

DEPARTMENT OF EDUCATION-FSA  
FMS INTEGRATION PARTNER  
INTERFACE FUNCTIONAL DESIGN



FMS TO FMSS INTERFACE PROGRAM  
TO 128 – FMS TO FMSS DATA TRANSFORMATION  
AND TRANSFER

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Subject: FMS to FMSS Interface Functional Design
Phase: TO 128 – FMS to FMSS Data Transformation and Transfer
Version: 8

Prepared by: Jason M. Belyew	Date: March 20, 2003
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## Document Change Control

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03/03/2003	Jason M. Belyew	5.0	Updates based on review comments
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03/13/2003	Jason M. Belyew	7.0	Updates based on review comments
03/20/2003	Jason M. Belyew	8.0	Update based on design changes

## Approval

<b>Created By:</b>	Jason M. Belyew	202-962-0677	<b>Creation Date:</b> 02/10/2003
<b>Team Lead Sign Off:</b>	John Kim	202-962-0702	<b>Sign Off Date:</b> 03/24/2003
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## Specification

<b>Interface Name:</b>	FMS to FMSS Interface Program
<b>Functional Design Document ID &amp; Title:</b>	FMS_TO_FMSS_INTERFACE_FD
<b>Application:</b>	Oracle GL
<b>Priority:</b>	High
<b>Estimated Production Date:</b>	June 2003
<b>Other Affected Applications:</b>	ED FMSS
<b>Comments:</b>	N/A



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## General Requirements

### Business Objective (Requirements):

The FMS GL to FMSS Interface program was originally implemented as part of FMS Phase II efforts. This interface was designed to provide the required financial data from FSA to the Department of Education (ED). The current interface transfers all required financial data from the FSA Set of Books (SOB) to the FSA ED SOB within FMS. Subsequently, the EDCFO\_GL2GL prepare program validates the lines of the FSA ED SOB, creates a file, and sends the file as an email to ED FMSS.

As part of the FMS TO 128 effort, FMS has been tasked with designing and developing a new interface program. The FMS to FMSS Interface program will replace the current interface program, EDCFO\_GL2GL prepare program, and the email process. The new process will also allow FMS to no longer require the future use of the FSA ED SOB.

The FMS to FMSS Interface program has been designed to meet the following requirements:

- 3.1 Ability to send data daily in a text file from FMS General Ledger (GL) to FMSS GL through an automated interface on a secure FTP server.
- 3.2 Ability to summarize, within a batch, at the ACCS level (Segment1 --> Segment13) plus Treasury Reference Number, ALC, Confirmation Date, and Department Id.
- 3.3 Ability to flag batches that have been sent from the FMS GL to FMSS GL using Attribute4 in the FMS GL Batches base table.
- 3.4 Ability to store the date batches that are sent from the FMS GL to FMSS GL using Attribute4 in the FMS GL Batches base table.
- 3.5 Ability to consolidate accounting segment structure from 15 to 11 segments (eliminating segment12 - Source Code, segment13 - Cost Code, segment14 - Institution and segment15 - Loan Grant Type) before sending.
- 3.6 Ability to populate segment12 (Funds Check Level) with "00000" for all data except data with source code of 0243X% and LIM 625, which is to be populated with "000A2" before sending.
- 3.7 Ability to populate segment13 (Cost Code) with "000000" for all data before sending.
- 3.8 Ability to convert segment1 (Fund) format from %NNN to %NNNNN (Ex: %XNY ---> %XNOYR; %M02 --> %M2002).
- 3.9 Ability to convert segment3 (Budget Fiscal Year) and segment10 (Cohort Year) from a two digit to four-digit year format before sending.
- 3.10 through 3.35 Accounting rules (See Appendix A).
- 3.36 Ability to manually hold processing of daily FMS to FMSS interface. This will halt processing of all files.
- 3.37 Ability to store files sent during FMS to FMSS interface for one fiscal year on the server.
- 3.38 Ability to send to FMSS lines with ATTRIBUTE1 (user je category name) values of CG, OG, SG, SV, GA, GV, LE, DF, DT, and CF as defined in the SFA GL setup.
- 3.39 Ability to not send to FMSS lines with ATTRIBUTE1 value of NON EDCFO DATA as defined in the SFA GL setup.  
Note: Within Requirements 3.38 & 3.39 that the user je category name will be derived dynamically through the \*\* Form

### Interface Short Description:

The FMS to FMSS Interface program will be automated and scheduled to run daily. The program will capture all unprocessed and previous error batches (flagged as 'E' with the creation date after the error date) from FMS GL. The lines from the gl\_je\_lines table will be summarized at the ACCS level (This includes Segments 1-13, Treasury Reference Number, Agency Location Code, Confirmation Date, and Department ID) within each batch (Requirement 3.2).



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At the line level, the interface will verify that the Segment12 field is populated with EDCFO data, as defined in the FSA GL setup (Requirement 3.38). The values consist of segment12 and user\_je\_category\_name values as follows: CG, LC, LO, OG, SG, SV, GA, GV, LE, DF, DT, & CF. If Segment12 is populated with a non-EDCFO data destination the line will not be processed or sent to FMSS (Requirement 3.39). A batch will still be processed, but the given line containing the non-EDCFO data destination will not be included in the batch.

Furthermore, for each summarized line within a given batch, the fields will be formatted as follows:

- The accounting segment structure will change from 15 to 11 segments (Requirement 3.5).
- Segments12 will be generated with '00000' for all data except data with source code of 0243X% and LIM of 625, which will be populated with '000A2' (Requirement 3.6).
- Segments13 will be generated with '000000' for all data (Requirements 3.7).
- Segment1 (Fund) format will convert from %NNN to %NNNNN (Requirement 3.8).
- Convert segment3 (Budget Fiscal Year) and segment10 (Cohort Year) from a two digit to four-digit year format (Requirement 3.9).

After each line is formatted correctly, it is inserted into the temporary table.

The Interface will apply and validate all accounting rules for each summarized line in the temporary table by batch (Requirement 3.10 through 3.35 see Appendix A).

If all the lines for the selected batch adhere to the given accounting rules (Appendix A), the batch will be flagged as 'P' in the temporary table. The lines for that batch will then be written to a newly created flat file (.txt). Upon successfully writing to the file, the batch will be flagged as processed ('P' + date stamp) in the FMS Attribute4 field of the GL\_JE\_BATCHES.(Requirement 3.3 & 3.4).

If any of the lines for the selected batch do not adhere to the rules, it will be flagged as 'E' in the temporary table. When any lines for a selected batch have errors it will be flagged as error ('E' + date stamp) in the FMS Attribute4 field of the GL\_JE\_BATCHES. This batch will not be sent to FMSS. The file will need to be corrected before resending to FMSS. Note: This occurs for all batches selected in the run of the interface.

The newly created flat file will be sent to FMSS, via FTP from the standard Unix directory on the secure FMS server, it will contain all batches and associated lines that were successfully processed through the accounting validation rules (Requirement 3.1). This flat file will be stored for one fiscal year on the server in FMS (Requirement 3.37).

### Business Event That Initiates Interface:

All new GL transactions with ATTRIBUTE1 (Source) values in FMS (CG, OG, SG, SV, GA, GV, LE, DF, DT, & CF) must be sent to FMSS.

The file that will be sent to FMSS will contain multiple batches and records. A batch may contain records from different sources. However, each record within a batch will contain one of the values mentioned above in the 'User JE Category Name' of the file (The layout of the file is included in this document). These category name values can be used to determine the original source of each record. The category descriptions and name values are as follows:

<u>Category Name Description:</u>	<u>Category Name Value:</u>
DL Consolidation G REC	CG
DL Origination G REC	OG
DL Servicing G REC	SG
Loan Servicing	SV



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Guaranty Agencies	GA
Guaranty Agencies VFA Agreements	GV
Lenders	LE
Raytheon File	DF
Conditional Disability Discharge Tracking	DT
COD to FMS Interface	CF

**Interface Characteristics:**

<b>Interface Direction:</b>	Outbound (FMS GL to FMSS GL)
<b>Interface Type:</b>	Batch
<b>Interface Category:</b>	N/A
<b>Instances:</b>	N/A
<b>Frequency:</b>	Nightly
<b>Volume:</b>	Varies (Range from 100 to 3000 batches on a monthly basis)
<b>From System:</b> FSA FMS Oracle GL	<b>To System:</b> ED FMSS Oracle GL

**Selection Criteria:**

**Batch Selection Criteria**

- Journal batches that have not been processed (Attribute4 = null on the GL\_JE\_BATCHES table) and journal batches that have a creation date after the process date (Attribute4 = 'E' + date stamp or 'P' + date stamp) will be selected.
- .

**Scheduling Requirements:**

The FMS to FMSS Interface program will be scheduled to run nightly after all transactions have been processed during that day.

**Transaction Purge Criteria:**



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The temporary interface table will be purged if the automatic report completes successfully during the scheduled run of the FMS to FMSS interface. If the report completes with error the temporary table will not be purged by the FMS to FMSS interface due to temporary interface table usage requirements of the report.

**Contingency Procedures:**

If a failure occurs during account validations, the batch in which the error occurred will be flagged as 'E' with a date stamp in the FMS GL Batches table and in the temporary table. Each line that triggered a particular accounting validation error will store the related error number (3.12, 3.13, 3.14, 3.17, 3.18, 3.20, 3.21, 3.22, 3.23, 3.24, 3.25, 3.28, 3.29, 3.30, 3.31, 3.32, 3.33, 3.34, 3.35) in the error column (SFALIB\_FMS\_TO\_FMSS\_INTERFACE.process\_error) of the temporary table.

**Development Complexity:**

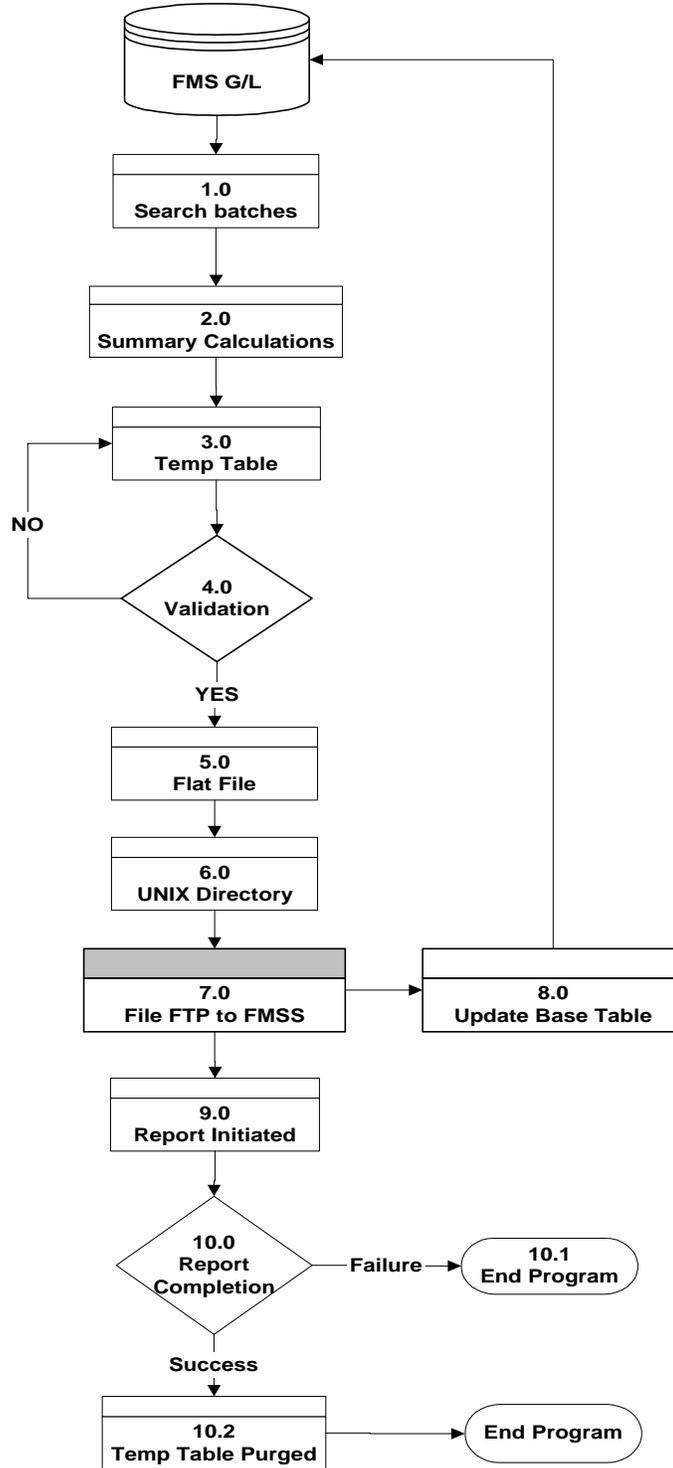
High

**Assumptions:**

- All daily transactions have been processed prior to running this program.
- Batches will be processed each business day.
- Segment12 value in SFA Set of Books must be populated:
  - Included in batch if ATTRIBUTE1 in (CG, OG, SG, SV, GA, GV, LE, DF, DT, & CF).
- Batches that error in FMSS cannot be flagged on the FMS side.



## Design Data Flow Diagram:





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## Data Flow Diagram Narrative:

### 1.0 SEARCH BATCHES

The FMS to FMSS Interface program will search the FMS GL batches table for new or previous error batches. For previous error batches, the original batch will be reversed and a modified batch will be created. When the batch is reversed, the modified batch will have a creation date as of the reversal date. The modified batches will only be processed if the creation date is after the error date of the original batch in the GL Batches table.

### 2.0 SUMMARY CALCULATIONS

Summarization will be performed within each batch at the ACCS level plus Treasury Reference Number, ALC, Confirmation Date, and Department Id. The summary calculation is by unique code combination of each line plus these three attribute values.

### 3.0 TEMPORARY TABLE

This table will be populated with each selected batch and that batch's associated ACCS summary lines. The table will contain the fields provided in the Data Mapping section below. This table will temporarily hold the data to be inserted into the flat file.

### 4.0 VALIDATION

The accounting rules provided in Appendix A of this document will be used to validate the batches in the temporary table. If a batch successfully passes all accounting rules, it will be updated with a flag of 'P' and date stamp in the temporary table. Otherwise, the batch will be updated with a flag of 'E', date stamp, and the related error code(s) in the temporary table.

### 5.0 FMS FLAT FILE

All successfully validated batches will be created in a .txt file (Common Output File). Refer to the Common File layout section under Data Mapping for more detail.

### 6.0 UNIX DIRECTORY

The file will be transferred to the appropriate UNIX directory. The files will be saved for one fiscal year from the creation date on the FMS server.

### 7.0 FTP FILE

The flat file will be sent to FMSS through a secure FTP server. The file will contain all successful validated batches.

### 8.0 UPDATE BASE TABLE

The program updates the status in an attribute field of the GL\_JE\_BATCHES table as:

1. Processed Successful - The batch is flagged in the GL\_JE\_BATCHES table as 'P' with a date stamp.
2. Error - The batch is flagged in the GL\_JE\_BATCHES table as 'E' with date stamp. The Error batches will need to be corrected by FSA before they are sent to ED.

### 9.0 REPORT INITIATED

The Splitter Reconciliation Notification will be initiated. Refer to FMS to FMSS Interface Notification functional design document for details on the notification.

### 10.0 REPORT COMPLETION

- 10.1. If the report completes with error the program will end immediately and the temporary table will not be purged.
- 10.2. If the report completes successfully the program will purge the temporary table and the program will end.



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### Data Mapping:

The table below describes the format of the flat file that will be sent to FMSS.

#### Common Flat File Format:

Field Name	Field Number	Field Type	Field Size (Characters)	Field Position	Description
Status	1	A	50	1-50	Status of Record (NEW)
Set of Books ID	2	N	15	51-65	Set of books is used. (21)
Accounting Date	3	N	11	66-77	GL Headers - Period name (last day of month)
Currency Code	4	A	15	78-93	Verifies currency type (USD)
Actual Flag	5	A	1	94	Actual flag from GL Batches
User JE Category Name	6	A	25	95-120	Journal Entry, Category name (Attribute1 – flex values table)
User JE Source Name	7	A	25	121-146	Source (SFA)
Segment1	8	A	9	147-156	Fund Name
Segment2	9	A	1	157	Fund Category
Segment3	10	A	4	158-161	Budget Fiscal Year
Segment4	11	A	6	162-167	Account
Segment5	12	A	8	168-175	Organization
Segment6	13	A	3	176-178	Limitation
Segment7	14	A	5	179-183	Object Class
Segment8	15	A	3	184-187	Activity
Segment9	16	A	3	188-190	CFDA
Segment10	17	A	4	191-194	Cohort Year
Segment11	18	A	1	195	Sector
Segment12	19	A	5	196-200	Fund Check Level (00000 or 000A2)
Segment13	20	A	6	201-206	Future Use (000000)
Entered DR	21	N	50	207-256	Amount of currency debited (Dollar Value)
Entered CR	22	N	50	257-306	Amount of currency credited (Dollar Value)
Batch ID	23	A	15	307-321	Batch ID
Treasury Reference Number	24	A	50	322-371	Attribute1 from GL lines table schedule number
Confirmation Date	25	N	9	372-380	Attribute3 from GL lines table
Department_ID	25	A	25	381-405	Attribute4 from GL lines table
ALC (Agency location code)	27	A	50	406-455	Attribute2 from GL lines table

### Database Objects:

Database Object Name	Object Type	Oracle Application	Comments
SFALIB_FMS_FMSS_pkg	PL/SQL Package	GL	This is the main package for this Interface.



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## Dependencies

### Data Cleansing:

Task	Responsibility	Dependency

### Dependencies on Other RICE Components:

N/A

### Dependencies on Other Business Components:

N/A

### Design Constraints:

N/A

### Performance Considerations:

Due to the bulk of the data and functionality of the interface, the program will need to be run nightly during non-peak hours for time considerations.

### Implementation Considerations:

For the first execution in any given environment, all journal batches will have a FMS to FMSS status (GL\_JE\_BATCHES.attribute4) of NULL because the current approach does not populate this attribute on the GL\_JE\_BATCHES table. We will populate the attribute of these batches on the table to avoid reprocessing these journal batches. The attribute will be populated with an 'X' and the batch will not be picked up by the interface program.

### Other Dependencies/Special Concerns:

N/A

## Error Handling

Potential Errors	Possible Reasons	Solution Strategy
1. Batch fails any accounting validation rules.	See Appendix A	Error recorded in GL_JE_BATCHES table as 'E' and data stamp. Reconfigured by accounting division following day (See 4).
2. Database goes down	N/A	Program is rolled back to start.
3. Failure during file creation or file transmission.	Permissions problems, programmatic error, FMSS system failure, etc.	Status of journal batches is not updated or not committed until after successful file transmission. Once problem is resolved interface can be rerun for same dataset.



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## Testing Requirements

Test Condition	Expected Results
Batch successfully processes through to FMSS.	Batch qualifies all accounting rules, updated in gl_je_batch table at 'P' with date stamp and is successfully moved to the UNIX directory.
Batch fails an accounting rule.	The batch is flagged in temp table as 'E' with error. Batch is flagged in base table (gl_je_batch) as 'E' including date stamp.
Successful batches are inserted to flat file.	Flat file created with all batches, which were flagged as 'P' in temporary table.
Summary calculations are performed.	Summary calculations are performed and are correct at the ACCS level.
Batch search picks up all unprocessed and previous error batches.	Search picks up all batches in the GL batches table of having a null or 'E' within the Attribute4 field.
Flat file is transferred to UNIX directory.	File is present in specified UNIX directory.
Verify all dates in temporary table are in four-digit year format.	Dates are in four-digit format within temporary table.
Verify all segment1 formats as %NNNNN.	Segment1 is present as ex. %XNY → %XNOYR or %M02 → M2002.
Verify all segment12 formats with '00000' or '000A2'.	Segment12 is present as '00000' or '000A2'.
Verify all segment13 format with '000000'	Segment13 is present as '000000'.
Verify all segment12 format with 0243X% and LIM 625 will be populated with '000A2'	Segment12 is present as '000A2' for all data
Verify all edcfo data with segment12 as 'CF' is selected.	User_je_category_name is populated with 'CF'
Verify all edcfo data with segment12 as 'CG' is selected.	User_je_category_name is populated with 'CG'
Verify all edcfo data with segment12 as 'GA' is selected.	User_je_category_name is populated with 'GA'
Verify all edcfo data with segment12 as 'GV' is selected.	User_je_category_name is populated with 'GV'
Verify all edcfo data with segment12 as 'LE' is selected.	User_je_category_name is populated with 'LE'
Verify all edcfo data with segment12 as 'OG' is selected.	User_je_category_name is populated with 'OG'
Verify all edcfo data with segment12 as 'SG' is selected.	User_je_category_name is populated with 'SG'
Verify all edcfo data with segment12 as 'SV' is selected.	User_je_category_name is populated with 'SV'
Verify all edcfo data with segment12 as 'DT' is selected.	User_je_category_name is populated with 'DT'
Verify all edcfo data with segment12 as 'DF' is selected.	User_je_category_name is populated with 'DF'



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## Issues and Additional Considerations

The following Issues were defined during Functional Design:

Issue	Raised By / Date Needed	Resolution/Answer	Resolved By / Date Completed
Will the temporary table be cleaned before or after the program is run?	Jason Belyew	The temporary table will be purged after the report is run successfully.	Jason Belyew 2.19.2003
Which scheme will the package run in?	Jason Belyew	EDCFO	Jason Belyew 2.25.2003
What is the exact file format needed to send to FMSS? Where Batch Id will be populated?	Jason Belyew	Batch ID will be sent in the Line ID column and Department_ID is sent NULL and now is Future_use.	Brian Hills 3.11.2003
Requirement 3.36 - Manually hold processing of daily FMS to FMSS Interface 1. If error batches are present, continue to process new batches. 2. If error batches are present, do not process any batches.	Jason Belyew	FMS will manually send email to DBA to unscheduled the run of the interface	Brian Hills 2.24.2003
What field in the GL_JE_BATCHES table will be used to store flag, date stamp, error? 1. Store in two fields flag and stamp in first and error in second. 2. Store all in one field concatenated together.	Jason Belyew	Attribute 4 field in FMS GL batches table	Jason Belyew 2.27.2003
Volume of data processed by interface?	Jason Belyew	Estimation of number of batches per month 1000.	Emily Plenge 3.3.2003
What User_je_category_name should be populated when segment12 = 'CG' or 'FP'.	Jason Belyew	CG = CG FP = GA	Jason Belyew 3.3.2003
Req 3.9 Ability to convert segment3 (Budget Fiscal Year) and segment10 (Cohort Year) from a two digit to four-digit year format before sending. These segments contain many non-date values: Budget Fiscal Year (BY, T, BD, CO, DP, MI, BF, P, P4, CV, P2, Z3) and Cohort Year (CY, T, PS, CN, DC, P, NP). How will they be converted?	Jacob Marks	Cohort Year and Budget Fiscal Year will be retrieved from the gl_cons_hierarchy table and converted to a date. Cohort Yr values: 0000, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, PS, COIN.  Budget Fiscal Yr values: BDCL, DPF, CONV, MISC, 0, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005,	Brain Hills 3.3.2003
May be some accounting rules that we would automatically fix rather than fail. For example, 3.15, we could automatically remove attr 1,2, and 3 for invalid lines rather than failing the whole batch.	Jacob Marks	Programmatically accounting rules: 10,11,15,16,19,26, & 27, will be converted within program .	Brain Hills 3.3.2003



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## Appendix

### A. Accounting Rules Specified

*NOTE*	All segment values referenced in this section refer to the segments in the gl_code_combinations table.
3.10	Ability to validate that the batch level accounting_date on all data sent from FMS to FMSS is the last day of the fiscal month before sending.
3.11	Ability to validate that the format of the accounting_date field is "DD-MON-YYYY" for all data before sending.
3.12	Ability to validate that the value in the gl_je_lines.attribute3 (Confirmation Date) field is not greater than the System Date for all data before sending.
3.13	Ability to validate that every line with a 1010% account must have a gl_je_lines.attribute1 (Treasury Reference Number), gl_je_lines.attribute2 (ALC), and gl_je_lines.attribute3 (Confirmation Date) before sending.
3.14	Ability to validate that every line with a 212000 account must have a gl_je_lines.attribute1 (Treasury Reference Number) and gl_je_lines.attribute2 (ALC) before sending.
3.15	Ability to validate that every line with an account other than 1010% or 212000 must NOT have a gl_je_lines.attribute1 (Treasury Reference Number), gl_je_lines.attribute2 (ALC), and gl_je_lines.attribute3 (Confirmation Date) before sending.
3.16	Ability to validate that every line with a 212000 account must NOT have a value in gl_je_lines.attribute3 (Confirmation Date) before sending.
3.17	Ability to validate that the gl_je_lines.attribute2 (ALC) must be in the format 9102000X before sending.
3.18	Ability to validate that the last digit of the gl_je_lines.attribute2 (ALC) (9102000X) must equal the fifth digit of segment4 (1010XN) where segment4 is 1010% before sending except 10100% accounts, where the ALC must be 91020001.
3.19	Ability to validate that the gl_je_lines.attribute3 (Confirmation Date) must be in the format "DD-MON-YYYY" before sending.
3.20	Ability to validate that lines with segment1 value of "4253XNOYR" must have segment3 value "CONV" before sending.
3.21	Ability to validate that lines with segment1 value of "%XNOYR" must have segment5 value "EN000000" before sending.
3.22	Ability to validate that lines with segment1 value of "%FNOYR" must have segment5 value "00000000" before sending.
3.23	Ability to validate that lines with segment1 value of "%RNOYR" must have segment5 value "00000000" before sending.
3.24	Ability to validate that lines with segment1 value of "%NOYR" must NOT have a balance where segment4 = 1010X2 nor 1010X3.
3.25	Ability to validate that lines with segment1 value of "%RNOYR" must NOT have a balance where segment4 = "4XXXXX" before sending.
3.26	Ability to validate that lines with segment1 value of "0243%" where segment6 = "625" must have segment12 = "000A2" before sending.
3.27	Ability to validate that lines where segment12 = "000A2" must be with no other combination than segment1 = "0243%" and segment6 = "625" before sending.
3.28	Ability to validate that lines with segment1 value of "0230XNOYR" must NOT have a value in segment6 of "BB7" before sending.
3.29	Ability to validate that lines with segment5 value of "00000000" must have a value in segment6 of "000" before sending except where segment1 value = "%FNOYR%".
3.30	Ability to validate that lines with segment6 value of "000" must have a value in segment5 of "00000000" before sending.
3.31	Ability to validate that lines with user_je_category_name of "LE" must ONLY have a value in segment6 of "B02", "B04", "B08", "BA7", "BB7", or "BPI" before sending.



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Version: 8

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3.32	Ability to validate that lines with a unique user_je_category_name must have a net balance of 0.00 before sending.
3.33	Ability to validate that lines with all unique segment1, segment6 combinations must have a net balance of 0.00 before sending.
3.34	Ability to validate that the sum of the balance of all lines where segment4 is in the range 400000 - 4999999 should have a net balance of 0.00 before sending.
3.35	Ability to validate that the sum of the balance of all lines where segment4 is in the range 100000 to 3999999 plus the sum of the balance of all lines where segment4 is in the range 5000000 to 7999999 should have a net balance of 0.00 before sending.