer to Note 1 after this table. |
| Reaction-Maximum Deviation | 9 | REAL | Refer to Note 1 after this table. |
| Raw Result | 9 | ALPHA | Refer to Note 1 after this table.<br><br>Note:  Result field reporting the results for TDM's may contain a < (less than) or > (greater than) sign. |
| Calculated Result | 9 | ALPHA | Refer to Note 1 after this table.<br><br>Note:  Result field reporting the results for TDM's may contain a < (less than) or > (greater than) sign. |
| Calibration Rate | 9 | REAL | Refer to Note 1 after this table. |

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Table 3.14      Expanded Results, continued

| Field | Length | Format | Notes |
|---|---|---|---|
| Positive or Negative | 1 | FLAG | 0 = Negative<br>1 = Positive<br>2 = Not applicable<br>3 = Equivocal (DxC 600i or DxC 800i only)<br>4 = Non-reactive (DxC 600i or DxC 800i only)<br>5 = Reactive (DxC 600i or DxC 800i only)<br>6 = Not confirmed (DxC 600i or DxC 800i only)<br>7 = Confirmed (DxC 600i or DxC 800i only)<br>8 = Gray zone flag (DxC 600i or DxC 800i only)<br>9 = Access 2 LOW flag (DxC 600i or DxC 800i only)<br><br>Refer to Note 3 after this table. |
| Units | 2 | CODE | Refer to Table 4.6 Unit Codes. |
| Instrument Codes | 9 | ALPHA | Refer to Table 4.7 Instrument Codes with Remarks. |
| Result Error 1 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 2 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 3 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 4 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 5 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 6 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 7 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 8 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |

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Table 3.14        Expanded Results, continued

| Field | Length | Format | Notes |
|---|---|---|---|
| Result Error 9 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 10 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 11 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 12 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 13 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 14 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 15 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Result Error 16 | 2 | CODE | Refer to Table 4.8 Result Error Codes. |
| Intermediate ADC 1 | 5 | NUMERIC | |
| Intermediate ADC 2 | 5 | NUMERIC | |
| Intermediate ADC 3 | 5 | NUMERIC | |
| Intermediate ADC 4 | 5 | NUMERIC | |
| Intermediate ADC 5 | 5 | NUMERIC | |
| Dilution Factor | 6 | REAL | 0.0-1000.0 |
| Future Use Space | 23 | ALPHA | |

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Note 1:  The number of decimal places is adjusted to fit the number into this field.

Note 2:  The most significant character of the range of the Rack Number field will be located in the most significant character position of the Cup Number field.

Example:  Rack 345, Cup 1 would be 45, 31.

Note 3: For DxC chemistries, 0 and 1 are used only for drugs of abuse (DAT). On DxC 600i or DxC 800i, values from the range 0, 1, 3-9, are used by some Access 2 results, depending on the specific chemistry. Refer to the *Access Immunoassay System Manual* for additional information. All other chemistries use 2.

Example:

```
[-0,702,81,100497,140128,---88,-50331669,---916097,S221-------,22,-1,
385875993,-1,05A-,-E,#,0,0,#####,#####,###,###,0.5623355,0.5538675,
#########,-0.127546,#########,#########,-0.003311,0.5732892,
0.0002016,0.0003895,-0.012754,0.5577027,0.0001692,0.0002893,-0.012754,
46.466198,#########,2,-0,---------,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,NO,
NO,NO,NO,NO,#####,#####,#####,#####,#####,1.0000,#####################]AE<CR><LF>
```

(- Indicates space holder)

# Stream 703 - Instrument Status

## Stream 703 - Function 1: Power Up

**Sent by:** UniCel DxC
**Purpose:** Sent upon DxC power up or reset. This message can be turned off in the host setup option.

Table 3.15    Power Up

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 703 | |
| Function | 2 | 01 | |
| Date | 6 | DATE | |
| Time | 6 | TIME | |
| Software Set | 10 | ALPHA | Console Master Program Version Number |
| CV ICC BOOT | 10 | ALPHA | |
| CV ICC APP | 10 | ALPHA | |
| CV MSMC1 BOOT 1 | 10 | ALPHA | |
| CV MSMC1 BOOT 2 | 10 | ALPHA | |
| CV MSMC1 APP | 10 | ALPHA | |
| CV MSMC2 BOOT 1 | 10 | ALPHA | |
| CV MSMC2 BOOT 2 | 10 | ALPHA | |
| CV MSMC2 APP | 10 | ALPHA | |
| CV SM BOOT | 10 | ALPHA | |
| CV SM APP 21 | 10 | ALPHA | |
| CV SM APP 11 | 10 | ALPHA | |
| CV SM APP 12 | 10 | ALPHA | |
| CV SM APP 13 | 10 | ALPHA | |
| CV SM APP 14 | 10 | ALPHA | |
| CV SM APP 31 | 10 | ALPHA | |
| CV SM APP 41 | 10 | ALPHA | |
| CV SM APP 42 | 10 | ALPHA | |
| CV SM APP 43 | 10 | ALPHA | |

*(1 of 2)*

Table 3.15　　Power Up, continued

| Field | Length | Format | Notes |
|---|---|---|---|
| CV SM APP 51 | 10 | ALPHA | |
| CV SM APP 52 | 10 | ALPHA | |
| CV SM APP 61 | 10 | ALPHA | |
| CV SM APP 62 | 10 | ALPHA | |
| CV SM APP 63 | 10 | ALPHA | |
| CV SM APP 71 | 10 | ALPHA | |
| CV SM APP 81 | 10 | ALPHA | |
| CV SM APP 82 | 10 | ALPHA | |
| CV SM APP 91 | 10 | ALPHA | |
| CV SM APP A1 | 10 | ALPHA | |
| CV SM APP A2 | 10 | ALPHA | |
| CV SM APP B1 | 10 | ALPHA | |
| CV SM APP B2 | 10 | ALPHA | |
| CV SM APP B3 | 10 | ALPHA | |
| CV SM APP C1 | 10 | ALPHA | |
| CV SM APP C2 | 10 | ALPHA | |
| CV SM APP C3 | 10 | ALPHA | |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |
| SPARE | 10 | ALPHA | All "#"s |

*(2 of 2)*

Example:
```
[-0,703,01,100497,164320, v01.00----,v00.00----,v00.00----,v00.00----,
v00.00----,v00.00----,v00.00----,v00.00----,v00.00----,v01.06----,
v00.13----,v04.54----,v04.54----,v04.54----,v04.54----,v01.30----,
v00.89----,v00.89----,v00.89----,v00.89----,v00.89----,v04.54----,
v04.54----,v04.54----,v00.89----,v00.1B----,#########,v00.30----,
v00.89----,v00.89----,v00.89----,v00.89----,v00.89----,v00.89----,
v00.89----,v00.89----,##########,##########,##########,##########,
##########,##########,##########,##########,##########,##########,
##########,##########]5E<CR><LF>
```

(- Indicates space holder)

## Stream 703 - Function 2: Bidirectional On

**Sent by:** UniCel DxC
**Purpose:** This message is sent to the host when bidirectional communication is enabled.  This message can be disabled in the host setup option.

Table 3.16      Bidirectional On

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 0-99 | Operator assigned |
| Stream | 3 | 703 | |
| Function | 2 | 02 | |
| Date | 6 | DATE | |
| Time | 6 | TIME | |
| Software Set | 10 | ALPHA | DxC Software Version |

Example:
```
[-0,703,02,100497,203332,A4.4.54---]F0<CR><LF>
```

(- Indicates space holder)

## Stream 703 - Function 3: Request Instrument State

**Sent by:** Host
**Purpose:** Sent to obtain the state of the UniCel DxC.

Table 3.17      Request Instrument State

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 00-99 | Operator assigned |
| Stream | 3 | 703 | |
| Function | 2 | 03 | |

Example:
```
[-0,703,03]93<CR><LF>
```

(- Indicates space holder)

## Stream 703 - Function 4: Instrument State

**Sent by:** UniCel DxC

**Purpose:** Sent in response to a Request Instrument State, 703-03 message from the host.

Table 3.18      Instrument State

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 00-99 | Operator assigned |
| Stream | 3 | 703 | |
| Function | 2 | 04 | |
| Date | 6 | DATE | |
| Time | 6 | TIME | |
| Configuration | 5 | ALPHA | DxC |
| MC State | 2 | CODE | Refer to Table 4.11 Instrument Status Codes. |
| CC State | 2 | CODE | Refer to Table 4.11 Instrument Status Codes. |
| Future Use | 2 | ALPHA | |
| Instrument Mode | 2 | CODE | 0 = Rack/cup priority<br>1 = Bar code priority. |

Example:

```
[-0,703,04,110497,105150,DxC-,02,15,##,-1]87<CR><LF>
```

(- Indicates space holder)

## Stream 703 - Function 17: End of Run

**Sent by:**  UniCel DxC
**Purpose:**  Sent when the DxC completes all programmed tests.  This message can be turned off in the host setup option.

Table 3.19      End of Run

| Field | Length | Format | Notes |
|-------|--------|--------|-------|
| Device ID | 2 | 00-99 | Operator assigned |
| Stream | 3 | 703 | |
| Function | 2 | 17 | |
| Date Queued | 6 | DATE | |
| Time Queued | 6 | TIME | |

Example:
```
[-0,703,17,100497,140245]1F<CR><LF>
```

(- Indicates space holder)

# Stream 704 - Setup Status

## Stream 704 - Function 7: Request Installed Chemistries

**Sent by:** Host
**Purpose:** Sent to obtain the list of installed chemistries from the DxC database.

Table 3.20      Request Installed Chemistries

| Field | Length | Format | Notes |
|---|---|---|---|
| Device ID | 2 | 00-99 | Operator assigned |
| Stream | 3 | 704 | |
| Function | 2 | 07 | |

Example:

```
[00,704,07]8E<CR><LF>
```

## Stream 704 - Function 8: Installed Chemistries

**Sent by:** UniCel DxC
**Purpose:** This message is sent in response to a Request Installed Chemistries, 704-07 message from the host.

Table 3.21      Installed Chemistries

| Field | Length | Format | Notes |
|---|---|---|---|
| Device ID | 2 | 00-99 | Operator assigned |
| Stream | 3 | 704 | |
| Function | 2 | 08 | |
| Date | 6 | DATE | |
| Time | 6 | TIME | |
| Com Chem ID 1 | 4 | CHEM CODE | Refer to Table 4.4 and Table 4.5 for Chemistry (Chem) Codes. |
| Com Chem ID N | 4 | CHEM CODE | Refer to Table 4.4 and Table 4.5 for Chemistry (Chem) Codes. |

Note:  Only chemistry codes of chemistries that are configured on the DxC will be included in the message.  The last chemistry code transmitted will be "0000" to indicate that no more chemistry codes follow.  If no chemistries are configured on the instrument, only "0000" chemistry code will be listed.

Example:

```
[-0,704,08,110497,105518,01A-,01B-,04A-,02A-,09D-,08D-,05D-,03E-,06D-,
43D-,07D-,14B-,56B-,35A-,31A-,31B-,54A-,84A-,10A-,24C-,24B-,93B-,30A-,
30B-,85A-,86A-,05A-,98A-,59A-,44A-,32A-,32B-,40A-,87A-,89A-,12A-,62A-,
46B-,72C-,36A-,06A-,14A-,83A-,79B-,52B-,51B-,53B-,55A-,33A-,50A-,50B-,
07B-,64A-,63A-,48A-,92A-,66A-,67C-,68C-,65A-,93C-,94A-,91A-,11A-,42B-,
42C-,88A-,88B-,41A-,69C-,70C-,71B-,0000]BE<CR><LF>
```

(- Indicates space holder)

# CHAPTER 4  Tables/Codes

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# Tables/Codes

## Test Type Codes

### Test Type Codes

Table 4.1    Test Type Codes

| Code | Description |
|------|-------------|
| CA[a] | Calibrator |
| CO | Control |
| EX[a] | Extinction |
| RO | Routine |
| SC | STAT control |
| ST | STAT |

[a]   Not programmable by the Host.

# Sample Type Codes

## Sample Type Codes

Table 4.2        Sample Type Codes

| Code | Description |
|------|-------------|
| SE | Serum |
| SF | Spinal fluid |
| UR | Urine (Random) |
| TU | Timed urine (Can not be used with control or STAT Control) |
| PL | Plasma |
| OT | Other (Refer to Note after this table) |
| AM | Amniotic (UniCel DxC 600i or DxC 800i only) |
| BL | Blood |
| CE | Cervical (UniCel DxC 600i or DxC 800i only) |
| SA | Saliva (UniCel DxC 600i or DxC 800i only) |
| SY | Synovial (UniCel DxC 600i or DxC 800i only) |
| UT | Urethral (UniCel DxC 600i or DxC 800i only) |

## Age Unit Codes

Table 4.3        Age Unit Codes

| Code | Description |
|------|-------------|
| 1 | Hours |
| 2 | Days |
| 3 | Weeks |
| 4 | Months |
| 5 | Years |

# Chemistry Codes

## Chemistry Codes

Table 4.4        Chemistry (Chem) Codes

| Code | Chemistry |
|------|-----------|
| 01A | Sodium (NA) |
| 01B | Potassium (K) |
| 02A | Carbon Dioxide ($CO_2$) |
| 03A | Creatinine (CREA) |
| 03E | Creatinine (CREm) |
| 04A | Chloride (CL) |
| 05A | Urea Nitrogen (BUN) |
| 05D | Urea Nitrogen (BUNm) |
| 06A | Glucose (GLU) |
| 06D | Glucose (GLUCm) |
| 07A | Total Protein (TP) |
| 07B | Micro Protein (M-TP) |
| 07D | Total Protein (TPm) |
| 08A | Albumin (ALB) |
| 08D | Albumin (ALBm) |
| 08E | Prealbumin (PAB) |
| 08M | Microalbumin (MA) |
| 09D | ISE Calcium (CALC) |
| 10A | Amylase (AMY) |
| 10C | P-Amylase (PAM) |
| 11A | Total Bilirubin (TBIL) |
| 12A | Direct Bilirubin (DBIL) |
| 13B | Infinity Lithium[a] (LI) |
| 14A | Hemoglobin, Total (Hb) |
| 14B | Hemoglobin, A1c (A1c) |
| 14I | Hemoglobin Total (Hb2) |
| 14J | Hemoglobin, A1c (A1c2) |

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Table 4.4    Chemistry (Chem) Codes, continued

| Code | Chemistry |
|------|-----------|
| 15A | Homocysteine (HCY) |
| 24B | Apolipoprotein B (ApoB) |
| 24C | Apolipoprotein A (ApoA) |
| 30A | Aspartate Aminotransferase (AST) |
| 30B | Aspartate Aminotransferase (Pyridoxal-5′-phosphate) (AST-) |
| 31A | Alanine Aminotransferase (ALT) |
| 31B | Alanine Aminotransferase (Pyridoxal-5′-phosphate) (ALT-) |
| 32A | Creatine Kinase (CK) |
| 32B | Creatine Kinase (N-Acetyl-L-cysteine) (CK-) |
| 33A | Lactate Dehydrogenase (LD) |
| 34A | Lactate Dehydrogenase (LD-P) |
| 34B | LDL Cholesterol (LDLD) |
| 35A | Alkaline Phosphatase (ALP) |
| 36A | Gamma Glutamyl Transferase (GGT) |
| 40A | Creatine Kinase MB (CKMB) |
| 41A | Uric Acid (URIC) |
| 42B | Triglycerides GPO (TG) |
| 42C | Triglycerides GPO Blanked (TG-B) |
| 43D | Phosphorus (PHOSm) |
| 43E | Phosphorus (PHS) |
| 44A | Cholesterol (CHOL) |
| 46B | Iron (FE) |
| 48A | Magnesium (MG) |
| 50A | Lipase (LIPA) |
| 50B | Lipase Wash (LIWA) |
| 50M | Haptoglobin (HPT) |
| 51B | Immunoglobulin G (Ig-G) |
| 52B | Immunoglobulin A (Ig-A) |
| 53B | Immunoglobulin M (Ig-M) |
| 54A | Ammonia (AMM) |

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Table 4.4       Chemistry (Chem) Codes, continued

| Code | Chemistry |
|------|-----------|
| 55A | Lactate (LAC) |
| 56A | Ethanol Alcohol (ETOH) |
| 59A | Cholinesterase (CHE) |
| 60A | Lipase (LIP) |
| 61M | Complement (C3) |
| 61R | Complement (C4) |
| 62B | Digoxin (DIGN) |
| 63A | Methaqualone (METQ) |
| 64A | Methadone (METD) |
| 65A | Propoxyphene (PROX) |
| 66A | Phencyclidine (PCP) |
| 67C | Phenobarbital (PHE) |
| 68C | Phenytoin (PHY) |
| 69C | Theophylline (THE) |
| 70C | Tobramycin (TOB) |
| 71B | Transferrin (TRFN) |
| 72C | Gentamicin (GEN) |
| 72M | Vancomycin (VANC) |
| 73A | Urea Nitrogen (UREA) |
| 73D | Urea Nitrogen (UREAm) |
| 79B | Iron Binding Capacity, Total (IBCT) |
| 83D | HDL Cholesterol (HDLD) |
| 84A | Amphetamines (AMPH) |
| 85A | Barbiturates (BARB) |
| 86A | Benzodiazepine (BENZ) |
| 86B | Benzodiazepine (BNZG) |
| 87A | Cocaine Metabolite (COCM) |
| 88A | Cannabinoid 100 ng (THC) |
| 88B | Cannabinoid 20 ng (THC2) |
| 88C | Cannabinoid 50 ng (THC5) |

*(3 of 4)*

Table 4.4　　　Chemistry (Chem) Codes, continued

| Code | Chemistry |
|---|---|
| 89A | C-Reactive Protein (CRP) |
| 89E | High Sensitivity C-Reactive Protein (CRPH) |
| 89G | C-Reactive Protein (C-RP) |
| 90A | T-Uptake (TU) |
| 91A | Thyroxine (T4) |
| 92A | Opiate 300 ng (OP) |
| 92B | Opiate 2000 ng (OP2) |
| 93B | Antistreptolysin (ASO-) |
| 93C | Rheumatoid Factor (RF) |
| 94B | Salicylate (SALY) |
| 94M | Acetaminophen (ACTM) |
| 95A | Valproic Acid (VPA) |
| 98A | Carbamazepene (CAR) |
| 99B | Icterus (ICTER) |
| 99C | Lipemia (LIPEM) |
| 99D | Hemolysis (HEMOL) |
| 99E[b] | Cartridge Chemistry Wash Solution (CCWA) |

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[a]　All trademarks are the property of their respective owners.
[b]　Do not use as a result.

## Access Chemistry Codes

The following chemistry (assay) codes pertain to chemistries run on the Access 2 analyzer. The Access 2 analyzer is part of the UniCel DxC 600i or DxC 800i System.

Table 4.5        Access Chemistry Codes

| Code | Chemistry |
|------|-----------|
| A02 | Alpha-fetoprotein (AFP) |
| A03 | OV Monitor (OV125) |
| A04 | BR Monitor (BR153) |
| A05 | GI Monitor (GI199) |
| A06 | CEA (CEA) |
| A07 | Chlamydia (ChlAg) |
| A08 | Chlamydia Block (ChlBk) |
| A10 | Cortisol (Cort) |
| A11 | Digoxin (Dig-) |
| A12 | Ostase[a] (Ostas) |
| A13 | Toxo IgM II (Tox-M) |
| A14 | Estradiol (ESTRD) |
| A15 | Unconjugated Estriol (uE3) |
| A16 | Testosterone (Testo) |
| A17 | Total BhCG (TBhCG) |
| A18 | Diluted Total BhCG (DlhCG) |
| A19 | Ferritin (Ferr) |
| A22 | Ultrasensitive hGH (hGH) |
| A23 | Thyroglobulin (TgAg) |
| A30 | Myoglobin (MYO) |
| A36 | hFSH (hFSH) |
| A39 | hLH (hLH) |
| A40 | Insulin (Insul) |
| A42 | Prolactin (PRL) |
| A43 | Progesterone (Prog) |
| A46 | Rubella IgG (Rub-G) |
| A48 | Theophylline (Theo) |
| A49 | Creatine Kinase-MB (CK-MB) |

*(1 of 2)*

Table 4.5        Access Chemistry Codes, continued

| Code | Chemistry |
|------|-----------|
| A50 | Total T3 (TotT3) |
| A51 | Total IgE (IgE) |
| A52 | Total T4 (TotT4) |
| A53 | Toxo IgG (Tox-G) |
| A57 | HYPERsensitive hTSH (TSH) |
| A59 | Uptake (TU-) |
| A60 | Vitamin $B_{12}$ (B12) |
| A61 | Free T4 (FT4) |
| A62 | Hybritech[a] PSA (PSA) |
| A63 | Hybritech[a] free PSA (fPSA) |
| A67 | AccuTnI[a] (cTnI) |
| A68 | Thyroglobulin Antibody (TgAb) |
| A72 | Intrinsic Factor Antibody (IFAb) |
| A73 | Dehydroepiandrosterone Sulfate (DHEAS) |
| A74 | Triage BNP[a] (BNP) |
| A75 | Folate (FOL2) |
| A76 | RBC Folate (RBC2) |
| A77 | Diluted Alpha-fetoprotein (dAFP) |
| A78 | Fast hTSH (FTSH) |
| A80 | Free T3 (FT3) |

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[a]   All trademarks are the property of their respective owners.

# Unit Codes

## Unit Codes

Table 4.6    Unit Codes

| Code | Unit |
|------|------|
| 00 | mg/dL |
| 01 | mg/L |
| 02 | g/dL |
| 03 | g/L |
| 04 | mmol/L |
| 05 | µmol/L |
| 06 | mEq/L |
| 07 | nKat/L |
| 08 | µKat/L |
| 09 | IU/L |
| 10 | µg/mL |
| 11 | ng/mL |
| 12 | µg/dL |
| 13 | µg/L |
| 14 | nmol/L |
| 15 | Ku.u |
| 16 | U/L |
| 17 | Other |
| 18 | *%* |
| 19 | mA |
| 20 | mA/min |
| 21 | IU/mL |
| 22 | U/mL |
| 23 | Rate |
| 24 | ng/dL |
| 25 | µIU/mL |
| 26 | mIU/mL |

*(1 of 2)*

Table 4.6        Unit Codes, continued

| Code | Unit |
|------|------|
| 27 | KU/L |
| 28 | nIU/dL |
| 29 | mIU/L |
| 30 | Positive |
| 31 | Negative |
| 32 | pg/mL |
| 33 | pg/dL |
| 34 | mg/mL |
| 35 | ng/L |
| 36 | pmol/L |
| 37 | %Uptake |
| 38 | %GHb |
| 39 | %A1c |
| 40 | GPL |
| 41 | MPL |
| 42 | APL |
| 43 | RLU |
| 44 | S/CO (sample to cutoff ratio) |
| 45 | AU/mL (allergy units or arbitrary units) |
| 46 | AU/L (arbitrary units) |
| 47 | mAU/L (arbitrary units) |
| 48 | mAU/mL (arbitrary units) |
| 49 | (1) SI (T-uptake SI units) |
| 50 | %Supp |

*(2 of 2)*

# Instrument Codes

## Instrument Codes

Table 4.7       Instrument Codes with Remarks

| Instrument Report Printout | Printed in Remark Area of Instrument Report | Inst. Code | Description |
|---|---|---|---|
| *"a printed result"* | | | Result was calculated |
| *"a printed result"* | CHECK RESULT | | DxC has processed the sample prior to Access 2. Results for specific Access 2 tests should be checked for potential sample-to-sample carryover. This error code applies to Access 2 assays where a small quantity of carryover could significantly increase the results.<br>(DxC 600i or DxC 800i only) |
| *"a printed result"* | CRITICAL HIGH | | Exceeds Critical range high |
| *"a printed result"* | CRITICAL LOW | | Exceeds Critical range low |
| *"a printed result"* | HIGH | | Exceeds reference range high |
| *"a printed result"* | LOW | | Exceeds reference range low |
| *"a printed result"* | OIR LO | | Result is outside of reportable range – low (DxC 600i or DxC 800i only) |
| *"a printed result"* | TEMP ERR | T | RA temperature |
| *"a printed result"* | TEMP ERR | T | PP temperature |
| *"a printed result"* | TEMP ERR | T | ISE Temperature |
| *"a printed result"* | | C | Calibration overridden |
| *"a printed result"* | | D | Reagent Days exceeded |
| *"a printed result"* | | E | Calibration time extended |
| *"a printed result"* | | J | Slope offset adjustment |
| *"a printed result"* | | M | Set point modification |
| *"a printed result"* | | O | ORDAC sample |
| *"a printed result"* | | P | Default Panel |

*(1 of 6)*

Table 4.7    Instrument Codes with Remarks, continued

| Instrument Report Printout | Printed in Remark Area of Instrument Report | Inst. Code | Description |
|---|---|---|---|
| *"a printed result"* | | R | Reagent Expired |
| *"a printed result"* | | V | Rerun result |
| *"a printed result"* | | S | Substrate expired |
| < X (X = lower inst range) | | | Less than X - OIR LO response (no suppressed result) from the CAU |
| < X (X = lower reportable range) | | | Less than X - ORR LO response from console but result is not suppressed |
| > Y (Y = upper reportable range) | | | Greater than Y - ORR HI response from console but result is not suppressed |
| >Y (Y = upper inst range) | | | Greater than Y - OIR HI response from CAU but result is not suppressed |
| BACK TO BACK | Calibration failed | | Back to back |
| CAL FAILED | Calibration failed | | Calibration failed |
| CAL TIMED OUT | | | Calibration timed out |
| CHEM ABORTED | | | Too many retries |
| CHEM BYPASSED | | | Channel bypassed |
| CHEM DB ERROR | | | Chemistry DB Error |
| CHEM NEEDS CAL | | | Chemistry needs calibration |
| CHEM NOT RUN | | | Not run |
| DAC ERROR | | | ISE DAC failure |
| DIL1 LEV SENSE | | | Level sense error in diluent reagent |
| DISABLED | | | Module Disabled |
| DIVISION ERROR | | | 0 denominator |
| HI REAGENT | | | High reagent level |
| INCOMPLETE | | | Not all programmed tests have a valid result |

*(2 of 6)*

Table 4.7        Instrument Codes with Remarks, continued

| Instrument Report Printout | Printed in Remark Area of Instrument Report | Inst. Code | Description |
|---|---|---|---|
| INCOMPLETE | CHEM NEEDS CAL | | No curve – calibration required (DxC 600i or DxC 800i only) |
| | CHEM NOT RUN | | Cannot run test because:<br>• Sample is not detected by CTA<br>• Insufficient supply at CTA/ Access 2<br>• Loss of communication between CTA and Access 2<br>• Access 2 is not ready<br>• CTA - No chemistry definition at Access 2<br>• CTA/Access 2 waste bag is full<br>• AV expired<br>• Access 2 cover is open<br>(DxC 600i or DxC 800i only) |
| | DEVICE ERROR | | Mechanical device error detected (DxC 600i or DxC 800i only) |
| | NO SAMPLE DETECT | | Insufficient sample quantity at Access, or no sample detected - CTA level sense (DxC 600i or DxC 800i only) |
| | NO SAMPLE ID | | Cannot run Access test because sample ID is not programmed (DxC 600i or DxC 800i only) |
| INSUFF DIL1 | | | Insufficient diluent reagent |
| INSUFF REAG | | | Insufficient reagent |
| INVALID CHEM | | | Invalid chemistry |
| LEV SENSE ERR | | | Low reagent fluid |
| LO REAGENT | | | Low reagent level |

*(3 of 6)*

Table 4.7    Instrument Codes with Remarks, continued

| Instrument Report Printout | Printed in Remark Area of Instrument Report | Inst. Code | Description |
|---|---|---|---|
| MATH ERR | Calibration required | | Math error |
| MOTION ERR | | | Motion error |
| NO DIL1 ON SYS | | | No diluent reagent on the reagent carousel |
| NO REAG ON SYS | | | Reagent not on board |
| NO SAMP DETECT | | | Low sample fluid |
| NO SAMP DETECT | | | No sample detected |
| NO SAMP ON SYS | | | Sample not on board |
| NOT ACCEPTED | | | Wrong state for sample program message |
| PENDING TEST | | | Not ready |
| PROBE OBSTRUCT | | | Probe obstruction detected |
| RACK CONFLICT | | | Test cancelled because sample is in wrong rack (HDL, IBCT, HbA1c chemistries) |
| RANGE | Calibration failed | | Range error |
| RECOVERY | Calibration failed | | Recovery error |
| RESULT ERR | | | Result error |
| Results Suppressed | AG EXCESS | | Antigen Excess |
| Results Suppressed | BL ABS HI | | Blank absorbance high |
| Results Suppressed | BL ABS LO | | Blank absorbance low |
| Results Suppressed | BL MAX DEV | | Blank outlier (maximum deviation) |
| Results Suppressed | BL MEAN DEV | | Blank noise (mean deviation) |
| Results Suppressed | BL RATE HI | | Blank rate high |
| Results Suppressed | BL RATE LO | | Blank rate low |
| Results Suppressed | CAL REF DRIFT | | Excessive reference drift - sample to calibration |
| Results Suppressed | INDETERMINATE | | Unable to determine results - near cutoff value (DxC 600i or DxC 800i only) |

*(4 of 6)*

Table 4.7      Instrument Codes with Remarks, continued

| Instrument Report Printout | Printed in Remark Area of Instrument Report | Inst. Code | Description |
|---|---|---|---|
| Results Suppressed | INIT ABS HI | | Initial Absorbance high |
| Results Suppressed | INIT ABS LO | | Initial Absorbance too low |
| Results Suppressed | INIT ADC HI | | Initial ADC error **high** |
| Results Suppressed | INIT ADC LO | | Initial ADC error **low** |
| Results Suppressed | INIT COND HI | | Initial conductance high |
| Results Suppressed | INIT COND LO | | Initial conductance low |
| Results Suppressed | INIT RATE HI | | Initial rate high |
| Results Suppressed | INIT RATE LO | | Initial rate low |
| Results Suppressed | K REQ | | Bad K value |
| Results Suppressed | NA/K REQ | | Bad Na value |
| Results Suppressed | OIR HI | | Out of Instrument Range high |
| Results Suppressed | OIR LO | | Out of Instrument Range low |
| Results Suppressed | ORDAC HI | | Out of Instrument range ORDAC high |
| Results Suppressed | ORDAC LO | | Out of Instrument range ORDAC low |
| Results Suppressed | URDAC HI | | URDAC high |
| Results Suppressed | URDAC LO | | URDAC low |
| Results Suppressed | ORR HI | | Out of reportable range high |
| Results Suppressed | ORR LO | | Out of reportable range low |
| Results Suppressed | ORR O HI | | Out of ORDAC reportable range high |
| Results Suppressed | OVERFLOW | | Number overflow error |
| Results Suppressed | REF NOISE | | Reference signal noise |
| Results Suppressed | RLU RANGE | | Relative light units (RLUs) exceeds measuring range of Access luminometer (DxC 600i or DxC 800i only) |
| Results Suppressed | RX ABS HI | | Reaction absorbance high |
| Results Suppressed | RX ABS LO | | Reaction absorbance low |

*(5 of 6)*

Table 4.7        Instrument Codes with Remarks, continued

| Instrument Report Printout | Printed in Remark Area of Instrument Report | Inst. Code | Description |
|---|---|---|---|
| Results Suppressed | RX ERR | | Reaction error |
| Results Suppressed | RX MAX DEV | | Reaction outlier (maximum deviation) |
| Results Suppressed | RX MEAN DEV | | Reaction noise (mean deviation) |
| Results Suppressed | RX NOISE | A | Erratic ADC (cup) |
| Results Suppressed | RX RATE HI | | Reaction rate high |
| Results Suppressed | RX RATE LO | | Reaction rate low |
| Results Suppressed | SAMP REF DRIFT | | Excessive reference drift - sample to sample |
| Results Suppressed | SAMPLE NOISE | | Sample signal noise |
| Results Suppressed | SUB DEPL | | Substrate depleted |
| Results Suppressed | INCUBATOR TEMP | | Access temperature error (DxC 600i or DxC 800i only) |
| Results Suppressed | SUBSTRATE TEMP | | Access temperature error (DxC 600i or DxC 800i only) |
| Results Suppressed | CAROUSEL TEMP | | Access temperature error (DxC 600i or DxC 800i only) |
| SENSITIVITY | Calibration failed | | Sensitivity error |
| SEV RECOVERY | Calibration required | | Severe recovery error |
| SEV SENSITVITY | Calibration required | | Severe Sensitivity error |
| SPAN | Calibration failed | | Span error |
| TEST STOPPED | | | Test was aborted by console - recovery, cleanup, etc. |
| TOO MANY TESTS | | | Too many tests on CC |

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# Result Error Codes

## Result Error Codes

Table 4.8        Result Error Codes

| Host Code | Description |
|:---:|:---|
| AB | Not all programmed tests have a valid result |
| AX | Antigen excess |
| BH | Blank absorbance high |
| BL | Blank absorbance low |
| BN | Blank noise (mean deviation) |
| BO | Blank outlier (maximum deviation) |
| CH | Initial conductance high |
| CL | Initial conductance low |
| CR | Check result Access result may have been contaminated by DxC processing of sample |
| DH | Out of instrument range high |
| DL | Out of instrument range low |
| DR | Reference signal noise |
| DS | Sample signal noise |
| EA | Erratic ADC |
| EC | Excessive reference drift - sample to calibration |
| ES | Excessive reference drift - sample to sample |
| GH | URDAC high |
| GL | URDAC low |
| GT | Greater than upper instrument or reportable range |
| HI | Initial ADC error high |
| HR | Reaction absorbance high |
| IA | Initial absorbance either too high or too low |
| IK | Bad K value |
| IL | Initial rate too low |
| IN | Bad NA value |
| IR | Initial rate too high |

*(1 of 2)*

Table 4.8    Result Error Codes, continued

| | |
|---|---|
| LI | Initial ADC error low |
| LO | Result is lower than minimum reportable result value defined in APF (Assess LOW flag) |
| LR | Reaction absorbance low |
| LT | Less than lower instrument or reportable range |
| OF | Number overflow error |
| OH | Out of instrument range ORDAC high |
| OK | Result was calculated |
| OL | Out of instrument range ORDAC low |
| OR | Relative light units (RLUs) are outside acceptable luminometer measuring range |
| RE | Reaction error |
| RH | Reaction rate high |
| RL | Reaction rate low |
| RN | Reaction noise (mean deviation) |
| RO | Reaction outlier (maximum deviation) |
| SD | Substrate depleted |
| SH | Blank rate high |
| SL | Blank rate low |
| TM | Temperature error |
| UH | Out of reportable range high |
| UL | Out of reportable range low |
| UO | Out of ORDAC reportable range high |
| ZD | Zero denominator |

*(2 of 2)*

## Result Error Code Descriptions

The following table provides the DxC result error code descriptions.

Table 4.9        Error Code Descriptions

| Error | Description |
|---|---|
| **Antigen Excess** | Failed antigen excess test for immunoglobulin reagents. |
| **Blank Absorbance (Hi/Lo)** | The mean absorbance measured during the reagent blank spin cycle (read window). The units are in absorbance and will characterize reagent quality. |
| **Blank Outlier Maximum Deviation** | A single blank absorbance data point obtained during the reagent blank read window deviates more than allowed from the line of regression. The Blank Deviation units are measured in delta absorbance. Blank Max Deviation will check for a constant rate during the blank spin cycles. |
| **Blank Mean Deviation** | The average difference between the absorbance readings and the line of regression is greater than allowed. This will check for a constant rate during the blank spin cycles. |
| **Calibrator Order Error** | Occurs in rack mode when not all calibrator levels are in ascending order (low to high) and/or not all levels reside in the same rack. |
| **Erratic ADC's** | The difference between the high and low value of the four reference electrode readings (taken in milliseconds apart) has exceeded the limits allowed. Units are in ADC's and are a measurement of noise in the ISE system. |
| **Excessive Reference Drift** | An ISE reference electrode measurement for a sample drifted above the reference electrode measurement from the calibration and exceeded the limit. The units are in ADC's and are a measurement of ISE reference electrode drift. |
| **Initial Absorbance (Hi/Lo)** | The reaction absorbance data taken from the first spin cycle after sample inject has exceeded specifications. This is a measure of sample integrity. |
| **Initial Rate (Hi/Lo)** | The reaction absorbance data obtained between 2 and 17 seconds after sample inject exceeds specifications. |
| **Insufficient Reagent Strength** | GLUCm and BUNm reagent conductivity is below specifications. |
| **Iteration Error** | Too many iterations to fit nonlinear serum to multilevel calibration. |
| **Noise** | During a particular spin cycle, the average difference between an absorbance reading and the line of regression exceeded specifications. |

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Table 4.9        Error Code Descriptions, continued

| Error | Description |
|---|---|
| **Outlier** | During a particular spin cycle, the deviation of a single absorbance reading with respect to the line of regression exceeded specifications. |
| **Out of Instrument Range (Hi/Lo)** | The recovered value exceeds the value that the instrument reports. |
| **Out of ORDAC Range (Hi/Lo)** | Reaction exceeded the range of ORDAC value that the instrument reports. |
| **Reaction Absorbance (Hi/Lo)** | The mean absorbance measured during the reaction spin cycles. |
| **Reaction Maximum Deviation** | A single reaction absorbance data point obtained during the reaction read window deviates more than allowed from the line of regression.  The units are in delta absorbance and will check for a constant rate during the reaction read window. |
| **Reaction Mean Deviation** | The average difference between the reaction absorbance readings and the line of regression is greater than allowed. This will check for a constant rate during the reaction spin cycle. |
| **Reaction Rate (Hi/Lo)** | The rate calculated during the reaction read window.  Units are in delta absorbance. |
| **Substrate Depletion** | The difference (delta) between the initial absorbance taken after sample inject and the final absorbance data point within the reaction read window exceeds specifications. |
| **Blank Rate (Hi/Lo)** | Rate during blank timing period is not within specifications. |
| **Temperature** | The operating temperature of the system is beyond 0.1ºC from the set point value.  All chemistries will be reported with a flag. |
| **Ig-A ORDAC (Hi/Lo)** | Result is outside the specifications for the special below normal range Ig-A ORDAC range. |
| **Back to Back (Linear Cal)** | Difference between usable calibrator replicates.  Units are dependent on the reagent.  Measure of system precision during calibration. |

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Table 4.9        Error Code Descriptions, continued

| Error | Description |
|---|---|
| **Back to Back (ISE Cal)** | Measure of system precision during calibration.  The difference between the two middle Sample-Reference replicate values within a calibration level.  If the back-to-back limit is exceeded, the calibration fails.  Only the two consecutive replicates that meet back-to-back are used; all other replicates are discarded.  Select Calibrator Acceptance Limits under options in the Rgts/Cal screen to view current calibration limits. |
| **DAC** | Verifies proper operation of electrodes.  The Digital-to-Analog Conversion (DAC) check mimics expected ranges of electrode output.  Failure to detect an output within a predetermined range for each channel will trigger a DAC INITIALIZATION ERROR HAS OCCURRED... flag. |
| **Erratic ADC's** | The difference between the high and low value of the four electrode readings (taken milliseconds apart) must be within the delta limit.  Measure of noise for modular chemistries. |
| **Math Error 1** | Multi-point calibration error.  Algorithm produces curve parameters that are very large or small and/or rounding errors will give an invalid standard curve.  Curve parameters are not reported and calibration may not be overridden. |
| **Math Error 2** | Computer is not able to calculate the parameters needed to determine the other math errors.  Curve parameters are not reported and calibration may not be overridden. |
| **Math Error 3** | The range of data points is on a very small percent of the overall calculated curve.  Curve is not sensitive enough to get valid results.  Curve parameters are not reported and calibration may not be overridden. |
| **Math Error 4** | Future use. |
| **Math Error 5** | Calculated curve has multiple inflection points within the dynamic range indicating more than one result is possible for the same data point.  Curve parameters are not reportable and calibration may not be overridden. |
| **Math Error 6** | Data does not properly define the curve.  Only one point is near the inflection point of the curve.  Curve parameters are not reported and calibration may not be overridden. |
| **Math Error 7** | Future use. |

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Table 4.9      Error Code Descriptions, continued

| Error | Description |
|---|---|
| **Math Error 8** | Data does not properly define the curve. Only one point is near the inflection point of the curve. Results need to be evaluated by the user. Curve parameters are reported and calibration MAY be overridden. A less severe MATH ERROR 6. |
| **Math Error 9-15** | Future use. |
| **Math Error 16** | Occurs when calibrations include division by 0. |
| **Range (ISE cal)** | Measure of reagent and electrode performance. Determines if the calibrator set points fall within the acceptable range of ADC values. |
| **Range (linear cal)** | Absorbance or rate range that the usable calibrator replicates must fall between for a valid calibration. |
| **Recovery (Multi-point)** | Determines if recovery errors of each calibration level are too large for a calibration to be useful. The difference between the recovered concentration and the actual concentration exceeds specifications. It is overrideable. |
| **Recovery Severe (Multi-point)** | Non-overrideable extreme recovery error. Refer to Recovery (Multi-point) above. |
| **Sensitivity (Multi-point)** | A check of the calibration slope for each calibrator level and several intermediate levels to check if the response is too high or low. Is overrideable. |
| **Sensitivity Severe (Multi-point)** | Non-overrideable extreme sensitivity error. Refer to Sensitivity (Multi-point) above. |
| **Span (ISE cal)** | Difference between the average ADC value of calibrator 1 and the average ADC value of calibrator 2. Measure of sensitivity. |
| **Span (Multi-point)** | Difference between consecutive calibrator rates or absorbances. There can be up to 6 multi-point spans for level 0-1, 1-2, 2-3, 3-4, 4-5, 5-0. This is a measure of sensitivity over the entire standard curve. |
| **ADC Electrolyte Error** | More than 1 second elapsed between the start and end of the ADC conversion process. |

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# Special Calculation Status Codes

## Special Calculation Status Codes

Table 4.10     Special Calculation Status Codes

| Code | Description |
|------|-------------|
| AB | One of the involved chemistries was not run |
| OK | Valid result |
| UN | Units for the involved chemistries are not compatible |
| ZD | Denominator of a ratio is zero |

## Instrument Status Codes

### Instrument Status Codes

Table 4.11        Instrument Status Codes

| Code | Cartridge Chemistry Instrument Status | Code | Modular Chemistry Instrument Status |
|------|----------------------------------------|------|--------------------------------------|
| 01 | Stopped | 01 | Stopped |
| 02 | Pause initiated | 02 | Standby |
|  |  | 03 | System home |
|  |  | 04 | Reagent load |
| 05 | Running | 05 | Prime |
| 06 | Idle shutdown in progress (future use) |  |  |
| 07 | Idle (future use) | 07 | Running |
| 08 | Initializing (future use) | 08 | Maintenance |
| 09 | Reagent load |  |  |
| 10 | Homing |  |  |
| 11 | Priming |  |  |
| 12 | PVT | 12 | Boot (future use) |
|  |  | 13 | Pause initiated |
|  |  | 14 | Waiting |
| 15 | Standby | 15 | System idle (future use) |
| 18 | Procedure in progress |  |  |
| 21 | Waiting |  |  |

# Access Codes Converted to DxC Codes for DxC 600i Reporting

## Access Codes Converted to DxC Codes (DxC 600i only)

Table 4.12      Access Codes Converted to DxC Codes (DxC 600i only)

| Access 2 | | | DxC | | | |
|---|---|---|---|---|---|---|
| **Description** | **Value** | **Flags** | **Remarks** | **Inst Code** | **Result** | **Host Code** |
| Normal result | result | none | none | none | print result | none |
| Indeterminate | "No value" | IND | **INDETERMINATE** | none | suppress | **RE** |
| Out of range high | >highest | OVR | none | none | print: >X | **GT** |
| Curve expired | result | CEX | none | E | print result | none |
| Substrate expired | result | EXS | none | S | print result | none |
| Lot expired | result | LEX | none | R | print result | none |
| Lower than reportable result | result | LOW | **OIR LO** | none | print result | **LO** |
| | < lowest | none | none | none | print: < X | **LT** |
| No curve – cal required | Raw RLUs | NCR | **CHEM NEEDS CAL** | NA[a] | incomplete | NA |
| Pack expired | result | PEX | none | D | print result | none |
| Control outside QC limits | NA | QCF | NA | NA | NA | NA |
| Control lot expired | NA | QEX | NA | NA | NA | NA |
| Quantity not sufficient | "No value" | QNS | **NO SAMP DETECT** | NA | incomplete | NA |
| Reflex test | NA | RFX | NA | NA | NA | NA |
| RLU is out of measuring range | "Cancelled" | RLU | **RLU RANGE** | none | suppress | **OR** |
| Instrument error | NA | SYS | **DEVICE ERROR** | NA | incomplete | NA |
| Incubator temperature error | "No value" | TRI | **INCUBATOR TEMP** | none | suppress | **TM** |
| Substrate temperature error | "No value" | TRS | **SUBSTRATE TEMP** | none | suppress | **TM** |
| Carousel temperature error | "No value" | TRW | **CAROUSEL TEMP** | none | suppress | **TM** |
| Can't run test (Undetected by CTA) | "Cancelled" | other | **CHEM NOT RUN** | NA | incomplete | NA |

[a] *NA = Not applicable.*

# Key Code Conversion for Local Languages

## Key Code Conversion

For communications between the host computer and the UniCel DxC, local language character handling is accomplished using the extended ASCII character set as defined by IBM for the IBM PC and IBM compatible units.  The correct interpretation of foreign language characters on the UniCel DxC will require the use of 8-bit communication between the system and the host computer.

The defined foreign language characters and their extended ASCII character codes are shown below.  No other extended ASCII characters are supported by the UniCel DxC system for display, printing and host communication.

| DECIMAL VALUE → | | 0 | 16 | 32 | 48 | 64 | 80 | 96 | 112 |
|---|---|---|---|---|---|---|---|---|---|
| ↓ | HEXA DECIMAL VALUE | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 0 | 0 | BLACK (NULL) | ► | BLANK (SPACE) | 0 | @ | P | ` | p |
| 1 | 1 | ☺ | ◄ | ! | 1 | A | Q | a | q |
| 2 | 2 | ☻ | ↕ | " | 2 | B | R | b | r |
| 3 | 3 | ♥ | ‼ | # | 3 | C | S | c | s |
| 4 | 4 | ♦ | ¶ | $ | 4 | D | T | d | t |
| 5 | 5 | ♣ | § | % | 5 | E | U | e | u |
| 6 | 6 | ♠ | ▬ | & | 6 | F | V | f | v |
| 7 | 7 | • | ↨ | ' | 7 | G | W | g | w |
| 8 | 8 | ◘ | ↑ | ( | 8 | H | X | h | x |
| 9 | 9 | ○ | ↓ | ) | 9 | I | Y | i | y |
| 10 | A | ◙ | → | * | : | J | Z | j | z |
| 11 | B | ♂ | ← | + | ; | K | [ | k | { |
| 12 | C | ♀ | ∟ | , | < | L | \ | l | ¦ |
| 13 | D | ♪ | ↔ | − | = | M | ] | m | } |
| 14 | E | ♫ | ▲ | · | > | N | ^ | n | ∼ |
| 15 | F | ☼ | ▼ | / | ? | O | — | o | △ |

| DECIMAL VALUE → | | 128 | 144 | 160 | 176 | 192 | 208 | 224 | 240 |
|---|---|---|---|---|---|---|---|---|---|
| ↓ | HEXA DECIMAL VALUE | 8 | 9 | A | B | C | D | E | F |
| 0 | 0 | Ç | É | á | | | | ∝ | ≡ |
| 1 | 1 | ü | æ | í | | | | β | ± |
| 2 | 2 | é | Æ | ó | | | | Γ | ≥ |
| 3 | 3 | â | ô | ú | | | | π | ≤ |
| 4 | 4 | ä | ö | ñ | | | | Σ | ∫ |
| 5 | 5 | à | ò | Ñ | | | | σ | ∫ |
| 6 | 6 | å | û | ª | | | | µ | ÷ |
| 7 | 7 | ç | ù | º | | | | τ | ≈ |
| 8 | 8 | ê | ÿ | ¿ | | | | Φ | ° |
| 9 | 9 | ë | Ö | ⌐ | | | | Θ | • |
| 10 | A | è | Ü | ¬ | | | | Ω | • |
| 11 | B | ï | ¢ | ½ | | | | δ | √ |
| 12 | C | î | £ | ¼ | | | | ∞ | n |
| 13 | D | ì | ¥ | ¡ | | | | φ | 2 |
| 14 | E | Ä | ₧ | « | | | | ∈ | ■ |
| 15 | F | Å | ƒ | » | | | | ∩ | BLACK FF |

A009699L.EPS

Figure 4.1    Key Code Conversion Chart

# Index

## U

## V