



File Name : Demand Draft / Telegraphic Transfer / Cashier's Order / Cheques Bulk Service Check Summary Algorithm	
Date Released: 21 April 2003	Date Printed: 27 Sep 2004
	Version : 1.00


Demand Draft / Telegraphic Transfer Cashier's Order / Cheques Bulk Services Check Summary Algorithm

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Check Summary Algorithm

The algorithm describes in this document is to be used for computing the Check Summary amount as required in the File Control Header for the Bulk Services Demand Draft / Telegraphic Transfer / Cashier's Order and Cheques File Format Guide.

The check summary calculation is to exclude the control header (i.e. only applicable for record type 1, 2, 3 and 9 only).

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Check summary calculation algorithm

Read Control Header Record and ignore it. *(Record Number =1. Control Header won't be included to calculate check summary)*

Set HASH CODE index to 1.

Set Record Number to 1

Loop1:

Read next record.

If not(end of file)

 Increase Record Number by 1

 Set COLUMN NUMBER to 1 *(refer Notes pt. 1 below)*

 If not last column

 Loop2:

 Retrieve the BYTE CODE of the COLUMN NUMBER. *(refer Notes pt. 2 below)*

 If HASH CODE index > 23,

 reset HASH CODE index to 1

 End if

 Compute SUM = SUM + record number + (record number + COLUMN NUMBER) * BYTE CODE *
 HASH CODE value [*HASH CODE index*] *(refer Notes pt. 3 below)*

 Increase HASH CODE index by 1.

 Increase COLUMN NUMBER by 1.

 Go to Loop2.

 End if

Go to Loop1.


End if

The SUM # will be the final check summary value.

Notes

1. COLUMN NUMBER represents a single position in one record that ranges from 1 to 1250 for DD/TT file records and from 1 to 900 for CO/CHQ file records)
2. The BYTE CODE is the **ASCII value** of the byte regardless of the operating system. For example, OS/400 operation system uses EBCDIC code, it must be converted to ASCII code value to compute the check summary. This is to avoid the algorithm to be platform dependant. Refer to **Appendix A** for a list of ASCII values. For example, if the byte contains the character "A", the Ascii value is 65.
3. The HASH CODE Value is retrieve from the HASH CODE Array table as shown in **Appendix B**. The value to retrieve is based on the corresponding HASH CODE Index. For example, if the Hash Code index is 9, the Hash Code value is 11.

For info only. The maximum Sum for one file with 132,700 records (record length 1250, which is the length of DD/TT file – longest one in these 6 file formats) can be up to 999867960000000. Thus, the total record number cannot go beyond 132,700.


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Appendix A

ASCII Value conversion for DD/TT/CO/CHQ Bulk File Hashing

DEC	HEX	CHARACTER	DEC	HEX	CHARACTER

0	00	ctl@ NUL		64	40 @
1	01	ctlA SOH		65	41 A
2	02	ctlB STX		66	42 B
3	03	ctlC ETX		67	43 C
4	04	ctlD EOT		68	44 D
5	05	ctlE ENQ		69	45 E
6	06	ctlF ACK		70	46 F
7	07	ctlG BELL		71	47 G
8	08	ctlH BS		72	48 H
9	09	ctlI HT		73	49 I
10	0A	ctlJ LF		74	4A J
11	0B	ctlK VT		75	4B K
12	0C	ctlL FF		76	4C L
13	0D	ctlM CR		77	4D M
14	0E	ctlN SO		78	4E N
15	0F	ctlO SI		79	4F O
16	10	ctlP DLE		80	50 P
17	11	ctlQ DC1		81	51 Q
18	12	ctlR DC2		82	52 R
19	13	ctlS DC3		83	53 S
20	14	ctlT DC4		84	54 T
21	15	ctlU NAK		85	55 U
22	16	ctlV SYN		86	56 V
23	17	ctlW ETB		87	57 W
24	18	ctlX CAN		88	58 X
25	19	ctlY EM		89	59 Y
26	1A	ctlZ SUB		90	5A Z
27	1B	ctl[ESC		91	5B [
28	1C	ctl\ FS		92	5C \
29	1D	ctl] GS		93	5D]
30	1E	ctl^ RS		94	5E ^
31	1F	ctl_ US		95	5F _
32	20	Space		96	60
33	21	!		97	61 a
34	22	"		98	62 b
35	23	#		99	63 c
36	24	\$		100	64 d
37	25	%		101	65 e
38	26	&		102	66 f
39	27	'		103	67 g
40	28	(104	68 h
41	29)		105	69 i
42	2A	*		106	6A j
43	2B	+		107	6B k
44	2C	,		108	6C l
45	2D	-		109	6D m
46	2E	.		110	6E n
47	2F	/		111	6F o
48	30	0		112	70 p
49	31	1		113	71 q
50	32	2		114	72 r
51	33	3		115	73 s
52	34	4		116	74 t
53	35	5		117	75 u
54	36	6		118	76 v
55	37	7		119	77 w
56	38	8		120	78 x
57	39	9		121	79 y
58	3A	:		122	7A z
59	3B	;		123	7B {
60	3C	<		124	7C
61	3D	=		125	7D }
62	3E	>		126	7E -
63	3F	?		127	7F DEL

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Appendix B

HASH CODE Array

HASH CODE INDEX	HASH CODE VALUE	HASH CODE INDEX	HASH CODE VALUE
1	23	2	05
3	17	4	20
5	04	6	13
7	22	8	03
9	11	10	21
11	07	12	10
13	19	14	02
15	24	16	18
17	06	18	16
19	08	20	12
21	09	22	15
23	14	24	n.a.