

Digital magnifier (CCTV)

Equipment consists of a camera with zoom lens and a monitor for reading. The camera of the device is mounted on a frame or arm that displays a magnified image on a monitor. Digital magnifiers can provide magnification from 2-100X depending on the model and screen size. These are suitable across a range of vision losses especially in cases of severe vision loss. The primary benefit of a digital magnifier is that it can magnify any print, pictures, or anything placed under its camera. The image produced on monitor can be improved by setting contrast and brightness options provided in the device. The digital magnifiers come with a range of features including adjustable magnification. Reverse polarity, frame freeze and high contrast options. The digital magnifiers come with a rechargeable battery and can provide up to four hours of continuous use before the batteries need to be recharged. Digital Magnifiers are available in both stationary and portable forms. The primary function of both is to help users in reading by enlarging image of a reading material.

- **Product Classification**

- APL (WHO Assistive Product Priority List): 21 (Magnifiers, digital hand-held)
- ISO 9999:2022: 220318 (Image-enlarging systems)

- **Possible configuration variants**

- Mouse-type magnifier (similar to the computer mouse and attached to a visual display such as a television or a computer monitor; the user moves the mouse across the text and reads from the visual display; the extent of magnification depends on the size of the monitor; this device comes with the standard feature of adjustable magnification, high contrast mode and frame freeze).
- Digital magnifier with built-in display (stand-alone unit with a built-in display, including adjustable magnification, high contrast mode, reverse polarity and frame freeze; the built-in LED display is available in different sizes from 3,5 inches up to 10 inches; the user moves the magnifier on the text and reads from the attached display; some of the more advanced models come with a built-in SD card so that the materials can be transferred onto a computer; these magnifiers can also be attached to an external visual display to increase the screen size).
- Head-mounted digital magnifier (the magnifier is mounted on a unit, which is worn on the head in front of the eyes and provide viewing at near and far through an autofocus function; the user views by pointing the device in the direction of the task and the views on a display mounted in the device in front of the eyes; a processing unit is attached with a belt around the waist, which processes the information; newer models are also available with built-in processor in the helmet worn over the head).
- Magnifier with built-in optical character recognition and speech output (not only does it magnify the text on screen but also read it aloud).

- **Possible accessories or optional components**

- Camera that can be connected through Bluetooth.

- **Product goals**

Activities or functions the product is mainly intended to support, according to WHO ICF Classification:

- Reading [\[d166\]](#).
- Writing [\[d170\]](#).

- **Indicated impairments**

Difficulties the product is mainly intended to address, according to the WHO ICF Classification:

- Seeing [\[b210\]](#) (severe to moderate vision loss).

- **Contraindicated impairments**

Difficulties for which the product may be inappropriate:

- Difficulty in fine hand use (good manual dexterity is required to use this product effectively). *Unless used with variants: Head-mounted digital magnifier*

- **Indicated environments**

Specific environments in which the product should be used:

None specified.

- **Contraindicated environments**

Environments in which the product may be inappropriate:

None specified.

- **Other indicated factors**

Other factors or situations the product is intended to address:

None specified.

- **Other contraindicated factors**

Other factors or situations in which the product may be inappropriate:

None specified.

- **Points to be considered in product selection**

- These devices have been available for a while but have never become mainstream as the users despite the advantage find these cumbersome and heavy. Its use is also limited because of the cosmetic factors. The cost of these units is also very high making these not a feasible option for many users.
- These devices can be prescribed in a non-clinical setting and do not require a detailed assessment by a clinician. Training in the use of these devices is however important for the user to understand the various functions and moving the device over the task.
- Availability of electricity is essential to plug in or recharge the batteries. The maintenance of these devices is also a factor as after sale services are not available in many countries.
- Most of these devices require a flat surface to move these over the task.
- The digital magnifiers are most useful when extended reading is required and therefore is suitable for use in schools, libraries and workplaces.
- Selecting the right digital magnifier will depend on what the user needs and how often they plan to use it. While some of the features of overlap, there are different uses out of the different models. If being mobile is a priority, then battery life will be a major consideration.
- With the use of smart phones becoming very common, many users prefer to use the zoom function on their mobiles or tablets rather than opting for a separate digital magnifier.
- The main advantages of mouse-type magnifiers include the adjustable size of display, standard viewing distance and normal sitting posture. It is also the cheapest digital magnifier available however if the price of the visual display device is added then the price substantially increases. It can also be prescribed in a non-clinical setting, as the magnification is adjustable.
- The main disadvantages of mouse-type magnifiers include the change in spatial relationship where the mouse is moved over a text while the viewing occurs on the visual display. It also requires good manual dexterity. Finding the next row in the text is also a challenge especially in users with visual field defects. The other limitation is the portability of the unit unless it is attached to a laptop.
- The main advantages of digital magnifiers with built-in display include the portability as the can be carried around with ease and can be used at home in workplaces, schools etc. These magnifiers also maintain the spatial relationship with the task as the user is viewing the text on the screen that is on the task. Some of these magnifiers can also be used for writing when attached with a bracket, which lifts the magnifier over the text. It also comes with rechargeable batteries, which provide up to four hours of continuous use. It allows the user a comfortable sitting posture and maintain the habitual viewing distance. Some digital magnifiers can also be used to view far objects when these are pointed in that direction. For example, a student can point the device towards the writing board in the classroom.
- Some of the more advanced units come with an option of either the visual or the voice modes where the user can choose if they want to see the text visually or in the voice mode.
- The main disadvantages of digital magnifiers with built-in display include the small size of display limiting the magnification and the visual fields. These magnifiers require the user to use the spectacles to correct any significant refractive error, which can cause the blurring of the task. The recharging time of the batteries is also long and requires the user to plug in daily to recharge. Some users also complain about the glare and eye strain because of the small size of the display. Manual dexterity is also critical to move the magnifier over

the text. Another common challenge faced by most digital magnifier users is finding the next row on the text. The proper use of these devices requires training to use them effectively. The cost of the units has significantly come down; however, these are still not affordable for a vast number of users.

- **Points to be considered in product fitting**
 - The setting-up of stationary digital magnifier must be done ergonomically, keeping it at an eye level of user. The level of table and chair must also be adjusted accordingly.
 - The display of the monitor can reflect light, which can be uncomfortable for users.
 - The monitor size ranges from 16 to 24 inches. Picking the appropriate size of monitor depends on the workspace and the amount of magnification required.
- **Points to be considered in product use**
 - Digital magnifiers must be fit at an appropriate level and distance for the user to effectively read anything. The background of the object and the colors must be adjusted according to user's preferences. The camera must be pointed adequately at an appropriate angle.
 - Magnifiers are primarily designed for people with low vision and therefore the device controls are designed to make them visible and easy to use in order to zoom in on the objects, to change colors or set-up other relevant options. Users can comfortably identify, interpret and use the well-marked buttons and knobs. There are some magnifiers that additionally provide a wired control pad with the same controls as provided on the device. For people with dexterity issues, it is easier to use the control pad rather than using the controls on the device.
 - Portable devices can be stored in a protection case.
- **Points to be considered in product maintenance / follow-up**
 - For stationary devices, users must keep the camera, and the display unit must be cleaned regularly.
- **Examples of products available on the market**
 - Live product search in the EASTIN website <https://www.eastin.eu/en/searches/products/list?iso=220318>

Source

This Fact Sheet was compiled in 2021 by an international team of experts, to provide the initial knowledge base for a project ("An online system to assist the selection of assistive product") supported by the World Health Organization in 2020-2021 within the GATE Initiative (Global collaboration on Assistive Product). Fact Sheets were compiled for each of the 50 types of products included in the WHO APL (Assistive Product Priority List).

The team was composed of Renzo Andrich (Italy, group leader), Natasha Layton (Australia), Stefan von Prondzinski (Italy), Jerry Weisman (USA), Silvana Contepomi (Argentina) and Hasan Minto (Pakistan).

The project led to a prototype online tool called ASPREX (ASsistive PProduct EXplorer). At the end of the project, it was transferred to a WHO collaborating center (the Global Disability Hub in the UK), in view of possible future developments.