APPENDIX A TO PART 3 — EXAMPLES OF CHECK DIGIT CALCULATION (INFORMATIVE)

Example 1 — Application of check digit to date field

Using 27 July 1952 as an example, with the date in numeric form, the calculation will be:

	Date:	5	2	0	7	2	7
	Weighting:	7	3	1	7	3	1
Step 1 (multiplication)	Products:	35	6	0	49	6	7

Step 2 (sum of products)   35 + 6 + 0 + 49 + 6 + 7 = 103

Step 3 (division by modulus) $\dfrac{103}{10}$ = 10, remainder 3

Step 4. Check digit is the remainder, 3. The date and its check digit shall consequently be written as 5 2 0 7 2 7 3.

Example 2 — Application of check digit to document number field

Using the number AB2134 as an example for coding a 9-character, fixed-length field (e.g. passport number), the calculation will be:

	A	B	2	1	3	4	<	<	<
Sample data element:	A	B	2	1	3	4	<	<	<
Assigned numeric values:	10	11	2	1	3	4	0	0	0
Weighting:	7	3	1	7	3	1	7	3	1
Step 1 (multiplication) Products:	70	33	2	7	9	4	0	0	0

Step 2 (sum of products)   70 + 33 + 2 + 7 + 9 + 4 + 0 + 0 + 0 = 125

Step 3 (division by modulus) $\dfrac{125}{10}$ = 12, remainder 5

Step 4. Check digit is the remainder, 5. The number and its check digit shall consequently be written as AB2134<<<5.

Examples of the calculation of composite check digits.

The calculation method for composite check digits is the same for all MRTDs. However, the location and number of the digits to be included in the calculation are different between the different types of documents. For completeness, examples of each are included here.

Example 3 — Composite check digit calculation for TD3 documents

Using the lower line of MRZ data from a TD3 data page that follows, as an example for coding the composite check digit, the calculation will be:

Character positions 1-43: Example with no alpha-numeric characters in "optional data" field.

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Sample data element:	H	A	6	7	2	2	4	2	<	6
Assigned numeric values:	17	10	6	7	2	2	4	2	0	6
Weighting:	7	3	1	7	3	1	7	3	1	7
Step 1 (multiplication) Products:	119	30	6	49	6	2	28	6	0	42

Sample data element:	5	8	0	2	2	5	4	9	6	0
Assigned numeric values:	5	8	0	2	2	5	4	9	6	0
Weighting:	3	1	7	3	1	7	3	1	7	3
Step 1 (multiplication) Products:	15	8	0	6	2	35	12	9	42	0

Sample data element:	1	0	8	6	<	<	<	<	<	<
Assigned numeric values:	1	0	8	6	0	0	0	0	0	0
Weighting:	1	7	3	1	7	3	1	7	3	1
Step 1 (multiplication) Products:	1	0	24	6	0	0	0	0	0	0

Sample data element:	<	<	<	<	<	<	<	<	0
Assigned numeric values:	0	0	0	0	0	0	0	0	0
Weighting:	7	3	1	7	3	1	7	3	1
Step 1 (multiplication) Products:	0	0	0	0	0	0	0	0	0

Step 2 (sum of products)	119	+ 30	+ 6	+ 49	+ 6	+ 2	+ 28	+ 6	+ 0	+ 42
Step 2 (sum of products)	15	+ 8	+ 0	+ 6	+ 2	+ 35	+ 12	+ 9	+ 42	+ 0
Step 2 (sum of products)	1	+ 0	+ 24	+ 6	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0
Step 2 (sum of products)	0	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0	
Step 2 (sum of products)	448									

Step 3 (division by modulus) $\dfrac{448}{10}$ = 44, remainder 8

Step 4. Check digit is the remainder, 8. The lower line of MRZ data together with its composite check digit may consequently be written as follows:

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Example 4 — Composite check digit calculation for TD1 documents

Using the upper and middle lines of MRZ data of a TD1 that follow as an example for coding the composite check digit, the calculation will be:

Upper machine readable line (character positions 1–30): I<YTOD231458907<<<<<<<<<<<<<<<

Middle machine readable line (character positions 1–29): 3407127M9507122YT0<<<<<<<<<<

Sample data element:	D	2	3	1	4	5	8	9	0	7
Assigned numeric values:	13	2	3	1	4	5	8	9	0	7
Weighting:	7	3	1	7	3	1	7	3	1	7
Step 1 (multiplication) Products:	91	6	3	7	12	5	56	27	0	49

Sample data element:	<	<	<	<	<	<	<	<	<	<
Assigned numeric values:	0	0	0	0	0	0	0	0	0	0
Weighting:	3	1	7	3	1	7	3	1	7	3
Step 1 (multiplication) Products:	0	0	0	0	0	0	0	0	0	0

Sample data element:	<	<	<	<	<
Assigned numeric values:	0	0	0	0	0
Weighting:	1	7	3	1	7
Step 1 (multiplication) Products:	0	0	0	0	0

Sample data element:	3	4	0	7	1	2	7	9	5	0
Assigned numeric values:	3	4	0	7	1	2	7	9	5	0
Weighting:	3	1	7	3	1	7	3	1	7	3
Step 1 (multiplication) Products:	9	4	0	21	1	14	21	9	35	0

Sample data element:	7	1	2	2	<	<	<	<	<	<
Assigned numeric values:	7	1	2	2	0	0	0	0	0	0
Weighting:	1	7	3	1	7	3	1	7	3	1
Step 1 (multiplication) Products:	7	7	6	2	0					

Sample data element:	<	<	<	<	<
Assigned numeric values:	0	0	0	0	0
Weighting:	7	3	1	7	3
Step 1 (multiplication) Products:	0	0	0	0	0

Step 2 (sum of products)	91	+	6	+	3	+	7		+	12	+	5	+	56		+	27		+	0	+	49		+
Step 2 (sum of products)	0	+	0	+	0	+	0		+	0	+	0	+	0		+	0		+	0	+	0	+	
Step 2 (sum of products)	0	+	0	+	0	+	0		+	0	+	9	+	4		+	0		+	21		+	1	+
Step 2 (sum of products)	14	+	21		+	9	+	35		+	0	+	7	+	7	+	6	+	2	+	0	+		
Step 2 (sum of products)	0	+	0		+	0	+	0		+	0	+	0	+	0	+	0	+	0	+	0			
Step 2 (sum of products)	= 392																						

Step 3 (division by modulus) $\frac{392}{10} = 39$, remainder 2

Step 4. Check digit is the remainder, 2. The middle line of MRZ data together with its composite check digit may consequently be written as follows: 3407127M9507122YT0<<<<<<<<<<<2.

Example 5 — Composite check digit calculation for TD2 documents.

Using the lower line of MRZ data that follows as an example for coding the composite check digit, the calculation will be: Lower machine readable line (character positions 1–35):

<div align="center">HA672242<6YT05802254M9601086<<<<<<<</div>

Sample data element:	H	A	6	7	2	2	4	2	<	6
Assigned numeric values:	17	10	6	7	2	2	4	2	0	6
Weighting:	7	3	1	7	3	1	7	3	1	7
Step 1 (multiplication) Products:	119	30	6	49	6	2	28	6	0	42

Sample data element:	5	8	0	2	2	5	4	9	6	0
Assigned numeric values:	5	8	0	2	2	5	4	9	6	0
Weighting:	3	1	7	3	1	7	3	1	7	3
Step 1 (multiplication) Products:	15	8	0	6	2	35	12	9	42	0

Sample data element:	1	0	8	6	<	<	<	<	<	<
Assigned numeric values:	1	0	8	6	0	0	0	0	0	0
Weighting:	1	7	3	1	7	3	1	7	3	1
Step 1 (multiplication) Products:	1	0	24	6	0	0	0	0	0	0

Sample data element:	<
Assigned numeric values:	0
Weighting:	7
Step 1 (multiplication) Products:	0

Step 2 (sum of products)	119 +	30 +	6 +	49 +	6 +	2 +	28 +	6 +	0 +	42 +
Step 2 (sum of products)	15 +	8 +	0 +	6 +	2 +	35 +	12 +	9 +	42 +	0 +
Step 2 (sum of products)	1 +	0 +	24 +	6 +	0 +	0 +	0 +	0 +	0 +	0 +
Step 2 (sum of products)	0									
Step 2 (sum of products)	= 448									

Step 3 (division by modulus) $\frac{448}{10} = 44$, remainder 8

Step 4. Check digit is the remainder, 8. The lower line of MRZ data together with its composite check digit may consequently be written as follows:

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