

MCS HOST INTERFACE LINK HL7

INSTALLATION/CONFIGURATION GUIDE

NEC America, Inc.

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Chapter 1 HL7 INTERFACE

Background

The HL7 interface provided for the MCS supports several communication low level protocols and two physical interface types.

The MCS HL7 interface software has many configurable items that can be tailored for a particular site's communication link. Background information of these configurable items is described below. For more detailed information on the available options for these fields, refer to the section, [Shared Library Configuration \(LLP and Link Type\)](#) and, [Link Specific Parameters Configuration](#).

Shared Libraries (LLP and Link Type)

The Link Type defines the hardware link to the MCS HL7 interface. Currently, the MCS HL7 interface supports 1) a TCP/IP Ethernet connection, and 2) an asynchronous, serial line (RS-232) connection. In addition, different selections are available for the Low Level Protocol (LLP). The LLP defines a data encapsulation method to provide flow control and error recovery issues of data transmissions.

The installer selects from a menu of shared libraries to define the LLP and Link Type applicable to the site's communication link. Shared libraries provide a means to dynamically load the needed processing code into the MCS HL7 interface application without the need to have separate interface applications for each site specific communication link.

HL7 Configurations (User Definable)

The HL7 Standard Version document defines some fields as user-definable. For those fields that are applicable to the MCS, a configuration screen is provided to define the values expected in the HL7 message for correct processing of these fields by the MCS HL7 interface application.

Installation

*The MCS HL7 interface software is installed using the OAI APM **Installation of Applications/Packages** command. The installer will need to know the 'root' password for the system. After the files have been installed, the installation routine will prompt the installer to configure the MCS HL7 interface software. The configuration process is discussed in the following sections.*

Interface Configuration

Configuration of the MCS HL7 interface must be completed before the MCS HL7 interface application can be started. At each administrative login (as the user **mcshost**), if the MCS HL7 interface software has not yet been configured, the user is prompted to configure the interface.

Interface Configuration (Cont)

If the MCS HL7 interface software was not configured during the installation of the application, follow steps 1. - 2. to get to the Configuration option display. Otherwise, if configuration is being performed as part of installation, skip to step 3.

1. From the **login:** prompt enter the user account name **mcs host**. Enter a password if required.
2. If the system has not been previously configured for the MCS HL7 interface, you will be prompted to do so; otherwise the main menu screen (*Figure 1-1*) will be displayed. To configure the MCS HL7 interface, select the **Configuration** option from the main menu.

```
NEC America Inc      MCS Host Link Administration Menu      Tue - Jan 27, 1998

Version: HL71.03.03      Interface Status: Idle

Options

View Log File
Erase Log File
Initialize Interface
Terminate Interface
Configuration
Statistics

UNIX
Logout

Enter Option: [ ]
```

Figure 1-1 Main Menu

3. The **Configuration** command will display the screen shown in *Figure 1-2*. This menu displays all configurable items of the MCS HL7 interface application. Select the desired configuration option.

```

NEC America Inc      MCS Host Link Administration Menu      Tue - Jan 27, 1998

                                MCS Host Interface Configuration

Options

1) shared Library Configuration (LLP and Link Type)
2) Link Specific Parameters Configuration
3) misc Configurations (Timers, Counters, Etc.)
4) HL7 Configurations (User Definable)
9) return

Enter Option: [ ]

```

Figure 1-2 Configuration Menu

Shared Library Configuration (LLP and Link Type)

The shared library configuration options allow the user to select the LLP and / or the Link Type configuration items, and to load these libraries to shared library directory path.

1. Select '1' or 'S' to access the MCS Host Link/LLP Shared Library Installation display (*Figure 1-3*).

```

NEC America Inc      MCS Host Link Administration Menu      Tue - Jan 27, 1998

                                MCS Host Link/LLP Shared Library Installation

Currently Loaded LLP / Link Type      Current Selected LLP / Link Type
-----
Low Level Protocol: none              Low Level Protocol: none
Link Type: none                       Link Type: none

Options

1) Select Low Level protocol Shared Library
2) Select link Type Shared Library
3) Load Selected shared Libraries
9) return

Enter Option: [ ]

```

Figure 1-3 Shared Library Selection Menu

2. Select '1' or 'P' to choose the applicable LLP used by the site. The LLP Shared Library Selection menu screen is displayed (*Figure 1-4*).

```

NEC America Inc      MCS Host Link Administration Menu      Tue - Jan 27, 1998

Low Level Protocol (LLP) Shared Library Selection

Currently Loaded LLP: none

Available LLP Selections -

    LLP      Format

1) LLP1 - <SB>tvv<CR>{data}ccccxxx<EB><CR>
2) LLP2 - <SB>{data}<EB><CR>
3) LLP3 - {length}{data}
4) LLP4 - {data}<EB>
6) LLP6 - <STX><STX><STX><SOH>{data}<ETX><LRC><EOT>
7) LLP7 - <STX>{data}<ETX>

9) return

Enter Selection: [ ]

```

Figure 1-4 Low Level Protocol Selection Menu

Note: *The available LLP's are listed. The format of the LLP signifies the data encapsulation of the HL7 message. LLP1 and LLP2 are implementations of the Hybrid Lower Layer Protocol and the Minimal Layer Protocol, respectively, described in the HL7 Version 2.2. Implementation Guide. LLP3, LLP4 and LLP7 are recommended for use with the TCP/IP Link Type, while LLP6 is recommended for use with the Asynchronous Serial Link Type. For LLP3, '{length}' defines a 4 character length field, equal to the length of the '{data}' portion of the message. For LLP4, '<EB>' is equal to the ASCII <FS> character (1C hex). For LLP6, the <LRC> represents a longitudinal redundancy check byte.*

3. The currently loaded LLP value indicates the LLP presently used by the MCS HL7 interface application. A 'none' indicates the LLP has not yet been configured. Select the appropriate LLP number, followed by <CR>. The MCS Host Link/LLP Shared Library Installation menu screen is displayed (*Figure 1-3*).
4. Select '2' or 'L' to choose the applicable Link Type used by the site. The Link Type Shared Library Selection menu screen is displayed (*Figure 1-5*).

```
NEC America Inc      MCS Host Link Administration Menu      Tue - Jan 27, 1998

Link Type Shared Library Selection

Currently Loaded Link Type: none

Available Link Type Selections -

Link Type    Definition

1)  aSL  - Asynchronous Serial Link
2)  rCP  - TCP/IP Link

9)  rreturn

Enter Selection: [ ]
```

Figure 1-5 Link Type Selection Menu

5. The currently loaded Link Type value indicates the Link Type presently used by the MCS HL7 interface application. A 'none' indicates the Link Type has not yet been configured. Select the '1' or 'A' for an Asynchronous Serial Link, or select '2' or 'T' for a TCP/IP link, followed by <CR>. The MCS Host Link/LLP Shared Library Installation menu screen is displayed (*Figure 1-3*).
6. If the currently selected LLP / Link Type shown in the upper right portion of the display is correct, select '3' or 'S' to load the shared libraries for use with the MCS HL7 interface application. The Shared Library Load screen is displayed (*Figure 1-6*), showing the configuration chosen, with a prompt to load the libraries.

```
NEC America Inc      MCS Host Link Administration Menu      Tue - Jan 27, 1998

Shared Library Load

Current Shared Libraries Selected -
Low Level Protocol: llp2
Link Type:          tcp

Load Shared Libraries? (Y/N): [ ]
```

Figure 1-6 Shared Library Load Menu

Note: *If the MCS HL7 interface application is currently running, the shared libraries cannot be loaded. If this is the case, the user is notified and prompted to temporarily halt the interface while the shared libraries are loaded.*

When complete, the MCS Host Link/LLP Shared Library Installation menu screen is displayed (Figure 1-3). Select '9' or 'R' to return to the MCS Host Interface Configuration screen (Figure 1-2).

Link Specific Parameters Configuration

This menu gives the user different configuration options based on which Link Type was chosen in Section 1.3.1, *Shared Library Configuration (LLP and Link Type)*, step 5.

For TCP/IP Link Type:

1. Select '2' or 'L' to access the MCS Link Specific Parameters Configuration display (Figure 1-7).
2. Enter 'C' or 'S', followed by <CR>, to indicate whether the MCS HL7 interface acts as client or server, respectively, in the client/server model for TCP/IP. In "Server" mode, the applications "listens" for a connection from a client before communications can begin. In "Client" mode, the

Link Specific Parameters Configuration (Cont)

application makes repeated attempts to connect to the server application, and then communications can begin. The currently selected, or default value, is displayed in parenthesis.

```
NEC America Inc      MCS Host Link Administration Menu      Wed - Feb 04, 1998

MCS Link Specific Parameters Configuration

Currently Link Type: tcp

Enter (Client) or (Server) link type (S):
Enter Server host name (uap2000):
Enter Server port number (2020):

Update Completed

NOTE: Server host name - enter the host name defined in
the /etc/hosts file for the HL7 Host Link.

Press Return to continue.
```

Figure 1-7 TCP/IP Link Specific Parameters

3. Enter the server host name, followed by <CR>. For default when “S” or “Server” is selected, the UAP’s host name is shown. However, the value entered must match the host name as defined in the /etc/hosts file corresponding to the IP address used for the HL7 link. If the link type is “C”, the server host name is the name of the Hospital Information System (HIS) machine to which connect requests are being made.
4. Enter the server TCP/IP port number, followed by <CR>. When complete with this step enter <CR> again to return back to the MCS Host Interface Configuration screen (*Figure 1-2*). For an Asynchronous Serial Link Type:
5. Select ‘2’ or ‘L’ to access the MCS Link Specific Parameters Configuration display (*Figure 1-8*).

Link Specific Parameters Configuration (Cont)

6. Enter the serial device for receiving HL7 messages, followed by <CR>.
7. Enter the serial device for transmitting messages (HL7 messages and LLP acknowledgments), followed by <CR>.

```

NEC America Inc      MCS Host Link Administration Menu      Tue - Jan 27, 1998

MCS Link Specific Parameters Configuration

Currently Link Type: as1

Enter receive TTY port device, "-" to clear (/dev/ttyild):
Enter transmit TTY port device, "-" to clear (/dev/ttyild):

Line Mode and Speed

1) 9600B, 8-N-1      5) 9600B, 7-E-1
2) 4800B, 8-N-1      6) 4800B, 7-E-1
3) 2400B, 8-N-1      7) 2400B, 7-E-1
4) 1200B, 8-N-1      8) 1200B, 7-E-1

Enter line mode (1):

Update Completed

Press Return to continue.
    
```

Figure 1-8 Asynchronous Serial Link Specific Parameters

8. Enter the appropriate number indicating the line mode for the link, followed by <CR>. Each line mode displayed indicates baud rate, number of bits, parity type, and number of stop bits. When complete with this step enter <CR> again to return back to the MCS Host Interface Configuration screen (Figure 1-2).

Miscellaneous Configurations (Timers, Counters, Etc.)

Figure 1-9 shows the Miscellaneous Configurations menu, which gives miscellaneous options for configuration. These parameters have default values displayed in parenthesis next to each prompt. The default values are the recommended values. Modifications to these values should be coordinated with the system administrator.

```
NEC America Inc      MCS Host Link Administration Menu      Tue - Jan 27, 1998

                                MCS Host Link Miscellaneous Configuration

Enter the new configuration value or just
press Return to accept the current value.

Enter message reception timer value (5 sec):
Enter network (TCP/IP) link connection retry timer value (15 sec):
Enter logging level (9 level):
Enter host link shared memory key value (2734):
Enter number of times to send a negative acknowledgment (3):
Enter host interface working directory (/oai/app/mcs/host/bin):
Enter logging and statistics directory (/oai/app/mcs/host/log):
Enter modem dial out telephone number ():

Update Completed

Press Return to continue.
```

Figure 1-9 Miscellaneous Configurations

1. Select '3' or 'M' to access the MCS Host Link Miscellaneous Configuration display (*Figure 1-9*).
2. Enter a time-out value (in seconds) for waiting on a complete message reception, followed by <CR>. If a message reception has begun, and the complete message has not been received by this configured time, the message reception is aborted.
3. If the Link Type chosen is TCP/IP, enter the retry timer value, followed by <CR>. This value defines the time interval used to retry a 'connect' to the server when the link goes down.
4. Enter the logging level for the MCS HL7 interface application, followed by <CR>.
5. Enter the shared memory key value, followed by <CR>. The shared memory here is used to share information for collecting statistical data about message reception and message processing.
6. Enter the maximum number of negative acknowledgments (NAK) for a single message before terminating the link, followed by <CR>.

**Configurations
(Timers, Counters,
Etc.) (Cont)**

7. Enter the directory path for the current working directory, followed by <CR>.
8. Enter the directory path which contains the logging file, followed by <CR>.
9. If the Link Type chosen is Asynchronous Serial, and if a modem is being used, enter the dial out number, followed by <CR>. When complete with this step enter <CR> again to return back to the MCS Host Interface Configuration screen (Figure 1-2).

**HL7
Configurations
(User Definable)**

Some of the fields defined by the HL7 Standard are allowed to have site-specific values. The values for these ‘user-defined’ fields are configurable using the HL7 Configurations menu. Only those fields applicable to the MCS HL7 interface are available for configuration. The values entered here are compared against incoming HL7 messages. If a match occurs, processing is performed accordingly.

1. Select ‘1’ or ‘A’ to assign the Receiving Application name for HL7 messages (Figure 1-10).

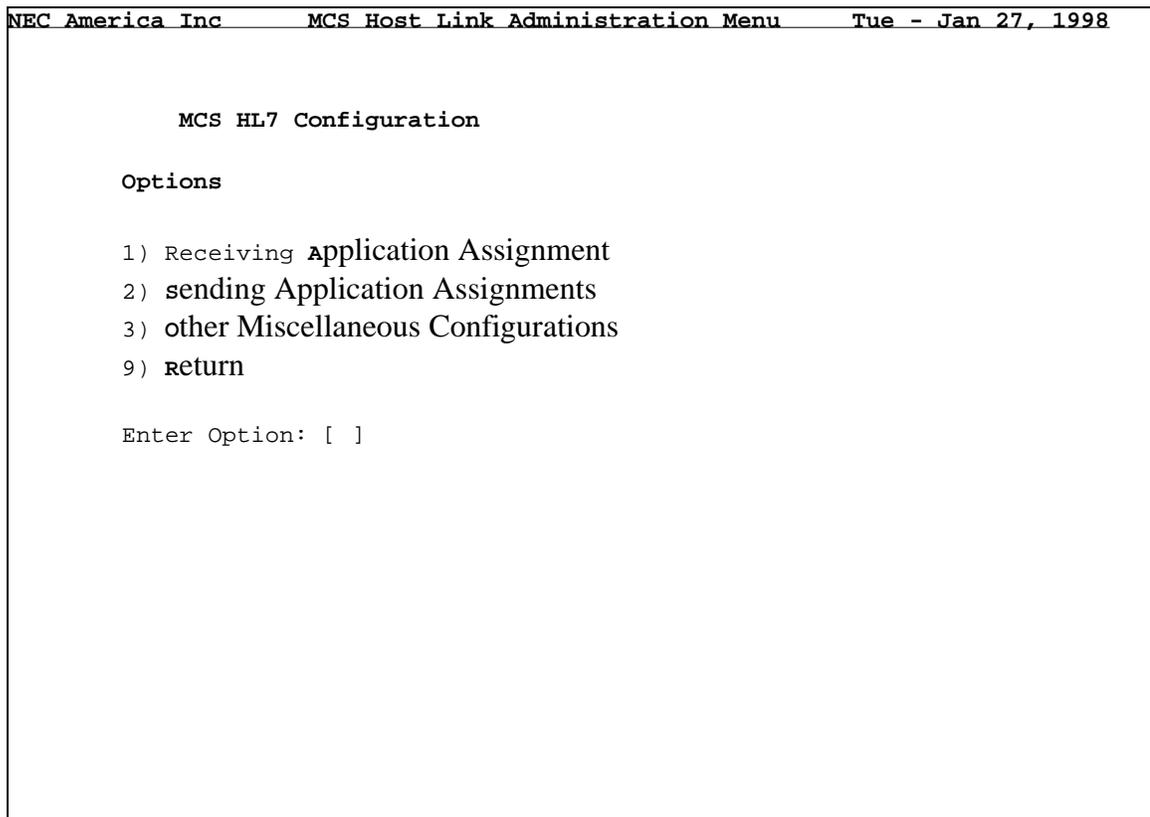


Figure 1-10 HL7 User-Definable Configuration

HL7 Configurations (User Definable)

2. Enter the value when prompted (*Figure 1-11*). If an HL7 message is received with no value entered in MSH-5 (receiving application), this value is used in the MSH-3, Sending Application, field in all HL7 acknowledgments. After entering the data, the HL7 User-Definable Configuration screen is displayed (*Figure 1-10*).

```
NEC America Inc      MCS Host Link Administration Menu      Tue - Jan 27, 1998

      Receiving Application Configuration

The Receiving Appl Name: Sets MSH-3 (Sending Appl Name) to this
for all Application Acknowledgments.

Enter the new configuration value or just
press Return to accept the current value.

Receiving Application Name (necuap):
```

Figure 1-11 HL7 Receiving Application Configuration

3. Select '2' or 'S' to enter the Sending Application names allowable for this interface (*Figure 1-12*). Only HL7 messages with these Sending Application names (MSH-3) are processed. Entering '-' allows all messages to be processed. After entering the data, the HL7 User-Definable Configuration screen is displayed (*Figure 1-10*)

```
NEC America Inc      MCS Host Link Administration Menu      Tue - Jan 27, 1998

      Sending Application Configuration

The Sending Appl Names: Filter list for received messages (MSH-3)
("-" indicates all names are acceptable.

Current Settings:
  Sending Appl Names (MSH-3)
  -----
  -

      add, Delete, Save or Quit (A, D, S, Q)?
```

Figure 1-12 HL7 Sending Application Configuration

**HL7
Configurations
(User Definable)
(Cont)**

4. Select '3' or 'O' to access the MCS HL7 Miscellaneous Configuration display (*Figure 1-13*).
HL7 Miscellaneous Configurations

```
NEC America Inc      MCS Host Link Administration Menu      Tue - Jan 27, 1998

      MCS HL7 Miscellaneous Configuration

Enter the new configuration value or just
press Return to accept the current value.

Death Indicator:
  Enter HL7 Message Segment Containing Death Indicator (PV1):
Discharge Disposition (PV1, Seq 36):
  Enter Death Indicator String (Y):
VIP Indicator (PV1, Seq 16):
  Enter Confidential w/ Visitors Allowed Indicator (Y):
  Enter Confidential w/o Visitors Allowed Indicator (Y):
  Enter Visitors Allowed Indicator (N):
  Enter No Visitors Allowed Indicator (N):
HL7 Application ACK Message Control ID:
  Generate New ID [N] or Duplicated Received ID [D] (D):
```

Figure 1-13 HL7 Sending Application Configuration

**HL7
Configurations
(User Definable)
(Cont)**

5. Enter the value used to indicate 'death' in the Discharge Disposition field (message segment PV1, sequence 36).
6. For the same field, enter the value to indicate 'other' cause for discharge.
7. Enter the value used to indicate a confidential patient with visitors allowed, as defined in the VIP Indicator field (message segment PV1, sequence 16).
8. For the same field, enter the value to indicate a confidential patient with no visitors allowed.
9. For the same field, enter the value to indicate a non-confidential with visitors allowed.
10. For the same field, enter the valued to indicate a non-confidential patient, but with no visitors allowed. When complete with this step enter <CR> again to return back to the MCS Host Interface Configuration screen (*Figure 1-2*).
11. Enter 'N' or 'D' to indicate whether a new or duplicated Message Control ID (MSH-10) is sent in HL7 acknowledgments. If 'D' is chosen, the Message Control ID of the received message (MSH-10) is used.

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