Core Receiver Requirements for Digital Switchover Help Scheme

The Government confirmed in September 2005 that digital switchover would proceed on a region by region basis, starting in Border region in 2008, and completing the process in the UK by the end of 2012. Government also announced a support scheme to make sure that no one is left behind in the switch. It will provide help with equipment and installation and follow-up support for people aged 75 years and over and people with significant disabilities.

This assistance will be provided to

(a) households where someone is aged 75 or over; and
(b) households with people with severe disabilities (defined as those people eligible for either Disability Living Allowance or Attendance Allowance or equivalent benefits); and
(c) households with one person registered as blind or partially sighted.

Assistance will consist of providing the necessary equipment to convert one TV set and the relevant help to install and use such equipment, including where necessary provision of appropriate set-top aerials or aerial upgrades.

This help will be free for the poorest eligible households those on Income Support, Job Seekers' Allowance or Pension Credit. We will charge a modest fee to others.

The equipment provided needs to be easy to use and to allow consumers to get all the services they have now and all the specific functionalities they need, such as subtitles or audio-description. The scheme itself needs to be easy to access and be designed around the specific needs of those who will need assistance.

We envisage the assistance scheme being managed by an organisation, as yet not specified, which will contract with one or more companies for the installation service, reflecting the fact that those eligible for assistance will be able to choose between the different platform offerings. The installation service providers may be responsible for providing the necessary consumer equipment. This will include set top boxes but may also include integrated digital televisions and personal video recorders, against a charge.

The DTI and DCMS, with advice from the BBC, have worked with the Consumer Expert Group on Core Receiver Requirements for the consumer equipment which we believe best meet the needs of older and disabled people. The government is aware that the pace of technological change demands flexibility as well as the need to specify core requirements. Equally, we recognise that respective industries will need appropriate lead time, to manufacture and produce the relevant technology.

This is why we conducted a consultation on the draft core receiver requirements for the equipment which we felt should be available to those eligible to the Assistance Scheme.

The consultation on Core Receiver Requirements for digital TV receivers, which closed on 8 September, proposed a core suite of requirements for receivers to be supplied under the Digital Switchover Help Scheme. The majority of responses indicated strong support for the full suite of requirements. There were some reservations from the supply chain, but these related mainly to the supply of receivers to the open market. (The consultation included a request for comments on the suitability of the proposed requirements to underpin the promotion of "best practice" in the market place.)

There was broad agreement that it was feasible to meet the proposed set of requirements within currently available technology. In their response Intellect noted that "The market is moving towards the inclusion of some of the access features like 'audio description' and recorded 'closed subtitles' anyway and working closely with manufacturers within the switchover programme can help to move this forward."

Given this situation, the intention is to base an offer to tender for a ‘contract of supply’ for a set top box for the Help Scheme on the requirements set out in the consultation document and reproduced at Annex A.

Companies interested in this type of arrangement should e-mail Patrick Brown Patrick.brown@culture.gsi.gov.uk

Annex A

Core Receiver Requirements document for Digital Switchover Help Scheme

This requirements document is for the provision of receiving equipment for the Digital Switchover Help Scheme.

For the purpose of this document 'shall' is a requirement and 'should' is a desirable.

The working premises are that a receiver meeting these requirements

- **should** set a high standard of "ease of use" whilst meeting the usability needs of the widest possible range of users and user-capabilities ;
- **shall** be capable of being operated by alternative remote controls which have been designed for people with dexterity problems ;
- **should** be capable at least of receiving all free-to-air standard-definition services including access-service components, digital text and interactive elements ;
- for DTT, **shall** be capable of adjusting to the inevitable shift in channels and frequencies which will take place during digital switchover ;
- **should** be capable of interoperability with most televisions available on the market &
- **shall** meet UK Government Procurement Requirements for Sustainable Products.- (see www.mtprog.com for current and future indicative requirements)

Such a receiver might be either a set-top box or an iDTV and could, of course, also incorporate other functionalities[1] not directly covered by the requirements defined here.

The requirement is in two sections, each of ***equal*** importance. Core functional requirements identified in section A are derived from, or consistent with, those recorded in the UK D-book v4 chapter 22 with some adaptations in the context of digital switch-over and platform neutrality [2].

Requirements specifically related to usability are identified in section B. These are requirements which have been identified by the Consumer Experts Group and described in their report entitled "Digital TV Equipment: Vulnerable Consumer Requirements" presented to the Government and Digital UK in March 2006.

Taken together these will form the basis of Core Requirements for receiving equipment for the vulnerable (elderly and those with disabilities) - the Assistance Scheme.

Central to any practicable design **should** be the principle that the receiver will be used by people with a wide range of abilities. A significant proportion of these will be used to very simple interfaces with their existing analogue TV equipment and some will be unaccustomed to complex menu-driven user interfaces. A small set of guiding principles **should** include that the UI **should** be simple to understand, **should** provide explicit user feedback for actions initiated by the user, **should**, where feasible, hide invisible behaviour (eg. autoscan, software downloads etc.) and, above all, **should** leave the user in no doubt as to where they are in any necessary navigation and how to return to the root or default decoding condition.

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1 eg. PDR, diversity reception, internet access, decoding of encrypted services, multi-device remotes etc.

2 The text of which is publicly accessible at http://www.dtg.org.uk/publications/books/dbook_ch22.pdf

Note that this is a document defining ***requirements*** of the receiving equipment– it is *not* a functional specification, nor does it, *at this stage,* specifically address issues such as packaging or user instructions.

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	Contact :	**Patrick.brown@culture.gsi.gov.uk**

A Requirements derived from UK D-book v4.0 section 22

The core receiver requirements of this section are derived from, or are consistent, with section 22 (Receiver Requirements) of the UK D-book v4.0 with minor modifications.

To avoid any doubt, the requirements in this section should be read with the following clarifications.

- *The receiver **should** be capable of simultaneously displaying subtitles and relevant user-interface data (menus, feedback icons - eg. mute etc.) where these don't compete for screen space **or** of temporarily suspending subtitle display during such a user-initiated dialogue and restoring them as appropriate.*
- *AD decoding and support **shall** be mandatory (items 1 & 1.4)*
- *Full EPG content information **shall** be presented to the user in appropriate form inc. availability of subtitles and AD (item 3)*
- *The receiver **shall** identify and respond to changes in the service line-up without undue disturbance to the viewer (items 3 & 3.3).*
- *A DTT receiver **shall** automatically identify changes in the receivable multiplexes (including new frequencies) from substantive changes to the data signalled in the Service Information within the received bit-stream (ie. in the NIT and/or SDT), update the relevant cached information and, where appropriate, execute a rescan in a suitable user-friendly manner (item 3.1). It is highly desirable that the strategy taken for any rescan can be made transparent (optimally wholly invisible) to the user [3]. This requirement is especially important over the transition period for DSO within any region.*
- *A DTT receiver **shall** correctly manage multiple instances of a service so that the optimum instance of that service is presented to the viewer (item 3.2.1) on the assumption that broadcasters have correctly identified their services. Where possible this **should** be capable of being performed automatically although optional manual override may be desirable. This requirement is especially important over the transition period for DSO within any region.*
- *The receiver **shall** provide the user with a means of selecting, reordering and/or filtering favourites (item 3.4.1.1).*
- *The receiver **should** optionally provide a suitable contemporary and cost-effective form of data I/O (item 4.4). This could be used to support supplementary assistive equipment (eg. voice synthesis of menu commands).*
- *The receiver remote control protocol and codes **shall** be made available to designers of alternative remotes (eg. for those with manual dexterity challenges) or of alternative specialist assistive technologies (eg. voice activated command input).*
- *In this section of the requirements the numeric part of each item reference maps directly to item numbers in section 22 of the D-book.*
- *Digital receivers **shall** be capable of decoding radio services.*
- *In the context of energy efficiency and avoiding screen burn, receivers **should** adopt suitable strategies to blank or to reduce the amplitude of static on-screen displays (inc. placeholders for radio services) after a suitable time delay.*

[Implementing many of these requirements may also substantially reduce the amount of post-installation support needed (eg. via a Digital UK, manufacturer or supply-chain help-line). In the "support benefit" column of the tables in this section "+" represents a clear positive support benefit whilst "±" indicates that there might be both benefits and costs (eg. with the provision of user preference storage). This attribute does ***not*** represent ease or difficulty of implementation.]

[3] eg. when the receiver is in "standby" or at a suitable time (early morning) which can be redefined by the user.

Item	Function	Details and D-book references	Status	Notes	Support benefit
A1	**Services**	**Summary** The receiver must give access to all UK free-to-view broadcast television, radio and enhanced television services. This must include the capability to: efficiently handle Digital Text and Enhanced Broadcast elements of all services; present subtitles (where broadcast) if requested by the viewer; handle both widescreen and 4:3 picture formats as required for the connected display. Receivers **should** be able to present both subtitles and interactive graphics or user-interface graphics simultaneously. Support for Audio Description is mandatory.			
A1.1	Time-exclusive services	The receiver **shall** handle the transition between the active and inactive states of a time exclusive service in an orderly fashion, presenting clean transitions into and out of video, audio and MHEG streams without presentation of any content or application not intended for the selected service. See D-book sections 6 and 8.	Req.		+
A1.2	MPEG-2 audio, video	See D-book sections 2, 3 and 4.	Req.	Including audio-only (eg. radio) services and AV services whose components are accessed via MHEG (eg. BBC Parliament on DTT)	+
A1.3	Subtitles	*For DTT, see D-book section 5.*	Req.		+
A1.3.1	Display of subtitles during enhanced programming	Where both are components of a service, ability to simultaneously present both Subtitles and MHEG application graphics if required by viewer preferences. See D-book sections 16.5, “Application impact on stream decoder specification”, and 14.2, “The colour palette” or by other means.	Opt.	Receivers must observe the rules enabling MHEG applications to suspend presentation of Subtitles where editorially required.	+
A1.4	Audio Description	Receivers **shall** be capable of presenting audio description with at least the minimum user controls *appropriate for the platform*. See section D-book 4.5, “Audio description”.	Req.	Design of controls **should** take into account that many users of audio description are visually impaired. *Receiver-mix AD for DTT, “broadcaster-mix” for DSAT*	±
A1.5	Widescreen	See D-book section 3.4, “Video format signaling extensions”.			+
A1.5.1	Active Format Descriptors	Ability to handle widescreen and 4:3 picture format changes as detailed in the ‘D-Book’ including support for correct aspect ratio and Active Format Descriptors. See D-book section 3.4.2, “Active format description”.	Req.	***NB: DTT-specific*** Broadcasters also to enforce correct use of guidelines .	+
A1.5.2	14x9 processing	Receiver **shall** offer the option of a 14x9 picture format when working with 4x3 displays. See D-book section 3.4.2.5, “Set Top Box (STB)”.	*Opt.*	Preferred terminology is “Letterbox mode” or “LB” with appropriate numerals to denote the exact mode selected.	

Table A-1. Services

Item	Function	Details and D-book references	Status	Notes	Support benefit
A2	**Tuner / Decoder**	**Summary** The DTT network is still evolving. Receivers must support a range of transmission parameters and modes to allow for changes in the use of allocated spectrum. DTT Receivers must meet minimum performance criteria to maximise both network coverage and the reliability of the retail process, i.e. use of coverage predictions. These requirements are addressed by section 10, including the following:			
A2.1	Band	UHF	Req.	***NB: DTT-specific***	
A2.2	FFT Size	The receiver **shall** be capable of detecting and presenting services transmitted using both 2K and 8K.	Req.	***NB: DTT-specific***	+
A2.2.1	Modulation	All modulation types QPSK (DTT & DSAT), plus 16QAM & 64QAM (DTT)	Req.		
A2.2.2	Code Rate	All code rates.	Req.	***NB: DTT-specific***	
A2.2.3	Guard Interval	All guard intervals.	Req.	***NB: DTT-specific***	+
A2.2.4	Hierarchical	Receiver **shall** not malfunction in the presence of hierarchical transmissions but is not required to decode them.	Req.	***NB: DTT-specific***	
A2.2.5	SFN Operation	See section 9.9, “Single frequency networks”.	Req.	***NB: DTT-specific*** At least for 8k and short guard intervals	+
A2.3	Performance	Meet performance figures given in section 10.	Req.	***NB: DTT-specific***	

Table A-2. Tuner / Decoder

Item	Function	Details and D-book references	Status	Notes	Support benefit
A3	**Service Information & Selection**	**Summary** On installation receivers must offer the viewer all services that may be received at the current location. Due to the distributed nature of DTT transmission a receiver may be able to receive more than one instance of a particular service, which may include regional variants of a service, and must handle such an occurrence sensibly from a viewer perspective. The services being broadcast in the DTT network will change over time (particularly during digital switch over). To ensure that the viewer is always able to access all service being broadcast, the receiver must detect and reflect to the viewer any such changes with minimal viewer involvement. All services have an associated (Logical) Channel Number. Broadcasters use this as a powerful marketing tool for service promotion to the viewer. Consequently, receivers must ensure that service selection by the viewer using numeric entry **shall** always select a service with a corresponding Logical Channel Number. However, viewers **should** be free to re-order and/or filter the channel list as required if suitable functionality is provided by the receiver. Access to, and use of, accurate service information is essential if the viewer is to enjoy all of the content being broadcast. Receivers must offer a complete list of available services and information about the current and following programmes. At present a comprehensive programme schedule is not transmitted so receivers cannot be expected to offer detailed programme guide functionality. These requirements are addressed by D-book section 8, including the following:			
A3.1	Scanning for multiplexes	For the avoidance of doubt, when first installed and (where relevant) under viewer instruction the receiver **shall** execute a full UHF/transponder scan and detect the presence of all receivable multiplexes.	Req.		+
A3.2	Logical channel numbers	Ability to locate, store and handle services with Logical Channel Numbers (LCNs) within the ranges of 1 to 799.	Req.	***NB: DTT-specific***	+
A3.2.1	Duplicate services	If competing duplicate services (i.e. those that have the same LCN allocated) are received from different transmitters, then the service with the highest received quality **shall** be placed in the correct LCN position and the other(s) made available to the user, for example stored at an alternative unallocated service number. After this allocation, in order to account for user regional viewing preference, the choice of service competing for a common service positioning **should** be user-selectable. 800 – 899 are assigned for services with duplicate LCNs and any service without an associated LCN.	Req.	***NB: DTT-specific***	+
A3.2.2	Receiver specific functions / services	900 – 999 are assigned to receiver specific functions / services.	Req.	***NB: DTT-specific***	
A3.3	Identification of service changes	Automatic identification / storage of services or service changes, without the need for user intervention, by reference to the NIT and/or SDT within 24 hours in the presence of correct NIT signalling. **Should** preferably be without significant disturbance to the viewer.	Req.		+

A3.4	Basic navigation	Ability to use SI to manipulate / navigate such that the receiver has the ability to recognise and appropriately display differently branded services within a single multiplex or between multiplexes, according to section 8.	Req.	Service selection may be by a number of mechanisms, including (but not restricted to) being picked from a service list or identified via numeric entry.	+
A3.4.1	Selection via service list	The initial displayed service list following a full UHF scan must present services in ascending order of LCN.	Req.	***NB: DTT-specific***	+
A3.4.1.1	Favourites	The viewer may re-order and/or filter the presentation of services in the service list. New services **should** not disturb existing viewer favourites.	Req.	Default favourite list in LCN order	+
A3.4.2	Selection via numeric entry	Service selection via numeric entry **shall** always select a service with a corresponding LCN regardless of any viewer favourites.	Req.		
A3.4.3	Hidden services	Services identified as “hidden” **shall** not appear in the service list presented to the viewer. In addition such services may also be identified as not selectable by numeric entry. D-book section 8.	Req.		+
A3.4.4	Unavailable services	Services that are unavailable (eg. on multiplexes that are not accessible) or not supported with this receiver (eg. encrypted in a receiver without CA support) **should** not appear in the service list.	Req.		+
A3.5	ESG	‘Now / Next’ screen guide using information derived from DVB SI EITp/f tables.	Req.		
A3.6	Schedule		Opt		

Table A-3 Service Information & Selection

Item	Function	Details and D-book references	Status	Notes	Support benefit
A4	**Set-up & I/O**	**Summary** Receivers must be both easy to install and use. An existing viewer of analogue services needs to be able to complete a basic digital installation, i.e. just for viewing, using only what has been supplied with the receiver. In addition, on-screen information must be provided in a clear and consistent manner both to aid installation and (if required) to enable an easy dialogue with any support staff, e.g. call-centre. A basic receiver is only required to provide a single output, i.e. a "digital converter" in very real terms. Viewers wishing to also connect the receiver to a recording device, e.g. an analogue VCR, may need to choose a product with an additional output. Consumer assistance may be required at the point of retail. To ensure the best possible reception of the DTT signal viewers will be encouraged to place the digital receiver at the start of any RF chain of looped-through devices. Hence, the need for receivers to loop-through the RF signal is a priority. The inclusion of a dial-up modem is not required.			
A4.1	Easy and simple to use documentation	Receivers **shall** be simple to set up and operate and be provided with clear easy to understand user documentation in line with that requirement. The specification in the D-Book is under development.	Req.	Documentation to include wiring examples to encourage installation of the set-top box or receiver as the first element in the RF chain.	+
A4.1.1	Support package	The following peripheral items **should** be included within a baseline receiver package: An RF fly lead (1m min. length, meeting CAI code of practice); (set-top box only) SCART cable (1m min. length, secure fixing type, fully connected; internal screening on appropriate connections. EN50049-1 [19]) or integral SCART lead; (set-top box only). Remote control and batteries. Handbook.	Req.		+
A4.2	Engineering Diagnostics	A specification for a standardised diagnostic screen is being drawn up by a cross-industry group. This specification may include access to diagnostics, receiver type and serial number, signal quality, etc.	Req.	A DTG subgroup is being set up to deal with this.	+
A4.2.1	Display of signal quality	To include the ability to display the signal quality of a user-selected UHF channel even where the received signal is below the decoding threshold.	Req.	Correlation of the display with signal to be specified.	
A4.3	**Outputs**				
A4.3.1	Primary outputs (STB)	(a) SCART with both composite and RGB with support for widescreen switching on pin 8. plus (b) PAL UHF tuneable to UHF channels 21 to 68.	Req.		
A4.3.3	Secondary outputs (STB)	SCART with composite and optionally RGB or S-video l. SCART input/output connectors fully connected so as to pass all signals. Programmed recording **should** be facilitated by the use of SCART pin 8.	Req	The use of S-video on an S-connector is not recommended due to lack of standardised support for widescreen switching.	
A4.3.3	Secondary outputs (IDTV)	SCART with composite and optionally RGB or S-video l. SCART input/output connectors fully connected so as to pass all signals. Programmed recording **should** be facilitated by the use of SCART pin 8.	Req	The use of S-video on an S-connector is not recommended due to lack of standardised support for widescreen switching.	
A4.3.5	Phono audio		Opt.		
A4.3.6	RF loopthrough	Loop-through must work both when receiver is 'ON' and in 'Stand-by'.	Req.		
A4.4	data I/O		Req.		+

Table A-4. Set-up and I/O

Item	Function	Details and D-book references	Status	Notes	Support benefit
A5	**Remote Control** [4]	**Summary** Unlike other digital platforms it is not practicable to mandate a standard remote control design to DTT. However, it is essential to have a common minimum of remote-control functionality to ensure that all broadcast services – and in particular interactive applications – are available to the viewer as intended by the broadcaster. In addition, any labelling used needs to be consistent both to allow the inclusion of onscreen instructions in broadcast services and to enable an easy dialogue with any support staff, e.g. call centres.			
A5.1	Functionality of remote controls	Functionality in MHEG UK Profile 1 and 25.3, "Recommendations for remote control labelling".	Req.		
A5.2	Standardisation of terminology used and button labels	Standardised remote control labelling & button definitions. See chapter 25, "Remote Control Key Labelling".	Req.	TEG-C activity to provide a common user experience between applications, services and platforms.	+

Table A-5 Remote Control

Item	Function	Details and D-book references	Status	Notes	Support benefit
A6	**Interactivity & software**	**Summary** Enhanced television services are an essential part of the digital TV proposition. Receivers must fully support all specified functionality. Full interactivity through access to a return-path by interactive applications is not currently specified, so receivers cannot be expected to offer such functionality. However, since the inclusion of a dial-up modem in the receiver is not required, if/when return-path functionality is introduced some receivers will never be able to support it. Viewers with such receivers will not be able to use elements of any interactive application that rely on the return-path. Consumer assistance may be required at the point of (and possibly post-) retail if/when return-path functionality is introduced.			
A6.1	MHEG-5 UK Profile 1	MHEG-5 Digital Text, Enhanced Broadcast and Interactive TV services at the UK profile 1.06 specification, and test suite.	Req.	***NB: DTT-specific*** Version 1.06 of the MHEG profile has now been ratified.	

Table A-6. Interactivity & software

Item	Function	Details and D-book references	Status	Notes	Support benefit
A7	**Conditional Access**	**Summary** All DTT free-to-view services are transmitted in the clear. Hence, there is no requirement for a receiver to support either a Conditional Access system or include a Smartcard reader.			*N/A*
A7.1	Conditional Access	D-book section 20	Opt.		-
A7.2	Common Interface	Including extensions	STB Opt. *IDTV Req.	* DTI requirements supporting EC Directive 95/47	-

Table A-7. Conditional Access

[4] Usability requirements for the remote control are covered in detail in section B of this document

Item	Function	Details and D-book references	Status	Notes	Support benefit
A8	**Maintenance & upgrade**	**Summary** The DTT network is still evolving. Digital receivers contain a large amount of software. To allow for changes in either, receivers must be upgradeable in a practical manner, i.e. over-air download. The process of upgrading **should** cause minimal disruption to the viewer. However, to minimise the diversity of deployed software builds and to most efficiently use the available broadcast capacity, the receiver must detect and act upon the broadcast of a relevant software download within 24 hours of its transmission commencing.			
A8.1	Auto-upgrade	Receivers **shall** be capable of automatic (i.e. not user initiated) software upgrade by over-air download with minimal interruption to the viewer and within 24 hours of availability of the download under normal operating conditions.	Req.	For low-cost products with a single bank of flash, the download **should** be implemented when stand-by is selected or by setting a timer for a designated night hour. If stand-by is not selected within 24hours a forced download **should** be initiated at a designated night hour.	+
A8.1.1	Download mechanism	The use of a public standard mechanism, as defined in the section 23, is required.	Req.	It is expected that manufacturers will increasingly adopt DVB SSU as the agreed European standard. This is expected to be included in D-Book in due course.	+
A8.1.2	Downloads in any multiplex.	Receivers **shall** be able to handle the presence of software downloads in any multiplex.	Req.		+
A8.1.3	Detection of upgrade on other Multiplexes	Specification is still in process of definition.	Req.	To overcome cases where the viewer never switched to the mux carrying the upgrade.	+

Table A-8. Maintenance & upgrade (DTT)

Item	Function	Details and D-book references	Status	Notes	Support benefit
A9	**Compliance**	**Summary** The core of the DTT network has been built on open standards. To ensure the development of a true open and horizontal market in receivers, delivering both a reliable and complete viewer experience, conformance to the relevant standards is essential.			
A9.1	DVB	ETSI standards as listed in the relevant sections of the D-Book	Req.		
A9.2	D-Book	Requirements for interoperability as specified in this document.	Req.	In general there is an intention to seek commonality with Europe (E-Book) except where UK requirements differ, but the UK D-Book remains the reference specification.	
A9.3	Energy standards	EU Code of Conduct on Energy Efficiency of Digital TV Service Systems.	Req.	*Qualified by UK Market Transformation Programme efficiency targets appropriate at any time*	
A9.4	Other standards	Applicable UK and EC law and EC Codes of Practice.	Req.		

Table A-9. Compliance

B Usability Requirements

B.1 User Interface

B.1.1 On-screen display

- *The User Interface (UI) **should** be designed using principles derived from good web design practice especially when working down menus, eg. use of clear and unambiguous menu terminology, highlighting current position in the menu etc.. Any selected menu option **should** be highlighted clearly.*
- *There **shall** be a direct and consistent correspondence between relevant on-screen prompts and button labels on the remote control.*
- *Items in pop-up menus **shall** be numbered and directly selectable using numeric keys.*
- *The UI **shall** use a san-serif font designed for readability and use on television & at sizes suitable for normal viewing distances [Tiresias is recommended with 24 line minimum for body text, 18 min. for upper-case]. Mixed case letters **should** be used; if not possible then lower-case **should** be favoured over upper-case. Italic, underlined, oblique or condensed fonts **should** be avoided.*
- *Text **shall** be displayed with good contrast. Colours **should** be limited to an absolute maximum of 85% saturation. Pure red & white and combinations of red and green **should** be avoided.*
- *Arabic numerals only **shall** be used (1, 2, 3, 4, 5…)*
- *Symbols **should** accord with internationally recognised standards (eg. CENELEC standards for symbols for Access Service).*
- *Arrows **should** accord with the ISO7001 specification.*
- *Generous inter-linear spacing **should** be provided. Words **should** have a clear space around them esp. adjacent to symbols. Flashing and scrolling text **should** be avoided.*
- *Left-aligned text **should** be used rather than centred or right-aligned. Justified paragraphs **should** be avoided.*

B.1.2 User Navigation

- *The UI **shall** leave the user in no doubt as to where he or she is in any necessary navigation and how to return to the root or default decoding condition.*
- *In general there **should** be only one way of achieving a particular user goal. (Exceptions would be selecting a service by numeric or P+/P- keys or from an epg. page.).*
- *The UI **shall** provide a direct means of returning to the previous menu screen using a common, clear, unambiguous and consistent action and terminology such as use of a “back” button.*

B.1.3 Feedback

- *The User Interface (UI) **shall** provide explicit and distinguishable user feedback for actions initiated by the user (eg. to acknowledge a highlighted choice, a key stroke, an activated command etc.). This **should** be both visual and audible although audible feedback may be capable of being disabled via the UI. [See also section B2.3]*
- *The UI **shall** leave the user in no doubt as to where he or she is in any necessary navigation and how to return to the root or default decoding condition.*
- *The UI **shall** provide appropriate explicit on-screen information re. system status.*
- *The receiver **should** provide a mechanism to support speech output of text displayed on screen (viz. on-screen text related to menu selection and receiver status message - eg.”no signal”- and the enunciation of channel names, programme names, presence of subtitles/AD and now/next event names). NB: the receiver is not expected to interpret Dtext pages or eTV applications verbally.*

B.1.4 Favourites and user preferences

- *The receiver **shall** provide the user with a means of selecting, reordering and/or filtering the presentation of services in the service list (ie.a "favourites" list). Newly" discovered" services **should** not impact existing favourites without user intervention.*
- *The UI **should** also provide the means of tailoring functionality & user interface to suit the user and of storing and retrieving individual user preferences.*

B.1.5 Invisible behaviour

- *The UI **shall** hide invisible receiver behaviour (eg. autoscan, software downloads etc.) where appropriate.*
- *The receiver **should** detect when software has become unstable and auto-recover without interrupting the presentation of vision and sound for the most-recently-selected service.*
- *Where feasible, software upgrades **should** not cause loss of all relevant existing user settings (eg. volume, subtitles enabled, favourites list etc.).*

B.1.6 Other

- *The UI **shall** provide the means of selecting and deselecting the display of subtitles and, independently, of selecting and deselecting the presentation of audio description.*
- *On-screen receiver set-up procedures **should** use easy-to-understand terms.*

B.2 Remote control

B.2.1 Keys

- *Keys **shall** be large and well separated (eg. at least 50% of button width).*
- *Adjacent keys **shall** be tactilely distinguishable (eg. be raised or have raised edges).*
- *There **shall** be a raised marking on the figure 5 key of the numeric pad.*
- *Keys **shall** be logically grouped by function and those functional groups **should** be separated by more than the distance between keys within each group. Different functions **should** also be distinguished by distinct shapes or texture (see ES 201 384).*

B.2.2 Labelling

- *The remote control **shall** have clear visual markings.*
- *All legends **shall** be clear, legible (in a san serif font and as large as possible) and contrast with the keys and/or backgound*
- *All labelling **shall** be durable and long-lasting (eg. moulded into casing).*
- *The labelling **shall** be intuitive & standardised with a clear meaning for each legend.*

B.2.3 Feedback

- *The receiver **shall** provide visual and audible feedback of pressing a remote key (e.g. click and led flash on pressing). Note that this **should** be a response of the receiver not of the remote control.*

B.2.4 Physical

- *The remote **shall** be capable of single handed operation by either hand.*
- *The remote **shall** be easy to grip and be coated in a non-slippery, textured material.*
- *The directional properties of the communications link from the remote control to the receiver **shall** be as wide angle as possible.*
- *The remote **shall** be stable if placed on a flat surface.*

B.2.5 General

- *Means **shall** be provided to allow various styles and complexity of remote controller to be supplied as options (for example minimalist, large-button etc.)*
- *Basic remote control functions **should** also be available from the receiver front panel (e.g. power on/off, channel up/down, volume up/down).*
- *Means **shall** be provided to dedicate a key to select/deselect subtitles and & to indicate the status of this setting.*
- *The remote **should** have no redundant keys.*
- *Access to the remote's battery compartment **should** be straightforward but proof against small children.*

Note that, particularly for the Targeted Help Receiver, provision in the one package of both a basic and full-function remote offers a simple strategy for supporting the installer/carer/technology-aware user and those for whom DTV is new and who might (initially at least) need little more than the equivalent of their analogue services. The basic remote might have, for example, only 0..9 numeric, P+/P-, V+/V-, STs on/off, MUTE and Power On/Standby keys.

B.3 Subtitles and Audio Description

B.3.1 Subtitles

- *If the user elects to see subtitles when available, this choice **shall** be maintained across channel changes without further user intervention.*

B.3.2 Audio description

- *If the user elects to listen to audio description when available, this choice **shall** be maintained across channel changes without further user intervention.*

B.4 Hardware

B.4.1 Audio output

- *The receiver **shall** provide an easily-accessible audio output at a signal level suitable for driving wireless headphones or inductive loop equipment. It **should** be possible to direct either the AD mix or programme sound to this output.*

B.4.2 Power switch

- *The receiver **shall** provide a power switch in an easily accessible position (eg. on the front panel) with which the receiver can be placed into its lowest power consumption (eg. standby) mode.*

B.4.3 Connections

- *A SCART lead **at least** 1m in length **shall** be provided. This **shall** comply with the appropriate standards not least to ensure that it remains securely in place at all times.*
- *External connections **should** be easily accessible and clearly marked (eg. with colour coding) to match the appropriate connectors with each supplied lead.*