Balancing and Settlement Code

BSC PROCEDURE

BSCP711 – Appendix A:

Fixed PAM Data Provider File Formats

Version ~~0.3~~0.4

Date:~~1 April 2025~~ DD MM YYYY

BSCP711 Appendix A Relating to Fixed PAM Data Provider File Formats

1.   Reference is made to the Balancing and Settlement Code and in particular, to the definition of "BSC Procedure" In Section X, Annex X-1 thereof.

2.   This is BSC Procedure 711 Appendix A, Version~~0.3~~0.4 relating to Fixed PAM Data Provider File Formats.

3.   This BSC Procedure is effective from ~~1 April 2025~~. DD MM YYYY

4.   This BSC Procedure has been approved by the Panel.

AMENDMENT RECORD

Version	Date	Description of Changes	Changes Included	Mods /Panel/ Committee Refs
1.0		Approved by the MHHSP on XX/XX/XX	1.0	

Contents

Related Documents

Reference 1   PAM User Requirements Specification

Reference 2   BSC Procedure: PAM Data Provision, Reporting and Publication of Peer
                   Comparison Data (BSCP711)

Reference 3   BSC Procedure: Fixed PAM Data Provision (BSCP711 – Appendix B: Fixed
                   PAM Calculation Guidelines)

1.   INTRODUCTION

1.1   Purpose

The purpose of this document is to specify the file format specification associated with the information outlined in BSCP711 relating to Fixed Performance Assurance Monitoring (PAM) to be submitted to the PAM system which monitors Market Participants' performance. This is intended to provide guidance for Data Providers to assist them in the development of their systems.

1.2   Fixed PAM Data

1.2.1   Fixed PAM Data: General Description

Fixed PAM Data consists of data pertaining to the performance of specified market Participants and is provided via a pre-determined series of files or other agreed methods by agreed Fixed PAM Data Providers (SVAA and the CDCA). This data is specified in BSCP711 PAM Data Provision, Reporting and Publication of Peer Comparison Data. The data will be loaded automatically into the PAM system. database using the corresponding PAM system validation process.

The data descriptions defined in the relevant Data sections of BSCP711 have been summarised in this paper into usable data identifiers.

The appropriate files are summarised below:

Output Data		
Serial	**Titled**	**FILETYPE**
TA01	GSP Group Correction Factor	P0137001
TA02	Annual Demand Ratio	P0138001
CM01	CVA MOA Proving Tests	P0133001
CM02	CVA MOA Fault Resolution	P0134001
SP07A	Supplier MSID Count – SVAA File	
SP07B	SVAA SMRA MSID Count – SVAA File	P0164001 (SVAA)
SP08	Energy and MSIDs on Actuals	P0145002
Standing Data		**FILETYPE**
PAM Industry Standing Data		P0136001
Suppliers Trading / Ceased Trading in GSP Groups		P0127001

2.   PHYSICAL FILE PRESENTATION

2.1   Media

Data files will be submitted into the PAM system by the Data Provider (BSC Agent) in the form of ASCII files or as otherwise agreed between the Data Provider and the PAA. A separate data file is required for each Serial, although a number of files may be contained in one submission.

2.2   File Naming

If using ASCII files aAn 8-character file naming convention will be used as follows:

- The 1st to 4th characters will be the participant ID of the Data Provider;

- The 5th to 7th will relate to the File Identifier that will be used in the SVA Data Catalogue; and

- The 8th will be the last digit of the year number (e.g. '2' for 2002, '3' for 2003).

The file extension will indicate the month to which the data pertains (JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC).

2.3 File Submission and Verification of Output Data

Data Providers should submit PAM data at a minimum frequency of +(x) WDs after the end of the reporting period as follows:

- SVAA: +7 WDs

All agreed data files will be submitted direct to the PAM system by the Data Providers specified in the File Formats or as otherwise agreed. ~~Where there has been no occurrence of an event monitored by a Fixed PAM Serial, Data Providers should reflect this by using zeros in place of the values for each Supplier and GSP Group. Where there has been no occurrence of an event, but appointments exist in for that Supplier and GSP Group combination, Data Providers should reflect this by submitting zero values against all the standards for these combinations. Failure to do so may result in missing data. **If no data is provided at all then the PAM system will regard the submission as incomplete and apply Supplier Charges if appropriate.** The process and timescale for submission is detailed in BSCP711 'Performance Assurance Monitoring Data Provision Reporting and Publication of Peer Comparison Data'.~~

Once received, BSCCo will distribute any Supplier-related data to the relevant Suppliers in order to allow them to verify the data submitted by its appointed agents, particularly where poor performance against a Serial may lead to Supplier Charges. Any queries raised will be dealt with between the Supplier and its Agent, and any resubmission of data should be by the specified Data Provider. (Suppliers can, of course, request that their agents provide copies of any files submitted to PAM system for checking, but this will not be assumed by BSCCo).

2.4 File Resubmission and Correction

Once a Data Provider has submitted a file, it may be resubmitted in order to correct errors subsequently identified in the file. **For each Fixed PAM Serial, if a correction is required then a complete submission for the affected GSP Group must be provided**, such that it is made clear that the data that was originally correct should remain in the system. If a file is submitted containing only the corrected data, the PAM system will assume that the rest of the data already stored in the system has been since been identified by the Data Provider as incorrect and that the data should be deleted from the system.

3.   PHYSICAL FILE FORMATS

3.1   **ASCII** ~~Pool~~ **File Format**

~~The majority of the Data Output files will use the Pool file format. In this format~~If using the ASCII file format, a file contains a number of records, each starting with a three-character identifier and ending with a Record Delimiter character. The first record of each file will be a header; the last a footer. The last record of a physical block will not require a Record Delimiter.

Each record contains fields of various types such as text, integer, date and time. The full range is described below:

Type	Format	Example
int (Integer)	ASCII representation, no leading zeros or spaces, leading "-" if negative (no sign if positive)	-1234 12
dec (Decimal)	ASCII representation. As for Integer, but with a decimal point and fixed number of decimal digits (including trailing zeros) dependent on precision	dec(4,2): -12.34 dec(3,2): 1.20
text	ASCII format, left aligned with trailing spaces stripped. Only includes printable characters excluding the separator	The quick fox
date	ASCII format as: YYYYMMDD	19961216
time	ASCII format as: HHMMSS (24 hour format). Note: both GMT and local time (e.g. British Summertime) will be used and will be indicated as necessary.	131501
date/time	ASCII format as: YYYYMMDDHHMMSS	19961216131501
bol (Boolean)	One ASCII character: T for True, F for False (uppercase only)	T F

A Field Separator character separates each field (**with the exception of the last field of each record**). All fields are mandatory, unless specifically indicated as optional in the 'comments' column. A null submission is achieved by omitting any characters between the Field Separators.

All files sent or received by the PAM system are structured as follows:

- Header - first record in file - record type = "ZHD"

- Body - other file records

- Footer - last record in file - record type = "ZPT"

For PAM Output Data, the first record of the file "Body" is a subject participant header (record type "SUB") containing information about the subject market participant.

Note that there may be many SUB records (e.g. where a Supplier has a number of agents, or an agent contracted to many Suppliers, and where the Supplier is operating in more than one GSP Group).

The components of these three standard record types are defined in the following tables:

ZHD - File Header			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= ZHD
2	File Type	text(8)	5 character type (ranges allocated for DTS, pool or internal use) plus 3 character version
3	From Role Code	text(1)	
4	From Participant Id	text(4)	
5	To Role Code	text(1)	'Z' (Non-Core - PAM)
6	To Participant Id	text(4)	'~~POOL~~'
7	Creation Time	date/time	Time file processing was started. Specified in GMT.

SUB - Subject Participant Header			
Field	Field Name	Type	Comments
1	Record Type	text(3)	= SUB
3	Market Participant Role Code	text(1)	Role Code of the subject Market Participant
4	Market Participant Id	text(4)	Identifier of the subject Market Participant
5	Period End Date	date	Date of the last calendar day of the period (generally either a month or a quarter) to which the data applies.
6	Periodicity	text(1)	Indicates whether the Period End Date is 'W'eekly, 'M'onthly or 'Q'uarterly.

ZPT - File Footer			
Field	Field Name	Type	Comments
1	Record Type	text(3)	= ZPT
2	Record count	int(10)	Includes header and footer
3	Checksum	int(10)	Although type is shown as int(10) the value is actually a 32-bit unsigned value and hence will fit in an "unsigned long" C variable.

The remaining component of the File is a body record containing the required PAM information. These will be specific for each Serial and, like the SUB record, will be repeated in situations where, data is required for a number of different Settlement Run types.

Some files involve the reporting of a data item against a list of Settlement dates, such as for Serial SP07. **In these instances, the dates and the associated data items should be listed in ascending order.**

The character set used is based on the ISO Level B character set and will include the following characters:

Letters, upper case	A to Z
Letters, lower case	a to z
Numerals	0 to 9
Space character	
Full stop	.
Comma	,
Hyphen/minus	-
Opening parenthesis	(
Closing parenthesis	)
Slash	/
Apostrophe	'
Plus	+
Colon	:
Equals	=
Question mark	?
Exclamation mark	!
Quotation mark	"
Percentage sign	%
Ampersand	&
Asterisk	*
Semi-colon	;
Less than	<
Greater than	>
Underscore	_

Field Separator: The vertical bar character '|' will be used as the separator.

Record Delimiter: The Line Feed character (hex "A") or a Carriage Return is used as the delimiter.

4. STANDING DATA FILE FORMATS

4.1 PAM Industry Standing Data

Unless otherwise agreed by the Data Provider and PAA, the following file format should be used by the Data Provider to submit PAM Industry Standing Data;

ZHD - File Header			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= ZHD
2	File Type	text(8)	= P0136001
3	From Role Code	text(1)	= G (SVA Agent)
4	From Participant Id	text(4)	CAPG (or other relevant Id)
5	To Role Code	text(1)	= Z (Non-Core - PAM)
6	To Participant Id	text(4)	= POOL
7	Creation Time	date/time	Date & time of file generation
VER : ISD version			
1	Record Type	text(3)	= VER
2	ISD Version Number	int(8)	
GSG : GSP Group			
1	Record Type	text(3)	= GSG
2	GSP Group Id	text(2)	
3	GSP Group Name	text(30)	
GGD : GSP Group Distributors			
1	Record Type	text(3)	=GGD
2	Distributor Id	int(2)	
3	Market Participant Role Code	text(1)	
4	Effective from Date {MPR}	date	
5	Effective from Settlement Date {GGD}	date	
6	Effective to Settlement Date {GGD}	date	optional
MRC : Market Participant Role Codes			

1	Record Type	text(3)	= MRC
2	Market Participant Role Code	text(1)	
3	Role Code Description	text(30)	
MAP : Market Participants			
1	Record Type	text(3)	= MAP
2	Market Participant Id	text(4)	
3	Market Participant Name	text(40)	
4	~~Pool Member Id~~	~~text(4)~~	~~optional~~
MPR : Market Participant Roles			
1	Record Type	text(3)	= MPR
2	Market Participant Role Code	text(1)	
3	Effective from Settlement Date {MPR}	date	
4	Effective to Settlement Date {MPR}	date	optional
SSR : SSR Run Type			
1	Record Type	text(3)	= SSR
2	SSR Run Type	text(2)	
3	SSR Run Type Name	text(40)	
SSC : Settlement Calendar			
1	Record Type	text(3)	= SSC
2	SSR Run number	int(7)	
3	Settlement Date	date	
4	SSR Run Type	text(2)	
5	SSR Run Date	date	

Note

1   there is a one to many relationship between Meter asset provider (MAP) and market participant role (MPR) record types

2   the VER record type denotes which version of ISD was used for the source of this file

Backus-Naur Form:

PAM Industry Standing Data ::= ZHD VER {GSG {GGD}} {MRC} {MAP {MPR}} {SSR} {SSC} ZPT

4.2 Suppliers Trading / Ceased Trading in GSP Groups

Unless otherwise agreed by the Data Provider and PAA, the following file format should be used by the Data Provider to submit data pertaining to Suppliers Trading / Ceased Trading in GSP Groups;

ZHD - File Header			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= ZHD
2	File Type	text(8)	= P0127001
3	From Role Code	text(1)	= G (SVA Agent)
4	From Participant Id	text(4)	CAPG (or other relevant Id)
5	To Role Code	text(1)	= Z (Non-Core - PAM)
6	To Participant Id	text(4)	= POOL
7	Creation Time	date/time	Date & time of file generation
SPT : Supplier Trading / Ceased Trading in GSP Group			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= SPT
2	GSP Group Id	text(2)	
3	Supplier Id	text(4)	
4	Effective from Date Supplier Trading in GSP Group	date	Calendar date started trading in GSP Group
5	Effective to Date Supplier Trading in GSP Group	date	Optional. Calendar date ceased trading in GSP Group

Backus-Naur Form:

Suppliers Trading / Ceased Trading in GSP Groups ::= ZHD {SPT} ZPT

5.   OUTPUT DATA FILE FORMATS

5.1   TA01 – GSP Group Correction Factor

Unless otherwise agreed by the Data Provider and PAA, the following file format should be used by the Data Provider to submit data pertaining to GSP Group Correction Factor:

ZHD - File Header			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= ZHD
2	File Type	text(8)	= P0137001
3	From Role Code	text(1)	= G (SVAA)
4	From Participant Id	text(4)	= CAPG (or other relevant Id)
5	To Role Code	text(1)	= Z (Non-Core - PAM)
6	To Participant Id	text(4)	= POOL
7	Creation Time	date/time	Date & time of file generation
SUB - Subject Participant Header			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= SUB
3	Market Participant Role Code	text(1)	= NULL
4	Market Participant Id	text(4)	= NULL
5	Period End Date	date	Date of last day of calendar month
6	Periodicity	text(1)	'M'onthly
TA1 Trading Arrangements Serial 1 Data			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= TA1
2	Number of import GCF queries raised	int(5)	
3	Number of export GCF queries raised	int(5)	

5.2   TA02 – Annual Demand Ratio

Unless otherwise agreed by the Data Provider and PAA, the following file format should be used by the Data Provider to submit data pertaining to Annual Demand Ratio:

ZHD - File Header			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= ZHD
2	File Type	text(8)	= P0138001
3	From Role Code	text(1)	= G (SVAA)
4	From Participant Id	text(4)	=CAPG (or other relevant Id)
5	To Role Code	text(1)	= Z (Non-Core - PAM)
6	To Participant Id	text(4)	= POOL
7	Creation Time	date/time	Date & time of file generation
SUB - Subject Participant Header			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= SUB
3	Market Participant Role Code	text(1)	Not applicable
4	Market Participant Id	text(4)	Not applicable
5	Period End Date	date	Date of last day of calendar month
6	Periodicity	text(1)	'M'onthly
TA2 Trading Arrangements Serial 2 Data			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= TA2
2	Annual Demand Ratio	dec(5,4)	

Backus-Naur Form:

Annual Demand Ratio ::= ZHD SUB TA2 ZPT

5.3   CM01 – CVA MOA Proving Tests

Unless otherwise agreed by the Data Provider and PAA, the following file format should be used by the Data Provider to submit data pertaining to CVA MOA Proving Tests:

ZHD - File Header			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= ZHD
2	File Type	text(8)	= P0133001
3	From Role Code	text(1)	= Z
4	From Participant Id	text(4)	= CDCA
5	To Role Code	text(1)	= Z (Non-Core - PAM)
6	To Participant Id	text(4)	= POOL
7	Creation Time	date/time	Date & time of file generation
SUB - Subject Participant Header			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= SB1
3	Market Participant Role Code	text(1)	= M (MOA)
4	Market Participant Id	text(8)	ID of CVA MOA
5	Period End Date	date	Date of last day of calendar month
6	Periodicity	text(1)	'M'onthly
CM01 CVA MOA Serial 1 Data			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= CM1
2	GSP Group Id	text(2)	= 'NULL' if directly-connected site
3	Number of MSIDs affected in period	int(7)	
4	Average number of working days Proving Test is outstanding after Effective From Date at time of report	dec(4,1)	
5	Count of faults outstanding after Effective From Date	int(7)	

Backus-Naur Form:

CVA MOA Proving Tests ::= ZHD {SB1 {CM1}} ZPT

5.4 CM02 – CVA MOA Fault Resolution

Unless otherwise agreed by the Data Provider and PAA, the following file format should be used by the Data Provider to submit data pertaining to CVA Fault Resolution:

ZHD - File Header			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= ZHD
2	File Type	text(8)	= P0134001
3	From Role Code	text(1)	= Z
4	From Participant Id	text(4)	= CDCA
5	To Role Code	text(1)	= Z (Non-Core - PAM)
6	To Participant Id	text(4)	= POOL
7	Creation Time	date/time	Date & time of file generation
SUB - Subject Participant Header			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= SB2
3	Market Participant Role Code	text(1)	= M (MOA)
4	Market Participant Id	text(8)	ID of CVA MOA
5	Period End Date	date	Date of last day of calendar month
6	Periodicity	text(1)	'M'onthly
CM02 CVA MOA Serial 2 Data			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= CM2
2	GSP Group Id	text(2)	= 'NULL' if directly-connected site
3	Number of MSIDs affected in period	int(7)	
4	Count of faults identified	int(7)	
5	Average number of working days faults outstanding at time of report	dec(4,1)	
5	Average number of working days taken to resolve faults	dec(4,1)	

Backus-Naur Form:

CVA MOA Fault Resolution ::= ZHD {SB2 {CM2}} ZPT

5.5 SP07A - ~~SVAA MSID~~Supplier MSID Count Report – SVAA File

Unless otherwise agreed by the Data Provider and PAA, the following file format should be used by the Data Provider to submit data pertaining to Supplier MSID Counts:

ZHD - File Header			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= ZHD
2	File Type	text(8)	~~= P0164001~~
3	From Role Code	text(1)	= G (SVAA)
4	From Participant Id	text(4)	= CAPG (or other relevant Id)
5	To Role Code	text(1)	= Z (Non-Core -PAM)
6	To Participant Id	text(4)	~~= POOL~~
7	Creation Time	date/time	Date & time of file generation

SUB - Subject Participant Header			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= SUB
3	Market Participant Role Code	text(1)	= X (Supplier)
4	Market Participant Id	text(4)	ID of Supplier
5	Period End Date	date	Date of last day of calendar month
6	Periodicity	text(1)	'M'onthly

SP7 Supplier Serial 7 Data			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= SP7
2	GSP Group Id	text(2)	
3	Market Participant ID	text(4)	ID of Data Service
4	Market Participant Role Code	text(1)	N (Smart Data Service Agent) or O (Advanced Data Service Agent) or Q (Unmetered Data Service)
5	Settlement Date	date(8)	yyyymmdd
6	Settlement Type	text(2)	
7	MSID Count	int(10)	

Backus-Naur Form:

SVAA MSID Count– SVAA File::= ZHD {SUB {SP7}} ZPT

SP07B – ~~Supplier~~ SMRA MSID Count Report – SVAA File

Unless otherwise agreed by the Data Provider and PAA, the following file format should be used by the Data Provider to submit data pertaining to SMRA MSID Counts:

ZHD - File Header			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= ZHD
2	File Type	text(8)	= P016X001
3	From Role Code	text(1)	= G (SVAA)
4	From Participant Id	text(4)	= CAPG (or other relevant Id)
5	To Role Code	text(1)	= Z (Non-Core -PAM)
6	To Participant Id	text(4)	= POOL
7	Creation Time	date/time	Date & time of file generation
SUB - Subject Participant Header			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= SUB
3	Market Participant Role Code	text(1)	= P (SMRA)
4	Market Participant Id	text(4)	ID of SMRA
5	Period End Date	date	Date of last day of calendar month
6	Periodicity	text(1)	'M'onthly
SP7B Supplier Serial 7B Data			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= SP7B
2	Market Participant ID	text(4)	ID of Supplier
3	Market Participant Role Code	text(1)	= X (Supplier)
4	Settlement Date	date(8)	yyyymmdd
5	Settlement Type	text(2)	
6	MSID Count	int(10)	

Backus-Naur Form:

Supplier MSID Count– SVAA File::= ZHD {SUB {SP7B}} ZPT

5.6   SP08 – Energy and MSIDs on Actuals

% Energy and % MSIDs Aggregated by CCC ID groupings in the output of SP08 is dependent on the determination of CCC ID groupings as determined by BSCP710 Supplier Charges. Unless otherwise agreed by Data Provider and PAA, the following file format should be used by the Data Provider to submit data pertaining to Energy and MSIDs on Actuals:

ZHD - File Header			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= ZHD
2	File Type	text(8)	= P0145002
3	From Role Code	text(1)	= G (SVAA)
4	From Participant Id	text(4)	= CAPG (or other relevant Id)
5	To Role Code	text(1)	= Z (Non-Core - PAM)
6	To Participant Id	text(4)	= POOL
7	Creation Time	date/time	Date & time of file generation
SUB - Subject Participant Header			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= SUB
3	Market Participant Role Code	text(1)	= X (Supplier)
4	Market Participant Id	text(4)	ID of Supplier
5	Period End Date	date	Date of last day of calendar month
6	Periodicity	text(1)	'M'onthly
SP8 Supplier Serial 8 Data			
Field	**Field Name**	**Type**	**Comments**
1	Record Type	text(3)	= SP8
2	Settlement Day	date	
3	Settlement Type	text(2)	SF, R1, R2, R3 and RF run types
4	GSP Group Id	text(2)	
5	% Energy Aggregated by CCC ID groupings set in BSCP710 Supplier Charges	dec(4,1)	The type 'dec 4,1' allows for percentage values up to, and including, 999.9% in this data field

6	MSID Count	dec(4,1)	
7	% MSIDs Aggregated by CCC ID groupings set in BSCP710 Supplier Charges	dec(4,1)	
8	Total Energy	dec(10,2)	

Backus-Naur Form:

Energy and MSIDs on Actuals::= ZHD {SUB {SP8}} ZPT

~~Appendix 1: Algorithm For Checksum Required For BSCCo Defined Software~~

~~Introduction~~

~~In order to meet the Auditor requirements for a method of ensuring file integrity, a checksum algorithm was agreed that provides a signature for files coming into, and out from, the three Business Process Operations (BPO) Service developed systems.~~

~~The purpose of the algorithm is to provide a reasonable degree of assurance that the binary nature of the file has not changed. It does not provide any assurance as to the accuracy of the data within the file.~~

~~Requirement~~

~~The checksum algorithm is defined as follows:~~

~~$W_{j,k}$ is the kth 4-byte word of the Jth record.~~

~~Therefore the function can be defined as:~~

~~$(((W_{1,1} \text{ XOR } W_{1,2}) \text{ XOR} W_{1,3}.).. \text{ XOR} W_{1+n,m})$~~

~~n = the total number of records (less the footer record)~~

~~m = the number of 4 byte words in the last record~~

~~Key points to note are that the algorithm:~~

- ~~excludes line terminators~~
- ~~excludes the last record~~
- ~~where the last word of a record is less than 4 bytes then it is padded with binary zeroes.~~

~~Pseudo-Code~~

~~The detail of the algorithm is as follows (note that this assumes that each record is submitted one by one):~~

~~This takes four byte sections (excluding the end of line character), padded with nulls if required, and exclusive OR (XOR) them into checksum. The algorithm for this is illustrated by the following 'C-like' pseudo code.~~

```
num_chars = strlen (context.record buffer)
FOR (i = 0; i < num_chars;)
    value = 0
    FOR (j = 0; j < 4; i++, j++)
        IF i < num_chars
            value = ((value << 8) + context.record_buffer[i])
        ELSE
            value = value << 8
        END IF
    ENDFOR
    context.checksum = context.checksum XOR value
```

~~ENDFOR~~

Example Algorithm

~~This algorithm has been produced by the BSCCo in Visual Basic. This routine has been used in the generation of test data and the output of the routine has been checked against BPO Service data.~~

Public Function Calc(sFile As String) As Long

'Algorithm to Calculate Checksum from G. Swinton, 23/04/97.

 On Error GoTo c1_Error

~~Dim i As Integer~~

~~Dim j As Integer~~

~~Dim chksum As Long~~

~~Dim bytes(4) As Integer~~

~~Dim sLine As String~~

' validate that the file exists

 Open sFile For Input As #1

~~Do While Not EOF(1)~~

~~Line Input #1, sLine~~

$i = 1$

~~If Left$(sLine, 3) <> "ZPT" Then~~

~~For j = 1 To Len(sLine)~~

~~bytes(i) = bytes(i) Xor Ase(Mid$(sLine, j, 1))~~

~~i = i + 1~~

~~If i = 5 Then i = 1~~

Next

~~End If~~

Loop

~~For j = 1 To 4~~

chksum = chksum + (256 ^ (4 - j) * bytes(j))

— ~~Next~~

~~Calc = chksum~~

e1   Exit:

Close #1

~~Exit Function~~

e1 Error:

~~MsgBox Error$()~~

Calc = -1

Resume e1_Exit

~~**End Function**~~