D-Book 12.6

Digital Terrestrial Television Requirements for Interoperability

The unique cross-industry collaboration centre looking after the interests of digital television in the UK. Working with the support of the industry, Government, academia and international partners.

DTG

THE CENTRE OF
UK DIGITAL TV

SUPPORTING:

FreeviewPlay   FreeviewPlay RECORDER   HbbTV

DVB·T   DVB·T2   Freesat   freeview

BT TV   EE   NOW   TalkTalk TV   youview

Introduction

The requirements for interoperability for the first terrestrial television service to launch in the world were set out by industry in the DTG D-Book in 1996. This exceptional cross-industry collaboration continues to reflect innovation in technology and market needs with a new annual edition. It is uniquely implemented across the entire distribution chain, from playout through to the television, set-top box or recorder.

Principally, and in the interests of international harmonisation, the D-Book references international technical standards. Where these are unavailable or not yet stable, the DTG publishes full UK technical requirements in advance of contribution, where appropriate, to the relevant international standards development organisation by the DTG or one of its members. Where it is later possible to reference an ETSI or other standard in subsequent editions the specific D-Book section will be simplified.

As a set of critical implementation guidelines, the D-Book ensures that there is a wide choice of consumer electronics devices available in the market from a range of international manufacturers.

DTG Testing is an independent industry test facility that allows manufacturers to have products verified for interoperability against the D-Book. DTG Testing supports the consumer electronics sector by ensuring device interoperability at the prototype stage. It continues this support when receivers are sold, by testing new services across receivers in the DTG Zoo; a fully connected and operational receiver collection.

As the complexity of the platform increases, the importance of interoperability and conformance against tests is greater than ever. Good interoperability underpins the ongoing success of Freeview and Freeview Play.

The D-Book has successfully supported the introduction of HD, DVB-T2 as well as the clearance of the 700 MHz band - which was completed in August 2020 (but note that, for the time being, one DTT multiplex continues to use channel 55, part of the 700 MHz band 'duplex gap').

Past editions of the D-Book introduced HbbTV references for Freeview Play and the MHEG to HbbTV transition. In addition, support for HEVC and HDR for IP delivered services was introduced.

The D-Book continues to support the development of products and services, including enhancements to coexistence testing; defining the profile of UHD; supporting compatible receivers for broadcast; and bringing the HbbTV requirements up to date with recent work by the HbbTV Association and DVB.

D-Book 12 removed requirements that were no longer needed for the evolution of DTT platforms, such as SD receiver profiles. This evolution continued in D-Book 12.5, mainly reflected in the "SI Rules of Operation" chapter and an update of the Errata of the HbbTV Specification. In addition, an overhaul of the structure improved navigation throughout the document and an effort to unify language and layout.

With the latest update to 12.6, D-Book continues the collaboration with HbbTV and DVB by updating the HbbTV requirements to the latest 2.0.3 specification. HbbTV support becomes a mandatory requirement, marking a new stage in the MHEG to HbbTV transition.

The DTG welcomes contributions from members on the evolution towards hybrid distribution systems which will feed into the development of future D-Books. The DTG continues to ensure European and international harmonisation wherever possible while meeting the needs of the rapidly developing and highly successful UK TV market.

Martyn Traynor
Principal Engineer, DTG
October 2021

F Displayable Character Repertoire

F.1 Introduction

Table F-1 lists the displayable characters that shall be implemented by all decoders conforming to this specification.

The character set requirements for HbbTV are defined in TS 102 796 [89] clause 10.2.1, which in turn references TS 102 809 [86], annex C. The character set in that annex includes all characters in the table below, except for character code 066B, Decimal Separator.

Note that the UK MHEG-5 profile and HbbTV specifications specify several characters that are not defined within ISO/IEC 6937 [23] on which the DVB SI specifications are based. These characters may be broadcast in, and shall be displayed correctly within, interactive applications; there is no guarantee that they will be displayed correctly within SI delivered text. The characters in the shaded cells are shown only to emphasise gaps.

UCS-2	UTF-8	ISO/IEC 6937 [23]	Glyph	Unicode Name for Character	Mandatory for MHEG	Mandatory for SI
0020	20	20		Space	Y	Y
0021	21	21	!	Exclamation Mark	Y	Y
0022	22	22	"	Quotation Mark	Y	Y
0023	23	23	#	Number Sign	Y	Y
0024	24	24	$	Dollar Sign	Y	Y
0025	25	25	%	Percent Sign	Y	Y
0026	26	26	&	Ampersand	Y	Y
0027	27	27	'	Apostrophe	Y	Y
0028	28	28	(	Left Parenthesis	Y	Y
0029	29	29	)	Right Parenthesis	Y	Y
002A	2A	2A	*	Asterisk	Y	Y
002B	2B	2B	+	Plus Sign	Y	Y
002C	2C	2C	,	Comma	Y	Y
002D	2D	2D	-	Hyphen-minus	Y	Y
002E	2E	2E	.	Full Stop	Y	Y
002F	2F	2F	/	Solidus	Y	Y
0030	30	30	0	Digit Zero	Y	Y
0031	31	31	1	Digit One [a]	Y	Y
0032	32	32	2	Digit Two [a]	Y	Y
0033	33	33	3	Digit Three [a]	Y	Y
0034	34	34	4	Digit Four[a]	Y	Y
0035	35	35	5	Digit Five [a]	Y	Y
0036	36	36	6	Digit Six [a]	Y	Y
0037	37	37	7	Digit Seven [a]	Y	Y
0038	38	38	8	Digit Eight [a]	Y	Y
0039	39	39	9	Digit Nine [a]	Y	Y
003A	3A	3A	:	Colon	Y	Y
003B	3B	3B	;	Semicolon	Y	Y
003C	3C	3C	<	Less-than Sign	Y	Y
003D	3D	3D	=	Equals Sign	Y	Y
003E	3E	3E	>	Greater-than Sign	Y	Y
003F	3F	3F	?	Question Mark	Y	Y
0040	40	40	@	Commercial At	Y	Y
0041	41	41	A	Latin Capital Letter A	Y	Y
0042	42	42	B	Latin Capital Letter B	Y	Y
0043	43	43	C	Latin Capital Letter C	Y	Y

UCS-2	UTF-8	ISO/IEC 6937 [23]	Glyph	Unicode Name for Character	Mandatory for MHEG	Mandatory for SI
0044	44	44	D	Latin Capital Letter D	Y	Y
0045	45	45	E	Latin Capital Letter E	Y	Y
0046	46	46	F	Latin Capital Letter F	Y	Y
0047	47	47	G	Latin Capital Letter G	Y	Y
0048	48	48	H	Latin Capital Letter H	Y	Y
0049	49	49	I	Latin Capital Letter I	Y	Y
004A	4A	4A	J	Latin Capital Letter J	Y	Y
004B	4B	4B	K	Latin Capital Letter K	Y	Y
004C	4C	4C	L	Latin Capital Letter L	Y	Y
004D	4D	4D	M	Latin Capital Letter M	Y	Y
004E	4E	4E	N	Latin Capital Letter N	Y	Y
004F	4F	4F	O	Latin Capital Letter O	Y	Y
0050	50	50	P	Latin Capital Letter P	Y	Y
0051	51	51	Q	Latin Capital Letter Q	Y	Y
0052	52	52	R	Latin Capital Letter R	Y	Y
0053	53	53	S	Latin Capital Letter S	Y	Y
0054	54	54	T	Latin Capital Letter T	Y	Y
0055	55	55	U	Latin Capital Letter U	Y	Y
0056	56	56	V	Latin Capital Letter V	Y	Y
0057	57	57	W	Latin Capital Letter W	Y	Y
0058	58	58	X	Latin Capital Letter X	Y	Y
0059	59	59	Y	Latin Capital Letter Y	Y	Y
005A	5A	5A	Z	Latin Capital Letter Z	Y	Y
005B	5B	5B	[	Left Square Bracket	Y	Y
005C	5C	5C	\	Reverse Solidus	Y	Y
005D	5D	5D	]	Right Square Bracket	Y	Y
005E	5E	5E	^	Circumflex Accent	Y	Y
005F	5F	5F	_	Low Line	Y	Y
0060	60	60	`	Grave Accent	Y	Y
0061	61	61	a	Latin Small Letter A	Y	Y
0062	62	62	b	Latin Small Letter B	Y	Y
0063	63	63	c	Latin Small Letter C	Y	Y
0064	64	64	d	Latin Small Letter D	Y	Y
0065	65	65	e	Latin Small Letter E	Y	Y
0066	66	66	f	Latin Small Letter F	Y	Y
0067	67	67	g	Latin Small Letter G	Y	Y
0068	68	68	h	Latin Small Letter H	Y	Y
0069	69	69	i	Latin Small Letter I	Y	Y
006A	6A	6A	j	Latin Small Letter J	Y	Y
006B	6B	6B	k	Latin Small Letter K	Y	Y
006C	6C	6C	l	Latin Small Letter L	Y	Y
006D	6D	6D	m	Latin Small Letter M	Y	Y
006E	6E	6E	n	Latin Small Letter N	Y	Y
006F	6F	6F	o	Latin Small Letter O	Y	Y
0070	70	70	p	Latin Small Letter P	Y	Y
0071	71	71	q	Latin Small Letter Q	Y	Y
0072	72	72	r	Latin Small Letter R	Y	Y
0073	73	73	s	Latin Small Letter S	Y	Y
0074	74	74	t	Latin Small Letter T	Y	Y
0075	75	75	u	Latin Small Letter U	Y	Y
0076	76	76	v	Latin Small Letter V	Y	Y
0077	77	77	w	Latin Small Letter W	Y	Y

UCS-2	UTF-8	ISO/IEC 6937 [23]	Glyph	Unicode Name for Character	Mandatory for MHEG	Mandatory for SI
0078	78	78	x	Latin Small Letter X	Y	Y
0079	79	79	y	Latin Small Letter Y	Y	Y
007A	7A	7A	z	Latin Small Letter Z	Y	Y
007B	7B	7B	{	Left Curly Bracket	Y	Y
007C	7C	7C	|	Vertical Line	Y	Y
007D	7D	7D	}	Right Curly Bracket	Y	Y
007E	7E	7E	~	Tilde	Y	Y
00A0	C2A0	A0		No-break Space	Y	Y
00A1	C2A1	A1	¡	Inverted Exclamation Mark	Y	Y
00A2	C2A2	A2	¢	Cent Sign	Y	Y
00A3	C2A3	A3	£	Pound Sign	Y	Y
00A5	C2A5	A5	¥	Yen Sign	Y	Y
00A9	C2A9	D3	©	Copyright Sign	Y	Y
00AB	C2AB	AB	«	Left-pointing Double Angle Quotation Mark	Y	Y
00AE	C2AE	D2	®	Registered Sign	Y	Y
00B0	C2B0	B0	°	Degree Sign	Y	Y
00B6	C2B6	B6	¶	Pilcrow Sign	Y	Y
00B7	C2B7	B7	·	Middle Dot	Y	Y
00BB	C2BB	BB	»	Right-pointing Double Angle Quotation Mark	Y	Y
00BC	C2BC	BC	¼	Vulgar Fraction One Quarter	Y	Y
00BD	C2BD	BD	½	Vulgar Fraction One Half	Y	Y
00BE	C2BE	BE	¾	Vulgar Fraction Three Quarters	Y	Y
00BF	C2BF	BF	¿	Inverted Question Mark	Y	Y
00C0	C380	C1 41	À	Latin Capital Letter A with Grave	Y	Y
00C1	C381	C2 41	Á	Latin Capital Letter A with Acute	Y	Y
00C2	C382	C3 41	Â	Latin Capital Letter A with Circumflex	Y	Y
00C3	C383	C4 41	Ã	Latin Capital Letter A with Tilde	Y	Y
00C4	C384	C8 41	Ä	Latin Capital Letter A with Diaeresis	Y	Y
00C5	C385	CA 41	Å	Latin Capital Letter A with Ring Above	Y	Y
00C6	C386	E1	Æ	Latin Capital Letter Ae	Y	Y
00C7	C387	CB 43	Ç	Latin Capital Letter C with Cedilla	Y	Y
00C8	C388	C1 45	È	Latin Capital Letter E with Grave	Y	Y
00C9	C389	C2 45	É	Latin Capital Letter E with Acute	Y	Y
00CA	C38A	C3 45	Ê	Latin Capital Letter E with Circumflex	Y	Y
00CB	C38B	C8 45	Ë	Latin Capital Letter E with Diaeresis	Y	Y
00CC	C38C	C1 49	Ì	Latin Capital Letter I With Grave	Y	Y

UCS-2	UTF-8	ISO/IEC 6937 [23]	Glyph	Unicode Name for Character	Mandatory for MHEG	Mandatory for SI
00CD	C38D	C2 49	Í	Latin Capital Letter I With Acute	Y	Y
00CE	C38E	C3 49	Î	Latin Capital Letter I With Circumflex	Y	Y
00CF	C38F	C8 49	Ï	Latin Capital Letter I With Diaeresis	Y	Y
00D1	C391	C4 4E	Ñ	Latin Capital Letter N with Tilde	Y	Y
00D2	C392	C1 4F	Ò	Latin Capital Letter O with Grave	Y	Y
00D3	C393	C2 4F	Ó	Latin Capital Letter O with Acute	Y	Y
00D4	C394	C3 4F	Ô	Latin Capital Letter O with Circumflex	Y	Y
00D5	C395	C4 4F	Õ	Latin Capital Letter O with Tilde	Y	Y
00D6	C396	C8 4F	Ö	Latin Capital Letter O with Diaeresis	Y	Y
00D7	C397	B4	×	Multiplication Sign[a]	Y	Y
00D8	C398	E9	Ø	Latin Capital Letter O with Stroke	Y	Y
00D9	C399	C1 55	Ù	Latin Capital Letter U with Grave	Y	Y
00DA	C39A	C2 55	Ú	Latin Capital Letter U with Acute	Y	Y
00DB	C39B	C3 55	Û	Latin Capital Letter U with Circumflex	Y	Y
00DC	C39C	C8 55	Ü	Latin Capital Letter U with Diaeresis	Y	Y
00DD	C39D	C2 59	Ý	Latin Capital Letter Y with Acute	Y	Y
00DF	C39F	FB	ß	Latin Small Letter Sharp S	Y	Y
00E0	C3A0	C1 61	à	Latin Small Letter A with Grave	Y	Y
00E1	C3A1	C2 61	á	Latin Small Letter A with Acute	Y	Y
00E2	C3A2	C3 61	â	Latin Small Letter A with Circumflex	Y	Y
00E3	C3A3	C4 61	ã	Latin Small Letter A with Tilde	Y	Y
00E4	C3A4	C8 61	ä	Latin Small Letter A with Diaeresis	Y	Y
00E5	C3A5	CA 61	å	Latin Small Letter A with Ring Above	Y	Y
00E6	C3A6	F1	æ	Latin Small Letter Ae	Y	Y
00E7	C3A7	CB 63	ç	Latin Small Letter C with Cedilla	Y	Y
00E8	C3A8	C1 65	è	Latin Small Letter E with Grave	Y	Y
00E9	C3A9	C2 65	é	Latin Small Letter E with Acute	Y	Y
00EA	C3AA	C3 65	ê	Latin Small Letter E with Circumflex	Y	Y

UCS-2	UTF-8	ISO/IEC 6937 [23]	Glyph	Unicode Name for Character	Mandatory for MHEG	Mandatory for SI
00EB	C3AB	C8 65	ë	Latin Small Letter E with Diaeresis	Y	Y
00EC	C3AC	C1 69	ì	Latin Small Letter I With Grave	Y	Y
00ED	C3AD	C2 69	í	Latin Small Letter I With Acute	Y	Y
00EE	C3AE	C3 69	î	Latin Small Letter I With Circumflex	Y	Y
00EF	C3AF	C8 69	ï	Latin Small Letter I With Diaeresis	Y	Y
00F1	C3B1	C4 6E	ñ	Latin Small Letter N with Tilde	Y	Y
00F2	C3B2	C1 6F	ò	Latin Small Letter O with Grave	Y	Y
00F3	C3B3	C2 6F	ó	Latin Small Letter O with Acute	Y	Y
00F4	C3B4	C3 6F	ô	Latin Small Letter O with Circumflex	Y	Y
00F5	C3B5	C4 6F	õ	Latin Small Letter O with Tilde	Y	Y
00F6	C3B6	C8 6F	ö	Latin Small Letter O with Diaeresis	Y	Y
00F7	C3B7	B8	÷	Division Sign[a]	Y	Y
00F8	C3B8	F9	ø	Latin Small Letter O with Stroke	Y	Y
00F9	C3B9	C1 75	ù	Latin Small Letter U with Grave	Y	Y
00FA	C3BA	C2 75	ú	Latin Small Letter U with Acute	Y	Y
00FB	C3BB	C3 75	û	Latin Small Letter U with Circumflex	Y	Y
00FC	C3BC	C8 75	ü	Latin Small Letter U with Diaeresis	Y	Y
00FD	C3BD	C2 79	ý	Latin Small Letter Y with Acute	Y	Y
00FF	C3BF	C8 79	ÿ	Latin Small Letter Y with Diaeresis	Y	Y
0131	C4B1	F5	ı	Latin Small Letter Dotless I	Y	Y
0152	C592	EA	Œ	Latin Capital Ligature OE	Y	Y
0153	C593	FA	œ	Latin Small Ligature OE	Y	Y
0174	C5B4	C3 57	Ŵ	Latin Capital Letter W with Circumflex	Y	Y
0175	C5B5	C3 77	ŵ	Latin Small Letter W with Circumflex	Y	Y
0176	C5B6	C3 59	Ŷ	Latin Capital Letter Y with Circumflex	Y	Y
0177	C5B7	C3 79	ŷ	Latin Small Letter Y with Circumflex	Y	Y
0178	C5B8	C8 59	Ÿ	Latin Capital Letter Y with Diaeresis	Y	Y
066B	D9AB	-	.	Decimal Separator [a][b]	Y	n

UCS-2	UTF-8	ISO/IEC 6937 [23]	Glyph	Unicode Name for Character	Mandatory for MHEG	Mandatory for SI
1E80	E1BA80	-	Ẁ	Latin Capital Letter W with Grave	Y	n
1E81	E1BA81	-	ẁ	Latin Small Letter W with Grave	Y	n
1E82	E1BA82	-	Ẃ	Latin Capital Letter W with Acute	Y	n
1E83	E1BA83	-	ẃ	Latin Small Letter W with Acute	Y	n
1E84	E1BA84	-	Ẅ	Latin Capital Letter W with Diaeresis	Y	n
1E85	E1BA85	-	ẅ	Latin Small Letter W with Diaeresis	Y	n
1EF2	E1BBB2	-	Ỳ	Latin Capital Letter Y with Grave	Y	n
1EF3	E1BBB3	-	ỳ	Latin Small Letter Y with Grave	Y	n
2007	E28087	-		Figure Space [a]	Y	n
2013	E28093	-	–	En Dash	Y	n
2014	E28094	?	—	Em Dash	Y	n
2018	E28098	A9	'	Left Single Quotation Mark	Y	Y
2019	E28099	B9	'	Right Single Quotation Mark	Y	Y
201C	E2809C	AA	"	Left Double Quotation Mark	Y	Y
201D	E2809D	BA	"	Right Double Quotation Mark	Y	Y
2022	E280A2	-	•	Bullet	Y	n
2039	E280B9	-	‹	Single Left-pointing Angle Quotation Mark	Y	n
203A	E280BA	-	›	Single Right-pointing Angle Quotation Mark	Y	n
2044	E28184	-	⁄	Fraction Slash	Y	n
20AC	E282AC	A4	€	Euro-currency Sign	Y	Y
2122	E284A2	D4	™	Trademark Sign	Y	Y
2190	E28690	AC	←	Leftwards Arrow	Y	Y
2191	E28691	AD	↑	Upwards Arrow	Y	Y
2192	E28692	AE	→	Rightwards Arrow	Y	Y
2193	E28693	AF	↓	Downwards Arrow	Y	Y
2212	E28892	-	−	Minus Sign [a]	Y	n
2214	E28894	-	+	Plus (monospaced) [a]	Y	n
2215	E28895	-	∕	Division Slash [a]	Y	n
221E	E2889E	-	∞	Infinity	Y	n
266B	E299AB	-	♫	Beamed Eighth Notes	Y	n
2713	E29C93	-	✓	Check Mark	Y	n
2717	E29C97	-	✗	Ballot X	Y	n

a] Digits have the same width as the Digit Zero (0x0030)

b] Not required for HbbTV implementation

Table F-1. Set of displayable characters supported by a compliant receiver