**RTCIS Interface Messaging**

for

**Automated Storage and Retrieval Systems**

and

**Pallet Conveying Systems**

PLC Messaging 5

HSTINB Messaging 30

RAI Messaging 36

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| --- | --- | --- |
| Date | Author | Description |
| 25-May-01 | R. J. DeNamur | New document replaces “Dry Laundry ASRS Project Application Communication Integration FSD” document. Included are all updates thru RTCIS version 4.2. |
| 20-Jun-01 | R. J. DeNamur | Documentation corrections  P24 hstinb.msgtyp length = 4 instead of 2  P36 withdrawal\_output\_time format is in “minutes” to deliver  P38 msg14 procedure name is HOST\_UL\_arrival  P47 brand\_code field was missing |
| 15-Jan-02 | R. J. DeNamur | Inserted at P31 a section which describes the RAI Library Installation requirements. |
| 17-Jan-02 | R. J. DeNamur | Corrected path name in section on library header files where McHugh header file is located.  Added section on library version specification. |
| 27-Feb-02 | R. J. DeNamur | P8, added general notes regarding PLC definitions. |
| 28-JUN-02 | E. Kerly | P20 updated delivery locations to reflect code change to allow up to 99; added note on site use of Msg 6 functionality |
| 22-Jul-02 | R. J. DeNamur | P24 added PLC messages 33 and 34 |
| 05-Sep-02 | R. J. DeNamur | P26 added msg R21 to hstinb table  P48 added msg type C21 |
| 24-Sep-02 | R. J. DeNamur | Add to HSTINB detail description the need for INTERCHANGE |
| 20-Jan-05 | T.E. Tedesco | Add order de-staging messages and descriptions– U32, D22,D23,D24.  Add dual fpds messages and descriptions – L8, U8.  Update msg 5 description. |
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| 05-Sep-07 | Bob Matthews | Removed Obsolete PLC messaging specs and changed document formatting  Added New msgs 35, 40, 41, 42, 43,44, 45 |
| 04-Feb-08 | Bob Matthews | Added PLCIO messaging – Reformatted PLC Messages |
| 12-May-08 | Bob Matthews | Added more PLCIO messaging |
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| 04-Jan-12 | Bob Matthews | Fixed Msg 25 message flow (copy paste error) |
| 04-Mar-14 | Toni Tedesco | RTCIS 7.4: Added option to fill in active\_output \_location with specific VTL in Msg13, added D21,E21, and F21 to Msg21. Previous RTCIS version: Added Hstinb Msg 9 for case transfer from CR776. |

Note to document editor: On page 1, to update page references, highlight and then press <F9>.

To update table of contents, highlight and then press <F9>.

To add new sections, use Header 1 for title and Header 2 for subtitle**Table of Contents**

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Overview of the PLC - RTCIS Interface

Communication between RTCIS and PLCs (**P**rogrammable **L**ogic **C**ontroller) is managed on the RTCIS machine using PLCIO software from CTI. Before RTCIS 6.4 HPUX sites used INTERCHANGE from Rockwell to communicate to the PLCs. PLCIO is a replacement for INTERCHANGE. This software is an API (application programming interface). It provides a library of function calls that can be embedded in application programs to exchange data with Allen-Bradley PLCs. Code error situations in the plc or control Logix carefully. Repeatedly sending messages if they fail will fill up the message buffer and not allow any other devices to communicate with Interchange and be processed, bringing the whole communications network to a standstill.

Communications from RTCIS use Ethernet networking. The Ethernet network can connect directly to the PLC if it has an Ethernet port or interface card. In some sites the Ethernet connection is to an A-B ControlLogix Gateway (CLGW) which is configured as a gateway to PLCs. Communication from the CLGW to the PLCs is over Data Highway.

The following diagram provides a high level view of what the communication paths look like and what the various setups together will achieve.

Non-abeth Setups

DTLDRV

(dtlmsgdrv)

PLC

DTLDRV

(dtlmsgdrv)

A/B

PLC

port

unsolicited

ENIPD

(enipd)

Unsolicited messages

app  
port

unsolicited

315

unsolicited

44818

ipaddr

plcmap

abeth Setups

socket

The setups are talked about individually that accomplish each piece of the above picture.

# DTLDRV Component Configuration

This is the RTCIS PLC processing daemon that handles communications with the PLC for any method of communication. The necessary info below relates to its setup in conjunction with the PLCIO package.

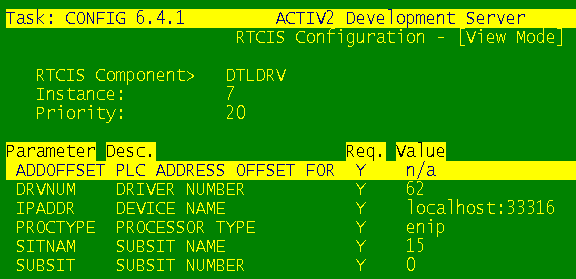
## PLCIO Connections

The DTLDRV component needs to know how to connect to the PLCIO driver for receiving *unsolicited* messages from the PLC and that is the purpose of its configuration parameters. It connects to the designated PLCIO driver by building a proper connect string identifying the module and pathway. The following parameters are used to directly correspond to the connect string usage defined in the PLCIO manual.

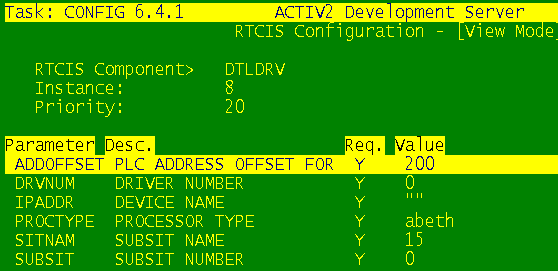
RTCIS DTL DRIVER SETUP

The DTL driver is a RTCIS application program. (DTL = Data Table Library) The DTL driver is used to manage the flow of data between RTCIS and PLCs. Embedded in the DTL driver program are calls to the INTERCHANGE or PLCIO functions.

For each PLC that communicates independently with RTCIS, a separate DTL driver must be configured.



\*Example setup for communication to a ControlLogix PLC or through a ControlLogix gateway. Using the ENIPD to handle unsolicited messages.



\* Example setup for using abeth to communicate to a PLC5 (on Ethernet) or a SLC5/05 (on Ethernet). Using the abeth module to handle unsolicited messages.

DTLDRV Configuration Parameters – PLCIO use

| Parameter | Description | Values |
| --- | --- | --- |
| ADDOFFSET | This defines a PLC address offset for unsolicited messages. (Only used for the Interchange environment.) | n/a |
| DRVNUM | Internal channel id used to track communications and must be unique among all connections to a single PLCIO driver. Some Logix PLCs don’t utilize a channel id. Note: **For ControlLogix it must match the “Source Link” as defined in the Message Configuration >Communication tab.** | 0 for abeth (PLC5 or SLC505 on Ethernet)  1+ for all others  where 0 is reserved to indicate the PLC does not support this functionality and nothing is added to the connect string (required if using abeth), otherwise it must be non-zero. |
| IPADDR | Device name designating how to connect to the PLCIO driver. It is identified by a UNIX host name (localhost if same box) or the actual IP address and the port number to talk over and must match the port used for the ENIPD app\_port parameter. | Host name|IP address[:port]  e.g. localhost:33403; port is optional, which means it will use the default of the PLCIO driver when not present.  (**When using abeth it must be an empty string so it’s not added to the connect string – use double quotes “” because a value is required.)** |
| PROCTYPE | Processor type which is the module for the PLC being used. | abeth | enip | remote   * abeth is used to communicate over Ethernet to a PLC5 or SLC5/05 on Ethernet, which normally talks over port 2222. (see above parameters.) * enip is the general unsolicited interface for all other PLCs. |
| SITNAM | Site name of the subsite that the PLC is part of (from the SUBSIT table). (Used internally to dtlmsgdrv.) | Must match a value in SUBSIT table and go with SUBSIT parameter. |
| SUBSIT | The subsite that the PLC is part of (from the SUBSIT table). (Used internally to dtlmsgdrv.) | Must match a value in SUBSIT table and correspond with SITNAM parameter. |

The connection string passed to PLCIO is generated by concatenating the values of the parameters in the following order:

PROCTYPE + IPADDR + DRVNUM

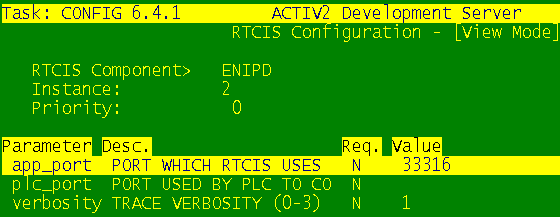
The actual connect string used is also written to the dtlmsgdrv log file with following message format to aid in troubleshooting:

plcio\_connect.c(n): plc\_open attempt n for |*connect string*|

# 

# **RTCIS ENIPD Driver Setup**

ENIPD is the generic unsolicited message over Ethernet/IP interface from the PLC. It is used when communicating to a ControlLogix PLC, ControlLogix Gateway, or CompactLogix PLC. It is not used when communicating to a PLC5 on Ethernet, or a SLC5/05, then the “abeth” module is used to process the unsolicited messages.



\* Example setup for configuring the ENIPD driver to handle unsolicited messages from a Logix processor.

App\_port - the port that the DTLDRV IPADDR is configured to use.

Plc\_port - the communication port number on the Linux server for the PLC to communicate through. Default is 44418. This setting allows for more than one ENIPD’s when talking to many PLC’s.

Verbosity – increases the PLCIO debugging messages in the ENIPD log file.

# **PLC Mapping Configuration –RTCIS Config**

This configuration defines how to write messages to the PLC and is held in the database table appropriately named plcmap. The following table defines all the mapping components and their relation to the PLCIO interface.

| Parameter | Description | Values |
| --- | --- | --- |
| Station\_id | ID of the station identification in the PLC to communicate with. | Unique value within a subsite. In a message response to an unsolicited message scenario, the user field of the unsolicited message is the station to respond to. |
| Port\_id | Used with Interchange interface only |  |
| Subsit | The subsite that PLC works within to aid in identification with related work. | Valid value from subsit database table. |
| Locatn | Identifies the ASRS location, if any, which is associated with a PLC’s scope. | Valid value from locatn database table. |
| Plcio\_module | Defines which PLCIO communication library is to be used with the PLC. | Any of the PLCIO modules mentioned below |
| Plc\_ip | IP address of the PLC or Gateway to connect to, which can be host name defined on machine such that the gethostname call will resolve. | nnn.nnn.nnn.nnn or host name |
| Plc\_port | Port number on which to connect to the PLC. | Any valid port number or nothing uses known defaults. |
| Connect\_string | Free field to either hold entire string or additional elements to string not identified above. Usually used for Path designation with ControlNet. | Up to 30 characters long. |

The above elements are used together to build the connect string in the DTLDRV component by concatenating them in the following order (a space is added in between each one):

Plcio\_module + Plc\_ip + Plc\_port + Connect\_string

With these building blocks you can build a valid connect string that is recognized by the PLCIO interface to do whatever is necessary to make the communications work. You should be able to find the connect string logged in the driver’s log file for debugging purposes.

# PLCIO Communications Modules

## abeth - Allen-Bradley Ethernet (PCCC)

Used when employing Allen-Bradley Ethernet as the communication pathway. For PLC5 on Ethernet or SLC505 on Ethernet

|  |  |
| --- | --- |
| **Write to PLC:** | abeth [plc5|slc500] <address>[:port]  plc5 is default |
| **Read from PLC:** | abeth |

## cip - Allen-Bradley ControlLogix & FlexLogix

This module uses ControlNet IP protocol which reads and writes using PLC tags. It reads all the tags on connection open which may take time depending on the amount of tags in the PLC.

|  |  |
| --- | --- |
| **Write to PLC:** | cip <address>[:port] [Slot=# | Path=#] |
| **Read from PLC:** | enipd |
| **Timeout:** | 60 seconds (default) |

## cipab -- Allen-Bradley PLC5/SLC500 over EtherNet/IP

This module supports sending solicited PCCC messages over Control Net (CIP) encapsulated by EtherNet/IP. This is for PLC5 or SLC500 communication through a ControlLogix Gateway. Use this module

|  |  |
| --- | --- |
| **Write to PLC:** | cipab [plc5|slc500] <address>[:port] [Path=<route>]  route is limited in use to 1,slot,port,node |
| **Read from PLC:** | enipd |
| **Timeout:** | 5 seconds (default) |

## cipmlx -- Allen-Bradley MicroLogix via 1761-NET-ENI

|  |  |
| --- | --- |
| **Write to PLC:** | cipmlx <address>[:port] |
| **Read from PLC:** | enipd |
| **Timeout:** | 5 seconds (default) |

# **PLC Message Configuration – RTCIS Config**

This configuration identifies what messages are written to the PLC and is held in the database table appropriately named plcmsg. It also defines where in the PLC’s memory the message is to be stored. A message must be identified in this setup and enabled in order to be sent to a PLC.

| Parameter | Description | Values |
| --- | --- | --- |
| Subsit | The subsite that PLC is within that will receive this message. | Valid value from subsit database table. |
| Msgtyp | Message type/number of the message that is identified for sending. | Any known message sent to a PLC from RTCIS. For example 2 or 6. |
| Enabled | Designates if message is allowed. | Y / N |
| Point\_address | Text string that is the identified tag in the PLC pointing to where the message is stored in memory. (Field allows for up to 79 characters) | valid tag string in PLC, e.g. N82 or N82:0. |

PLC to RTCIS Communications Setup

In the PLC, messages are sent from the PLC to RTCIS under the control of a “Message Send” function block in the PLC program. Within the function block there are setup parameters which define where the source data is (an integer file) and where it is to be sent. The examples below are for an Inventory Move Message (msg 3).

PLC5 ON ETHERNET MESSAGE

Communication Command: PLC-5 Typed Write

Data Table Address: Nxx:0

Size in Elements: 70 (dependent upon message type)

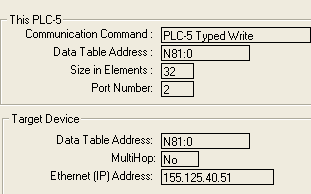
Port Number: 2

Target Data Table Address: N83:0 (use N81:0 for message 1, N82:0 for 2 etc)

MultiHop: No

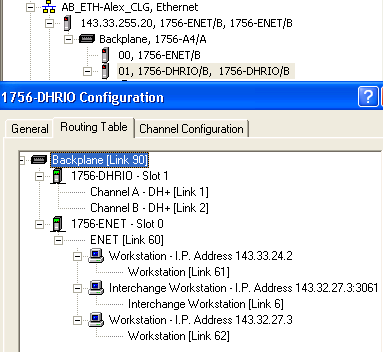
Ethernet (IP) Address: IP address of RTCIS package

The “xx” is an address dependent on the local PLC program.

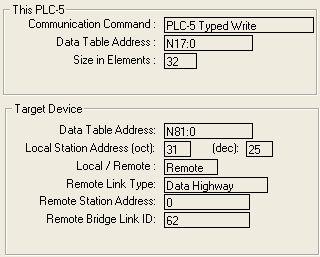


\*Example Message 1

PLC5 ON DH (THROUGH CLGW) MESSAGE

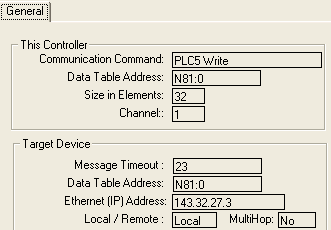


DHRIO configuration of CLGW – Link 61 points to RTCIS machine



\*Example Message 1

SLC5/05 MESSAGE

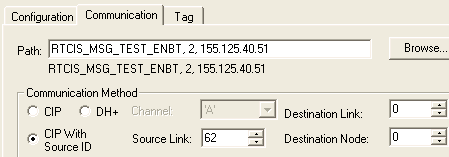
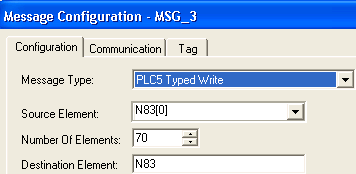


\* Example Message 1

ControlLogix COMMUNICATION SETUP

## ControlLogix 5550 Message Send Parameters

The message send block should be configured with the following parameters (msg 3 example):



*Message Type* – Always use PLC-5 Typed Write

*Source Element* – TAG\_NAME[0]

*Number of Elements* – Number of Integer words in message. 70 for message 3

Destination Element – N83:0 for message 3 (N81:0 for 1, N85:0 for 5 etc)

Path – ENET,2,IP\_ADDRESS the name given to the 1756-ENET module and can be selected with the browse button. Manually enter the remainder of the path to the host computer: ,2,IP\_ADDRESS. The ,2 means get off this module. The IP\_ADDRESS is the IP address of the RTCIS package; not the address of the Linux box. By using the IP address of the package, communication will be maintained after a switchover from the primary to the secondary Linux box. If using multiple ENIPD drivers then use “:####” after the IP address where #### is the PLC port number of the ENIPD.

*Communication Method*: CIP With Source ID

*Source Link*:– must match DTLDRV>DRVNUM (Do not use 0)

*Destination Link:* - 0

*Destination Node: -* 0

**GENERAL NOTES FOR ALL PLC MESSAGES**

ASCII Field Justification ASCII fields which are not fully filled should be left justified and padded with spaces. For example, the message\_type field when displayed in ASCII format with RSLogix should show up as “1 “. It should not be “1\00”. When a field has more than one plc word and not all words are used, the unused words do not need to be padded with spaces. Only the second byte of the last word with a character needs to be padded with a space. For example, even though the brand code field is eight characters, if the brand code is only five characters long, the RSLogix display should show an ASCII value of “12345 \00\00”.

Field Definitions All PLC messages are defined in header file **plcdef.h** on the HP9000. This file is the source for all PLC message layouts and fields described in this document. It is located as follows:

/opt/rtcis/v50/source/\_include/plcdef.h

MESSAGE 1 - Production Line Change-Over

##### DESCRIPTION

This message is sent from the PLC to RTCIS. It is used to implement what is known in RTCIS as the line change-over function. A line change-over occurs when for any given production line, there is a change in brand code, code date, or process order number. The PLC which sends this message is usually the PLC which controls a unit load former (ULF).

Note that message 3 which is described later in this document can also cause a line change-over. However, using message 1 for this function is preferable when RTCIS is required to supply a stacking pattern to the ULF. The stacking pattern is provided in message 2 which is sent from RTCIS to the PLC in response to a message 1.

Message 1 should be sent prior to the ULF forming a pallet with new line data. This will allow message 2 to be returned before a pallet is created with verification of correct data entry and a stacking pattern number.

|  |  |  |
| --- | --- | --- |
| **Message 1 – Production Line Change Over** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Addr*** |
| Message\_type | “1 “ – to initiate a line change-over. | A2  N81:0 |
| Message\_Intent | “A “ - Initiate a line change-over. (Typically used)  “M “ - to modify line data, but 1A can be used to do the same thing  “D “ Clear the data in the line data table – This is unnecessary | A2  N81:1 |
| Packing\_Line\_ID | This is a one or two character line identifier. This line identifier must be previously defined in RTCIS. This message cannot create a line in RTCIS. | A2  N81:2 |
| Unit\_Load\_Former\_ID | This is a one or two character ULF identifier and indicates which ULF is creating pallets from the designated packing line. This id number is used by RTCIS to sort a report of production by ULF. | A2  N81:3 |
| Brand\_Code | This is a five or eight character number which identifies the brand being produced on a specific line. It must match an item\_code defined in the RTCIS item master. | A8  N81:4 |
| By\_Pass\_Code | 0-99 Normally a decimal 0. The ulid will then be pending that CONSIGN or REJECT. A new RTCIS table has been added to allow more than 1 consign and 1 reject location. | D2  N81:8 |
| Code\_Date | This field will typically contain the Julian date which is of the format YDDD. RTCIS then adds to this the plant code and the line number to create a complete control group. If a complete control group is supplied in this field, RTCIS will use it without modification. If no value is supplied in this field, RTCIS will create a control group using what it knows as the Julian date plus the plant code and line number. | A10  N81:9 |
| Process\_Number | The value in this field is an SAP process order number. It must be filled in if the site is configured to use SAP. Otherwise this field can be null. | A18  N81:14 |
| User\_ID | This is a 4 Character PLC Identifier. It is needed for the response message 2. Must match PLCMAP.STATION\_ID. | A4  N81:23 |
| Message\_Timestamp | 2008,1-12,1-31,0-23,0-59,0-59 -This is the time at which the PLC creates the message comes from the PLC clock. Word 1=Year, 2=Month, 3=Day, 4=Hour, 5=Minute, 6=Second | 6\*D  N81:25 |
| End\_of\_message | -9999 - This value must always be -9999 and is the end of message marker. | D4  N81:31 |

MESSAGE 2 – Production Line Change-Over Validation

##### DESCRIPTION

This message is sent from RTCIS to a PLC. It is sent in response to a line change-over as indicated by message 1 or message 3. It will echo the data sent in the line change-over message and it will also send additional data which can be used by the PLC for display and control purposes.

This message will be written into a PLC integer file location. In the message layout, the integer file is N82. However, the integer file can be any available integer file in the PLC. It is then defined in RTCIS through the plcmsgmnt application.

|  |  |  |
| --- | --- | --- |
| **Message 2 – Production Line Change Over Validation** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Addr*** |
| Message\_type | “2 “ – Indicates a line change-over validation message. | A2  N82:0 |
| Message\_Intent | This value will be the same as the message\_intent value of message 1; A, M, or D. This value will always be an A if the line change-over occurred via message 3. | A2  N82:1 |
| Packing\_Line\_ID | This value will reflect the value of the packing\_line\_id in message 1 or the location\_name in message 3. | A2  N82:2 |
| Unit\_Load\_Former\_ID | This value will reflect the value of the unit\_load\_former\_id in message 1. | A2  N82:3 |
| Brand\_Code | This value will reflect the value of the brand\_code from the message 1 or the material\_code from the message 3. | A8  N82:4 |
| Brand\_Description | If all data in the line change-over message has been validated, then this field will contain the brand description ITMMST.ITMDSC. If any of the data was invalid, then this field will contain an error description  “ITMCOD |nnnnnnnn | nnnnnnnn”=Brand code <> PO Brand code by message 1  “Cannot Determine itmcls” = Unknown Brand\_Code by message 1  “Invalid Prdord” = Unknown Process\_Number by message 1  “caseqty exceeds limit.” = Too many cases in message 3M01  “UL already exists.” = LTA of an existing UL by message 3M01  “Error validating item.” = Invalid Material\_code by 3M01  “RTCIS system error.” = Material\_code <> PO Brand code by 3M01  “RTCIS system error.” = Error validating Process Order by 3M01  “ACK nnnnnnnnnnnnnnnnnn” – Successfully proccessed message 3 (only sent when enabled in DTL driver config) | A26  N82:8 |
| ULF\_Pattern\_Num | Stacking pattern number for the ULF. ITMMST.ULF\_PATTERN | D2  N82:21 |
| Code\_Date | Control group that was either sent in the line change-over message or that was created by RTCIS. | A10  N82:22 |
| Status\_Code | 0= line change-over was successful in RTCIS  1= a processing error in the line change-over | D1  N82:27 |
| Process\_Number | The value in this field is an SAP process order number. It must be filled in if the site is configured to use SAP. Otherwise this field can be null. | A18  N82:28 |
| Layers | Decimal number of Layers for Unit Load | D2  N82:37 |
| Cases\_In\_Layers | Decimal number of Cases per Layer | D2  N82:38 |
| User\_ID | This value will always be “RTCS”. | A4  N82:39 |
| Message\_Timestamp | 2008,1-12,1-31,0-23,0-59,0-59 -This is the time at which the RTCIS returned the message. Word 1=Year, 2=Month, 3=Day, 4=Hour, 5=Minute, 6=Second (Some sites use these values to set the PLC clock to match RTCIS time) | 6\*D  N82:41 |
| End\_of\_message | -9999 - This value must always be -9999 and is the end of message marker. | D4  N82:47 |

MESSAGE 3 - Unit Load Identification / Inventory Move

##### DESCRIPTION

Message 3 is sent by a PLC to RTCIS for unit load identification and inventory moves to/from/within RTCIS. It is intended to mimic the functionality of an RDT for Line Change-Over, Line Take-away, Receiving, Unit Load Transfer, and Self-Directed Unit Load Transfer. The type of move is determined by the transaction code.

|  |  |  |
| --- | --- | --- |
| **Message 3 – Unit Load Identification / Inventory Move** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Addr*** |
| Message\_type | “3 “ – Must be a 3 | A2  N83:0 |
| Message\_Intent | “A “- Only for line take-away and cases are to be added to an existing pallet. This can be a second item or control group  “M “- Valid for all Transaction Codes | A2  N83:1 |
| Transaction\_Code | “01” – Line Take Away (LTA) – Creates a UL in RTCIS  “02” – Receipt  “03” – Inventory Move – Moves a UL into, out of, or within RTCIS | A2  N83:2 |
| Subsite\_Number | This is the single character descriptor from the subsite maintenance screen. It is the subsite in which the pallet is being identified or the subsite to which the pallet is being moved. SUBSIT.SUBSIT | A2  N83:3 |
| Location\_Name | The location to put in this field will depend on the specific move.  “LINExx” – For LTA where xx is the line number.  “DOORxxx” – For receipt, where xxx is the door number.  From\_location – For move into RTCIS of an unknown pallet  To\_location – For a move of a pallet out of RTCIS  To\_location – For a move of a pallet from one RTCIS location to another | A8  N83:4 |
| Material\_Class | “F$00” Finished Product  “P$00” Packing Materials | A2  N83:8 |
| Material\_Code | This is a five or eight character number which identifies the brand being produced on a specific line. It must match an item\_code defined in the RTCIS item master. | A8  N83:9 |
| Code\_Date | This field will typically contain the Julian date which is of the format YDDD. RTCIS then adds to this the plant code and the line number to create a complete control group. If a complete control group is supplied in this field, RTCIS will use it without modification. If no value is supplied in this field, RTCIS will create a control group using what it knows as the Julian date plus the plant code and line number. | A16  N83:13 |
| Expiration\_Date | Word 1=YYYY, 2=MM, 3=DD. For products which have an expiration date on the packaging, this field should be filled in with that date. | 3\*D  N83:21 |
| Case\_Quantity | When identifying inventory with message 3 (LTA or move into RTCIS), this field should contain the quantity being identified. The Quantity is sent as three integer words RTCIS will re-assemble the number per the following formula: (1st word x 10,000) + (2nd word x 1) + (3rd word ÷ 1000) | 3\*D  N83:24 |
| Pallet\_Type | When identifying inventory with message 3, this field should contain the name of the pallet type: CHEP, GMA, EURO, etc. | A4  N83:27 |
| Unit\_Load\_ID | This is typically an SSCC-18 number a 20 digit barcode. | A20  N83:29 |
| Process\_Number | The value in this field is an SAP process order number. It must be filled in if the site is configured to use SAP. Otherwise this field can be null. | A18  N83:39 |
| By\_Pass\_Code | 0-99 Normally a decimal 0. The ulid will then be pending that CONSIGN or REJECT. A new RTCIS table has been added to allow more than 1 consign and reject location. | D2  N83:48 |
| Slide\_Flag | “N$00” = No Slide - Normal  “Y$00” = Line take-away message, for the given production line the ‘Slide Enabled’ flag will be set to Yes. When the pallet is picked up via unit load transfer, the put away location will be a door where there is a current slide shipment available. | A2  N83:49 |
| Base\_ULID | When two or more pallets are to be grouped into a ‘stacked pallet’, this field should contain the SSCC-18 number of the bottom pallet for pallets two, three, and four. | A20  N83:50 |
| Filler | This field is not used. | A2  N83:60 |
| User\_ID | This is a 4 Character PLC Identifier. It is needed for the response message 2 or 6. Must match PLCMAP.STATION\_ID. | A4  N83:61 |
| Message\_Timestamp | 2008,1-12,1-31,0-23,0-59,0-59 -This is the time at which the PLC creates the message comes from the PLC clock. Word 1=Year, 2=Month, 3=Day, 4=Hour, 5=Minute, 6=Second | 6\*D  N83:63 |
| End\_of\_message | -9999 - This value must always be -9999 and is the end of message marker. | D4  N83:69 |

###### Msg 3 FIELD REQUIREMENTS BY FUNCTION

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | LTA | LTA  2nd itm/cg | RECEIPT | INVMOV  into  RTCIS | INVMOV  out of  RTCIS | INVMOV  within  RTCIS |
|  |  |  |  |  |  |  |
| message\_type | ‘3’ | ‘3’ | ‘3’ | ‘3’ | ‘3’ | ‘3’ |
| message\_intent | ‘M’ | ‘A’ | ‘M’ | ‘M’ | ‘M’ | ‘M’ |
| transaction\_code | ‘01’ | ‘01’ | ‘02’ | ‘03’ | ‘03’ | ‘03’ |
| subsite\_number | O | O | N | R | N | O |
| location\_name | ‘LINExx’ | ‘LINExx’ | ‘DOORxxx’ | ‘fr\_loc’ | ‘to\_loc’ | ‘to\_loc’ |
| material\_class | R | R | N | R | N | N |
| material\_code | R | R | N | R | N | N |
| code\_date | R | R | N | R | N | N |
| expiration\_date | O | O | N | O | N | N |
| case\_quantity | R | R | N | R | N | N |
| pallet\_type | R | N | N | R | N | N |
| unit\_load\_id | R | R | R | R | R | R |
| process\_number | R | R | N | O | O | N |
| by\_pass\_code | O | O | O | O | N | N |
| slide\_flag | O | O | N | N | N | N |
| base\_ulid | O | N | N | O | O | O |
| filler | N | N | N | N | N | N |
| user\_id | R | R | R | R | R | R |
| message\_timestamp | R | R | R | R | R | R |
| END\_OF\_FILE | R | R | R | R | R | R |

R = required field

O = optional field

N = not required field; should be null; a value will be ignored by RTCIS

MESSAGE 4 - Unit Load Identification

##### DESCRIPTION

This message is sent from the PLC to RTCIS. It is used to identify new unit loads from production. The line change-over must have previously occurred via message 1. The deposit location of the unit load will automatically be the name of the FPDS.

This message is supplied for backward compatibility. New sites should use Message 3.

|  |  |  |
| --- | --- | --- |
| **Message 4 – Unit Load Identification** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Addr*** |
| Message\_type | “4 “ – Must be a 4 | A2  N84:0 |
| Packing\_line\_ID | This is a one or two character line identifier. The line must have been previously defined by msg 1. If the line exists in RTCIS but has not been set up by a msg 1, then msg 4 will fail and the unit load will not be identified. | A2  N84:1 |
| Unit\_Load\_Former\_ID | This is a one or two character ULF identifier and indicates which ULF is creating pallets from the designated packing line. This id number is used by RTCIS to sort a report of production by ULF. | A2  N84:2 |
| Brand\_Code | This is a five or eight character number which identifies the brand being produced on a specific line. It must match an item\_code defined in the RTCIS item master. | A8  N84:3 |
| Pallet\_Type\_Code | This is a one character identifier of the pallet type. It must be defined in both the ASRS and in RTCIS. Typical values are Q=chep, T=gma. In RTCIS these values are defined in the ULPALL table using sql to update the table. | A2  N84:7 |
| Unit\_Load\_ID | This is typically an SSCC-18 number a 20 digit barcode. | A20  N84:8 |
| Unit\_Load\_Status | See Unit\_Load\_Status in message 5 | D  N84:18 |
| By\_Pass\_Code | 0-99 Use the dlvlocmnt application to configure the DLVLOCDTL table. Bypass Types values (C=CONSIGN, R= REJECT, F=FPDS)  0= (Normal condition) No Pending Location set for this Unit load  8,9= (in Default config) UL is pending CONSIGN(8) or REJECT(9) location.  Non Zero = UL Pending location is set based upon the Bypass Type.  Non Zero = For ASRS site and code is not in the table a message 8M is sent to ASRS. UL pending location is set to ASRS.  Non Zero = Causes a Message 6 reply that typically has this value in the delivery\_location. If UL does not exist then no message 6 reply. | D2  N84:19 |
| User\_ID | This is a 4 Character PLC Identifier. It is needed for the response message 6. Must match PLCMAP.STATION\_ID. | A4  N84:20 |
| Message\_Timestamp | 2008,1-12,1-31,0-23,0-59,0-59 -This is the time at which the PLC creates the message comes from the PLC clock. Word 1=Year, 2=Month, 3=Day, 4=Hour, 5=Minute, 6=Second | 6\*D  N84:22 |
| End\_of\_message | -9999 - This value must always be -9999 and is the end of message marker. | D4  N84:28 |

MESSAGE 5 - Unit Load Status Update

##### DESCRIPTION

This message is sent from an FPDS PLC to RTCIS. It is used to tell RTCIS the status of the unit load and to also trigger RTCIS to determine the routing location for the unit load.

If the status code indicates the unit load is good and the bypass code is 0, RTCIS will request an input location from the ASRS and return the value to the FPDS PLC via msg 6.

If the status code indicates that there is something wrong with the pallet, RTCIS will not query the ASRS for an input, but instead will send a reject (9) delivery location back to the FPDS.

|  |  |  |
| --- | --- | --- |
| **Message 5 – Unit Load Status Update** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Addr*** |
| Message\_type | “5 “ – Must be a 5 | A2  N85:0 |
| Unit\_Load\_ID | This is typically an SSCC-18 number a 20 digit barcode. This field should always be filled in with one exception. When a unit load is deposited to the dock-end input location, this field should be left blank. The location can contain only one pallet and RTCIS will automatically know the unit\_load\_id. | A20  N85:1 |
| Unit\_Load\_Status | The Status is a bit pattern that indicates the status of the UL. If the bit is turned on (i.e. = 1), then a failure has occurred in that particular check. Multiple failures can occur, and the appropriate bit will be turned on for each failure. Table ULSTAT contains the configuration data. Any failures cause RTCIS to send a message 6 with destination=9 (Reject)  0= Good – No failures  Bit 0=1 (1) Top Failed  Bit 1=1 (2) Bottom Failed  Bit 2=1 (4) Front Failed  Bit 3=1 (8) Back Failed  Bit 4=1 (16) Left Failed  Bit 5=1 (32) Right Failed  Bit 6=1 (64) Pallet No-Read  Bit 7=1 (128) No Stretch Wrap  Bit 8=1 (256)  Bit 9=1 (512) Spur Full  Bit 10=1 (1024) Startup Timer  Bit 11=1 (2048) Scanner Misread  Bit 12=1 (4096) Tracking Mismatch  Bit 13=1 (8192) PR Exposed to Spark  \*Bits 8,14,15 Are Unused | D  N85:11 |
| Unit\_Load\_Weight | This field should contain a decimal value which represents the weight of the unit load. This value is stored in RTCIS for display purposes only. | D  N85:12 |
| By\_Pass\_Code | 0-99 Use the dlvlocmnt application to configure the DlvLocDtl table.  0 = And UL\_Status=0 then a message A8 is sent to ask the ASRS for a delivery\_location. This location is returned in a message 6 reply  8 = (or DlvLocDtl.Bypass\_Type=’C’) UL is pending Consign location.  9 = (or DlvLocDtl.Bypass\_Type=’R’) UL is pending Reject location.  88 = UL is pending ASRS location – Send message L8 to ASRS  99 = UL is pending ASRS location – Send message U8 to ASRS  \*For ASRS site and any value other than 0, 8, 9, 88, 99, or a value not in the DlvLocDtl table, it is inferred that the input location to the ASRS has been predetermined. RTCIS will inform the ASRS via msg M8 and return message 6 to the PLC with that location, unless another location is returned from the ASRS.  \*In all cases a message 6 reply occurs, except when the UL does not exist in the RTCIS database. | D2  N85:13 |
| User\_ID | This is a 4 Character PLC Identifier. It is needed for the response message 6. Must match PlcMap.Station\_Id. | A4  N85:14 |
| Message\_Timestamp | 2008,1-12,1-31,0-23,0-59,0-59 -This is the time at which the PLC creates the message comes from the PLC clock. Word 1=Year, 2=Month, 3=Day, 4=Hour, 5=Minute, 6=Second | 6\*D  N85:16 |
| End\_of\_message | -9999 - This value must always be -9999 and is the end of message marker. | D4  N84:22 |

MESSAGE 6 - Destination Assignment

##### DESCRIPTION

This message is sent from RTCIS to an FPDS PLC and is a reply to message 4 or 5. The purpose is to tell the FPDS the delivery location of the unit load. The delivery location can either be an input location of the ASRS or it can be the reject or consignment locations as defined in the dlvlocmnt application.

An FPDS can have several PLCs. RTCIS must know to which FPDS PLC to send msg 6. RTCIS determines that from the user\_id of the prompting message. The various FPDS PLCs and their user\_id must be defined in RTCIS using an application called plcmapmnt. This message will be written into a PLC integer file location. In the message layout, the integer file is N86. However, the integer file can be any available integer file in the PLC. It is then defined in RTCIS through the plcmsgmnt application.

The Msg 6 is normally returned in response to a Msg 5. Msg 6 is not returned to the PLC when the unitload id is unknown to RTCIS. For all other conditions, a Msg 6 is returned in response to a Msg 5.

This functionality is used by sites in auto truckloading. When a msg 6 is not returned, the conveyor PLC routes the unitload to a spur (reject) and the unit is not loaded onto the shuttle truck.

When a Msg 6 is returned, even with a delivery location of 9, the unit is still loaded onto the shuttle. The receiving subsite will know about the unit load based on the data available in RTCIS. If the unitload is unknown to RTCIS, the unit should never be sent to the subsite on the shuttle and remains at the producing site.

A Msg 6 will also be sent in response to a msg 4 if the msg 4 is sent in with a bypass code other than 0. The msg 6 goes back immediately to the ulf plc or cl processor that sent the msg 4 in, and the ulid’s pending location will be filled in with the appropriate location name corresponding to the bypass code number.

|  |  |  |
| --- | --- | --- |
| **Message 6 – Destination Assignment** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Addr*** |
| Message\_type | “6 “ | A2  N86:0 |
| Unit\_Load\_ID | This field will contain the SSCC-18 number that was sent in message 4 or 5. If msg 5 did not contain a value for unit\_load\_id, then this field will contain the unit\_load\_number of the pallet in the dockinp location. | A20  N86:1 |
| Delivery\_location | 0-99 This number is the indicator where the PLC should route the UL to.  The value in this field is a decimal number which corresponds to an ASRS input location.  Or the values can be 8 and 9 which are hard coded in RTCIS to correspond to locations CONSIGN and REJECT.  Or the values can be an additional consign or reject type location defined in the delivery location table as defined by the dlvlocmnt application | D2  N86:11 |
| Unit\_Load\_Former\_ID |  | D2  N86:12 |
| User\_ID | ‘RTCS’ This value will always be ‘RTCS’ | A4  N86:13 |
| Message\_Timestamp | 2008,1-12,1-31,0-23,0-59,0-59 -This is the time at which the PLC creates the message comes from the PLC clock. Word 1=Year, 2=Month, 3=Day, 4=Hour, 5=Minute, 6=Second – Some sites use this timestamp to set the PLC clock | 6\*D  N86:15 |
| End\_of\_message | -9999 - This value must always be -9999 and is the end of message marker. | D4  N86:21 |

MESSAGE 7 - Unit Load Transfer Complete

##### DESCRIPTION

This message is sent from an FPDS PLC to RTCIS. It is used to tell RTCIS that a unit load which was pending to a location has been delivered to that location. However, it is valid to deliver a unit load to a different location than the pending location. For example, a unit load pending to an ASRS input location could be delivered the reject location.

|  |  |  |
| --- | --- | --- |
| **Message 7 – Unit Load Transfer Complete** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Addr*** |
| Message\_type | “7 “ - This must always be a value of 7. | A2  N87:0 |
| Unit\_Load\_ID | This is typically an SSCC-18 number a 20 digit barcode. | A20  N87:1 |
| Unit\_Load\_Status | The Status is a bit pattern that indicates the status of the UL. If the bit is turned on (i.e. = 1), then a failure has occurred in that particular check. Multiple failures can occur, and the appropriate bit will be turned on for each failure. Table ULSTAT contains the configuration data.  0= Good – No failures  Bit 0=1 (1) Top Failed  Bit 1=1 (2) Bottom Failed  Bit 2=1 (4) Front Failed  Bit 3=1 (8) Back Failed  Bit 4=1 (16) Left Failed  Bit 5=1 (32) Right Failed  Bit 6=1 (64) Pallet No-Read  Bit 7=1 (128) No Stretch Wrap  Bit 8=1 (256)  Bit 9=1 (512) Spur Full  Bit 10=1 (1024) Startup Timer  Bit 11=1 (2048) Scanner Misread  Bit 12=1 (4096) Tracking Mismatch  Bit 13=1 (8192) PR Exposed to Spark  \*Bits 8,14,15 Are Unused  \*Note Setting a bit to a 0 does not clear any previous failures. The status needs to be reset from an RDT. | D  N87:11 |
| Delivery\_location | 0-99 The value in this field should be the code corresponding to the actual delivery location of the UL. It may be different from the Pending Location of the UL | D2  N87:12 |
| User\_ID | This is a 4 Character PLC Identifier. | A4  N87:13 |
| Message\_Timestamp | 2008,1-12,1-31,0-23,0-59,0-59 -This is the time at which the PLC creates the message comes from the PLC clock. Word 1=Year, 2=Month, 3=Day, 4=Hour, 5=Minute, 6=Second – Some sites use this timestamp to set the PLC clock | 6\*D  N87:15 |
| End\_of\_message | -9999 - This value must always be -9999 and is the end of message marker. | D4  N87:21 |

MESSAGE 11 - RF Broadcast

**MESSAGE 11 LAYOUT**

Data Item Name Size Values Justify PLC Type PLC Size Address

message\_type 2 11 LJ ASCII 1 word N88:0

tech\_group 10 RJ ASCII 5 words N88:1

rdt\_message 40 ASCII 20 word N88:6

user\_id 2+2 Node\_ID,PLC\_ID ASCII 2 words N88:26

message\_timestamp 12 YYYYMMDDHHMMSS Decimal 6 words N88:28

END\_OF\_FILE 2 -9999 Decimal 1 word N88:34

##### MESSAGE 11 DESCRIPTION

This message is sent from a PLC to RTCIS. Typically it is used to communicate critical errors or conditions on the FPDS/ULF control systems that need immediate operator attention. When RTCIS receives this message, it broadcasts an RF message to the appropriate users on radio display terminals (RDTs).

*message\_type* This must always be a value of 11.

*tech\_group* The value of this field must match a tech group name as defined in RTCIS. RTCIS users are assigned to tech groups and therefore, this field will determine which group of users get the broadcast message.

# rdt\_message This is a fourty character free form text field used to describe the error or condition. The content of this field will be displayed on the users’ RDTs.

*user\_id* See definition under msg 1.

*message\_timestamp* See definition under msg 1.

*end\_of\_file* See definition under msg 1.

MESSAGE 33 – Rack Index

**MESSAGE 33 LAYOUT**

Data Item Name Size Values Justify PLC Type PLC Size Address

slot\_identifier 2 LJ ASCII 1 word N88:0

##### MESSAGE 33 DESCRIPTION

This message is sent from RTCIS to a PLC. This message is sent automatically when a pallet is deposited to a location or is removed from a location. Within the RTCIS application, the location must be designated as an index location. This message can also be sent manually from the RDT using the <F25> function key.

The value sent to the PLC is the 3rd and 4th character of the location name: e.g. for location A027, value sent = 27. After one second, a second message 33 is sent to the same PLC address with a reset value = 99.

(note: This message was originally designed for a two high rack where both levels of a slot were indexed by one common mechanism. Therefore an index for A027 or B027 resulted in the same value of 27 being sent to the PLC.)

MESSAGE 34 – Rack Stop

**MESSAGE 33 LAYOUT**

Data Item Name Size Values Justify PLC Type PLC Size Address

emergency\_stop 2 LJ ASCII 1 word N88:1

##### MESSAGE 34 DESCRIPTION

This message is sent from RTCIS to a PLC. This message is sent manually from the RDT using the <F30> function key.

Two message 34s are sent. The first writes nulls into both bytes of the PLC word. The second message 34 writes an ASCII 0 into the upper byte of the PLC word. Once the emergency stop condition is cleared, the PLC must reset the PLC word to some designated value such as ASCII 99.

RTCIS SETUP FOR MESSAGES 33 & 34

The following system parameters must be configured in RTCIS:

• DTL: Message 33 Driver Number

• DTL: Message 34 Driver Number

• PLC: Address for Rack Messages

• PLC: Address for Rack Stop Messages

• PLC: Port ID for Rack Messages

• PLC: Station ID for Rack Messages

• Use Index Location Messaging to ASRS = Y

• Index = Incremental on Location Master

Port ID = null for direct ethernet to PLC5 or SLC500; = PMM:C INTERCHANGE syntax for ControlLogix

Station ID = null for direct ethernet to PLC5 or SLC500; = any two character numeric for ControlLogix

Overview of the HSTINB Interface

External computer applications can send messages to RTCIS by writing directly to an RTCIS Oracle table called “hstinb”. Writing a record to this table will trigger an RTCIS application to process the message. Messages 3 and 7 can be sent to RTCIS via this interface and are functionally the same messages that are sent via the PLC interface. For msg 3, the host-to-host interface provides the additional capability of identifying parent rolls; parent rolls cannot be identified via the PLC interface.

Detail Design for Communication via HSTINB Table

The hstinb table is available for external applications to write records and read status of the records in the table. Connection to the table is via sqlnet. The external application will need to connect using the Oracle instance name, login id, and password. Several different external hosts can write to the same hstinb table.

Once a record is written into the hstinb table, it will remain there until RTCIS processes the record. Once the record is processed by RTCIS, it will be deleted from the table by RTCIS. If the record is not processed successfully, the record will remain in the table and an error code will appear in the table’s status field and an error description will be written into the error description field. The external application can read these fields to determine the status of the message.

When a record is written into the hstinb table, a database trigger causes processing of the data into RTCIS through a process called hstinbprc. This inbound processing is turned on/off through the rtcis\_config application. A hstinb driver must be configured in the rtcis\_config application for turning the process on/off.

An additional application called hstinbmnt is used to selectively enable processing of records from the hstinb table. Processing is enabled based on the value in the field called machine\_number (machid). A single external host could be sending records with several different machid or several external hosts could be sending records with different machid.

The INTERCHANGE software under some circumstances is required when using the hstinb interface. Even though the interface does not involve communication with PLCs, the INTERCHANGE software is required when using the hstinb table for messages 3M01, 3M02, 3M03, and 7. This is because some of the message processing is done via subroutines that are common to both the DTL Message Driver and the Host Inbound Process. These shared messaging subroutines are linked to LIBDTL.SL which is a library within the INTERCHANGE software; therefore requiring the INTERCHANGE to be installed.

******

HSTINB TABLE LAYOUT

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Field Description** | **Data Base Field Name** | type/length | identify  parent roll | line take  away | line take  away  2nd itm/cg | manual id | inventory move | unit load transfer complete | load release | case transfer |
|  |  |  |  |  |  |  |  |  |  |  |
| message\_type | msgtyp | varchar2 4 | ‘3’ | ‘3’ | ‘3’ | ‘3’ | ‘3’ | ‘7’ | 21 | ‘9’ |
| message\_intent | msgint | varchar2 2 | ‘M’ | ‘M’ | ‘A’ | ‘M’ | ‘M’ | N | ‘R’ | ‘M’ |
| transaction\_code | trxcod | varchar2 2 | ‘04’ | ‘01’ | ‘01’ | ‘03’ | ‘03’ | N | N | ‘03’ |
| subsite\_number | subsit | varchar2 1 | R | R | N | R | R | R | R | R |
| from\_location\_name | from\_loc | varchar2 8 | R | R | N | R | O | N | N | O |
| to\_location\_name | to\_loc | varchar2 8 | R | N | N | N | R | N | N | O |
| material\_class | itmcls | varchar2 1 | R | R | R | R | N | N | N | O |
| material\_code | itmcod | varchar2 8 | R | R | R | R | N | N | N | O |
| code\_date | coddat | varchar2 16 | N | O | O | R | N | N | N | O |
| production\_date | prodat | date | R | O | O | N | N | N | N | N |
| expiration\_date | expdat | date | N | O | O | O | N | N | N | N |
| quantity | casqty | number 11,3 | R | R | R | R | N | N | N | R |
| pallet\_type | ulpall | varchar2 4 | O | O | N | R | N | N | N | O |
| unit\_load\_id | ulidcd | varchar2 20 | O | R | R | R | R | R | N | O |
| unit\_load\_status\_code | ul\_stacod | number 2 | R | N | N | N | N | N | N | N |
| process\_number | prdord | varchar2 18 | N | R | R | O | N | N | N | N |
| by\_pass\_code | bypcod | number 2 | N | O | O | N | N | N | N | N |
| slide\_flag | sldflg | varchar2 1 | N | O | N | N | N | N | N | N |
| delivery\_code | delvcd | number 2 | N | O | O | N | N | R | N | N |
| machine\_number | machid | varchar2 4 | R | R | R | R | R | R | R | R |
| team\_number | teamid | varchar2 1 | R | N | N | N | N | N | N | N |
| turnover | trnovr | varchar2 3 | R | N | N | N | N | N | N | N |
| position\_number | frtbck | varchar2 1 | R | N | N | N | N | N | N | N |
| print\_label | prtlbl | varchar2 1 | O | N | N | N | N | N | N | N |
| host\_id | host\_id | varchar2 6 | R | R | R | R | R | R | R | R |
| host\_record\_number | host\_rec | number 8 | O | O | O | O | O | O | O | O |
| message\_timestamp | mstamp | date | R | R | R | R | R | R | R | R |
| error\_code | errcod | varchar2 1 | R | R | R | R | R | R | R | R |
| error\_description | errdsc | varchar2 40 | - | - | - | - | - | - | - | - |
| control\_date | ctrl\_date | date | R | R | R | R | R | R | R | R |
| control\_user | ctrl\_user | varchar2 6 | R | R | R | R | R | R | R | R |
| base\_unit\_load\_id | base\_ulidcd | varchar2 20 | N | O | O | O | O | N | N | N |
| to\_ulidcd | to\_ulidcd | Varchar2 20 | N | N | N | N | N | N | N | R |
| Ctlgrp | ctlgrp | Varchar2 10 | N | N | N | N | N | N | N | O |

R = required field

O = optional field

N = not required field; any value will be ignored by RTCIS

HSTINB TABLE MESSAGE DESCRIPTIONS

With the exception of parent roll identification, load release, and case transfer, the function of the messages is the same as the corresponding messages that pass through the PLC interface. Common function calls are used within the RTCIS application.

The load release message, 21R, is unique to the hstinb table interface. It is designed for a control system to signal to RTCIS that it is okay to release the next shipment to the ASRS for staging. The actgetord process in RTCIS checks for a 21R record in the hstinb table when evaluating shipments for release to the ASRS. See change request CR0366 for a complete description of this message.

The case transfer message, 9, is unique to the hstinb table interface. It is designed to mimic the case transfer RDT functionality. See change request CR776 for a complete description of this message.

Below are tables with typical values for parent roll identification and case transfer. For the typical values in other functions, see the corresponding message type in the PLC definitions.

Besides the fields in the table that are unique to parent roll identification and case transfer, there are additional fields to support the host-to-host type interface. The description of these fields is as follows:

*machine\_number* This field is used in conjunction with the hstinbmnt application where processing for a specific subset of records can be turned on/off. Machid could be the name of any entity. For parent rolls it is the paper machine number. For other types of inventory is could be the name of a production line, the name of a ULF, or the name of a material handling system.

*host\_id* and *host\_record\_number* Since several external host systems can write to the table, a host\_id and a host\_record\_number field is provided. This enables the external host to read the table and determine if a specific record has been successfully processed by RTCIS.

*error\_code* When the external host writes a record to the hstinb table, it must include writing an A into this field (A=available for processing). Once RTCIS picks up the record, it will write an I into this field to indicate that processing is in progress. If an an error occurs in processing, RTCIS will write an E into this field. The external host can read the status of this field by searching on host\_id and host\_record\_number. If the processing of the record is successful, RTCIS will delete the entire record from the table.

*error\_description* The external host should not write to this field. If a processing error occurs, RTCIS will write an error description to this field.

PARENT ROLL MESSAGE REQUIREMENTS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Field Description** | **Field Name** | **type/length** |  | Typical Values for Parent Rolls |
|  |  |  |  |  |
| message\_type | msgtyp | varchar2 2 | ‘3’ | Fixed value of ‘3’ |
| message\_intent | msgint | varchar2 2 | ‘M’ | Fixed value of ‘M’ |
| transaction\_code | trxcod | varchar2 2 | ‘04’ | Fixed value of ‘04’ |
| subsite\_number | subsit | varchar2 1 | R | Must correspond to a defined subsite in the RTCIS subsite table, usually 0 |
| from\_location\_name | from\_loc | varchar2 8 | R | Must correspond to an HP location in RTCIS. Currently, these locations have names like 1M, 2M, 3M |
| to\_location\_name | to\_loc | varchar2 8 | R | This is the deposit location. Currently, these locations have names like PM1M, PM2M, PM3M |
| material\_class | itmcls | varchar2 1 | R | Fixed value of ‘P’ |
| material\_code | itmcod | varchar2 8 | R | This is the brand or GCAS number |
| code\_date | coddat | varchar2 16 | N | Null |
| production\_date | prodat | Date | R | This field determines the production date and should be in format MM/DD/YYYY hh24:mm:ss |
| expiration\_date | expdat | Date | N | Null |
| quantity | casqty | number 11,3 | R | Parent Roll Weight |
| pallet\_type | ulpall | varchar2 4 | O | null – This will cause RTCIS to select the default pallet type as defined in its item master; usually NONE. |
| unit\_load\_id | ulidcd | varchar2 20 | O | If null – The ULID will be created by RTCIS. If the ULID is suppplied by the external host, then it is used.. |
| unit\_load\_status\_code | ul\_stacod | number 2 | R | Code ‘14’ for fire rolls, otherwise ‘0’ |
| process\_number | prdord | varchar2 18 | N | Null |
| by\_pass\_code | bypcod | number 2 | N | Null |
| slide\_flag | sldflg | varchar2 1 | N | Null |
| delivery\_code | delvcd | number 2 | N | Null |
| machine\_number | machid | varchar2 4 | R | This is the paper machine number. For this transaction it will map directly to the machid field in RTCIS. |
| team\_number | teamid | varchar2 1 | R | This should be a value of A, B, C, or D; but it could be any printable ASCII character. |
| turnover | trnovr | varchar2 3 | R | This should be a character string between 000 and 999, but could be any printable ASCII character. |
| position\_number | frtbck | varchar2 1 | R | This is usually a value of F or B (front, back) but could be any printable ASCII character |
| print\_label | prtlbl | varchar2 1 | O | A value of ‘Y’ indicates that a label should be printed by RTCIS |
| host\_id | host\_id | varchar2 6 | R | This should be any unique name for the external host |
| host\_record\_number | host\_rec | number 8 | O | This is a sequential number assigned by the external host. |
| message\_timestamp | mstamp | Date | R | This is the time that the message is created by the sending application and should be of the form MM/DD/YYYY hh24:mm:ss |
| error\_code | errcod | varchar2 1 | - | The sending application must set this field to ‘A’. Rtcis sets this field to ‘I’ as the record is processed. RTCIS sets this field to ‘E’ if a processing error occurs. |
| error\_description | errdsc | varchar2 40 | - | If a processing error occurs, RTCIS will write a text description into this field. |
| control\_date | ctrl\_date | Date | R | Date of the last update to this record. |
| control\_user | ctrl\_user | varchar2 6 | R | User that performed the last update/insert. The external application should fill this in with the machine ID upon insert. |
| base\_unit\_load\_id | base\_ulidcd | varchar 20 | N | Null |

CASE TRANSFER MESSAGE REQUIREMENTS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Field Description** | **Data Base Field Name** | Type/length | Case Transfer | Typical Values for Case Transfer |
| message\_type | msgtyp | varchar2 4 | ‘9’ | Fixed value of ‘9’ |
| message\_intent | msgint | varchar2 2 | ‘M’ | Fixed value of ‘M’ |
| transaction\_code | trxcod | varchar2 2 | ‘03’ | Fixed value of ‘03’ |
| subsite\_number | subsit | varchar2 1 | R | Must correspond to a defined subsite in the RTCIS subsite table, usually 0 |
| from\_location\_name | from\_loc | varchar2 8 | O | Can be an HP location. |
| To\_location\_name | to\_loc | varchar2 8 | O | This is the deposit location. It can’t be a line/ULIN location. The destination location must be provided and valid if the destination unit load is not provided. The UOM will be assumed to be CS. |
| material\_class | itmcls | varchar2 1 | O | ‘P’ or ‘F’. Required if the unit load (or case pick location) transferring from contains more than one item class or is an HP location. |
| material\_code | itmcod | varchar2 8 | O | Brand or GCAS number. Required if the unit load (or case pick location) transferring from contains more than one item code or is an HP location. |
| code\_date | coddat | varchar2 16 | O | Null |
| production\_date | prodat | date | N | Null |
| expiration\_date | expdat | date | N | Null |
| Quantity | casqty | number 11,3 | R | The transfer quantity can not exceed the “Maximum Case Qty Adjustment Multiplier” syspar times the full unit load quantity when transferring from a HP location. The transfer quantity can’t exceed the actual quantity on the unit load (or case pick location) when transferring from a RTCIS location. |
| pallet\_type | ulpall | varchar2 4 | O | This will cause RTCIS to select the default pallet type as defined in its item master. The ulpall must be provided and valid if the destination unit load is not provided. The destination unit load will be created. The UOM will be assumed to be CS. |
| unit\_load\_id | ulidcd | varchar2 20 | O | The from Ulid cannot be in a dock end input, full pallet delivery system (FPDS), or ACTIV location. UOM must be CS. |
| unit\_load\_status\_code | ul\_stacod | number 2 | N | Null |
| process\_number | prdord | varchar2 18 | N | Null |
| by\_pass\_code | bypcod | number 2 | N | Null |
| slide\_flag | sldflg | varchar2 1 | N | Null |
| delivery\_code | delvcd | number 2 | N | Null |
| machine\_number | machid | varchar2 4 | R | This is the machine number. For this transaction it will map directly to the machid field in RTCIS. |
| team\_number | teamid | varchar2 1 | N | Null |
| Turnover | trnovr | varchar2 3 | N | Null |
| position\_number | frtbck | varchar2 1 | N | Null |
| print\_label | prtlbl | varchar2 1 | N | Null |
| host\_id | host\_id | varchar2 6 | R | This should be any unique name for the external host |
| host\_record\_number | host\_rec | number 8 | O | This is a sequential number assigned by the external host. |
| message\_timestamp | mstamp | date | R | This is the time that the message is created by the sending application and should be of the form MM/DD/YYYY hh24:mm:ss |
| error\_code | errcod | varchar2 1 | R | The sending application must set this field to ‘A’. Rtcis sets this field to ‘I’ as the record is processed. RTCIS sets this field to ‘E’ if a processing error occurs. |
| error\_description | errdsc | varchar2 40 | - | If a processing error occurs, RTCIS will write a text description into this field. |
| control\_date | ctrl\_date | date | R | Date of the last update to this record. |
| control\_user | ctrl\_user | varchar2 6 | R | User that performed the last update/insert. The external application should fill this in with the machine ID upon insert. |
| base\_unit\_load\_id | base\_ulidcd | varchar2 20 | N | Null |
| to\_ulidcd | to\_ulidcd | Varchar2 20 | R | Destination ulid must exist when transferring from an HP location. A new unit load (manual id) will be created if the destination unit load does not exist if not transferring from an HP location. The to Ulid cannot be in a dock end input, full pallet delivery system (FPDS), or ACTIV location. |
| Ctlgrp | ctlgrp | Varchar2 10 | O | Required if the unit load (or case pick location) transferring from contains more than one ctlgrp or if case transfer is being done from an HP location. |

R = required field

O = optional field

N = not required field; any value will be ignored by RTCIS

ACCESS TO HSTINB TABLE

For an external system to write to the hstinb table, the external system must first connect to Oracle via sqlnet. The login account name is hstinbliv (or hstinbtst, hstinbtrn). This will give the external system view privileges to all RTCIS tables and write privileges to the hstinb table only.

If the hstinb user account(s) doesn’t exist, it can be added as follows:

- Copy the files create\_hstinb, hstinb\_liv.sql, hstinb\_tst.sql, and hstinb\_trn.sql to live3 home directory /opt/rtcis/vXX/system. These files can be found on the RTCIS test machine.

- Log in as live3 on the target machine.

- Run the command ./create\_hstinb

Overview of the P&G RAI Host Interface

RAI is the acronym for the **R**TCIS-**A**CTIV **I**nterface. It was originally developed for application communication between RTCIS and ACTIV in North American ASRS sites. It is now being reapplied for communication with ACTIW in Cabuyoo, with MSX in London, and with CIMAT’s ECCS.

Communication between Host (RTCIS) and ASRS (historically ACTIV) is based on function calls. Each “message” is passed as a parameter in the call interface of its associated function, packaged in one of two shared libraries of such functions. One library is dedicated to messages going from Host to ASRS ***(libaal.sl) [ASRS access library]***. A second library provides for messages going from ASRS to Host ***(libhal.sl) [Host access library].*** It is the intention of the original design that these libraries are managed jointly, but they are each viewed as being “owned “ by the party granting access to their territory (i.e., Host access is granted by ***libhal.sl*** and is maintained by the owners of the RTCIS system; ASRS access is granted by ***libaal.sl*** and is maintained by the owners of the ASRS system). Messages are thus implemented by appropriately placed function calls in either domain. These function calls generally pass “message” information by reference, that is, by way of a pointer to a buffer containing the “message”. This setup allows for changes to be made in the size and shape of the message itself, without changing the structure of the procedure call interface.

Detail Design for Host to ASRS Communication

Messages from Host to ASRS are packaged in library routines within the shared library ***libaal.sl.***

All ***libaal.sl*** functions have an embedded procedure call named ***rai\_comm( ).*** Each such library function sets up the necessary information to support the intended message, and passes the following parameters to ***rai\_comm( ):***

• The specific message buffer, of type consistent with ***\*RAI\_UNION*** as defined in ***/asrs/vk/himtra/host\_him\_hdr.h***

• The type of this message as defined in ***/RAI/source/include/host\_hdr.h***

• The size of this message in bytes as defined in ***/RAI/source/include/host\_hdr.h***

• An internal tag for this messaging procedure

• A user name indicating the user invoking the calling routine

Internal to this ***rai\_comm( ),*** a larger buffer of type ***RAI\_ACTIV\_INTERF*** is plugged with this and other data (e.g., the calling process PID) and sent off to the “incoming RAI message queue”. A timer is set and a read posted on the “outgoing RAI message queue”, awaiting a reply. When the reply message appears, the appropriate portion of the buffer is passed back to the calling process by being copied back into the interfaced message field, and the result value (success =0, otherwise an RAI error code) is returned. If no reply is received at expiration of the timer, the RAI result indicates timeout, and the procedure returns. Thus, any process reading the incoming RAI message queue is expected to do its intended work and “send back” a single message reply, including the result code for this operation. This result code becomes the return value for the function call issued by the Host process.

These RAI message queues (the incoming RAI mailbox and the outgoing RAI reply mailbox) constitute the effective boundary between processes running under Host control and those running under ASRS control for this pipeline of the interface. Logic to confirm the existence of these message queues is built into ***rai\_comm( )*** in such a way that for each procedure call, the ability to deliver such a message is the indicator that ASRS is ready to receive this message. If such access is not granted, an attempt to deliver a message to ASRS via ***rai\_comm( )*** returns with an appropriate RAI return code indicating that no communication is possible.

Refer to the accompanying RTCIS/ACTIV Communication Overview (for ACTIV Ver1\_6) diagram to place these components.

Currently the ASRS (ACTIV) process ***himtra*** (“host interface message translator”) has exclusive control of these RAI message queues. This process has a mission to read and process messages coming through the incoming RAI message queue and sending associated replies back through the outgoing RAI message queue, on a single threaded FIFO basis.

This ***rai\_comm( )*** may be found in ***/asrs/vk/retroshare/retro\_misc.c***

Detail Design for ASRS to Host Communication

In the current ACTIV design, the various functions called via linkage to ***libhal.sl***  are issued using a single procedure call [using a common routine named ***host\_call( )***] from within ACTIV software. Each such ***libhal.sl*** function implements a specific message from ASRS to Host software, and is invoked using the calling sequence implied by the parameters given to ***host\_call( ),*** as follows:

1. A function pointer for the intended ***libhal.sl*** routine
2. A host message pointer, of type ***void\**** (which will be interpreted appropriately on the Host side)
3. A pointer to an alarm trapper routine, which may be null
4. An alarm period value, which may be zero

This ***host\_call()*** routine wraps the call to the shared library routine in a RETRY logic, which is kicked in if there is a failure to get a successful return value after five (5) tries (a #define parameter, MAX\_TRIES).

The ***host\_call( )*** routine first turns off the external software alarm, if it exists. [The calling procedure may typically have a timed activity cycle that must be suspended for the duration of this call.] It then attempts to call the shared library function and pass it the host message, up to 5 (or MAX\_TRIES) times. If it succeeds (return value = 0), the alarm is set using the alarm period value (re-establishing the external timer upon exit), returning to calling process with the reported ***host\_call( )*** result (being zero in this case). If it does not succeed, the IAAP alarming logic is kicked in (which loops until correction of the problem), and eventually there will be an external indicator that releases the calling process from this RETRY state (removal of a semaphore file). This IAAP logic will be clarified elsewhere if needed.

Refer to the accompanying ACTIV/RTCIS Communication Overview (for ACTIV Ver1\_6) diagram to place these components.

It should be clear that the procedure ***host\_call( )***effectively embodies the ASRS-level interface to Host, supporting the actual details of the shared library calls as encased in the RETRY logic, but shielding that detail from the ACTIV software itself.

The ACTIV function ***host\_call( )*** may be found in ***/asrs/vk/lib/src/iaap/iaap.c***



RAI Library Installation

LIBRARY LOCATION

The shared library executables, **libhal.sl** and **libaal.sl**, should both reside in the directory **/RAI/lib**.

It may be observed that the shared library executables reside in the three directories shown below. However, the three directories are actually the same and there is only one copy of the shared library.

/RAI/lib = /opt/RAI/lib = /opt/rtcis/v50/RAI/lib

The three directories shown above are actually the same directory because of the following directory links:

/RAI ---> /mnt/r1/RAI50

/opt/RAI ---> /mnt/r1/RAI50

/opt/rtcis/v50/RAI ---> /mnt/r1/RAI50

The shared libraries are typically created elsewhere and the executables are copied to /RAI/lib. For RTCIS, the shared library libhal.sl is created in /opt/rtcis/v50/source/\_libhal. For a library to be copied into /RAI/lib, all processes which use the library must be shut down.

LIBRARY LINKS

Applications which make function calls to one of the shared libraries must have a link to the library when the application is compiled. However, all references are resolved at run time of the application. So if a link is not defined, an error will occur at run time, but not when the application is compiled.

Library links are defined in a file called Makefile. Each application which calls a library function has its own Makefile in which the library link must be defined. In RTCIS there are many such applications where this library link must be defined. As an example, the application “qastatchg” makes a call to the library libaal.sl to inform the ASRS of quality status changes for pallets that are in the ASRS inventory.

The library link is defined in: /opt/rtcis/v50/source/qastatchg/Makefile

The entry in the Makefile is: LIBS = /opt/rtcis/v50/RAI/lib/libaal.sl \

For ASRS applications which use the RAI interface, there are two libraries which must be linked:

libhal.sl

libiaap.sl (located in /usr/lib)

The reason for also creating a link to libiaap.sl is to be able to send an alarm message for errors that occur in any of the libhal.sl functions. Since all of the references are resolved by the calling application, the link must be defined by the ASRS application making the function call to libhal.sl.

As an example, the ACTIV application “ordprc” makes a call to function HOST\_get\_order (msg21) in libhal.sl. The HOST\_get\_order function then calls the RTCIS application “actgetord” to get the data required for msg21. If the HOST\_get\_order function cannot open a pipe interface, it tries to generate an IAAP message by making a call to the libiaap.sl library. But if the link is not defined, the reference can not be resolved by the ordprc application and the ordprc would die.

Note: Directory path names which contain “50” are updated with each RTCIS upgrade.For ACTIV applications, the library link is not directly defined in a Makefile. Instead, the Makefile references a script call “shrlink” where the library links are defined. So for msg21, ordprc gets linked as follows:

The shrlink script is referenced: /asrs/vk/ordprc/Makefile

The shrlink script is located in: /asrs/bin/shrlink

The entry in the shrlink script is: MK\_SYS\_LIBS="/RAI/lib/libhal.sl /usr/lib/libiaap.sl"

LIBRARY HEADER FILES

There is a common header file which is used when building any of the functions in the shared libraries (both libhal.sl and libaal.sl). This header file, host\_hdr.h, defines all of the message types, the message fields, and their lengths in bytes. The host\_hdr.h file resides in several directories and is used as follows:

/asrs/RAI/source/include/host\_hdr.h This is the “gold copy” maintained by Retrotech.

/RAI/source/include/host\_hdr.h This is a copy of the “gold copy.” McHugh should insure that this copy is in place at all ASRS sites. Other ASRS vendors (Savoye, Swisslog, Naaraharju) should use a copy of this file.

/opt/rtcis/v50/source/\_include/rai/host\_hdr.h This is a copy that McHugh actually uses when compiling RTCIS applications.

In addition, there are two other common header files in these directories: rai\_err.h and rai\_str.h.

rai\_err.h Contains error codes for use in host interface routines.

rai\_str.h Contains default string characteristics

LIBRARY VERSION SPECIFICATION

All suppliers of a libaal.sl library must use the same version designation (11/1993).

When the RTCIS executables are created, the Retrotech version of libaal.sl is used. When Retrotech compiles the library, a pragma directive is specified which hard codes the version of the library to 11/1993. This version number is then included in the RTCIS executables. At run time a version check is made between the version recorded in the RTCIS executable and the version in the installed libaal.sl library. If the versions do not match, or if there is no version number in the library, the following error will occur:

/usr/lib/dld.sl: Invalid version of shared library

/opt/rtcis/v50/RAI/lib/libaal.sl

/usr/lib/dld.sl: Exec format error

For more detail on versioning, refer to the unix man for dld.sl. Refer to the section on Intra-Library Versionsing.

RAI Library Naming Conventions

• Routines and procedures that are owned by RTCIS are prefixed with **HOST**.

• Routines and procedures that are owned by the ASRS are prefixed with **ACTIV**.

• The RTCIS shared library is named **libhal.sl**

• The ASRS shared library is named **libaal.sl**

• The RTCIS shared library shall reside in the directory /RAI/lib

• The ASRS shared library shall reside in the directory /RAI/lib

• Applications which access the libraries must belong to the live3 group.

RAI DATA Definitions

Data Item Name Data Item Length

activ\_level\_id X(2)

activ\_input\_location X(5)

activ\_output\_location X(5)

brand\_code X(8)

code\_date X(12)

host\_control\_number X(12)

line\_item\_sequence\_number X(4)

line\_item\_array X(891) pointer

line\_qty X(8)

message\_timestamp X(16)

message\_type X(4)

order\_disposition X(2)

pallet\_type\_code X(2)

ul\_hold\_status\_code X(6)

ul\_withdrawl\_qty X(4)

scheduled\_ship\_date X(8)

scheduled\_ship\_time X(8)

unit\_load\_id X(20)

user\_id X(20)

withdrawal\_intent\_code X(2)

withdrawal\_output\_time X(6)

withdrawal\_request\_id X(16)

withdrawal\_select\_flag X(2)

line\_count integer return value

brand\_description X(40)

fifo\_window X(4)

item\_group X(6)

base\_ulid X(20)

busy\_slot X(5)

slot\_type X(2)

previous\_state X(4)

current\_state X(4)

All data items are left justified, padded with spaces, and null terminated.

Shared memory buffer where data is exchanged is initialized with spaces.

Complete data definitions and message structures are defined in the /opt/RAI/source/include/**host\_hdr.h** file. This file is maintained by Retrotech and is what must be used when compiling any application that accesses the shared libraries.

In the same directory is the **rai\_err.h file** which contains all of the error codes that can be returned from a function call.

MESSAGE 8 - Assign ASRS Input Location

**Message Description:**

This is a message sent from RTCIS to the ASRS requesting the ASRS to supply an input location for a unit load. This message actually takes the form of a library procedure supplied by the ASRS that when called by RTCIS and passed an item code returns a value indicating the proper input location.

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 8 – Assign ASRS Input Location** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Flow*** |
| Message\_type | ‘A8 ‘– Ask ASRS for input location. Occurs when delivery location = 0 in message 5. Two A8s are sent for Stacked pallets.  ‘D8 ‘– De-announce the Unit load to ASRS. Happens when unit load pending location is the ASRS. The ASRS then de-allocates resources for storing the specific unit load. Only one D8 is sent for stacked pallets.  ‘M8 ‘– Announce to ASRS which input location will arrive. When delivery location is not 0, 88, 99, consign type, or reject type location.  ‘C8’ – Request an input location for a case picked unit load. This is a unit load which has been created with many different item codes.  ‘L8’ – same as an A8, except it is telling the ASRS system that the ulid is on the lower FPDS, so the ASRS system will only return lower input points. Happens when message 5 delivery location = 88  ‘U8’ – same as an A8, except it is telling the ASRS system that the ulid is on the upper FPDS, so the ASRS system will only return upper input points. Happens when message 5 delivery location = 99 | A4 R→A |
| Unit\_load\_id | Unit load Barcode including check digit | N20 R→A |
| Brand\_Code | The 5 or 8 digit Product Identifier  (UNTDTL.ITMCOD) | N8 R→A |
| Brand\_Description | This is an alpha/numeric description of the brand code. It is supplied in message types A8 and M8. It is blank in message M8. In message C8, this field contains the shipment number and a sequence number. The format is nnnnnnnnnnnn:s where “nnnnnnnnnnnn” is up to a twelve digit shipment number and “s” is a loading sequence number. See message 21 for a description of how this information is used for retrieving case picked unit loads. | A40 R→A |
| Code\_date | This is a unique description of when and where a product is produced. The value is typically of the form YDDDPPPPLL. YDDD is the Julian date, PPPP is the plant code, and LL is the production line number. Code Date is also commonly referred to as batch code. Within RTCIS, the corresponding field is called control group.  The time difference between production of a unit load and introduction to the ASRS can sometimes be large. For the ACTIV ASRS, the Julian date is extracted from the code\_date and is used as the fifo date. | A12 R→A |
| Pallet\_Type | This is a one character indicator of the pallet.   * ACTIV - Q=CHEP and T=GMA. * MSX - U=CHEP, E=EURO, and W=WERO. * Any character can be used to indicate pallet type, but it must be the same in the ASRS data base and in the RTCIS data base. (ULPALL.PLCPAL) | A2 R→A |
| Ul\_hold\_status\_code | This indicates the quality status as controlled by RTCIS. RL indicates that a unit load is available for shipment. HQ indicates the the unit load should not be withdrawn from the ASRS for a shipment. | A6 R→A |
| Activ\_input\_location | When making the function call to the ASRS, this will be blank for message types A8, D8, C8, L8, and U8. For message type M8, this field will contain the number of the input location to which the unit load is manually delivered.  This field is also a return value from the ASRS. It will indicate the input location to which the unit load should be delivered. If for any reason the ASRS cannot accept the unit load, then a value of 9 will be returned in this field. | A5 R↔A |
| User\_id | This is the name of the application making the function call. | A20 R→A |
| Message\_Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 R→A |
| Item\_group | This is a family of brand codes such as soap, food, and paper and is defined in RTCIS. A brand code will belong to one item group. This information is used by the CIMAT ASRS to segregate unit loads by product family. Other ASRSs ignore this data. | A6 R→A |
| Base\_ulid | When pallets are stacked for storage, this is the SSCC-18 number of the bottom unit load. A message A8 is sent for each unit load in the stack, with the base\_ulid value contained in each message. This allows the ASRS to know which unit loads are stacked with each other. | N20 R→A |
| Case\_quantity | Number of cases on pallet. Format XXXXXXXXYYY with 3 implied decimal places. Untdtl.casqty  E.g. 00000001000 = 1 case. | N11  R→A |
| Partial\_flag | Y – Unit Load is a partial  N – Unit Load is a full or setup | A1  R→A |

**Message Return Values:**

activ\_input\_location 1,2,3,4. . . 99

status code 0 if successful library call

MESSAGE 13 – Manual Output Request

**Message Description:**

This is a message sent from RTCIS to the ASRS requesting the ASRS to retrieve a unit load(s) and is manually initiated within RTCIS. This message takes the form of a library procedure supplied by the ASRS. Pallets can be requested by brand\_code/pallet\_type/code\_date or by specific unit\_load\_id.

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 13 – Manual Output Request** | | |
| ***Data Item Name*** | ***Values – Description*** | ***Type Flow*** |
| Message\_type | ‘A13’ - | A4 R→A |
| Host\_control\_number | This number is assigned within RTCIS. It consists of an M plus a 4 digit number | A12 R→A |
| Brand\_Code | The 5 or 8 digit Product Identifier  (UNTDTL.ITMCOD) | N8 R→A |
| Unit\_load\_id | Unit load Barcode including check digit | N20 R→A |
| Code\_date | This is a unique description of when and where a product is produced. The value is typically of the form YDDDPPPPLL. YDDD is the Julian date, PPPP is the plant code, and LL is the production line number. Code Date is also commonly referred to as batch code. Within RTCIS, the corresponding field is called control group. | A12 R→A |
| Pallet\_Type | This is a one character indicator of the pallet.   * ACTIV - Q=CHEP and T=GMA. * MSX - U=CHEP, E=EURO, and W=WERO. * Any character can be used to indicate pallet type, but it must be the same in the ASRS data base and in the RTCIS data base. (ULPALL.PLCPAL) | A2 R→A |
| Ul\_withdrawal\_qty | Number of Unit Loads to Withdrawal | A4 R→A |
| Activ\_output\_location | This is the location where the ASRS will deliver the Unit Loads. Based on SYSPAR ’ASRS: Send VTL Location for Message 13=Y’ and using the zoncod table, a specific VTL location can be sent to ASRS. If a replen request can not be fulfilled, a blank location will be returned. | A5 R←A |
| withdrawal\_intent\_code | ‘N’ indicates that this message is a new request.  ‘C’ to cancel a previous withdraw request. | A2 R→A |
| withdrawal\_select\_flag | ‘RL’- Retrieve “Released” unit loads  ‘HQ’ – Retrieve “Hold Quality” unit loads | A2 R→A |
| withdrawal\_output\_time | Estimate in minutes by the ASRS software as to when the pallet will actually be delivered to the output location. | A6 A→R |
| User\_id | This is the name of the application making the function call. | A20 R→A |
| Message\_Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 R↔A |
| Withdrawal\_partial\_code | “1” - Only Full Pallet(s)  “2” - Only Partial(s)  “3” - Prefer Full Pallet(s), then Partial(s)  “4” - Prefer Partial(s), then Full Pallet(s)  If the request is for an automatic replenishment for a case pickface, this is “4”. This is ‘1” for replenishment of layer pickfaces. For manual replenishment requests or withdrawal requests, the tech selects the value based on what is available in the ASRS. | N1 R→A |

**Message Return Values:**

withdrawal\_output\_time minutes

activ\_output\_location

message\_timestamp

status code 0 if successful library call

MESSAGE 14 - UL Arrival at Output Point

**Message Description:**

This is a message sent from the ASRS to RTCIS and indicates that a pallet which had been requested via msg 13 has been delivered to an output location.

\*Stacked pallets – for CIMAT systems, 1 A14 is sent. For ACTIV systems, 2 A14s are sent.

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 14 – UL Arrival at Output Point** | | |
| ***Data Item Name*** | ***Values – Description*** | ***Type Flow*** |
| Message\_type | ‘A14’ – sent by the ASRS whenever a pallet requested via msg 13 has been delivered to an output location.  ‘D14’ – sent by the ASRS if a portion or all of a manual withdraw request cannot be delivered. | A4 A→R |
| Host\_control\_number | M#### - This is the host control number that was passed to the ASRS in msg A13.. It consists of an M plus a 4 digit number | A12 A→R |
| Activ\_output\_location | This is the location where the ASRS delivered the Unit Load | A5 A→R |
| Activ\_level\_id | Spaces – Not used | A2 A→R |
| Unit\_load\_id | Unit load Barcode including check digit | N20 A→R |
| Pallet\_Type | This is a one character indicator of the pallet.   * ACTIV - Q=CHEP and T=GMA. * MSX - U=CHEP, E=EURO, and W=WERO. * Any character can be used to indicate pallet type, but it must be the same in the ASRS data base and in the RTCIS data base. (ULPALL.PLCPAL) | A2 A→R |
| Brand\_Code | The 5 or 8 digit Product Identifier  (UNTDTL.ITMCOD) | N8 A→R |
| Code\_date | This is a unique description of when and where a product is produced. The value is typically of the form YDDDPPPPLL. YDDD is the Julian date, PPPP is the plant code, and LL is the production line number. Code Date is also commonly referred to as batch code. Within RTCIS, the corresponding field is called control group. | A12 A→R |
| withdrawal\_output\_status | This field is normally 0 or an error code. It will have an error code of -106 in response to an A13C, cancel request. If the message type is D14, then this field contain the short quantity. | A2 A→R |
| User\_id | This is the name of the application making the function call. | A20 A→R |
| Message\_Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 A→R |

**Message Return Values:**

status code 0 if successful library call

MESSAGE 15 - Unit Load Removed from Output

**Message Description:**

This is a message sent from the ASRS to RTCIS and indicates that a pallet which had been staged for a shipment (msg21, 41) has been removed from the output location. The message structure is the same as an A14.

**\*Stacked pallets –** for CIMAT systems, 1 A15 is sent. For ACTIV systems, 2 A15s are sent.

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 15 – UL Removed from Output** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Flow*** |
| Message\_type | ‘A15’ – sent by the ASRS whenever a pallet has been removed from an output location. | A4 A→R |
| Host\_control\_number | This is the host control number that was passed to the ASRS in msg A13, A21 or A41. | A12 A→R |
| Activ\_output\_location | This is the location where the Unit Load was removed | A5 A→R |
| Activ\_level\_id | The ACTIV ASRS output slot has three levels: A, B, and C. The activ\_ouput\_location concatenated with the activ\_level\_id comprise the location name used in RTCIS. For sites other than ACTIV or ACTIW, the activ\_level\_id should always be “A”. | A2 A→R |
| Unit\_load\_id | Unit load Barcode including check digit | N20 A→R |
| Pallet\_Type | This is a one character indicator of the pallet.   * ACTIV - Q=CHEP and T=GMA. * MSX - U=CHEP, E=EURO, and W=WERO. * Any character can be used to indicate pallet type, but it must be the same in the ASRS data base and in the RTCIS data base. (ULPALL.PLCPAL) | A2 A→R |
| Brand\_Code | The 5 or 8 digit Product Identifier  (UNTDTL.ITMCOD) | N8 A→R |
| Code\_date | This is a unique description of when and where a product is produced. The value is typically of the form YDDDPPPPLL. YDDD is the Julian date, PPPP is the plant code, and LL is the production line number. Code Date is also commonly referred to as batch code. Within RTCIS, the corresponding field is called control group. | A12 A→R |
| withdrawal\_output\_status | This field is normally 0 or an error code. | A2 A→R |
| User\_id | This is the name of the application making the function call. | A20 A→R |
| Message\_Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 A→R |

**Message Return Values:**

result status 0 if successful library call

MESSAGE 16 - Unit Load Quality Status Change

**Message Description:**

This message is sent from RTCIS to the ASRS telling the ASRS to change the status of the specific unit load. If all the unit loads within a batch are to be changed, this message is sent for each unit load in the batch.

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 16 – Unit Load Quality Status Change** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Flow*** |
| Message\_type | ‘A16’ – sent by the RTCIS whenever a pallet has a Quality Status change | A4  R→A |
| Unit\_load\_id | Unit load Barcode including check digit. This is the SSCC-18 number of the specific unit load whose status is to be changed. | N20 R→A |
| Code\_date | This is a unique description of when and where a product is produced. The value is typically of the form YDDDPPPPLL. YDDD is the Julian date, PPPP is the plant code, and LL is the production line number. Code Date is also commonly referred to as batch code. Within RTCIS, the corresponding field is called control group. | A12 R→A |
| Ul\_hold\_status\_code | This is the new status of the specific unit load | A6 R→A |
| User\_id | This is the name of the application making the function call. | A20 R→A |
| Message\_Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 R→A |

MESSAGE 20 - Order Cancel notification

**Message Description:**

This is a message sent from RTCIS to the ASRS to notify the ASRS that an order has been cancelled. The ASRS is to stop staging unit loads.

If any unit loads have been staged, the ASRS should send a msg 24 to indicate that staging is complete.

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 20 – Order Cancel notification** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Flow*** |
| Message\_type | ‘A20’ – sent by the RTCIS to notify that an order has been cancelled | A4  R→A |
| Host\_control\_number | This is the host control number supplied in msg 21 | A12 R→A |
| User\_id | This is the name of the application making the function call. | A20 R→A |
| Message\_Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 R→A |

MESSAGE 21 - Retrieve Next Shipment

**Message Description:**

This is a message sent from the ASRS to RTCIS requesting the next available shipment to be sent to the ASRS for staging. This message is a library procedure supplied by RTCIS that when called by the ASRS returns shipment data.

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 21 – Retrieve Next Shipment** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Flow*** |
| Message\_type | ‘A21 ‘ – normal message type used by all ASRSs  ‘B21 ‘– When RTCIS receives a B21 message, it returns the data for the next available shipment where the MOT code = B.  ‘C21 ‘ –  The MSX ASRS in London uses all three message types. When RTCIS receives an A21 message, it returns the data for the next available shipment where the MOT code = A. (MOT = Method Of Transport indicated on the shipment header.) See RTCIS change request CR119 for further explanation of how to configure RTCIS to handle the different message types.  ‘D21’-  ‘E21’-  ‘F21’-  The London ORCA project required more Msg21 types. | A4 A→R |
| Host\_control\_number | This is a unique number assigned within RTCIS. For shipments, this number is equal to the shipment number which is usually a 10 or 12 digit numbers. For manual withdraw requests, the host\_control\_number consists of an M plus a 4 digit number. Within RTCIS, manual withdraw requests which exceed a certain number of unit loads, usually 4, are treated as shipments for staging purposes and are passed to the ASRS via message 21 instead of message 13. | N12  R→A |
| Withdraw\_select\_flag | ‘RL’ - use released product, to fulfill the shipment requirements  ‘HQ’ – use hold product | A2  R→A |
| Scheduled\_Ship\_date | YYYYMMDD Date when shipment is scheduled for pickup | N8  R→A |
| Sheduled\_Ship\_time | HHMMSSss This is the time at which the shipment is scheduled for pickup by the carrier. This value in conjunction with the scheduled\_ship\_date is used by the ASRS to order the shipments in its work queue. | N8  R→A |
| Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 A↔R |
| User\_id | The ID of the program that initiated the message | A20 A↔R |
| Order\_disposition | Spaces – Normal Disposition  ‘SS’ – Stage Short – Only Stages available Inventory  ‘SO’– Stage Open – Stage avail and wait for missing Inventory to arrive  ‘SW’ – Stage anyWay – Stage Inventory regardless of Pallet Type | A2  A↔R |
| Line\_count | 0= indicates that there is not a shipment available for download  >0 indicates how many records are in the line\_item\_array.  <0 is an error code. | N8 R→A |

|  |  |  |
| --- | --- | --- |
| ***Line Item Details – repeated for each unit load in this Production Order*** | | |
| Sequence | This specifies the staging order for this product. This is a number which indicates the sequence in which unit loads need to be staged and put on the vehicle. Each unit load is assigned a sequence number, but unit loads can have the same sequence number. Unit loads which have the same sequence number can be staged in any sequence within that group. | N4 R→A |
| Brand\_Code | The 5 or 8 digit Product Identifier  (UNTDTL.ITMCOD) | N8 R→A |
| Code\_date | This field will normally be blank. Only if the control group is specified as part of the shipment detail will this field contain a value. If this field does contain a value, then the ASRS must retrieve unit loads with that specific code date. | A12 R→A |
| Pallet\_Type | This is a one character indicator of the pallet.   * ACTIV - Q=CHEP and T=GMA. * MSX - U=CHEP, E=EURO, and W=WERO. * Any character can be used to indicate pallet type, but it must be the same in the ASRS data base and in the RTCIS data base. (ULPALL.PLCPAL) | A2 R→A |
| Line\_qty | This field was intended to contain the number of unit loads of each brand code on a shipment. In the current design, RTCIS will always make this quantity = 1. When more than one unit load of a brand code is required, RTCIS will create duplicate records. | N8  R→A |
| Fifo\_window | This is the number of days that defines the tolerance for FIFO picking. The ASRS picks the oldest unit load or a unit load that is not more than N days newer than the oldest unit load. This field is only used by the CIMAT ASRS. | N4  R→A |

**MESSAGE 22 - Order Staging Started**

**Message Description:**

This is a message sent from the ASRS to RTCIS to indicate that staging has begun on a particular order, or de-staging has begun on a cancelled order. It also indicates to which output location the unit loads will be delivered. For a de-staged order, the ulids will be moved to the location name of the ASRS system (e.g. ACTIV, CIMAT)

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 22 – Order Staging Started** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Flow*** |
| Message\_type | ‘A22’ – ASRS has started staging an order  ‘D22’ – ASRS has started to De-stage Order | A4  A→R |
| Host\_control\_number | This is the host control number supplied in msg 21. Blank in D22 | A12 A→R |
| Activ\_output\_location | This is the output location to which pallets will be delivered. For an ACTIV ASRS, this is a slot number. | A5 A→R |
| User\_id | This is the name of the application making the function call. | A20 A→R |
| Message\_Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 A→R |

MESSAGE 23 - Unit Load Staged

**Message Description:**

This is a message sent from the ASRS to RTCIS to indicate that a specific unit load has been delivered to a staging lane. It is sent for each pallet on an order. It will also be sent for each unit load in a cancelled order that has been de-staged back into the ACTIV system

Stacked pallets – for CIMAT systems, 1 A23 is sent. For ACTIV systems, 2 A23s, or D23s are sent.

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 23 – Unit Load Staged** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Flow*** |
| Message\_type | ‘A23’ – ASRS has moved a unit load into a staging lane  ‘D23’ – ASRS has De-stage a unit load | A4  A→R |
| Host\_control\_number | This is the host control number supplied in msg 21. | A12 A→R |
| Unit\_load\_id | Unit load Barcode including check digit. This is the SSCC-18 number of the specific unit load whose status is to be changed. | N20 A→R |
| Activ\_output\_location | This is the output location to which pallets will be delivered. For an ACTIV ASRS, this is a slot number. | A5 A→R |
| Activ\_level\_id | The ACTIV ASRS output slot has three levels: A, B, and C. The activ\_ouput\_location concatenated with the activ\_level\_id comprises the location name used in RTCIS. For sites other than ACTIV or ACTIW, the activ\_level\_id should always be “A”. Blank for D23 | A2 A→R |
| Pallet\_type\_code | This is the pallet type of the unit load delivered to the output location. Blank for D23. | A2 A→R |
| Brand\_Code | The 5 or 8 digit Product Identifier  (UNTDTL.ITMCOD) | N8 A→R |
| Code\_date | This is the code date of the unit load delivered to the output location. Unit loads can contain more than one code date. However, when the unit load is introduced via msg 8, the ASRS is only informed of the oldest code date. When the pallet is retrieved, RTCIS will validate this field against the oldest control group. Blank for D23. | A12 A→R |
| Line\_item\_sequence\_number | This value must match a sequence number from msg 21. Blank for D23 | N4 A→R |
| User\_id | This is the name of the application making the function call. | A20 A→R |
| Message\_Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 A→R |

MESSAGE 24 - Order Staging Complete

**Message Description:**

This is a message sent from the ASRS to RTCIS to indicate that the ASRS is done staging a particular order. This message is normally sent when all of the required pallets to fill an order have been staged. It should also be sent when the ASRS has staged all of the pallets it can deliver even though it may not fill the order requirement. It is also sent upon completion of de-staging a cancelled order.

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 24 – Order Staging Complete** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Flow*** |
| Message\_type | ‘A24’ – ASRS has completed staging an order  ‘D24’ – ASRS has completed de-staging an order | A4  A→R |
| Host\_control\_number | This is the host control number supplied in msg 21. Blank in D24 | A12 A→R |
| Activ\_output\_location | This is the output location to which pallets will be delivered. For an ACTIV ASRS, this is a slot number. This is the slot number that the cancelled order was de-staged from.The D24 will only have this field filled in. | A5 A→R |
| User\_id | This is the name of the application making the function call. | A20 A→R |
| Message\_Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 A→R |

MESSAGE 25 - Staging Lane Empty

**Message Description:**

This is a message sent from RTCIS to the ASRS to indicate that the staging location is empty. This is only used at London with the MSX system. All other ASRS sites should provide a stub function which always returns a result of “0”. Many of the data elements are not used since this message was previously designed for a different purpose.

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 25 – Staging Lane Empty** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Flow*** |
| Message\_type | ‘A25’ – ASRS has moved a unit load into a staging lane | A4  R→A |
| Host\_control\_number | This is the host control number supplied in msg 21. | A12 R→A |
| Unit\_load\_id | Spaces – Not Used | N20 R→A |
| Activ\_output\_location | This is the staging lane that is empty | A5 R→A |
| Activ\_level\_id | Spaces – Not Used | A2 R→A |
| Pallet\_type\_code | Spaces – Not Used | A2 R→A |
| Brand\_Code | Spaces – Not Used | N8 R→A |
| Code\_date | Spaces – Not Used | A12 R→A |
| Line\_item\_sequence\_number | Spaces – Not Used | N4 R→A |
| User\_id | This is the name of the application making the function call. | A20 R→A |
| Message\_Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 R→A |

MESSAGE 26 - Stop Staging Pallets

**Message Description:**

This is a message sent from RTCIS to the ASRS to tell the ASRS to stop staging pallets for a specific shipment. This occurs when a shipment is assigned to a trailer and the trailer is moved to a door.

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 26 – Stop Staging Pallets** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Flow*** |
| Message\_type | ‘A26’ – sent by RTCIS to stop staging pallets for an order | A4  R→A |
| Host\_control\_number | This is the host control number supplied in msg 21 | A12 R→A |
| User\_id | This is the name of the application making the function call. | A20 R→A |
| Message\_Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 R→A |

MESSAGE 32 - Slot Sign on/Signoff

**Message Description:**

This is a message sent from RTCIS to the ASRS to request that the ASRS move the pallets forward in the staging slot such that they can be picked up by a fork lift truck. In an ACTIV ASRS, this causes the drive mechanisms to be allocated to the slot. In the MSX system this caused the pallets to be released to move forward on the gravity feed conveyors. The CIMAT system should provide a stub function and always return a value of “0”.

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 32 – Slot Sign on / Signoff** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Flow*** |
| Message\_type | ‘A32’ – sent when a user signs on to load a shipment which has been staged in an ASRS output slot or conveyor. The user can also manually sign on to a staging slot or conveyor from the RDT.  ‘D32’ – sent when a user signs off the shipment loading or manually signs off the slot.  ‘U32’ – is used to tell ACTIV to de-stage a cancelled order. | A4  R→A |
| Host\_control\_number | This is the host control number supplied in msg 21. It is included in the A32 message but not the D32 or U32 message. | A12 R→A |
| Activ\_output\_location | This is the output slot or conveyor location which is being signed on to, or the location of the order to de-stage. | A5 R→A |
| Busy\_slot | Spaces – Not Used | A5 R→A |
| Slot\_type | Spaces – Not Used | A2 R→A |
| Previous\_state | Spaces – Not Used | A4 R→A |
| Current\_state | Spaces – Not Used | A4 R→A |
| User\_id | This is the name of the application making the function call. | A20 R→A |
| Message\_Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 R→A |

MESSAGE 35 – Request ASRS FPDS Input Conveyor for Inbound Trailer

**Message Description:**

RTCIS allows multiple FPDS locations to be defined for an ASRS sub-site. Message 35 occurs when a trailer/shuttle of manufactured inventory, or an interplant receipt, is moved to a dock door in the ASRS building and unloaded.

RTCIS queries the *ASRS* system to determine which FPDS location is the most appropriate for the inventory being inducted. *The ASRS* will choose the best FPDS location to maintain the optimal inventory balance in the ASRS. Once the FPDS is chosen, RTCIS will suggest a dock door associated with the FPDS for the trailer/shuttle being moved.

See CR 575 for more details

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 35 – Request ASRS FPDS Input Conveyor for Inbound Trailer** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Flow*** |
| Message\_type | ‘A35 ‘ – Ask ASRS for Input Conveyor  ‘D35 ‘– De-announce to ASRS the trailer’s arrival  ‘M35 ‘ - Announce to ASRS which FPDS this trailer will arrive on | A4 R→A |
| Trailer\_number | The unique trailer identifier for a truck line  (TRAILER.TRLNUM) | A10 R→A |
| Truck\_line | The carrier code ie ‘SCNN’  (TRAILER.TRKLIN) | A10 R→A |
| User\_id | The T# of the user who initiated the message – ‘TA9999’ | A20 R→A |
| Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 R→A |
| Activ\_input\_conveyor | The conveyor ASRS picked for an A35. The conveyor RTCIS announced for a M35. ‘FPDS1’, ‘FPDS2’ etc. | A6 R↔A |
| Line\_count | Number of Unit loads on this truck | N8 R→A |
| ***Line Item Details – repeated for each unit load for A35 and M35*** | | |
| Unit\_load\_id | Unit load Barcode including check digit | N20 R→A |
| Brand\_Code | The 5 or 8 digit Product Identifier  (UNTDTL.ITMCOD) | N8 R→A |
| Item\_Number | * ACTIV - ‘1’ in the first character position means Feeder Stock | A16 R→A |
| Pallet\_Type | This is a one character indicator of the pallet.   * ACTIV - Q=CHEP and T=GMA. * MSX - U=CHEP, B=EURO, and W=WERO. * Any character can be used to indicate pallet type, but it must be the same in the ASRS data base and in the RTCIS data base. (ULPALL.PLCPAL) | A2 R→A |

MESSAGE 40 – Customization Order Cancelled

**Message Description:**

This is a message sent from RTCIS to the ASRS to notify the ASRS that a Customization order has been cancelled. The ASRS is to stop staging unit loads.

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 40 – Customization Order Cancelled** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Flow*** |
| Message\_type | ‘A40’ – sent by the RTCIS to notify that an order has been cancelled | A4  R→A |
| Host\_control\_number | This is the host control number supplied in msg 41 | A12 R→A |
| User\_id | This is the name of the application making the function call. | A20 R→A |
| Message\_Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 R→A |

MESSAGE 41 - Retrieve Next Customization Order

**Message Description:**

This is a message sent from the ASRS to RTCIS requesting the next available customization order to be sent to the ASRS for staging. This message is a library procedure supplied by RTCIS that when called by the ASRS returns shipment data. This message is similar to the A21 retrieve next shipment but to deliver pallets for a customization order.

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 41 – Retrieve Next Customization Order** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Flow*** |
| Message\_type | ‘A41 ‘ –RTCIS response for next customization order request | A4 R→A |
| Host\_control\_number | Contains the Production Order Unique Identifier | N12  R→A |
| Delivery\_location | Contains the Line name the product is to be delivered | A7  R→A |
| Scheduled\_start\_date | Date when production is to start - YYYYMMDD | N8  R→A |
| Sheduled\_start\_time | Time when production is to start - HHMMSSss | N8  R→A |
| Order\_disposition | Spaces – Normal Disposition  ‘SS’ – Stage Short – Only Stages available Inventory  ‘SO’- Stage Open – Stage avail and wait for missing Inventory to arrive  ‘SW’ – Stage anyWay – Stage Inventory regardless of Pallet Type | A2  R→A |
| Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 R→A |
| User\_id | The ID of the program that initiated the message | A20 R→A |
| Line\_count | Number of Unit loads in this Production Order. If equal 0 then no Production Orders are available | N8 R→A |
| ***Line Item Details – repeated for each unit load in this Production Order*** | | |
| Sequence | This specifies the staging order for this product | N4 R→A |
| Brand\_Code | The 5 or 8 digit Product Identifier  (UNTDTL.ITMCOD) | N8 R→A |
| Code\_date | This field will normally be blank. If this field does contain a value, then the ASRS must retrieve unit loads with that specific code date. | A12 R→A |
| Pallet\_Type | This is a one character indicator of the pallet.   * ACTIV - Q=CHEP and T=GMA. * MSX - U=CHEP, B=EURO, and W=WERO. * Any character can be used to indicate pallet type, but it must be the same in the ASRS data base and in the RTCIS data base. (ULPALL.PLCPAL) | A2 R→A |
| Line\_qty | This field was intended to contain the number of unit loads of each brand code on a shipment. In the current design, RTCIS will always make this quantity = 1. | N8  R→A |
| Fifo\_window | Spaces – Not Used | 4  R→A |

MESSAGE 42 – Customization Order Staging Started

**Message Description:**

This is a message sent from the ASRS to RTCIS to indicate that staging has begun on a particular customization order. It also indicates to which output location the unit loads will be delivered.

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 42 – Customization Order Staging Started** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Flow*** |
| Message\_type | ‘A42’ – ASRS has started staging a Customization order | A4  A→R |
| Host\_control\_number | This is the host control number supplied in msg A41. | A12 A→R |
| Activ\_output\_location | This is the output location to which pallets will be delivered. For an ACTIV ASRS, this is a slot number. | A5 A→R |
| Delivery\_location |  | A7 A→R |
| User\_id | This is the name of the application making the function call. | A20 A→R |
| Message\_Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 A→R |

MESSAGE 43 - Customization Order Unit Load Staged

**Message Description:**

This is a message sent from the ASRS to RTCIS to indicate that a specific unit load has been delivered to a staging lane. It is sent for each pallet on an order. It will also be sent for each unit load in a cancelled order that has been de-staged back into the ACTIV system

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 43 – Customization Order Unit Load Staged** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Flow*** |
| Message\_type | ‘A43’ – ASRS has moved a unit load into a staging lane | A4  A→R |
| Host\_control\_number | This is the host control number supplied in msg A41. | A12 A→R |
| Unit\_load\_id | Unit load Barcode including check digit. This is the SSCC-18 number of the specific unit load whose status is to be changed. | N20 A→R |
| Activ\_output\_location | This is the output location to which pallets will be delivered. For an ACTIV ASRS, this is a slot number. | A5 A→R |
| Activ\_level\_id | The ACTIV ASRS output slot has three levels: A, B, and C. The activ\_ouput\_location concatenated with the activ\_level\_id comprises the location name used in RTCIS. | A2 A→R |
| Pallet\_type\_code | This is the pallet type of the unit load delivered to the output location. | A2 A→R |
| Brand\_Code | The 5 or 8 digit Product Identifier  (UNTDTL.ITMCOD) | N8 A→R |
| Code\_date | This is the code date of the unit load delivered to the output location. Unit loads can contain more than one code date. However, when the unit load is introduced via msg 8, the ASRS is only informed of the oldest code date. When the pallet is retrieved, RTCIS will validate this field against the oldest control group. | A12 A→R |
| Line\_item\_sequence\_number | This value must match a sequence number from msg A41. | N4 A→R |
| User\_id | This is the name of the application making the function call. | A20 A→R |
| Message\_Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 A→R |

Example Message contains

Mon Jan 29 00:00:55 EST 2007 "actulstage" "A43 " "0025963000 " "00100370003265

569223" "81 " "A " "Q " "84965633" "7018170108 " “0001” "WthPrc(10488) " "2007

012900005200"

MESSAGE 44 – Customization Order Staging Complete

**Message Description:**

This is a message sent from the ASRS to RTCIS to indicate that the ASRS is done staging a particular order. This message is normally sent when all of the required pallets to fill an order have been staged. It should also be sent when the ASRS has staged all of the pallets it can deliver even though it may not fill the order requirement.

**Message Contents:**

|  |  |  |
| --- | --- | --- |
| **Message 44 – Customization Order Staging Complete** | | |
| ***Data Item Name*** | ***Values - Description*** | ***Type Flow*** |
| Message\_type | ‘A44’ – ASRS has completed staging a Customization order | A4  A→R |
| Host\_control\_number | This is the host control number supplied in msg A41. | A12 A→R |
| Activ\_output\_location | This is the output location to which pallets will be delivered. For an ACTIV ASRS, this is a slot number. | A5 A→R |
| Delivery\_location |  | A7 A→R |
| User\_id | This is the name of the application making the function call. | A20 A→R |
| Message\_Timestamp | The time the function call was made - YYYYMMDDHHMMSSss | N16 A→R |

example message

Mon Jan 29 00:40:57 EST 2007 "actstgcmp" "A44 " "0025889940 " "12 " "WthPrc(

10488) " "2007012900405500"