



RESOURCE AND PATIENT MANAGEMENT SYSTEM

Dental/EDR Interface

(BADE)

Technical Manual

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Preface

For over a decade, hospitals and health centers of the Indian Health Service (IHS) and numerous tribal health programs have utilized an information system called the Resource and Patient Management System (RPMS). The RPMS is a highly integrated system consisting of some 50 healthcare and administrative applications. Virtually all of these applications directly interact with one or more, and sometimes many, of the other RPMS applications.

During this same period, IHS and tribal dental programs have made use of the RPMS Dental Data System (DDS) as their primary system for maintaining a history of individual patient services; contributing dental data to the RPMS electronic clinical record; producing provider and department workload data; and contributing statistical data to the national data center located in Albuquerque, New Mexico. At many sites, data captured in the DDS has also been utilized in the RPMS Third Party Billing System.

With the replacement of the RPMS DDS with an Electronic Dental Record (EDR), it is required that RPMS applications interact with the EDR to meet the needs of both the Dental Department and the local health program as a whole. The RPMS/HL7–Optimized (HLO) interface is a way to send Patient Information (ADT) to the EDR and to receive dental procedures from the EDR and store them into the PCC V Dental file.

1.0 Introduction

Prior to the adoption of the EDR, the IHS and tribal dental programs made use of the RPMS DDS as their primary system for maintaining a history of individual patient services, contributing dental data to the RPMS electronic clinical record, producing provider and department workload data, and contributing statistical data to the national data center located in Albuquerque, New Mexico. At many sites, data captured in the DDS was also utilized in the RPMS Third Party Billing System. Currently, there are approximately 320 dental clinics in the IHS supported by 175 RPMS sites.

When the EDR and the RPMS/EDR Interface are complete, the EDR will be the primary data repository for dental data for sites that use the EDR. Information required by the RPMS Patient Care Component (PCC), the RPMS Scheduling Package, and the Electronic Health Record (EHR) will be transferred from the EDR to the RPMS through the RPMS/EDR interface.

It is the shared vision of IHS national representatives and the Division of Oral Health that the RPMS/EDR Interface described in this document serves as a prototype to provide a messaging framework for all HL7 message interfaces required by the IHS.

This document focuses on identifying the requirements for an interface that enables secure communication of specified data between the RPMS database and the EDR databases in a way that easily and quickly enables users of the EDR to obtain updated information about patients and dental providers, and to enable RPMS administrators to identify problems, provide maintenance, and support the interface.

This includes the development of:

- HL7 registration messages from RPMS that keep information in sync between the two databases
- HL7 visit messages from the EDR that populate the RPMS PCC module with necessary information for keeping the dental visit file current
- HL7 messages from RPMS that sync the dental provider tables between the two systems
- The HL7 message interfaces from the EDR to the RPMS scheduling package and the EHR, which will be specified at a later date.

2.0 Implementation and Maintenance

2.1 General Information

The RPMS/EDR interface occupies the BADE namespace. Options, security locks/keys, templates, routines, protocols, and parameters are namespaced.

The interface is divided into three types of messages:

- Admission, Discharge, and Transfer (ADT) messages are sent to the EDR. ADT messages are also divided into two functions. To begin using this interface, routines are run to populate the EDR system with all living patients. This load can be paused and restarted if the system requires it. The initial load may also have its speed adjusted depending on system needs. After the initial load, new patient registrations or changes to a patient's registration are sent via message to the EDR.
- Provider Information (MFN) messages are sent to the EDR. MFN messages are also divided into two functions. An initial load searches the New Person file for those who are dentists and sends their data to the EDR. After the initial load, the addition or edit of a dentist's record sends a new message to the EDR.
- Patient dental information is sent back from the EDR in real time. The program stores a dental visit into the PCC files, and creates an entry into the V Dental file. Procedures can be added, edited, or deleted.

2.2 System Requirements

- Kernel 8.0 Patch 1015 or higher
- FileMan 22 Patch 1002 or higher
- XB/ZIB Utilities Version 3.0 Patch 11 or later
- IHS/HL Version 1.6 Patch 1006
- AG Version 7.1 Patch 4 or later
- APCH Version 2.0 Patch 17 or later
- BJPC Version 2.0

2.3 Security Keys

There are three security keys with this application:

- **BADEZMGR.** Key for the main BADE menu, which contains both the upload menu and the menu to send individual messages. This should be given to site managers.

- **BADEZSND**. Key for the management menu to send individual messages after the initial upload. This should be given to site managers and those in dental department who may need to send individual messages.
- **BADEZUPL**. Key for those responsible for the initial upload of patient and provider data. This should be given to the site manager and those who may do the initial upload.

Security Key	Description	Assign to
BADEZMGR	BADE Interface Management	Site managers and anyone responsible for the interface.
BADEZSND	BADE Resend Option access	Site manager and someone in dental who can resend a message.
BADEZUPL	BADE Upload Option access	Site manager and anyone else responsible for the initial upload.

2.4 HL7 Messaging

2.4.1 Outbound Patient ADT

There are two outbound message types: A28 (new patient registration) and A31 (updates).

There is a one-time patient load of all existing and living patients. This load is a TaskMan job that sites run at the site. Time to run this job depends on the number of patients and the system activity. It runs with a low priority.

Sites can throttle the patient load with two parameters: BADE EDR THROTTLE CT and BADE EDR PT THROTTLE.

- **BADE EDR THROTTLE CT**. Enables the site to determine how many messages should be processed before the system checks to see if it should wait before continuing.
- **BADE EDR PT THROTTLE**. Enables the site to determine how many seconds the system should hold before processing more patients.

There are also options to shut down the load and to restart the load. In addition, there is an option to display the status of the load. Once the load is completed, the options are marked Out Of Order.

Once the load is completed, new registrations and updates are triggered by protocols in patient registration. There is also the ability to manually send a registration message.

2.4.2 Outbound Provider MFN

Provider information for dentists is also sent. Like the patient data, there is first a tasked option to load all dentist data. This job does not need throttling, but it can be paused and restarted using options on the menu. The status of this job can be viewed in the Display Status option. These jobs are marked Out Of Order once the task is complete.

New providers and changes to provider information are triggered when a provider is added or edited. There is also an option to manually send a provider's data to the interface.

2.4.3 Inbound Patient DFT

Dental visit data is received and stored into PCC. Visits are created, Purposes of Visit (POVs) and providers assigned, and the V DENTAL file populated. New messages are handled in the following manner:

1. The message arrives.
2. The Dentrax unique number is found. This number is stored in the EXTERNAL KEY field of the V DENTAL file.
3. The V DENTAL file is searched to determine if this is a new number.
4. The description field of the message is checked to determine whether it is "new," "update," or "delete."
5. If the key is new:
 - a. If the description is "new":
 - i. Find or create a new visit
 - ii. Add a VPOV if it's a new visit
 - iii. Add the provider if it's a new visit
 - iv. Add a new V DENTAL entry
 - b. If the description is "change," it is an error since the key was not found in RPMS.
 - c. If the description is "delete," it is an error since the key was not found in RPMS.
6. If the key already exists:
 - a. If the description is "new," it is an error since it cannot be added twice.
 - b. If the description is "change":

- i. If Dental field data was changed
 1. Delete the V DENTAL entry.
 2. Create a new one.
 - ii. If the date of the visit changed:
 1. Delete the V DENTAL entry.
 2. Determine whether the visit should be deleted.
 3. Determine whether a new visit is needed.
 4. Make a new V DENTAL entry.
 - iii. If the provider changed:
 1. Delete the old provider if this provider is not associated with other procedures on this visit.
 2. Add the new provider.
- c. If the description is “delete”:
- i. Remove the V DENTAL entry.
 - ii. Determine whether the visit should be deleted.

2.5 HL7 Message Types

2.5.1 Section 1 – Patient Registration/Demographic Data

The HL7 message segments for adding patients to the DDS via ADT/A28 Messages and for modifying existing patients via ADT/A31 Messages are:

- MSH Message Header
- EVN Event Type
- PID Patient Identification
- PD1 Additional Demographic Information
- ZP2 I H S Patient Information
- NK1 Next of Kin
- IN1 Insurance
- IN2 Insurance – Additional Information

Sequence #	Component Piece	Data Element	For Encoded Values, RPMS Expanded File/Field ¹
PID Segment			
3	1	ASUFAC ² /PATIENT ID	LOCATION/ASUFAC ³
3	2	PATIENT FACILITY ⁴	LOCATION/ASUFAC
4	1	ASUFAC/PATIENT ID OTHER FACILITIES (repeats)	
4	2	PATIENT FACILITY OTHER FACILITIES ENTERPRISE MASTER PERSON INDEX (PATIENT) ID	
5	1	PATIENT LAST NAME	
5	2	PATIENT FIRST NAME	
5	3	PATIENT MIDDLE NAME OR INITIAL	
6	1	MOTHER'S MAIDEN NAME	
7	1	DATE OF BIRTH	
8	1	SEX	
9	1	PATIENT ALIAS 1 (Desired)	
11	1	PATIENT ADDRESS-STREET	
11	4	PATIENT ADDRESS-CITY	
11	5	PATIENT ADDRESS-STATE	STATE
11	6	PATIENT ADDRESS-ZIP	
13	1	PHONE NUMBER-HOME	
14	1	PHONE NUMBER-BUSINESS	
15	1	LANGUAGE	
16	1	MARITAL STATUS	
17	1	RELIGION	
18	1	PATIENT ACCOUNT#	
19	1	PATIENT'S SSN	
29	1	PATIENT DEATH DATE AND TIME	

¹ If no field identified, the expanded value is the only field in the file.

² ASUFAC identifies the Area, Service Unit, and Facility codes; for this field, the ASUFAC is concatenated together with the Patient ID in order to provide a unique identifier for the patient.

³ For expansion of ASUFAC code portion of the element, not the Patient ID.

⁴ The facility associated with the record may be a separate but associated facility than that in the ASUFAC/Patient ID which identified the patient.

Sequence #	Component Piece	Data Element	EDR Usage	Special note to RPMS	For Encoded Values, RPMS Expanded File/Field
PD1 Segment					
4	1	PRIMARY CARE PROVIDER-ID NUMBER	Medical provider ID	NPI	Not used
4	2	PRIMARY CARE PROVIDER-NAME ENTERPRISE MASTER PERSON INDEX (PROVIDER) ID	Medical provider names		
NK1; Next of Kin NK1 Segment					
2	1	NOK NAME			
3	1	NOK RELATIONSHIP-CODE			RELATIONSHIP/RECODE
3	2	NOK RELATIONSHIP-TEXT			
4	1	NOK ADDRESS-STREET			
4	4	NOK ADDRESS-CITY			
4	5	NOK ADDRESS-STATE			STATE
4	6	NOK ADDRESS-ZIP			
5	1	NOK PHONE			
6	1	NOK BUSINESS PHONE			
7	1	CONTACT ROLE			Hard code "NOK"
7	2	CONTACT ROLE TEXT			Next of Kin
NK1; Emergency Contact NK1 Segment					
2	1	EC NAME			
3	1	EC RELATIONSHIP-CODE			RELATIONSHIP/RECODE
3	2	EC RELATIONSHIP-TEXT			
4	1	EC ADDRESS-STREET			
4	4	EC ADDRESS-CITY			

Sequence #	Component Piece	Data Element	EDR Usage	Special note to RPMS	For Encoded Values, RPMS Expanded File/Field
4	5	EC ADDRESS-STATE			STATE
4	6	EC ADDRESS-ZIP			
5	1	EC PHONE			
6	1	NOK BUSINESS PHONE			
7	1	CONTACT ROLE			Hard code "EC"
7	2	CONTACT ROLE TEXT			Emergency Contact
IN1; Third Party/Incoming IN1 Segment					
1	1	SET ID (1, 2, ...)			
2	1	INSURANCE PLAN ID	Unique identifier for a plan (required)	REQUIRED	
3	1	INSURANCE COMPANY ID		REQUIRED	
4	1	INSURANCE COMPANY NAME	(Required)	REQUIRED	
8	1	GROUP NUMBER			
9	1	GROUP NAME			
12	1	PLAN EFFECTIVE DATE			
13	1	PLAN EXPIRATION DATE			
16	1	NAME OF INSURED			
17	1	RELATIONSHIP TO INSURED	Patient's relationship to the insured (SPO, CHD, SEL, OTH)	REQUIRED	RELATIONSHIP
18	1	INSURED'S DATE OF BIRTH			
19	1	INSURED'S ADDRESS-STREET			
19	4	INSURED'S ADDRESS-CITY			
19	5	INSURED'S ADDRESS-			STATE

Sequence #	Component Piece	Data Element	EDR Usage	Special note to RPMS	For Encoded Values, RPMS Expanded File/Field
		STATE			
19	6	INSURED'S ADDRESS-ZIP			
36	1	POLICY NUMBER	IT IS ONE OF THE ID THAT CAN BE USED FOR THE INSURED; IF IN1-49 IS NOT POPULATED, THE SYSTEM CHECKS THIS FIELD FOR AN ID.	REQUIRED IF IN1-49 IS NOT POPULATED	SPONSOR CARD HOLDER POLICY NUMBER
43	1	INSURED'S SEX	M/F/O/U		
49	1	INSURED'S ID NUMBER	THIS IS THE FIRST FIELD THE SYSTEM CHECKS FOR INSURED'S ID;	REQUIRED IF IN1-36 IS NOT POPULATED	
IN2; Third Party IN2 Segment					
3	2	INSURED'S EMPLOYER NAME	Employer ID and Name		
8	1	MEDICAID CASE NUMBER	This field is not used. The ID can be copied to IN1-49, or IN1-36	Copy this ID to IN1-49. Fill other fields in the same way as commercial plans	
59	1	Coverage type flag	Use "DN for dental or "MD" for medical		

Sequence #	Component Piece	Data Element	For Encoded Values, RPMS Expanded File/Field	Data type and size
ZP2 Segment				
2	1	DATE OF LAST REG UPDATE		DateTime
3	1	OUTPATIENT MED/RR RELEASE DATE		DateTime
4	1	MED/RR RELEASE REVOKED DATE		DateTime
5	1	TRIBAL ENROLLMENT NUMBER		Text 1 to 12 characters
6	1	CHS TRIBAL AFFILIATION-CODE	TRIBE/CODE	3-digit code
6	2	CHS TRIBAL AFFILIATION-TEXT		Text 3 to 40 characters
7	1	BLOOD TYPE-CODE	PATIENT/BLOOD TYPE	Text 2 to 3 characters
9	1	ASSIGN BENEFITS OBTAINED DATE		DateTime
10	1	ASSIGN BENEFITS EXPIRED DATE		DateTime
11	1	SSN VERIFICATION STATUS-CODE	SSN STATUS	Text 1 character
11	2	SSN VERIFICATION STATUS-TEXT		Text 3 to 30 characters
11	3	99IHS		
12	1	REASON FOR NO SSN-CODE	PATIENT/REASON FOR NO SSN	Text 1 character
12	2	REASON FOR NO SSN-TEXT		Text 3 to 30 characters
12	3	99IHS		
13	3	BIRTH PLACE-CITY		Text 2 to 20 characters
13	4	BIRTH PLACE-STATE	STATE	Text 1 to 30 characters
14	1	BIRTH CERTIFICATE NO.		Text 6 characters
15	1	TRIBE OF MEMBERSHIP-CODE	TRIBE/CODE	3-digit code
15	2	TRIBE OF MEMBERSHIP-TEXT		Text 3 to 40 characters

Sequence #	Component Piece	Data Element	For Encoded Values, RPMS Expanded File/Field	Data type and size
15	3	99IHS		
16	1	TRIBE QUANTUM		Text 1 to 30
17	1	INDIAN BLOOD QUANTUM		Text 1 to 40
18	1	CLASSIFICATION/BENEFICIARY-CODE	BENEFICIARY/CODE	Text 2 characters
18	2	CLASSIFICATION/BENEFICIARY-TEXT		Text 3 to 30 characters
18	3	99IHS		
19	1	CURRENT RESIDENCE DATE		DateTime
20	1	STATE OF DEATH	STATE	Text 1 to 30 characters
21	1	DEATH CERTIFICATE NUMBER		Text 6 to 8 characters
22	1	CURRENT COMMUNITY	COMMUNITY	Text 3 to 30 characters
23	1	TRIBE MEMBERSHIP VERIFIED FLAG-CODE	PATIENT/TRIBE MEMBERSHIP VERIFIED FLAG	Text 1 character
23	2	TRIBE MEMBERSHIP VERIFIED FLAG-TEXT		Text 1 to 30 characters
23	3	99IHS		
24	1	RESIDENCE VERIFIED		Text Y or N
25	1	DATE ELIGIBILITY DETERMINED		DateTime
26	1	ELIGIBLE MINOR CHILD-CODE	PATIENT/ELIGIBLE MINOR CHILD	Text 1 character
26	2	ELIGIBLE MINOR CHILD-TEXT		Text 1 to 40 characters
26	3	99IHS		
27	1	LOCATION OF HOME		Text - unlimited length
28	1	ADDITIONAL REGISTRATION INFO		Text - unlimited length
29	1	REMARKS		Text - unlimited length

Sequence #	Component Piece	Data Element	For Encoded Values, RPMS Expanded File/Field	Data type and size
31	1	FATHER'S NAME		Text - 3 to 35 characters
32	3	FATHER'S BIRTH PLACE-CITY		Text 2 to 20 characters
32	4	FATHER'S BIRTH PLACE-STATE	STATE	Text 1 to 30 characters
33	3	MOTHER'S BIRTH PLACE-CITY		Text 2 to 20 characters
33	4	MOTHER'S BIRTH PLACE-STATE	STATE	Text 1 to 30 characters

2.5.2 Section 2 – DFT-P03 (Post Detail Financial Transactions)

- MSH Message Header
- EVN Event Type
- PID Patient Identification
- FT1 Financial Transaction Segment

Sequence #	Component Piece	Data Element	EDR Usage	Special note to RPMS	For Encoded Values, RPMS Expanded File/Field ⁵
FT1 Segment					
1	1	SETID	1	Always a "1"	1 message per procedure
2	1	TRANSACTION ID	Procedure ID	Unique procedure identifier	PROCEDURE ID
4	1	TRANSACTION DATE	Procedure date		DATE
5	1	TRANSACTION POSTING DATE	Post date		

⁵ If no field identified, the expanded value is the only field in the file.

Sequence #	Component Piece	Data Element	EDR Usage	Special note to RPMS	For Encoded Values, RPMS Expanded File/Field ⁵
6	1	TRANSACTION TYPE	CG: Procedural charge; PY: Payment; AJ: Adjustment; CD: Credit;	Only CG is sent to RPMS right now.	
7	1	TRANSACTION CODE	ADA code or other system code	ADA (D plus 4 numeric or 5 characters for national or facility special IH codes	ADA CODE
8	1	TRANSACTION DESCRIPTION	ADA text Code description		
9	1	TRANSACTION DESCRIPTION –ALT	0: New; 1: Deletion; 2: Update;	For PCC visit action; required	NEW(0)/DELETION(1)/UPDATE(2)
10	1	TRANSACTION QUANTITY	1	Always 1	“1”
11	1	TRANSACTION AMOUNT-EXTENDED	Procedure charge amount	Not used	
12	1	TRANSACTION AMOUNT-UNIT	Default to US dollar	Not used	
13	1	DEPARTMENT CODE	Dept Code(optional)	Not used	
14	1	INSURANCE PLAN ID	Primary and secondary dental insurance plan external IDs. Repeated.	Not used	
16	1	ASSIGNED PATIENT LOCATION	Procedure clinic	ASUFAC	
17	1	FEE SCHEDULE	Not used		

Sequence #	Component Piece	Data Element	EDR Usage	Special note to RPMS	For Encoded Values, RPMS Expanded File/Field ⁵
18	1	PATIENT TYPE	Note used		
19	1	DIAGNOSIS CODE - FT1	Dental diagnostic codes (optional)	Hardcode "V72.2" ICD9	ICD9 CODE Dental
20	1	PERFORMED BY CODE	Provider ID	ID	PROVIDER ID = IEN of File 200
20	2		Provider Last Name		
20	3		Provider First Name		
20	4		Provider Middle Initial or Name		
21	1	ORDERED BY CODE	Not used		
22	1	UNIT COST	Not used		
23	1	FILLER ORDER NUMBER	Not used		
24	1	ENTERED BY CODE	Not used		
25	1	PROCEDURE CODE	ADA or other system code not used		Not used; see Sequence 7 of FT1 Segment
26	1	PROCEDURE CODE MODIFIER	Tooth number	Tooth number	
26	2		Operative site code	Text description	Requires Fileman lookup to resolve pointer value for VDENTAL
26	3		IHS	Hard Code "IHS 99"	
26	4		Surface code	M,O,D,B,L,I can be singular , multiple, or repeating	Examples B, MOD, MOODBL (no punctuation)

2.5.3 Section 3 – MFN-M02 (Master File)

- MSH Message Header
- MFI Master File Identification
- MFE Master File Entry
- STF Staff Identification
- PRA Practitioner Detail

Sequence #	Component Piece	Data Element	EDR Usage	For Encoded Values, RPMS Expanded File/Field ⁶
MFI Segment				
1	1	MASTER FILE IDENTIFIER	If the record is for a doctor/physician then it contains a 'PRA'; If the record is for a staff, then it contains a 'STF';	Hard Code "PRA" Data came from RPMS File 200 required
2	1	Master file application identifier		Not used
3	1	FILE-LEVEL EVENT CODE	REP' for replace or 'UPD' for update	Hard Code "UPD"
4	1	Entered date time	2.4; TS	
5	1	Effective date time	2.4; TS optional	Not used
6	1	RESPONSE LEVEL CODE		Hard code "NE"
MFE Segment				
1	1	RECORD-LEVEL EVENT CODE	If the doctor/ staff was added then this field contains 'MAD'. If the doctor or staff was modified then this field contains 'MUP'. If an update should only apply to provider names, or just indicating inactivation, it contains 'MUP1'.	
2	1	MFN CONTROL ID		Always a "1"
3	1	EFFECTIVE		Not used

⁶ If no field identified, the expanded value is the only field in the file.

Sequence #	Component Piece	Data Element	EDR Usage	For Encoded Values, RPMS Expanded File/Field ⁶
		DATE/TIME		
4	1	PRIMARY KEY VALUE	The internal ID of the provider/staff. (Optional) This ID may be the same as in STF-1.	PROVIDER IEN
5	1	PRIMARY KEY VALUE TYPE	CE for coded element (optional).	Hard coded "CE"?
STF Segment				
1	1	PRIMARY KEY VALUE - STF	Internal ID of the doctor/staff. This ID should be the same as in MFE-4	PROVIDER IEN
2	1	STAFF ID CODE[0]	External ID of the staff. This is the display ID of the provider.	PROVIDER IEN
3	1	FAMILY NAME		PROVIDER LAST NAME
3	2	GIVEN NAME		PROVIDER FIRST NAME
3	3	MIDDLE NAME		PROVIDER MIDDLE NAME
3	4	SUFFIX		PROVIDER SUFFIX
3	5	PREFIX		
4	1	STAFF TYPE		
7	1	ACTIVE/INACTIVE FLAG		"I" IF MFE:1 IS "MDC" (DEACTIVATE) / "A" FOR ALL OTHER TYPES
10	1	TELEPHONE NUMBER		OFFICE PHONE
10	2	TELECOMMUNICATION USE CODE		
10	3	AREA CODE		
10	4	PHONE NUMBER		
10	5	EXTENSION		
10	6	ANY TEXT		
11	1	STAFF-STREET ADDRESS		PROVIDER OFFICE STREET
11	2	STAFF-OTHER DESIGNATION		PROVIDER OFFICE STREET 2
11	3	STAFF-CITY		PROVIDE OFFICE CITY
11	4	STAFF-STATE		PROVIDER OFFICE STATE
11	5	STAFF-ZIP		PROVIDER OFFICE ZIP CODE

Sequence #	Component Piece	Data Element	EDR Usage	For Encoded Values, RPMS Expanded File/Field ⁶
PRA Segment				
1	1	PRIMARY KEY VALUE - PRA	Internal ID of a doctor/ staff. (optional, it should be the same as in STF-1)	PROVIDER IEN
5	1	SPECIALTY NAME	The specialty of the staff. Dentrix Enterprise accepts the following specialties: Dental General Practice; Denturist; Endodontics; Independent Hygienist; Maxillofacial Surgery; Oral Surgery; Orthodontics; Pedodontics; Periodontics; Prosthodontics;	Hard coded "Dental General Practice"
6	1	ID NUMBER		Not used
6	2	TYPE OF ID NUMBER		Not used
6	1	ID NUMBER		Not used
6	2	TYPE OF ID NUMBER		Not used
6	1	ID NUMBER		Not used
6	2	TYPE OF ID NUMBER		Not used

2.5.4 Escape Characters

HL7 encoding characters, if found within a data field, are automatically replaced with the proper escape sequence. The escape sequence is \ = E, ^ = S, & = T, and ~ = R.

3.0 Routines

3.1 Routines Description

Routine Name	Description
BADEEC01	Environment checker and post-installs
BADEEVNT	Main menu for ADT messages
BADEHL1	Send A31 and A28 messages
BADEHL2	Send MFN messages
BADEHL3	Receive Dental Procedures messages
BADEHL4	Process update and delete messages from the interface
BADEHLI	Get and send the insurance information
BADEHLZ	Get and send the ZPS message data
BADEVNT1	Send MFN messages
BADESND	Resend outbound message, reprocess inbound message
BADEUTIL	Utility functions

4.0 Files

There are no new files with this application.

5.0 Cross-References

Figure 5-1 displays a new cross-reference for the V DENTAL file on the EXTERNAL KEY field being used in this application. This cross-reference was added in BJPC v2.0.

```
CROSS REF NAME: AXK
TYPE: REGULAR
Node: 1 S ^AUPNVDEN("AXK", $E(X,1,30),DA)=" "
Node: 2 K ^AUPNVDEN("AXK", $E(X,1,30),DA)
```

Figure 5-1: Cross references

6.0 Mail Group

There is one mail group in this build: RPMS DENTAL. The users in this mail group receive notifications of errors generated on both outbound and incoming messages.

The users in this group need the ability to review these messages and possibly take action and reprocess or resend messages.

7.0 Parameters

The Dental/EDR interface relies heavily on parameters to hold data required for the interface to run. All of the parameters are included in menu options so that they can be set at the sites.

Routine Name	Description
BADE EDR DEFAULT CLINIC	Setup default dental clinic so visits can be viewed in the EHR.
BADE EDR DEFAULT TIME	Setup default time to use if a time is not sent with the visit date.
BADE EDR ERROR PTS	List of patients that created errors on upload.
BADE EDR LAST DFN	Last patient processed in initial upload.
BADE EDR LAST NEW PERSON	Last provider processed in initial load.
BADE EDR LOAD TSK	Task number for initial patient load.
BADE EDR PAUSE PATIENT LOAD	Temporarily stop patient load.
BADE EDR PAUSE PROV LOAD	Temporarily stop provider load.
BADE EDR PRV TSK	Task number for initial provider load.
BADE EDR PROVIDER ERRORS	List of providers unable to be processed in initial upload.
BADE EDR PT THROTTLE	Seconds to wait before continuing the initial patient load. Throttling mechanism.
BADE EDR THROTTLE CT	Number of patient to process before checking the throttle and waiting the defined number of seconds.
BADE EDR TOTAL ERRORS	Total number of patient upload errors.
BADE EDR TOTAL PROCESSED	Total patients processed in the initial load.
BADE EDR TOTAL PROVIDER ERRORS	Total number of providers who could not be processed in the initial upload.
BADE EDR TOTAL PROVIDERS	Total providers processed in the initial load.

8.0 Exported Options

Option Name	Description
BADE EDR DISPLAY PROGRESS	Display the status, totals, and throttle data for the uploads.
BADE EDR MAIN MENU	Main menu for interface.
BADE EDR MANAGE INTERFACE MENU	Menu for sending messages after upload is completed.
BADE EDR PAUSE PATIENT LOAD	Temporarily stop the patient upload. Data is stored in a parameter.
BADE EDR PAUSE PROV UPLOAD	Temporarily stop the provider upload. Data is stored in a parameter.
BADE EDR PT THROTTLE	Set the number of seconds to hold the patient upload. Data is stored in parameter.
BADE EDR RESTART PAT UPLOAD	Restart the patient upload at last processed patient.
BADE EDR RESTART PROV UPLOAD	Restart the provider upload at last processed provider.
BADE EDR SEND A28	Select patient and send a single ADT A28 message.
BADE EDR SEND A31	Select provider and send a single ADT A31 message.
BADE EDR SEND MFN	Send a single MFN message.
BADE EDR THROTTLE CT	Set the number of patients to process before checking to hold for the throttle number of seconds. Data is stored in a parameter.
BADE EDR UPLOAD ALL PATIENTS	Upload of all patients. Job is tasked and task number is stored in a parameter.
BADE EDR UPLOAD ALL PROVIDERS	Upload all providers. Job is tasked and task number is stored in a parameter.
BADE EDR UPLOAD MENU	Menu of upload options.
BADE EDR DEFAULT CLINIC	Default dental clinic so that visits appear in the electronic health record.
BADE EDR RESEND OUT MESSAGE	Enter the message IEN and resend an outbound message.
BADE EDR REPROCESS IN MESSAGE	Enter the message IEN and reprocess an inbound message.
BADE EDR ERROR PTS	Displays the parameter which holds the patients in which there were errors on upload.
BADE EDR DEFAULT TIME	Setup a default time to be used for visits without a time.
BADE EDR PROVIDER ERRORS	Displays the parameter which holds the providers in which there were errors on upload.

9.0 Menu Diagram

Figure 9-1 displays the Dental Interface Main Menu Diagram.

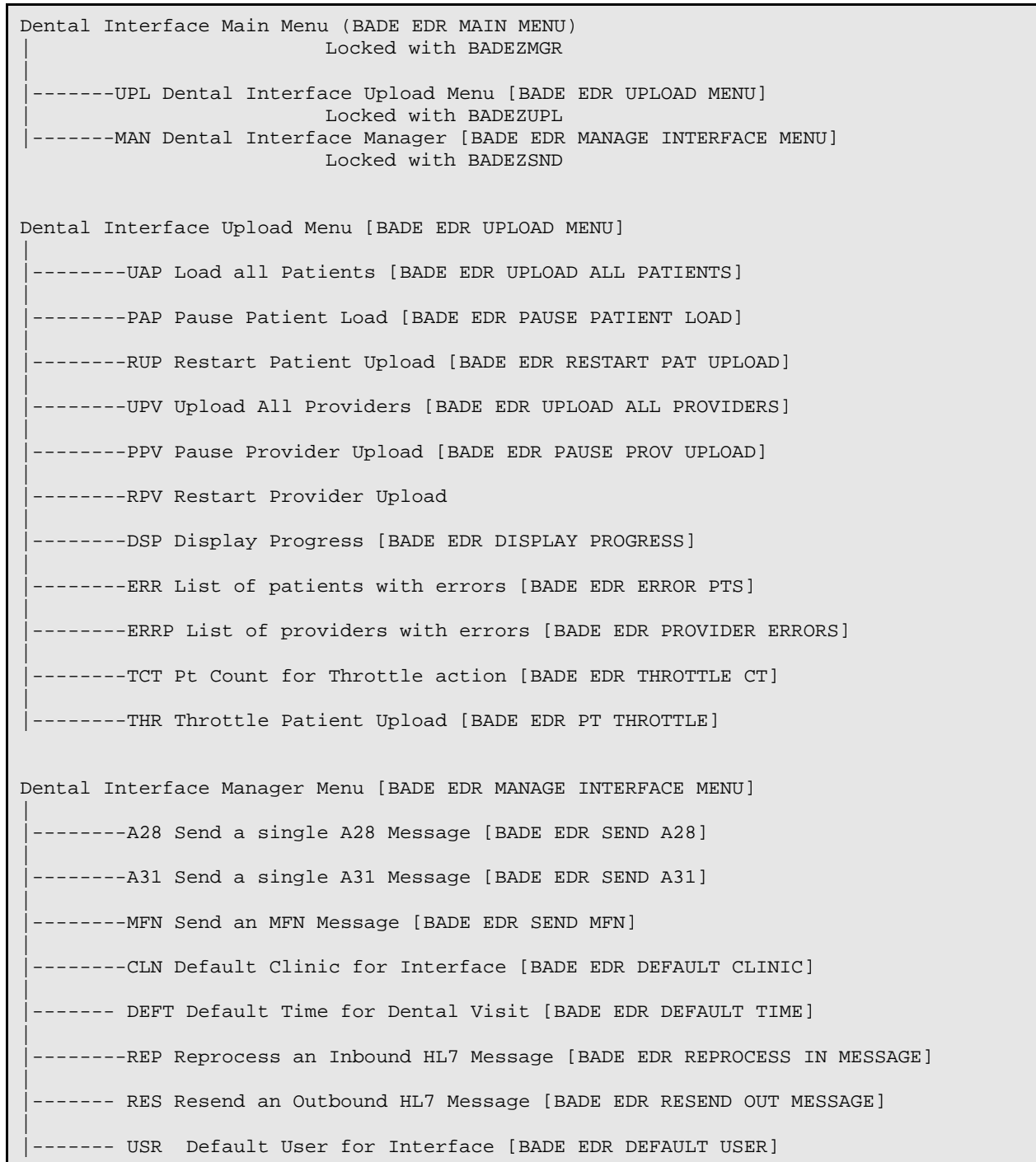


Figure 9-1: Menu Diagram

10.0 Protocols and Links

10.1 Protocols

After the initial upload of patients and providers, real-time updates to patient and provider data is obtained by attaching protocols with the action to send a message to existing protocols in the RPMS setup. These protocols are attached in the post-installation of the Kernel Installation and Distribution System (KIDS) build, but sites may want to check and make sure that the attachment has been done before sending any messages. The BADE PROTOCOL entries are disabled at installation. Once the initial loads are completed these protocols will need to be enabled.

New Protocol	Parent Protocol	Sequence Number	Description
BADE PATIENT A28	AG REGISTER A PATIENT	967	Sends a new patient registration to the dental interface.
BADE PATIENT A31	AG UPDATE A PATIENT	967	Sends a patient registration update to the dental interface.
BADE PROVIDER UPDATE MFN-A02	AVA PROVIDER UPDATE MFN_M02	967	Send new or changed provider data to the dental interface.

10.2 Links

HL7 messages are sent on logical links. Two links have been created.

- **DENTRIX.** Figure 10-1 displays DENTRIX, which is the outbound link. Sites must edit the IP address and Port to make a connection to the dental server.

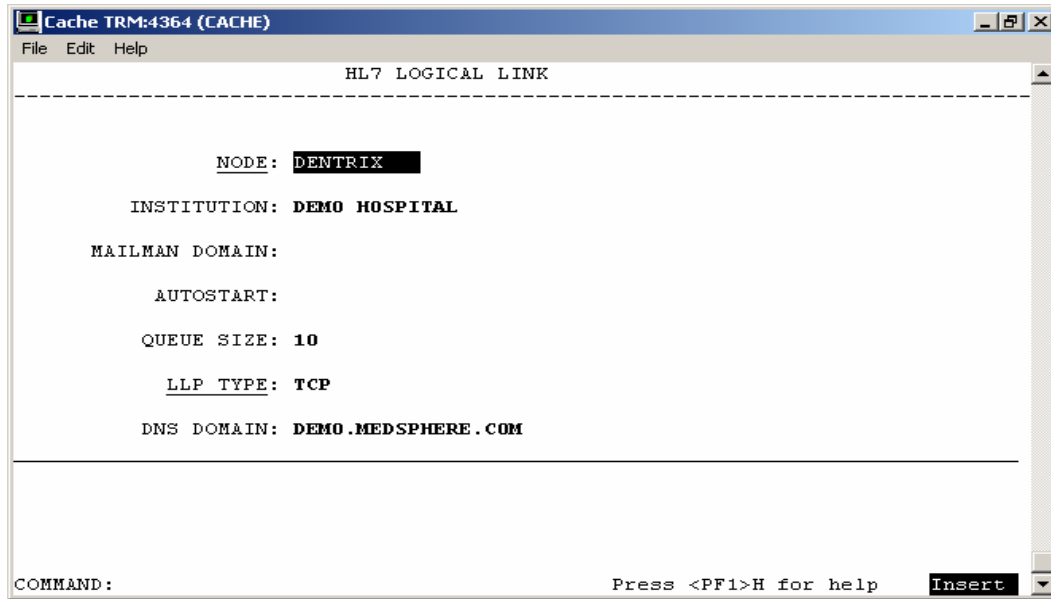


Figure 10-1: DENTRIX outbound link

- Figure 10-2 displays the TCP/IP CLIENT (SENDER) Service Type.

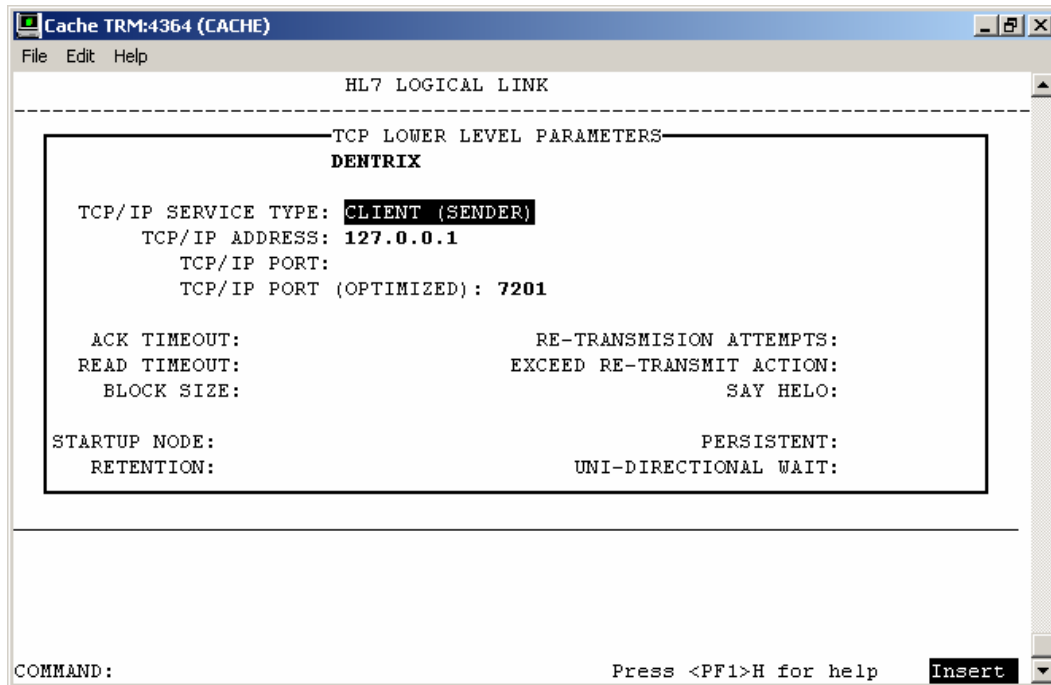


Figure 10-2: TCP/IP CLIENT (SENDER) service type

- **HLO RPMS.** Figure 10-3 displays the HLO-RPMS, which is the standard HLO listener. It is used by ALL HLO applications. *The defined port is 5001 for production systems and 5026 for test servers.*

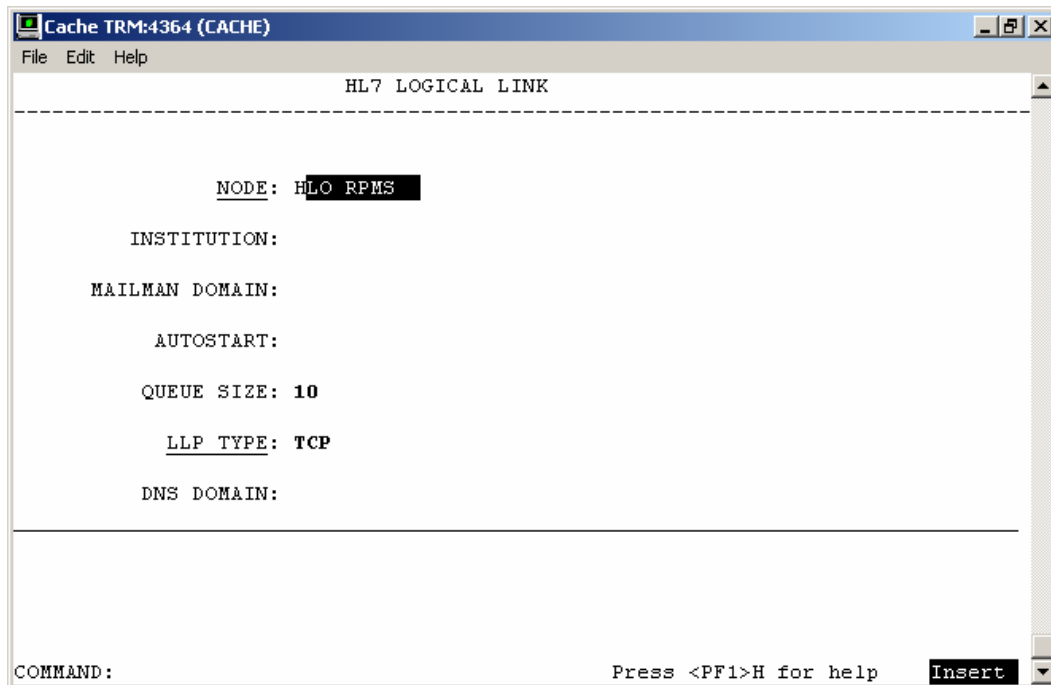


Figure 10-3: HLO RPMS Listener

- Figure 10-4 displays the Multi Listener.

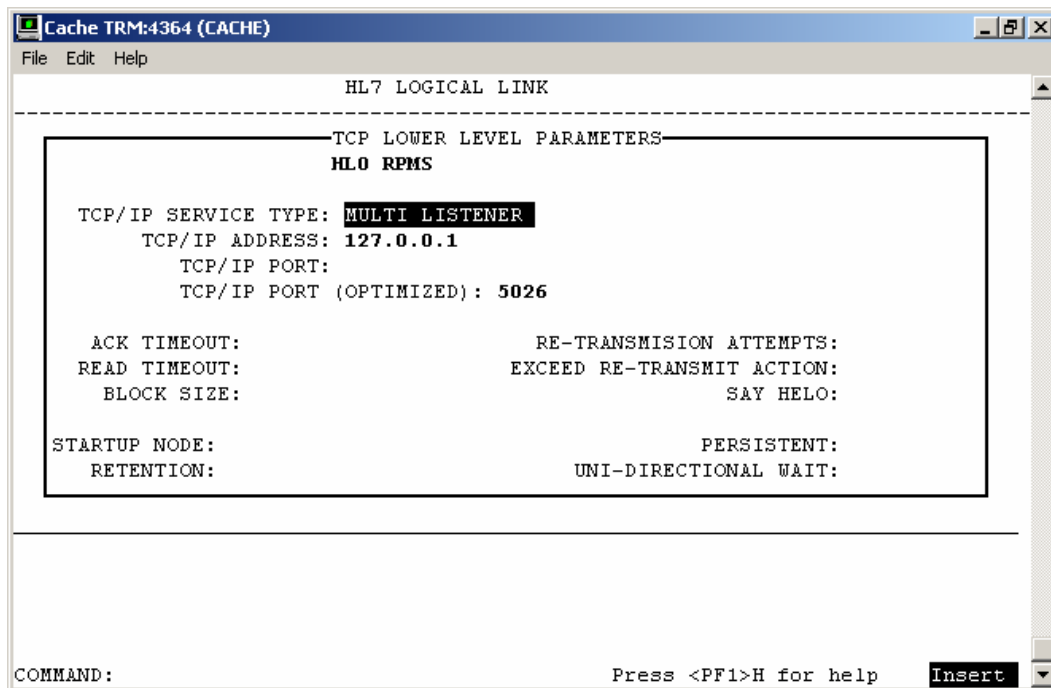


Figure 10-4: MULTI Listener

11.0 Archiving and Purging

HL7 messages are periodically purged. This is setup in the HLO SYSTEM PARAMETERS FILE. An example is shown below. Sites can change these setting for system performance and disk space.

Figure 11-1 shows that normal messages are retained for a number of hours and bad messages for a number of days.

```
Select HLO SYSTEM PARAMETERS DOMAIN NAME: 127.0.0.1
DOMAIN NAME: 127.0.0.1//
STATION NUMBER: 353135//
PRODUCTION ID: training//
MAXIMUM STRING LENGTH: 512//
BUFFER SIZE FOR HL7 (BYTES): 15000//
BUFFER SIZE FOR USER (BYTES): 5000//
NORMAL MSG RETENTION (HOURS): 36//
BAD MESSAGE RETENTION (DAYS): 7//
HLO ON/OFF SWITCH: ON//
HLO STANDARD LISTENER: HLO RPMS//
```

Figure 11-1: Normal Message Retention

12.0 External Relations

This package calls the following documented entry points:

Security Key	Description
^ZTLOAD	Task off upload
GET^XPAR	Get data on a particular parameter
SET^XPAR	Set data on a particular parameter
\$\$ADDSEG^HLOAPI	Add an HL7 message segment
\$\$NEWMSG^HLOAPI	Create a new HL7 message
\$\$SENDONE^HLOAPI1	Send out one HL7 message
EN^VAFHLPID	Create a PID segment from the sent field numbers
\$\$HRCNF^BDGF2	Get the health record number
\$\$ADDR^VAFHLFNC	Create an HL7 formatted address
\$\$HLPHONE^HLFNC	Get an HL7 formatted phone number
SET^HLOAPI	Set a field in an HL7 segment
\$\$HLDATE^HLFNC	Create an HL7 formatted date
\$\$NEXTSEG^HLOPRS	Get the next segment in the HL7 message
\$\$GET^HLOPRS	Get a field in an HL7 segment
\$\$HRCNF^APSPFUNC	Get the ASUFAC number
GETVISIT^BSDAPI4	Create/find a visit in the visit file
EN^APCDALVR	Add data to a V file
DEL^APCDALVR	Delete data from a V file
D EN^APCDVDLT	Delete a visit

13.0 Internal Relations

All users should be given the access to the appropriate options and keys to them, as needed. All of the options stand alone.

14.0 How to Generate Online Documentation

The namespace is BADE. All parameters, routines, options, etc., begin with BADE.

This section describes some of the methods by which users can generate dental technical documentation. Online technical documentation pertaining to the Dental and Dental/EDR software can be generated through the use of several Kernel options. These include, but are not limited to, the following:

- %INDEX
- Menu Management
- Inquire Option
- Print Option File
- VA FileMan
- Data Dictionary Utilities
- List File Attributes

Entering question marks at the “Select...Option” prompts also provides users with valuable technical information. For example, a single question mark (?) lists all options that can be accessed from the current option. Entering two question marks (??) lists all options accessible from the current one, showing the formal name and lock for each.

Three question marks (???) displays a brief description for each option in a menu, whereas an option name preceded by a question mark (?OPTION) shows extended help, if available, for that option.

For a more exhaustive option listing and further information about other utilities that supply online technical information, consult the *DHCP Kernel Reference Manual*.

14.1 %INDEX

This option analyzes the structure of a routine to determine in part if the routine adheres to RPMS Programming Standards. The %INDEX output can include the following components:

- Compiled list of errors and warnings
- Routine listing
- Local variables
- Global variables
- Naked globals

- Label references
- External references

By running %INDEX for a specified set of routines, the user is afforded the opportunity to discover any deviations from RPMS Programming Standards that exist in the selected routines, and to see how routines interact with one another (for example, which routines call or are called by other routines).

To run %INDEX for the Health Summary Component package, specify the BHS namespace at the “Routine(s)?>” prompt.

14.2 Inquire Option

This menu management option provides the following information about a specified option:

- Option name
- Menu text
- Option description
- Type of option
- Lock (if any)

In addition, all items on the menu are listed for each menu option. To secure information about Dental Interface options, the user must specify the BADE namespace.

14.3 Print Option File

This utility generates a listing of options from the Option file (#19). The user can choose to print all of the entries in this file, or can specify a single option or range of options. For a list of Dental Interface options, refer to Section 9.0.

14.4 List File Attributes

This VA FileMan option enables the user to generate documentation pertaining to files and file structure. Using the standard format of this option yields the following data dictionary information for a specified file:

- File name and description
- Identifiers
- Cross-references
- Files pointed to by the file specified

- Files that point to the file specified
- Input, print, and sort templates

In addition, the following applicable data is supplied for each field in the file:

- Field name, number, title, and description
- Global location
- Help prompt
- Cross-references
- Input transform
- Date last edited
- Notes

Using the Global Map format of this option generates an output that lists the following information:

- All cross-references for the file selected.
- Global location of each field in the file.
- Input, print, and sort templates.

15.0 SAC – Requirements/Exemptions

There are no SAC requirements or exemptions for this application.

16.0 Glossary

Archiving

The storing of historical or little-used data off-line (often on tape).

Banner

A line of text with a user's name and domain.

Browser

An interactive application that displays ASCII text on a terminal that supports a scroll region. The text can be in the form of a word-processing field, sequential local, or global array. The user is allowed to navigate freely within the document.

Callable Entry Points

Places in a routine that can be called from an application program.

Component

A segment of the health summary that provides a mechanism for grouping data into sections.

Cross-reference

An indexing method whereby files can include pre-sorted lists of entries as part of the stored database. Cross-references (x-refs) facilitate look-up and reporting.

Entry Point

Entry point within a routine that is referenced by a "DO" or "GOTO" command from a routine internal to a package.

File

A set of related records or entries treated as a single unit.

FileMan

The database management system for RPMS.

Flowsheet

A tabular format for organizing and displaying data in a special section of the health summary.

Global

In MUMPS, global refers to a variable stored on disk (global variable) or the array to which the global variable may belong (global array).

ICD

International Classification of Diseases.

INDEX (%INDEX)

A Kernel utility used to verify routines and other MUMPS code associated with a package. Checking is done according to current ANSI MUMPS standards and RPMS programming standards.

This tool can be invoked through an option or from direct mode (>D ^%INDEX).

Init

Initialization of an application package. The initialization step in the installation process builds files from a set of routines (the init routines). Init is a shortened form of initialization.

Internal Entry Number (IEN)

The number used to identify an entry within a file. Every record has a unique internal entry number.

IRM Information Resource Management

The IHS personnel responsible for information systems management and security.

Kernel

The set of MUMPS software utilities that function as an intermediary between the host operating system and application packages, such as Laboratory and Pharmacy. The Kernel provides a standard and consistent user and programmer interface between application packages and the underlying MUMPS implementation. These utilities provide the foundation for RPMS.

Menu

A list of choices for computing activity. A menu is a type of option designed to identify a series of items (other options) for presentation to the user for selection. When displayed, menu-type options are preceded by the word "Select" and followed by the word "option" as in Select Menu Management option: (the menu's select prompt).

Namespace

A unique set of two to four alpha characters that are assigned by the database administrator to a software application.

Option

An entry in the Option file. As an item on a menu, an option provides an opportunity for users to select it, thereby invoking the associated computing activity. Options may also be scheduled to run in the background, non-interactively, by taskman.

Panel

A tabular format for presenting a series of clinical measurements or results in the health summary.

Patient Care Component (PCC)

The central repository for data in the Resource and Patient Management System (RPMS).

Queuing

Requesting that a job be processed at a later time rather than within the current session.

Routine

A program or sequence of instructions called by a program that may have some general or frequent use. MUMPS routines are groups of program lines that are saved, loaded, and called as a single unit via a specific name.

UCI

User Class Identification: a computing area.

Up-Hat (^)

A circumflex, also know as a “hat” or “caret,” that is used as a piece delimiter in a global. The up-hat is denoted as “^” and is typed by pressing Shift+6 on the keyboard.

Utility

A callable routine line tag or function. A universal routine usable by anyone.

Variable

A character or group of characters that refers to a value.

MUMPS recognizes three types of variables: local variables, global variables, and special variables. Local variables exist in a partition of the main memory and disappear at sign-off. A global variable is stored on disk, potentially available to any user. Global variables usually exist as parts of global arrays.

17.0 Contact Information

If you have any questions or comments regarding this distribution, contact the OIT Help Desk by:

Phone: (505) 248-4371 or (888) 830-7280

Fax: (505) 248-4199

Web: <http://www.ihs.gov/GeneralWeb/HelpCenter/Helpdesk/index.cfm>

Email: support@ihs.gov