Storm Assistive Technology Products (ATP) Best Practices

Information authored, compiled and/or collated by Peter Jarvis and Nicky Shaw of Storm Interface.

Contents

Notes regarding this document:

The terms 'Self-Service Transaction Machine' (SSTM), 'kiosk' and 'self-service technology' are used interchangeably in this document. All of these terms are used to describe technology which is designed to be used by members of the public without assistance, for example in the same way that a bank's ATM is used.

SSTMs, kiosks and self-service technology are used in a wide variety of business sectors for a variety of different purposes. For example ticketing, retail, voting, wayfinding, visitor check in etc. etc. For the purposes of this document, a user's interaction with an SSTM or kiosk is defined as a 'transaction', regardless of whether the interaction includes payment or not.

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What's the Problem?

Self-service transaction machines (SSTMs) or kiosks which provide a touchscreen only interface create significant disadvantages for those with disabilities. **Access to information and services is denied to those who are unable to see, read or physically interact with a visual display screen.**

The use of self-service technology has been described as an embarrassing and sometimes humiliating experience by those with disabilities. It frequently requires intervention and assistance from staff or other members of the general public.

This is an unacceptable denial of personal independence.

What Are the Requirements (Standards, Mandates, Laws and Legal Precedent)

UK	Equality Act 2010 The European Accessibility Act (EAA) is recognized by the UK. The following link shows its inclusion in The National Archives: www.legislation.gov.uk/eudr/2019/882/annex/I/section/I
Europe	EN 301-549 mandates a comprehensive set of accessibility requirements for public procurement of ICT products and services in the EU. The European Accessibility Act (EAA) came into effect in 2019. This Directive (EU 2019/882) covers private sector products and member states of the EU should have passed the necessary implementation laws by June 28, 2022. Compliance with the EAA is required from June 28, 2025. For more information about the EAA, please see the European Union website here: https://ec.europa.eu/social/main.jsp?catId=1202
North America	Americans with Disabilities Act 2010 (ADA). Design for Accessibility. **Please Note:** In September 2022 the US Access Board issued an ANPRM, which is the first stage in the process of updating the ADA. This update aims to address the inequality in access to various types of self-service transaction machines (SSTMs). More information can be found at https://www.regulations.gov/document/ATBCB-2022-0004-0001 US Department of Transportation: Air Carrier Access Act (ACAA) became effective during 2010 with implementation required to commence by Dec 2016. US Rehabilitation Act: Section 503 [Federal government contractors]. Section 504 [Rights in education, employment and other settings]. Section 508 [Requirements for electronic and information technology developed, maintained, procured or used by the Federal Government]. FCC: 21st Century Communications and Video Accessibility Act (CVAA), requiring communications services and products to be accessible to people with disabilities. Implemented December 2016. The Accessible Canada Act (ACA) came into force in 2019 and the legislation established Accessibility Standards Canada (ASC) to develop national accessibility standards. Accessibility for Ontarians with Disabilities Act (AODA)
Other Territories	United Nations Convention on the Rights of Persons with Disabilities (UNCRPD). W3C Web Content Accessibility Guidelines (WCAG) for international standards.

Consequences of Non-Compliance

Although the Americans with Disabilities Act (ADA) does not mention SSTMs, POS, kiosks and self-service technologies by name, it does not mean that the law does not apply to those technologies. Based on court decisions in various lawsuits, it is clear that the goods, services & information offered to customers via a kiosk or other self-service application must be accessible to all customers, not just those who can see, read or physically interact with a touchscreen.

In a lawsuit against a retailer's inaccessible credit card payment machine, the Department of Justice filed a "Statement of Interest". This Statement provides an insight as to how the DOJ (which is the Government department responsible for overseeing the ADA) views accessibility. The entire Statement of Interest can be found here: https://www.ada.gov/briefs/lucky_brand_soi.pdf

In summary the DOJ view is: "The absence of specific technical standards or regulatory provisions that directly address a public accommodation's obligation to provide accessible POS devices in no way establishes that the accessibility of POS devices is outside the scope of title III, especially where current regulations incorporate specific obligations for effective communication."

This case, along with other POS related topics, is discussed in an article by Seyfarth's ADA Title III Specialty Team Attorneys here: https://www.adatitleiii.com/tag/point-of-sale/

Another Statement of Interest filed by the DOJ on September 20th 2021, was intended to clarify that Title III of the Americans with Disabilities Act requires that public accommodations provide auxiliary aids and services so that individuals with disabilities "can fully and equally enjoy all of their services, including services provided through visual and electronic means on self-service kiosks." This Statement of Interest was filed in a case against a provider of self-service check in kiosks used in medical offices. The plaintiff claims that the touchscreen only interface offered by the kiosk is inaccessible to anyone with visual impairments. According to the plaintiffs, this problem is compounded by the lack of effective auxiliary aids and services which results in an inferior experience for anyone who cannot use the kiosk. The entire Statement of Interest can be found here: https://www.ada.gov/quest_soi.pdf

How Do We Achieve Compliance?

In addition to the visual display screen or touchscreen, system deployers must provide an alternative, ‘accessible’ method for impaired users to navigate and interact with self-service technology.

One widely deployed, effective and compliant solution is to provide users with access to audible descriptions and instructions, enabling them to explore, navigate and select the information, services and products (content) they require. Audible content must be navigable and accessible by use of a tactilely discernable interface (e.g. a keypad). When used in conjunction with appropriate customer interface software and an accredited, tactile navigation keypad, a compliant, practical and accessible solution is achieved. Storm’s range of Assistive Technology Products (ATP) offer the hardware element for this so called ‘Audible-Tactile Content Navigation Solution’. Storm ATP devices have been independently assessed by the RNIB as compliant with the applicable requirements of ADA.

Speech commanded technology may also help to improve accessibility for those who have difficulty using a touchscreen. Many Storm ATP devices now include microphone support, although it should be noted that this mode of access is not designed to replace the previously described ‘Audible-Tactile Content Navigation Solution’.

When addressing accessibility, system designers should consider a ‘universal design’ approach. The aim should be to provide alternative (additional) means for users to interact independently with any self-service technology. The needs of those with impaired hearing, vision or dexterity must be accommodated. This should help to ensure that the maximum number of users can access and benefit from the products, services & information offered by self-service technology.

The primary requirement is equality in access to information, services and products.

Getting It Right First Time

One of the main goals of self-service technology is to facilitate engagement with as many customers as possible. To help retain customer loyalty and ultimately drive revenue, the experience must also be as frictionless as possible.

With this in mind, deployers of self-service technology are encouraged to consider a ‘universal design’ approach, to help ensure that accessibility is considered in every aspect of the hardware and software design. This approach usually yields a more successful solution and is more cost effective than attempting to add accessibility features after the hardware has been specified and the software written.

For businesses publishing an RFP or an RFQ ahead of the project, it should be written such that it specifies what is required in terms of accessibility. An article published by TPGi explains how to draft an effective RFQ and the considerations it should include for accessibility: https://www.tpgi.com/writing-a-kiosk-rfp-recommended-accessibility-requirements/

Hardware: Possibilities and Best Practice

Storm Assistive Technology Products are widely (globally) deployed. For example:

- Airport/airline check-in
- Retail product search, point-of-order and point-of-payment kiosks
- Interactive digital menu boards (restaurants)
- Access to government and citizen services kiosks (electronic voting)
- Customs and immigration screening kiosks (Global Entry Program)
- Transport system timetables, ticketing and fare collection (Amtrak)
- Hospital and doctor's surgery registration terminals
- Vending machines
- Wayfinding and interactive digital signage
- Post office services kiosks
- Gaming
- Hotels and hospitality

These tactilely discernable keypads are designed to facilitate audible and tactile navigation of any self-service application or customer interface. This is achieved by the connection of a headset, earbuds, cochlea implants or other assistive hearing devices to the Storm ATP device. The device can be operated by those with impaired sight, limited dexterity or those using head-sticks or easy grip styli. As required by mandate, users are able to explore the keypad by touch without unintended activation of the keys. When pressed, the keys deliver a tactile response which the user can feel under their fingertip.

To help ensure compliance with ADA, the ATP range has been independently tested and accredited by The Royal National Institute of Blind People (RNIB) as part of their Tried and Tested program. This RNIB accreditation for each Storm ATP device can be found on Storm's website www.storm-interface.com.

Storm ATP devices are connected via USB 2.0, enumerating as a Human Interface Device (HID) and advanced audio device. They are compatible with many leading OS and kiosk software applications.

Storm ATP devices are sealed to survive regular sanitization using sprayed anti-microbial coatings, disinfectants and common cleaning fluids (they are also weather resistant). As a product designed for use in unsupervised or semi-supervised public environments, they are constructed to withstand hard use and abuse.

Storm Assistive Technology Products are offered for sale as Commercially Available Standard Products (CASP) products and are therefore readily available, with no MOQ, providing an affordable and economically viable solution for manufacturers and deployers of accessible self-service technology.

Overview of Storm ATP Functionality

All Storm Assistive Technology Products (ATP) function in a very similar way. They connect to the host system via USB 2.0 and enumerate as a standard keyboard + HID + standard audio device (i.e. they enumerate as a 'composite device'). Instructions for integration into the host application are provided in the technical manual for each product.

In the base of the audio jack socket found on Storm ATP devices there is a tip switch which detects when a headset jack plug is inserted or disconnected. The ATP device is designed to transmit a unique key press or key release code when either of those events occur. Each button on the ATP device is also assigned a unique key press and key release code which is transmitted to the host application when the button is pressed. The customer interface application must be designed to respond appropriately when it receives each keycode. For example, when the keycode for JACK IN is received, the host application should begin the audio feed, or when the keycode for the BACK button is received it should go back one menu/option, etc. etc.

The key press codes transmitted by the ATP device can be changed if required; either by using the free Software Configuration Utility provided by Storm or by the customer interface application via the API. Key press codes can also be configured at the factory during production (please note this customization may require a minimum order quantity).

Tactilely Discernible Controls

An alternative means of content navigation must be provided for those who cannot see, read or interact with touch screens. An alternative means of content navigation must provide access to all information, services and products provided to those without impairments or disabilities. Alternate means of content navigation must include provision to navigate audible descriptions, instructions, directions and content.

Storm ATP devices include keys that are tactilely discernible without activation. This means that a blind or visually impaired user can explore the ATP device by touch, without fear of inadvertently pressing one of the keys.

The keys of the Storm ATP device all have industry standard, tactile identifiers (idents). They are designed such that the operational boundaries of each key contrast visually and tactilely from background surfaces. The contrast ratio is approximately 3:1.

Keytops are raised above the surrounding surfaces by at least 0.5mm and are operable with one hand, without the need for tight grasping, pinching, or twisting of the wrist. The force required to activate the keys of the Storm ATP device does not exceed 3.0 Newtons.

Key repeat is supported and the delay before repeat is adjustable up to 2 seconds per character.

The keys on the Storm ATP device operate reliably, with a similar tactile dynamic, when pressed anywhere within the discernable keytop boundary, including on or close to a keytop's discernable boundary. Confirmation of a keypress is provided via a tactile response to the keypress. Storm suggest that an audible response to each keypress is also provided by the customer interface software.

Keytop characters or symbols are provided in an accessible, open, 'sans-serif' font/icons, with strong visual contrast against the keytop's operational surface.

Alphabetic Keys

Where kiosk users are required to enter alpha/numeric data, it is recommended that provision of a physical full alpha keyboard be considered in combination with Storm's AudioComm Module. As a guide, Storm would recommend that a physical keyboard be provided whenever the user is required to enter extended strings of characters or primarily text-based content.

The navigation (arrow) keys of the keyboard can be used to navigate onscreen content and audio content can be provided via the Storm AudioComm Module. To help ensure compliance with ADA, all Storm 2210 Series keyboards feature highly tactile keys with a responsive and dynamic key press 'action', along with recognized industry standard tactile idents. The keytop dynamics also allow for tactile exploration of all keys without unintended operation of the keys. Large, high contrast keytop characters with an open sans-serif font are standard across Storm's entire keyboards range.

Storm's public use keyboards are configured in a standard QWERTY style layout. The "F" and "J" keys (home keys), along with other critical reference keys, include raised tactile idents to make them tactilely discernable from the other keys. This enables visually impaired users to locate these 'home keys' and 'reference keys' and thereby understand where the other keys are in relation to these keys (using the keytop counting method). Each key press and character entry should be audibly confirmed to the user with a description of the character or function selected. The keys of Storm keyboards are designed to operate as described in the previous section entitled 'Tactilely Discernible Controls'.

Where a physical QWERTY keyboard is provided, the user should be audibly advised that the keyboard has a standard QWERTY, QWERTZ or AZERTY layout in accordance with the local standard keyboard layout as defined in the country in which the host system is to be installed.

Numeric Keys

When using a Storm numeric keypad in a public use application, it is recommended that a 'telephone layout' keypad be used. Telephone layout keypads comprise 12 keys, laid out like those of a telephone with 1, 2, 3 along the top row of keys. All Storm numeric keypads include a tactile ident on the number 5 which is the industry standard 'home key'. Provision of this tactile ident enables visually impaired users to locate the number 5 key and thereby understand where the other numeric keys are in relation to that key.

The inclusion of alpha characters on numeric keypads is not recommended as the international norms for alternate alpha characters differ from country to country. Additional characters on keytops also compromise the clarity and readability of the primary numeric keys. Where alpha characters are needed, these should be separate from the numeric keys.

Storm's numeric keypads are designed in a grid format on either a regular 16mm or 19mm pitch.

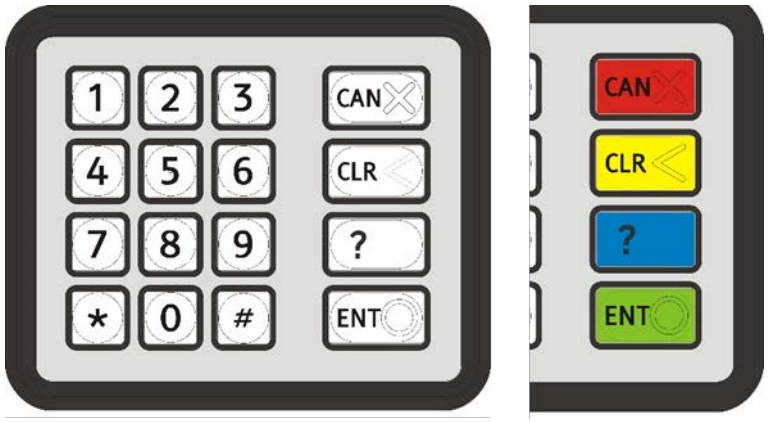


Figure 1 Typical example of a tactilely discernable keypad with function keys

Where additional 'function keys' are included on Storm's numeric keypads, they are always arranged vertically in a column to the right of the numeric keys. For example from top to bottom; CAN, CLR, ?, ENT as found on Storm's 6000 and SF6000 Series keypads. This is the most widely accepted and internationally recognized layout for accessible numeric keypads, often referred to as 'International Telephone Format'.

It is recommended that the Enter Key (when included in a standard numeric keypad array) should be situated as the bottom right key in the keypad array as shown in Figure 1. This rule does not however apply when an Enter (or 'select') key is included as part of a directional or content navigation keypad.

The function keys of the Storm 6000 and SF6000 Series keypads are tactilely and visually differentiated from the numeric keys by adoption of an extended horizonal spacing (pitch) between the function keys and their adjacent numeric keys. The CAN, CLR and ENT function keys also include the designated tactile idents associated with their specific function. Please see the following image (Figure 2).

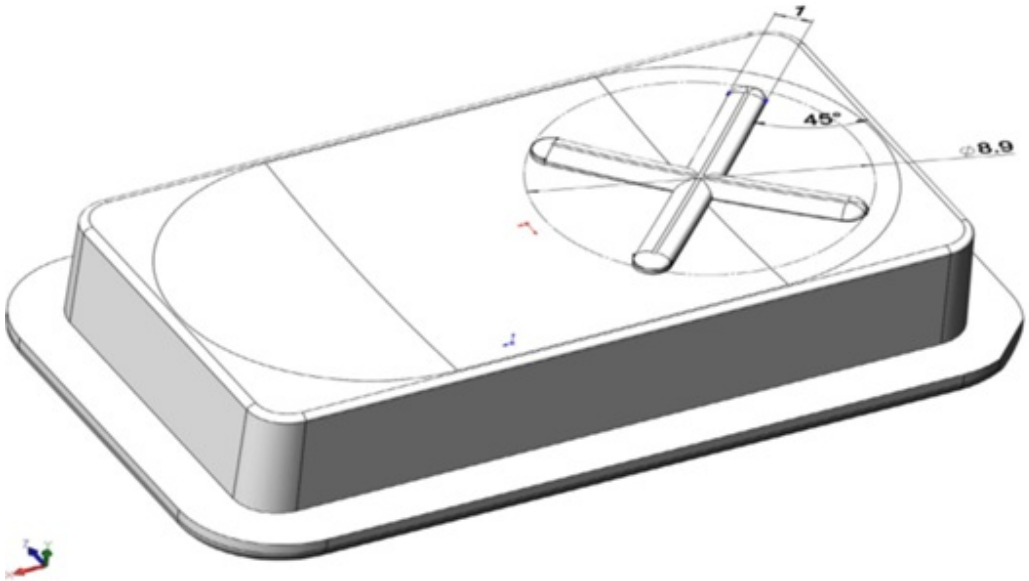


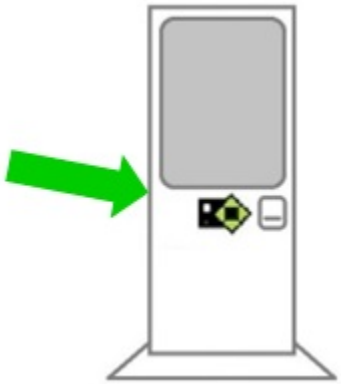
Figure 2 Typical example and form of a tactile ident to denote the specific purpose of a function key. In this case 'CANCEL'

Tactile idents should be a minimum 5.0mm tall x 5.0mm wide. However, it is recommended that tactile idents should, where possible, be larger. (e.g. 10.0mm x 10.0mm). Tactile lines should be approximately 1.0mm in width and be raised a minimum 0.5mm above the surrounding surface. Tactile idents should have radiused edges to avoid sharp corners being presented to the user's fingertips. Where possible function keys should also be delineated by color. For example Red, Yellow, Blue, Green. However please note that whilst color is a useful method of identifying keys there must be some other way of differentiating the keys, for example by including symbols or words on the keytop. This enables people with monochrome vision or who are colorblind to use the keys.

Positioning of Storm Assistive Technology Products (ATP)

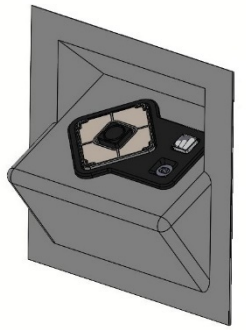
Storm usually suggest that the ATP device be installed just below the touchscreen, as shown in the diagram below.

This diagram shows a Storm AudioNav positioned centrally below the touchscreen. However, there are often other peripherals such as a credit card reader, receipt printer or barcode scanner also installed in this area of the kiosk. This makes it difficult to prescribe an exact and definitive location for the Storm ATP device.



Consideration must be given to the height at which the ATP device is installed. It is important that it be installed at a height that is reachable by both standing users and also those users in a wheelchair (the ADA provides details for where 'operable parts' such as the Storm ATP device should be installed https://www.ada.gov/law-and-regs/design-standards/2010-stds/#308-reach-ranges).

If possible, the operational tactile controls should be presented to the user at an angle of 12° to 45° from the vertical or horizontal plane (depending on the height of installation. This to prevent wrist strain for those of different statures and standing users or users in wheelchairs.



CAD files are available for all products in the ATP range to assist kiosk manufacturers in their kiosk design.

Storm also offer an Externally Mounted AudioNav. This version of the AudioNav provides options for kiosk manufacturers to permanently affix an AudioNav device to the outer casing of a kiosk or to adjacent surfaces such as walls or service counters. An optional 'Quick Release Cradle' allows the AudioNav to be detached from the host system for use as a hand-held device. In this hand-held configuration AudioNav can, if required, be passed directly to any user with limited reach or impaired dexterity.

Density and Population of Accessible SSTMs

The generally accepted recommendation is that all self-service transaction machines (SSTMs) should be as inclusive and as accessible as possible. However, it is recognized that this objective may not be viably delivered in all locations or applications. It is therefore suggested that deployers adopt a 'minimum density of accessible kiosks' policy.

The Air Carrier Access Act, issued by the US Department of Transportation, relates to public SSTMs deployed in the Air Passenger Transportation Sector. The ACAA requires that the density of available accessible kiosks, when located together with other kiosks, for a common purpose, in a group, line or other configuration, must be not less than one in four (25%). For example: If three kiosks are located together, for a common purpose(s), in a group, line or other configuration, then a minimum of one kiosk must be accessible. Furthermore, the ACAA requires that only accessible kiosks should be installed until 25% of the kiosk population meets the requirements for Accessible Design.

If no other legal mandate exists, Storm usually suggest that deployers consider adopting this 'one in four' rule when calculating the number of accessible SSTMs that may be required in each location. That said, consideration must also be given to the occasions where individual kiosks may be unavailable for use. If the only accessible kiosk in a group of four is not operational, then there is effectively no accessible option. Having two different kiosk designs (one accessible and one inaccessible) may also not be desirable for deployers.

Where there is a combination of accessible and inaccessible kiosks, it is important that it is clear to all users which kiosks are accessible and that the accessible kiosks be easy to locate (for example by visually impaired users).

Software: Possibilities and Best Practice

Storm ATP devices are designed to make integration with host system software as easy as possible. When an audio jack is connected/disconnected, or a key is pressed/released, the keypad transmits a USB key press or key release code. The host application software must be configured to act appropriately when it receives each keycode.

The audio program (audio content) and customer interface application software are not created or provided by Storm. We do however offer some 'best practice' recommendations for developers creating the host application as explained on the following pages.

Software as a Primary Customer Interface

Where a touchscreen is used as the primary customer interface, consideration must be given to:

- How the information on the touchscreen can be provided to a person with vision impairments, or those who for other reasons cannot read or understand this onscreen information.
- How a person with reach or movement problems can navigate through the information/options displayed on the touchscreen and make their selections.

Offering kiosk users the ability to enlarge onscreen font sizes and increase the contrast of the text color against its background is always encouraged. However, interaction with a touchscreen usually requires the user to tap or swipe and these actions in themselves may be difficult for users who do not have full control of their hands or fingers. Users who have a tremor for example may find the tap or swipe gesture difficult.

Achieving accessibility by provision of just a touchscreen with modified customer interface software is challenging and usually ineffectual. To ensure a greater degree of accessibility, deployers are therefore advised always to provide an audible and tactile means for users to interact with kiosks and self-service technology.

Storm is often asked whether it is acceptable to provide a button on the kiosk which users can press to summon a member of staff to assist in the operation of a touchscreen interface. This would probably not be considered as an acceptable solution by any of the disability advocate groups because it essentially discriminates against those who cannot use a touchscreen, compromises their privacy/security and undermines their aspirations to live independently.

On Screen Information

It is worth remembering that there are more non-readers than 'non-see-ers'. Non-readers will also benefit from an accessible audible content navigation facility. Bright and dynamic graphics and text should always be displayed on the touchscreen, regardless of whether a user has connected their assistive hearing device. The option of changing the color and size of on-screen graphics may also be offered to help partially sighted users who may wish to use a combination of the Storm ATP device and the touchscreen. Many (most) sight impaired users have some residual light/dark or color perception. Those users can often perceive and benefit from changes to screen graphics in response to input via the Storm ATP device. Responsive screen content is a useful augmentation of the audio response/confirmation delivered though the connected headphones or assistive hearing device (which must be considered as a primary and essential response).

Audio

Audible descriptions, instructions, directions and content should be accessible by lifting a handset or connecting a headset, earbuds or assistive hearing device via a standard 3.5mm jack plug socket.

Lifting a handset or connection of a headset, earbuds or assistive hearing device should automatically initiate an audible welcome message. At this point the user must be provided with the opportunity to set the volume (ideally while listening to say, the welcome message). It is important to note that the user must be provided with as much time as may be necessary to position and adjust the handset, headset, earbuds or assistive hearing device before initiating the audio program.

In user trials, a synthesized voice is usually preferred by blind & partially sighted users, rather than a recorded human voice.

The ability to control the rate of audio speed is also an important requirement for many users. Many blind and partially sighted users are able to understand synthesized speech, even when played at very fast speeds. Whereas, if a recorded human voice is played at very high speed, it often becomes unintelligible.

The use of both male and female synthesized voices can also be beneficial. For example: using a female voice for instructions about use of the system and a male voice for information about available menu options (or vice-versa). This is useful because it allows users to easily differentiate between the two different types of audio information. Those users who become familiar with the interface can then quickly speed through the instructional audio.

At any point during the audible program it should be possible for the user to terminate the transaction by disconnecting the headset or assistive hearing device. Reconnection of the headset or assistive hearing device should return the audio program to the initial welcome message.

Audible Output

When the kiosk provides audible output, the audio signal shall be provided, via a standard 3.5mm jack plug socket, at a default safe sound level (DSL) recommended to be between 50 dB and 60 dB at the ears. This to provide for private listening.

The majority of Storm ATP devices include a 3.5mm jack plug socket which features a tip switch to detect the connection (and disconnection) of a headset.

The user should, at any time, be able to pause the transaction and return to the initial welcome message by pressing and holding down the enter/select button for a minimum duration of 3 seconds. (Access to this ‘help menu’ should be explained to the user during the Welcome Message.).

When products deliver voice output in a public area, incremental volume control shall be provided with output amplification up to a level of at least 65 dB. Where the ambient noise level of the environment is above 45 dB, a volume gain of at least 20 dB above the ambient level shall be user selectable. A function shall be provided to automatically reset the volume to the default level after every use.

Where a timed response is required, the user shall be alerted visually, as well as audibly and shall be given the opportunity to indicate that more time is needed to complete a required/requested task or action.

Sound Volume

Please note that it is important to provide the user with as much time as may be necessary to position and adjust the handset, headset, earbuds or assistive hearing device before initiating the audio program.

We recommend that the volume level increase by 20 decibel (dB) increments. Sound volume control should only permit an increase to the maximum volume setting (as limited by the host system to avoid damage to hearing) before decreasing by 20 dB increments to the default safe sound level (the DSL is recommended to be between 50 dB and 60 dB). This is often referred to as cycling the sound volume level. When a user disconnects their headset, the host application software must reset the sound volume to a default safe sound level (DSL) recommended to be between 50 dB and 60 dB at the ears.

Initial Welcome Message

Upon initial connection of a headset (detected by a tip switch in the jack plug socket) it is essential that an audio welcome message is automatically played. This message should include an explanation of how the user can adjust the audio program sound level and navigate content using the Storm ATP device. The welcome message should repeat (loop) continuously, allowing time for users to configure or adjust their assistive hearing device. The repeating welcome message should advise the user that it will be necessary to press the circular enter key when they are ready to 'move-on' to the next screen/menu page. We recommend that the welcome message should also advise the user that disconnecting and re-connecting the audio jack plug at any time will immediately return them to the welcome message and user instructions. This feature is very useful if a user should get lost during navigation of the menu structure. Disconnection and re-connection of the jack plug must also return the audio program sound level to the default 'safe' level.

'Time Out' Feature

It must be possible for the kiosk user to pause or dwell at any point in the audio program where a decision or action is required by the user. It should also be possible for the user to go back, to hear again the description of the choices available or actions required. We recommend against the use of a time out feature, relying instead on the disconnection of the audio jack plug as a signal to reset the audio program.

Audible Instructions for Using the Storm Device

As part of the Welcome Message, we suggest that the user is given a 'tour' of the keys on the keypad. This 'tour' should provide information as to what the specific function of each key is. For the AudioNav, as an example:

'To the right of the audio jack there are four navigation keys arranged in a diamond shaped pattern: up, down, left and right. In the center of these four navigation keys is a select or enter key with a raised circular tactile ident. Should you need help at any time during the transaction, press and hold the center enter key for three seconds. This will provide a recap of what selections you have made so far. Pressing the center enter key for a further five seconds will initiate a call for assistance and an audible acknowledgement that a call for assistance has been logged.'

Please note: The Storm ATP device will transmit key repeat codes which indicate to the host application software that a key on the keypad is being held down. How the host application software interprets and responds to these key-repeat codes is at the discretion of the software designer.

Recap, Reconfirm or Cancel

Every user option selected should be reconfirmed audibly to the user upon selection. An option to 'Confirm', 'Go Back' or 'Cancel' a selection should be given.

If the transaction includes multiple user choices, (for example, in a fast-food ordering application), the user should, as a final summary before confirming their order, have an option to review their order in total and then confirm or make changes.

Legal Notices

If the transaction involves the user agreeing to certain terms and conditions or having access to your company's trading policies etc. then the user must be offered the opportunity to access that information by alternative means, either audibly, visually or by tactile means (braille).

Help Menus

It may be desirable to provide users with access to a help menu, particularly if the application is quite complex. This help menu can offer any or all of the following:

- A recap which provides a review of the options that the user has selected so far (and offers the user a chance to go back and make changes).
- Instructions for how to use the Storm ATP device, change the volume or speech rate etc.
- Request that a member of staff be called to provide assistance. This would require the host application to include a method of discreetly notifying a trained store associate of the request for assistance. Please, no flashing lights or sirens on the top of kiosks! **Note: Inclusion of this feature in isolation is not considered ADA compliant.**

Because the Storm ATP device sends key press and key release codes, the host system software can be designed to detect when a user presses and holds down a key. In the absence of a dedicated help button, we suggest that the host application be designed so that the help menu is activated when a user presses and holds the Enter key for a set period of time.

Instructions for how to access the help menu should be provided to the user along with the general instructions for using the Storm ATP device.

Voice Recognition and Speech Command in a Public Environment

The emergence and increasing use of smart speakers (AI) in the home environment has delivered significant benefits for those with mobility, sensory, cognitive or dexterity impairment. For millions of disabled people voice recognition and speech command technology, allied with audible confirmation and presentation of requested information, permits more informed decision making and personal control of their immediate environment.

This improved access to information and control opens a new world of communication, entertainment, education and opportunity for those who are unable to see, read or interact with content presented on a display screen and for those who lack the mobility or dexterity to manipulate tactile system interface devices (such as keyboards, trackballs or touch screens etc.).

However, although speech command technology creates significant new opportunities for independent living, it can also present a unique challenge for designers of SSTM hardware and software.

Outlined below are certain considerations:

Legal Implications of Utilizing Voice Recognition/Speech Command in a Public Environment

A person's voice is biometric information and many general privacy regulations worldwide include basic provisions for how personal data (such as biometric data) may be collected, recorded, stored and used. There are also an increasing number of regulations/laws which are designed to specifically protect a person's biometric information, or include provision for protection. For example, GDPR in Europe and BIPA in Illinois, USA. For more information please see https://pro.bloomberglaw.com/brief/biometric-data-privacy-laws/ and https://www.thalesgroup.com/en/markets/digital-identity-and-security/government/biometrics/biometric-data

Most privacy laws often require the SSTM to offer a mechanism for users to 'opt in' before any biometric data can be captured.

It is essential that all SSTM users and those members of the public in proximity to the SSTM be made aware that the terminal includes Voice Recognition and/or Speech Command technology and that the Speech Command facility may be "on and listening". This awareness is essential for two reasons:

- To inform the SSTM user that Speech Command/Voice Recognition technology is available for their use and convenience.
- To warn members of the public (in proximity) that their conversations may/will be picked up by the Speech Command/Voice Recognition facility and may be transmitted to a remote server for analysis, processing and possible retention.

This awareness must be provided for members of the public who are sighted, partially sighted, non-sighted or hearing impaired.

Speech Command and Voice Recognition technology provide an effective and valuable improvement in accessibility to public ICT systems. They should however not be offered as the **only** accessible interface on public use SSTMs. Rather, they should be considered as part of a 'multi-modal' approach to accessibility, Speech Command/Voice Recognition can provide an additional option for those with disabilities (and those without) to confirm their biometric identity and to interface with the kiosk's application software. The kiosk user should be able to choose from a combination of tactile, audible or visual interface devices to best meet their specific accessibility needs.

It is important to consider the suitability of Speech Command/Voice Recognition systems to the actual transaction. Not all information is suitable for collection via spoken means, for example passwords, government issued ID numbers, etc.

Use of Storm's Array Microphone and Mic Activation Sensor

To help ensure compliance with privacy / data protection regulations, Storm offer a Mic Activation Sensor for use with its Array Microphone.

The Activation Sensor is designed to be highly visible and tactilely discernable to SSTM users. The symbol featured on the front of the product was designed in conjunction with the Royal National Institute of Blind People (RNIB). This symbol has become the universally recognized symbol for a microphone and is a raised tactile ident on the Sensor to help ensure that it can be found by blind or visually impaired users. The symbol can also be illuminated to indicate that the microphone is active. When the microphone is activated, there should also be an audible indication provided by the host application.

The Sensor also contains infrared technology which detects if a user is standing within 0.7m of the SSTM, or within the 'addressable zone'. By using a combination of the Storm Activation Sensor and Array Microphone, the host software application can be designed to hold the microphone in a muted state until a user is within the addressable zone and has provided their approval for voice biometrics to be captured by the SSTM.

Use of Personal Phones as an Accessible Interface

As a manufacturer of Accessible System Interface Devices (including Touchless-CX technology), Storm Interface believe that clarification is needed about the suitability of smartphones as the primary (only) accessible interface to Self-Service Transaction Machines (SSTMs).

Our concern centers around the needs of people with a diverse range of sensory, physical, dexterity and cognitive impairments. Including, but certainly not limited to, those with sight impairments.

Use of a touchscreen smartphone as a **primary** system interface discriminates against the following groups: -

- The significant socio-demographic group without the financial resources to purchase an internet enabled smartphone or pay for a service plan supporting prolonged internet connectivity and/or application downloads.
- Foreign visitors (and other travelers) without an international phone service or a roaming capability.
- Those with smartphones not capable of maintaining battery charge during prolonged periods of use.
- And, most significantly, those with impaired dexterity including, but not limited to; palsy, neuropathy, tremor, missing or atrophied limbs or digits, muscular dystrophy, MND, etc.

When proposing Storm's Touchless-CX technology as an aid to accessibility, it is our policy to promote it as part of a multi-technology, accessible interface solution. It should only be promoted as a supplement to tactilely discernible navigation and control of both audible content and visible content displayed on a screen. We believe it cannot and should not be promoted or considered as a compliant accessible interface when used in isolation.

Sources of Information, Support and Advice

(Federal agencies, white-papers, codes of practice, national and international institutions supporting accessibility for those with physical, cognitive and sensory impairment.)

https://www.ada.gov/2010ADAstandards_index.htm

https://section508.gov/

https://www.transportation.gov/sites/dot.gov/files/docs/Kiosk-website-FR-final%20rule.pdf

https://www.aapd.com/

https://adata.org/

https://kma.global/resources/

https://www.adatitleiii.com/

https://www.tpgi.com/creating-a-usable-kiosk-experience-for-customers-with-disabilities/

Interesting Kiosk Marketplace article 'ADA Lawsuits Targeting Kiosks' Part 1, Part 2, Part 3

https://www.tpgi.com/writing-a-kiosk-rfp-recommended-accessibility-requirements/

https://browngold.com/practice-areas/civil-rights/disability-rights/

Please see Appendix A for suggested text which could be included in any commercial proposals or contracts to supply kiosks or other self-service systems.

Appendix A

Recommended text for inclusion in any commercial proposals or contracts to supply kiosks or other self-service systems:

Kiosks and self-service terminals deployed for use by the public or in places of public accommodation are required by Federal and international mandates to be accessible for those with sensory, physical or cognitive disabilities.

The self-service/information/communication systems as described in this (contract/commercial proposal/specification/document) include design features and assistive technology intended to meet the applicable requirements of those mandates.

Should XYZ decide or instruct ABC to omit, disable or remove such assistive design features/technology, it is understood and acknowledged that such a decision or instruction is contrary to the information and advice provided by ABC to XYZ.

By signed acknowledgement of this information and advice XYZ confirm that any decision or instruction to omit, disable or remove assistive design features/technology is made entirely and solely at the risk and liability of XYZ and that XYZ will protect and hold ABC harmless from any claims, proceedings, legal actions, penalties or punishments related to omission, disablement or removal of assistive design features/technology.

As the lawful representative of XYZ, these conditions, information and advice, as described above, are acknowledged and accepted for and on behalf of XYZ by:

Name:

Position:

Organization:

Address:

Signature:

Date: