

DISPLAY DEVICE ASSEMBLY

BACKGROUND OF THE INVENTION

5 Field of the Invention

The field of the invention relates to bar form factor display device assemblies comprising a bar form factor display device and a detachable case, and detachable cases for bar form factor display devices, especially detachable cases which comprise a display screen. Bar form factors include slab, slate, block, bar and candybar.

10 Technical Background

Bar form factor display devices, eg. slate devices such as the iPhone™ and the iPad™, are known. A bar form factor device may be a slate device. However, these devices comprise only a single display screen. When the device is placed face down on a surface, the user cannot see the device screen, and therefore the user cannot see updated information on the device screen for example.

Discussion of Related Art

EU Registered Community Design number 001668393-0001, which includes the disclosure of prior art Figure 6, discloses a case for a mobile phone. The case shown in prior art Figure 6 appears to have a function of covering the mobile phone screen to protect it from scratching or dirt.

A user of a single screen bar form factor display device may want to see what is displayed on the screen, even if he has placed it face down on a surface. It is desirable to provide a way of upgrading a bar form factor device to provide two displays, without having to replace the bar form factor device.

25 Summary of the Invention

According to a first aspect of the invention, there is provided a display device assembly including a bar form factor display device and a detachable casing, the assembly operable to be assembled wherein the detachable casing is in attachment with the bar form factor display device, the assembly when assembled comprising front and back major faces, wherein the front major face is arranged to present a first display screen which forms part of the bar form factor display device, and wherein the back major face is arranged to present a second display screen different to the first display screen, which forms part of the detachable casing.

The display device assembly may be one wherein the bar form factor display device

includes a first battery and wherein the detachable casing includes a second battery.

The display device assembly may be one wherein when the assembly is assembled, the second battery is operable to charge the first battery.

5 The display device assembly may be one wherein when the assembly is assembled, the second battery is operable to power the bar form factor display device.

The display device assembly may be one wherein when the assembly is assembled, a data connection is formed between the bar form factor display device and the detachable casing.

The display device assembly may be one wherein the data connection is a wired data connection.

10 The display device assembly may be one wherein the data connection is a wireless data connection.

The display device assembly may be one wherein the bar form factor display device includes a first port and the detachable casing includes a second port, wherein when the assembly is assembled the first port is in connection with the detachable casing, and the
15 second port provides a connectivity of the assembly which is equivalent to a connectivity of the first port when the bar form factor display device is in isolation.

The display device assembly may be one wherein the second port provides a connectivity of the assembly which is a wired connectivity.

The display device assembly may be one wherein the second port provides a connectivity
20 of the assembly which is a wireless connectivity.

The display device assembly may be one wherein one of the bar form factor display device and the detachable casing includes a magnet and the other of the bar form factor display device and the detachable casing includes a material capable of magnetic attraction, wherein the bar form factor display device and the detachable casing are arranged such that
25 a magnetic force between the magnet and the material capable of magnetic attraction is sufficiently large to pull the detachable casing firmly into contact with the bar form factor display device.

The display device assembly may be one wherein the bar form factor display device and the detachable casing comprise mating guide surfaces which are arranged to guide the
30 detachable casing to a correct position for connection with the bar form factor display device.

The display device assembly may be one wherein the bar form factor display device includes external electrical contact elements and the detachable casing includes external electrical contact elements.

The display device assembly may be one wherein the contact includes an electrical contact between the external electrical contact elements in the detachable module and in the device.

5 The display device assembly may be one wherein the second display screen is a low power display screen.

The display device assembly may be one wherein the low power display screen is a bi-stable display screen.

The display device assembly may be one wherein the low power screen is Electronic Paper Display under glass.

10 The display device assembly may be one wherein the low power display screen uses electrowetting technology.

The display device assembly may be one wherein the low power display screen is a grayscale panel.

15 The display device assembly may be one wherein the low power display screen is an interferometric modulation technology panel.

The display device assembly may be one wherein the low power display screen is a transflective LCD panel.

The display device assembly may be one wherein the low power display screen is an AMOLED panel.

20 The display device assembly may be one wherein the bar form factor display device is a slate device.

The display device assembly may be one wherein the bar form factor display device is a bar or candybar device.

25 The display device assembly may be one wherein the bar form factor display device is a slab-shaped form.

The display device assembly may be one wherein the display device assembly detachable casing is operable to display an image in a low power notification mode.

The display device assembly may be one wherein the display device assembly detachable casing is operable to display an image in an off state.

30 The display device assembly may be one wherein the display device assembly detachable casing is also operable to display an image in in a low power notification mode.

The display device assembly may be one wherein the display device assembly first display screen is a liquid crystal display screen.

The display device assembly may be one wherein the display device assembly first display

screen is an active-matrix organic light-emitting diode display screen.

The display device assembly may be one wherein the device assembly appearance is context related.

5 The display device assembly may be one wherein the context related device assembly appearance includes location-based advertising.

The display device assembly may be one wherein the context related device assembly appearance includes results of a location-based search.

The display device assembly may be one wherein any application or service executing on the display device assembly is able to display a notification on the second display screen.

10 The display device assembly may be one wherein the first display screen is a touch screen.

The display device assembly may be one wherein the second display screen output provides one or more of: Interactions, Control, Use cases, Personalization, Widgets, Privacy.

15 The display device assembly may be one wherein the second display screen output provides Social aggregator output.

The display device assembly may be one wherein the second display screen output provides Latitude & Longitude.

The display device assembly may be one wherein the second display screen output provides Location, for example device assembly location.

20 The display device assembly may be one wherein the second display screen output provides Notifications.

The display device assembly may be one wherein the second display screen output provides Operator Push output.

25 The display device assembly may be one wherein the second display screen output provides news provided by a news service.

The display device assembly may be one wherein the second display screen output provides social messages provided by a social messaging service.

The display device assembly may be one wherein the second display screen output provides calendar information.

30 The display device assembly may be one wherein the second display screen output provides content updates of one or more categories, wherein the categories are preselected.

The display device assembly may be one wherein the categories are preselected by a user.

The display device assembly may be one wherein the categories are preselected by a network services provider.

The display device assembly may be one wherein the display device assembly is portable.

The display device assembly may be one wherein the display device assembly is mobile.

The display device assembly may be one wherein the display device assembly is a mobile phone.

- 5 The display device assembly may be one wherein the detachable casing includes a backlight module for illuminating the second display screen.

According to a second aspect of the invention, there is provided a detachable casing for a display device assembly including a bar form factor display device and the detachable casing, the assembly operable to be assembled wherein the detachable casing is in
10 attachment with the bar form factor display device, the assembly when assembled comprising front and back major faces, wherein the front major face is arranged to present a first display screen which forms part of the bar form factor display device, and wherein the back major face is arranged to present a second display screen different to the first display screen, which forms part of the detachable casing.

- 15 The detachable casing may be one wherein the detachable casing includes a battery.

The detachable casing may be one wherein the detachable casing is operable to form a data connection, such that when the assembly is assembled, a data connection is formed between the bar form factor display device and the detachable casing.

The detachable casing may be one wherein the detachable casing is operable to form a
20 wired data connection.

The detachable casing may be one wherein the detachable casing is operable to form a wireless data connection.

The detachable casing may be one wherein the detachable casing includes a first port, wherein when the assembly is assembled a second port of the bar form factor display
25 device is in connection with the detachable casing, and the first port provides a connectivity of the assembly which is equivalent to a connectivity of the second port when the bar form factor display device is in isolation.

The detachable casing may be one wherein the first port provides a wired connectivity.

The detachable casing may be one wherein the first port provides a wireless connectivity.

- 30 The detachable casing may be one wherein one of the bar form factor display device and the detachable casing includes a magnet and the other of the bar form factor display device and the detachable casing includes a material capable of magnetic attraction, wherein the bar form factor display device and the detachable casing are arranged such that a magnetic force between the magnet and the material capable of magnetic attraction is sufficiently

large to pull the detachable casing firmly into contact with the bar form factor display device.

The detachable casing may be one wherein the bar form factor display device and the detachable casing comprise mating guide surfaces which are arranged to guide the detachable casing to a correct position for connection with the bar form factor display device.

The detachable casing may be one wherein the detachable casing includes external electrical contact elements.

The detachable casing may be one wherein the second display screen is a low power display screen.

The detachable casing may be one wherein the low power display screen is a bi-stable display screen.

The detachable casing may be one wherein the low power display screen is Electronic Paper Display under glass.

Brief Description of the Drawings

Figure 1 shows the front face and back face of an example device assembly in the same Figure. The device assembly is shown in the off state.

Figure 2 shows the front face and the back face of an example device assembly in the same Figure. The device assembly is shown in the on state.

Figure 3 shows a side view of an example device assembly. The device assembly may relate to the device assembly of Figure 2.

Figure 4 shows the front face and the back face of an example device assembly in the same Figure. The device assembly is shown in the on state. The device assembly may relate to the device assembly of Figure 2.

Figure 5 shows a bar form factor device housed inside a detachable case, to form a device assembly.

Figure 6 is from the prior art publication EU Registered Community Design number 001668393-0001. This Figure shows a mobile phone in a case.

Detailed Description

There is provided a detachable device case (eg. phone case) with a bi-stable or low (eg. very low) power consumption display on its back side. Figure 5 shows a bar form factor device housed inside its detachable case, to form a device assembly. The device (eg. phone) may be provided with a battery. The case may be provided with a battery. If there is a battery inside the device (eg. phone), a charged battery in the case can be used to charge

the device battery. A user may detach a detachable case from a device when both the battery in the case and the battery in the device are discharged, in order to attach another detachable case with a well-charged battery, so as to charge the battery of the device, or to power the device. A user may possess several detachable cases, so that the user can
5 exchange detachable cases several times in order to charge the device battery each time, or to power the device, without requiring connection to a mains power source.

A connection (eg. a data connection) from the case to the device (eg. phone) can be implemented by wired connector or wirelessly eg. by Bluetooth. A wired connection between the device and its detachable case may be implemented via a connection between
10 the device and its detachable case, such as via a port of the device, such as by a USB-compatible port of the device, or such as by a custom port of the device. A connection between the device and its detachable case may be implemented via a connection between the device and its detachable case, such as via a port of the device, such as by a custom port of the device. The connection may be wireless. The detachable case may provide a
15 port which is operable to provide the connectivity of the port of the device which is no longer available for use when the device is in connection with its detachable case. Such connectivity may be wired connectivity or wireless connectivity.

In an example, the device assembly comprises the device and a detachable case for the device. The device may include external electrical contact elements. The detachable case
20 may include external electrical contact elements. The device and the detachable case may comprise mating guide surfaces which guide the detachable case to the correct position for connection with the device. One of the device and its detachable case may be provided with a magnet, while the other of the device and its detachable case may be provided with a material capable of magnetic attraction, wherein a magnetic force between the magnet
25 and the material capable of magnetic attraction is sufficiently large to pull the detachable module firmly into contact with the device. The contact may include an electrical contact between external electrical contact elements in the detachable module and in the device. In one example, the magnet is in the device. In another example, the magnet is in the detachable case.

30 User scenarios include those described below.

In an example, there is provided a dual screen bar form factor phone assembly with a bi-stable display. The bi-stable display forms part of a detachable case of the phone assembly. An advantage of a dual screen bar form factor phone assembly is that one screen is always visible, whichever way up the device is placed on a table. By displaying an incoming

message on both screens, this ensures that incoming messages are always visible when the device is lying on a table. The first display screen may use electrowetting technology. In another example, the second display screen may use electrowetting technology eg. Liquavista.

- 5 The device assembly appearance may be context-related eg. in relation to position such as one determined using a global positioning system (GPS) receiver, or in relation to weather, or in relation to temperature, or in relation to time of day. Context related (eg. position-related) device appearance may include location-based advertising. Context related (eg. position-related) device appearance may include results of a location-based search.
- 10 Notification and customization are important tasks in mobile computing. For notification it is known to use sound, vibration or LCD/AMOLED (liquid crystal display/ Active-matrix organic light-emitting diode) displays. All those ways provide notification for a limited time and cannot work in always-on mode due to high power consumption. There are cases with segmented bi-stable displays used for notifications, but they don't give right
- 15 flexibility with notification messages or/and options.

There are many ways for customization of the device assembly – pictures and themes for user interface (UI) on main screen, sounds and different accessories like different phone cases can be used to change the look of the device assembly. The look of the device assembly can be changed by changing what is displayed on the bi-stable screen, such as to

20 give the appearance of a different phone case for example. For example, a device assembly skin can be changed. A device assembly skin may be one or more of wallpaper, photos, movies, user-customized content.

In an example, there is provided a bi-stable active matrix and high-resolution display on the back panel of the device assembly. The bi-stable display forms part of a detachable

25 case of the device assembly. This improvement gives the following advantages in relation to prior art cases:

- Phone customization – user is able to display any pattern, picture or application interface to differentiate their phone from others
- Notifications – any application or service is able to display the notification on the
- 30 back screen. Notification time is not limited, because a bi-stable display is used.
- Notifications – any application or service is able to display the notification on the front screen. The notification such as a message may be provided on the front screen and on the back screen.

- The information remains on the screen even when the phone itself is switched off. This is important even for manufacturing – a manufacturer can place all needed information directly on the bi-stable screen: eg. serial number, certification logos, country of origin and so on.

5 An example is shown in Figure 1. Figure 1 shows the front face and back face of an example device assembly in the same Figure. The device assembly is shown in the off state. In the off state, the front face is not illuminated: it is shown as dark. However, in the off-state, the bi-stable display on the back face continues to display content, which can be viewed as a result of external illumination eg. ambient illumination. In an example of
10 Figure 1, the front face has an AMOLED display, and the back face has an E-ink bi-stable display.

A bi-stable display may use interferometric modulation technology eg. Qualcomm Mirasol.

An example is shown in Figure 2. Figure 2 shows the front face and the back face of an
15 example device assembly in the same Figure. The device assembly is shown in the on state. In the on state, the front face is illuminated and can display an image or other content. In the on-state, the bi-stable display on the back face also can display an image or other content. In an example of Figure 2, the front face has an AMOLED display, and the back face has an E-ink bi-stable display. Figure 3 shows a side view of an example of
20 Figure 2.

An example is shown in Figure 3. Figure 3 shows the front face and the back face of an example device assembly in the same Figure. The device assembly is shown in the on state. In the on state, the front face is illuminated and can display an image or other content. In the on-state, the bi-stable display on the back face also can display an image or
25 other content. In an example of Figure 3, the front face has an AMOLED display, and the back face has an E-ink bi-stable display.

An example of the front display is: 4" WVGA (800 x 480 Or 854 x 480)

Technology: AMOLED or sIPS / FFS

Nissha Capacitive touch screen

30 Glass: Gorilla Glass (Corning)

An example of the back screen is: Electronic Paper Display under glass on back side (E-INK).

Properties of the back face may include:

- E-INK Back screen
- Sharp Greyscale panel
- Perceived as part of case
- Low power consumption

5 Properties of the back screen may include:

1. Image

- Resolution: 700~900 x 480 (possible target: similar to front display)
- Colors: 16 Grey scale (E-ink) or 65K (LG)
- Contrast: 10:1 ~ 20:1, Reflective ratio: 40%+

- 10
- Refresh ratio: 150 ms ~ 400 ms
 - Ability to refresh any area starting from 1 pixel
 - Color scheme conforms to case color

2. Power Consumption

- Approximately 1000 full screen updates using 300 mAh of charge
- 15
- To minimize power consumption, update rate should be minimized to the order of twice per minute
 - Does not consume / require power when in bi-stable state

The back screen output may provide:

- Interactions,
- 20
- Control,
 - Use cases,
 - Personalization,
 - Widgets,
 - Privacy

- 25 An example of interactions is text messages from a blog site. An example of control is varying the frequency of back screen updates eg. from once per minute to once per 5 minutes. An example of use cases is receipt of a major emergency notification by an emergency services worker. An example of personalization is putting a photo of a favourite landmark on the back screen. An example of privacy is removing names of
- 30 companies or individuals from any received incoming message displayed on the back screen.

A bar form factor display device assembly may be one wherein the back display screen output provides a social network screen.

Preinstalled Widgets may include: Clock, Social aggregator, Communications Log, “Favorites” Bucket, News, Weather, Yota Connection, Battery, Contacts Favorites, Latitude & Longitude, and Player.

The Back Screen may provide:

- 5 • Context related Themes (Weather, Location, Environment)
 - Widgets, Notifications
 - Personalization
 - Post cards
 - Operator Push (Congratulations, Customer info)
- 10 The back display of the device assembly may display news provided by a news service. The back display of the device assembly may display social messages provided by a social messaging service. The back display of the device assembly may display output providing social aggregator output or social network output. The social aggregator output or social network output may be a Facebook page. The back display of the device assembly may
- 15 display a Google search page. The back display of the device assembly may display an indication of mobile phone signal strength. The back display of the device assembly may display an indication of battery charge state. The back display of the device assembly may display calendar information.
- The back display of the device assembly may be the only operational display of the device assembly when the device assembly operates in a low power notification mode. When the device assembly operates in a low power notification mode the back display of the device assembly may be updated in response to an incoming news story provided by a news service. When the device assembly operates in a low power notification mode the back display of the device assembly may be updated in response to an incoming social message
- 25 provided by a social messaging service. The device assembly may be programmed such that when the device assembly operates in a low power notification mode, the back display of the device assembly displays content updates of one or more categories, for example, news, social messages, an emergency notification, financial news, earthquake, tsunami or weather. The categories may be preselected, such as by a user or by a network services
- 30 provider.

Further aspects of the device assembly

The device assembly may be portable. The device assembly may be a mobile device assembly. The device of the device assembly may be a mobile phone, a portable digital

assistant, a laptop, a digital audio player or a tablet computer. Known digital audio players include the ipod and mp3 players. Known tablet computers include the ipad. The device assembly may include a virtual keyboard. The device assembly may have a touch screen. The device assembly may have two screens each of which is a touch screen. The bi-stable screen may be a touch screen. A screen that is not a bi-stable screen may be a touch screen. The device assembly may include a second bi-stable screen. The device assembly may include a second bi-stable screen which is a touch screen. The device assembly may include a second bi-stable screen which is not a touch screen.

The bi-stable screen may occupy greater than 50% of the area of the major face of the device assembly on which it is located. The bi-stable screen may occupy greater than 60% of the area of the major face of the device assembly on which it is located. The bi-stable screen may occupy greater than 70% of the area of the major face of the device assembly on which it is located. The bi-stable screen may occupy greater than 80% of the area of the major face of the device assembly on which it is located. The bi-stable screen may occupy greater than 90% of the area of the major face of the device assembly on which it is located. The bi-stable screen may occupy greater than 95% of the area of the major face of the device assembly on which it is located.

The screen other than the bi-stable screen may occupy greater than 50% of the area of the major face of the device assembly on which it is located. The screen other than the bi-stable screen may occupy greater than 60% of the area of the major face of the device assembly on which it is located. The screen other than the bi-stable screen may occupy greater than 70% of the area of the major face of the device assembly on which it is located. The screen other than the bi-stable screen may occupy greater than 80% of the area of the major face of the device assembly on which it is located. The screen other than the bi-stable screen may occupy greater than 90% of the area of the major face of the device assembly on which it is located. The screen other than the bi-stable screen may occupy greater than 95% of the area of the major face of the device assembly on which it is located.

A second bi-stable screen may occupy greater than 50% of the area of the major face of the device assembly on which it is located. A second bi-stable screen may occupy greater than 60% of the area of the major face of the device assembly on which it is located. A second bi-stable screen may occupy greater than 70% of the area of the major face of the device assembly on which it is located. A second bi-stable screen may occupy greater than 80% of the area of the major face of the device assembly on which it is located. A second bi-stable

screen may occupy greater than 90% of the area of the major face of the device assembly on which it is located. A second bi-stable screen may occupy greater than 95% of the area of the major face of the device assembly on which it is located.

The device assembly may comprise a single backlight module situated between its two major faces. The backlight module may illuminate one display on one major face. The backlight module may illuminate two displays each of which is situated on a different major face of the device assembly to the other display.

The device assembly including its detachable casing may comprise two backlight modules, each of which may illuminate a display situated on a major face of the device assembly including its detachable casing. Each backlight module may illuminate a respective display on a respective major face of the device assembly including its detachable casing. The two backlight modules may be situated between two displays of the device assembly including its detachable casing, where each display is situated on a different major face of the device assembly (including its detachable casing) to the other display. The detachable casing may include a backlight module for illuminating a display of the detachable casing.

The device assembly including its detachable casing may have flat (i.e. non-curved) front and back major faces. The device assembly including its detachable casing may have one major face that is curved with the other major face being flat (i.e. non-curved).

Curved bar form factor display device assembly (eg. phone) including detachable casing

The bar form factor display device assembly (eg. a phone) including its detachable casing may have a unique and organic shape – essential for rapid product differentiation in a crowded space. Examples are shown in Figures 3 and 4. The bar form factor display device assembly including its detachable casing may have a concave front face and a convex rear face. The magnitude of the curvature of the faces may be the same or similar. The concave front may match the path of a finger as the user's wrist rotates. Hence it's very natural to use. Having a curved surface as the vibrating distributed mode loudspeaker (DML) speaker is also better since if the front display with the speaker exciter was instead a flat surface, then it would sound unpleasant if that flat surface is placed down against a tabletop. Curving the surface prevents this happening. Preferred curvature of front and back is cylindrical, but spherical or aspherical are possible. The convex back can have a bistable display. Since the normal resting position is front face down, the back screen with bi-stable display is normally displayed when the bar form factor display device is in the resting position. This resting position is mechanically stable. If bar form factor display device

assembly including its detachable casing is placed back down (ie convex face down), the bar form factor display device assembly including its detachable casing could spin, which is unstable. Hence a user will likely place the bar form factor display device assembly including its detachable casing front face (i.e. concave face) down, with the bi-stable screen showing.

If the bar form factor display device assembly including its detachable casing is in a pocket, the front face (concave face) can face inwards, since this better matches leg curvature. This can be the better configuration (as opposed to front face up) for antenna reception.

In manufacturing, the curved shape may be laminated to glass.

DML bar form factor display device assembly (eg. phone) speaker

It's hard to get good quality audio performance, unless you have a large speaker with a large and ugly speaker hole. In one example, we use NXT plc distributed mode loudspeaker (DML) technology here to vibrate the entire bar form factor display device (eg. phone) screen - the whole screen surface acts as the speaker. The speaker hole can be fully eliminated. One can use two small drivers/exciters under the glass to make the screen vibrate. DML has never been used before to drive a screen surface in a mobile phone or a bar form factor display device. Haptic feedback can be provided by the drivers too – a new use for the DML exciters.

Device audio properties may be characterized by:

On-board Audio: 128-Voice Polyphony,
QconcertPlus, Dolby 5.1 Surround,
Echo and Noise Cancellation.
Additional ANC (Audience).

2 Microphones.

NXT display surface sound (No speakers)

Deep stereo Surface Sound

No conventional speakers

Adaptive Noise Cancellation

The bar form factor display device's case and the detachable case materials may be characterized by:

Case: Single block

Materials: Plastic or TexinTM

A hinged (eg. clam shell) phone assembly including its detachable casing may be provided

which includes, in addition to a main display which is concealed when the phone is in a closed configuration, two bi-stable displays, one on each major face of the phone when the device is in a closed configuration. One bi-stable display forms part of the detachable casing. This ensures that even when the device is in a closed configuration, received messages may be displayed on both bistable screens so that the received messages are visible to a user even when the phone is in the closed configuration, irrespective of which major face is facing upwards when the device is lying on a surface such as a table surface.

It is to be understood that the above-referenced arrangements are only illustrative of the application for the principles of the present invention. Numerous modifications and alternative arrangements can be devised without departing from the spirit and scope of the present invention. While the present invention has been shown in the drawings and fully described above with particularity and detail in connection with what is presently deemed to be the most practical and preferred example(s) of the invention, it will be apparent to those of ordinary skill in the art that numerous modifications can be made without departing from the principles and concepts of the invention as set forth herein.

Concepts

There are multiple concepts, described as concepts 'A-C', in this disclosure. The following may be helpful in defining these concepts. Elements of concepts A to C may be combined.

A. Bar form factor Display Device Assembly

There is provided a display device assembly including a bar form factor display device and a detachable casing, the assembly operable to be assembled wherein the detachable casing is in attachment with the bar form factor display device, the assembly when assembled comprising front and back major faces, wherein the front major face is arranged to present a first display screen which forms part of the bar form factor display device, and wherein the back major face is arranged to present a second display screen different to the first display screen, which forms part of the detachable casing.

The first display screen may be called the front display screen. The second display screen may be called the back display screen. The above may include additionally any of the following, alone or in combination:

- the bar form factor display device includes a first battery and wherein the detachable casing includes a second battery.
- When the assembly is assembled, the second battery is operable to charge the first

battery.

- when the assembly is assembled, the second battery is operable to power the bar form factor display device.
- when the assembly is assembled, a data connection is formed between the bar form factor display device and the detachable casing.
- the data connection is a wired data connection.
- the data connection is a wireless data connection.
- the bar form factor display device includes a first port and the detachable case includes a second port, wherein when the assembly is assembled the first port is in connection with the detachable case, and the second port provides a connectivity of the assembly which is equivalent to a connectivity of the first port when the bar form factor display device is in isolation.
- the second port provides a connectivity of the assembly which is a wired connectivity.
- the second port provides a connectivity of the assembly which is a wireless connectivity.
- one of the bar form factor display device and the detachable casing includes a magnet and the other of the bar form factor display device and the detachable casing includes a material capable of magnetic attraction, wherein the bar form factor display device and the detachable casing are arranged such that a magnetic force between the magnet and the material capable of magnetic attraction is sufficiently large to pull the detachable casing firmly into contact with the bar form factor display device.
- the bar form factor display device and the detachable casing comprise mating guide surfaces which are arranged to guide the detachable case to a correct position for connection with the bar form factor display device.
- the bar form factor display device includes external electrical contact elements and the detachable casing includes external electrical contact elements.
- the contact includes an electrical contact between the external electrical contact elements in the detachable module and in the device.
- the second display screen is a low power display screen.
- the second display screen uses electrowetting technology.
- the second display screen is a bi-stable display screen.

- Bar form factor display device is a slate device.
- Bar form factor display device is a bar or candybar device.
- Bar form factor display device is a slab-shaped form.
- 5 • Bar form factor display device assembly detachable casing displays an image in the off state.
- Bar form factor display device assembly detachable casing displays an image in a low power notification mode.
- Bar form factor display device assembly detachable casing displays an image on the bi-stable display in the off state or in a low power notification mode.
- 10 • Bar form factor display device first display screen is a liquid crystal display screen.
- Bar form factor display device first display screen is an active-matrix organic light-emitting diode display screen.
- Device assembly appearance is context related.
- Context related device assembly appearance includes location-based advertising
- 15 • Context related device assembly appearance includes results of a location-based search.
- The look of the device assembly can be changed by changing what is displayed on the bi-stable screen.
- The device assembly skin can be changed.
- 20 • The device assembly skin is one or more of wallpaper, photos, movies, user-customized content.
- The look of the device assembly can be changed by changing what is displayed on the bi-stable screen to give the appearance of a different phone case.
- There is provided a bi-stable active matrix and high-resolution display on the back panel of the device assembly.
- 25 • Regarding the back panel, user is able to display a pattern, picture or application interface to differentiate their phone from others.
- any application or service executing on the device assembly is able to display a notification on the back screen.
- 30 • Notification time is not limited, because a bi-stable display is used.
- The information remains on the back screen even when the phone itself is switched off.
- in the off-state, the bi-stable display on the back face continues to display content,

which can be viewed using external illumination.

- the back face has an E-ink bi-stable display.
- the front face has an AMOLED display, and the back face has an E-ink bi-stable display.
- 5 • In the on state, the front face is back-illuminated and can display an image or other content; in the on-state, the bi-stable display on the back face also can display an image or other content.
- front display is touch screen.
- back screen is: Electronic Paper Display under glass.
- 10 • back screen is: Grayscale panel.
- back screen is: interferometric modulation technology panel.
- back face is: perceived as part of case.
- back face has low power consumption.
- back screen resolution is similar to front display resolution.
- 15 • back screen provides approximately at least 1000 full screen updates using 300 mAh of charge for a screen size of approximately 4 inches.
- back screen update rate is the order of twice per minute.
- back screen does not consume power or require power when in bi-stable state.
- back screen output provides one or more of: Interactions, Control, Use cases, Personalization, Widgets, Privacy.
- 20 • back screen output provides Social aggregator output.
- back screen output provides Latitude & Longitude eg. those of the device.
- back screen output provides Location eg. device location.
- back screen output provides Notifications.
- 25 • back screen output provides Operator Push output.
- back screen output provides news provided by a news service.
- back screen output provides social messages provided by a social messaging service.
- back screen output provides an indication of mobile phone signal strength.
- 30 • back screen output provides an indication of battery charge state.
- back screen output provides calendar information.
- back display of the device assembly is the only operational display of the device

assembly when the device assembly operates in a low power notification mode.

- when the device assembly operates in a low power notification mode, the back display of the device assembly displays content updates of one or more categories.
- when the device assembly operates in a low power notification mode, the back display of the device assembly displays content updates of one or more categories, the categories including one or more of news, social messages, an emergency notification, financial news, earthquake, tsunami or weather.
- when the device assembly operates in a low power notification mode, the back display of the device assembly displays content updates of one or more categories, wherein the categories are preselected
- when the device assembly operates in a low power notification mode, the back display of the device assembly displays content updates of one or more categories, wherein the categories are preselected by a user
- when the device assembly operates in a low power notification mode, the back display of the device assembly displays content updates of one or more categories, wherein the categories are preselected by a network services provider.
- Bar form factor display device assembly, wherein an application or service executing on the device assembly is able to display a notification on the first screen.
- Bar form factor display device assembly, wherein any application or service executing on the device assembly is able to display a notification on the first screen.
- Bar form factor display device assembly, wherein a message is provided on first screen and on second screen.
- Bar form factor display device assembly, wherein the second display screen output provides a social network screen.
- Bar form factor display device assembly, wherein the second display screen output provides social aggregator output or social network output.
- Bar form factor display device assembly, wherein the social aggregator output or social network output is a Facebook page.
- Bar form factor display device assembly, wherein the second display screen output provides a Google search page.
- device assembly is portable.

- device assembly is a mobile phone, a portable digital assistant, a laptop, or a tablet computer.
- device assembly includes a virtual keyboard.
- device assembly has a touch screen.
- 5 • device assembly has two screens each of which is a touch screen.
- bi-stable screen is a touch screen.
- bi-stable screen is not a touch screen.
- A screen that is not a bi-stable screen is a touch screen.
- device assembly includes a second bi-stable screen.
- 10 • device assembly includes a second bi-stable screen which is a touch screen.
- device assembly includes a second bi-stable screen which is not a touch screen.
- bi-stable screen occupies greater than 70% of the area of the major face of the device assembly on which it is located.
- bi-stable screen occupies greater than 90% of the area of the major face of the device assembly on which it is located.
- 15 • bi-stable screen occupies greater than 95% of the area of the major face of the device assembly on which it is located.
- screen other than the bi-stable screen occupies greater than 70% of the area of the major face of the device assembly on which it is located.
- 20 • screen other than the bi-stable screen occupies greater than 90% of the area of the major face of the device assembly on which it is located.
- screen other than the bi-stable screen occupies greater than 95% of the area of the major face of the device assembly on which it is located.
- A second bi-stable screen occupies greater than 70% of the area of the major face of the device assembly on which it is located.
- 25 • A second bi-stable screen occupies greater than 90% of the area of the major face of the device assembly on which it is located.
- A second bi-stable screen occupies greater than 95% of the area of the major face of the device assembly on which it is located.
- 30 • device comprises a single backlight module situated between its two major faces.
- single backlight module illuminates one display on one major face.
- single backlight module illuminates two displays each of which is situated on a different major face of the device assembly to the other display

- device comprises two backlight modules, each of which illuminates a display situated on a major face of the device assembly
- the two backlight modules each illuminates a respective display on a respective major face of the device assembly
- 5 • The two backlight modules are situated between two displays of the device assembly, where each display is situated on a different major face of the device assembly to the other display.

B. Detachable Casing for Bar form factor Display Device Assembly

There is provided a detachable casing for a display device assembly including a bar form factor display device and the detachable casing, the assembly operable to be assembled wherein the detachable casing is in attachment with the bar form factor display device, the assembly when assembled comprising front and back major faces, wherein the front major face is arranged to present a first display screen which forms part of the bar form factor display device, and wherein the back major face is arranged to present a second display screen different to the first display screen which forms part of the detachable casing.

The first display screen may be called the front display screen. The second display screen may be called the back display screen. The above may include additionally any of the following, alone or in combination:

- 20 • the detachable casing includes a battery.
- the detachable casing is operable to form a data connection, such that when the assembly is assembled, a data connection is formed between the bar form factor display device and the detachable casing.
- the detachable casing is operable to form a wired data connection.
- 25 • the detachable casing is operable to form a wireless data connection.
- the detachable casing includes a first port, wherein when the assembly is assembled a second port of the bar form factor display device is in connection with the detachable case, and the first port provides a connectivity of the assembly which is equivalent to a connectivity of the second port when the bar form factor display device is in isolation.
- 30 • the first port provides a wired connectivity.
- the first port provides a wireless connectivity.
- one of the bar form factor display device and the detachable casing includes a

magnet and the other of the bar form factor display device and the detachable casing includes a material capable of magnetic attraction, wherein the bar form factor display device and the detachable casing are arranged such that a magnetic force between the magnet and the material capable of magnetic attraction is sufficiently large to pull the detachable casing firmly into contact with the bar form factor display device.

- the bar form factor display device and the detachable casing comprise mating guide surfaces which are arranged to guide the detachable casing to a correct position for connection with the bar form factor display device.

- the detachable casing includes external electrical contact elements.

- the second display screen is a low power display screen.

- the second display screen uses electrowetting technology.

- the second display screen is a bi-stable display screen.

- Bar form factor display device is a slate device.

- Bar form factor display device is a bar or candybar device.

- Bar form factor display device is a slab-shaped form.

- Bar form factor display device assembly detachable casing displays an image in the off state.

- Bar form factor display device assembly detachable casing displays an image in a low power notification mode.

- Bar form factor display device assembly detachable casing displays an image on the bi-stable display in the off state or in a low power notification mode.

- Bar form factor display device first display screen is a liquid crystal display screen.

- Bar form factor display device first display screen is an active-matrix organic light-emitting diode display screen.

- Device assembly appearance is context related.

- Context related device assembly appearance includes location-based advertising

- Context related device assembly appearance includes results of a location-based search.

- The look of the device assembly can be changed by changing what is displayed on the bi-stable screen.

- The device assembly skin can be changed.

- The device assembly skin is one or more of wallpaper, photos, movies, user-

customized content.

- The look of the device assembly can be changed by changing what is displayed on the bi-stable screen to give the appearance of a different phone case.
- There is provided a bi-stable active matrix and high-resolution display on the back panel of the device assembly.
- Regarding the back panel, user is able to display a pattern, picture or application interface to differentiate their phone from others.
- any application or service executing on the device assembly is able to display a notification on the back screen.
- Notification time is not limited, because a bi-stable display is used.
- The information remains on the back screen even when the phone itself is switched off.
- in the off-state, the bi-stable display on the back face continues to display content, which can be viewed using external illumination.
- the back face has an E-ink bi-stable display.
- the front face has an AMOLED display, and the back face has an E-ink bi-stable display.
- In the on state, the front face is back-illuminated and can display an image or other content; in the on-state, the bi-stable display on the back face also can display an image or other content.
- front display is touch screen.
- back screen is: Electronic Paper Display under glass.
- back screen is: Grayscale panel.
- back screen is: interferometric modulation technology panel.
- back face is: perceived as part of case.
- back face has low power consumption.
- back screen resolution is similar to front display resolution.
- back screen provides approximately at least 1000 full screen updates using 300 mAh of charge for a screen size of approximately 4 inches.
- back screen update rate is the order of twice per minute.
- back screen does not consume power or require power when in bi-stable state.
- back screen output provides one or more of: Interactions, Control, Use cases, Personalization, Widgets, Privacy.

- back screen output provides Social aggregator output.
- back screen output provides Latitude & Longitude eg. those of the device.
- back screen output provides Location eg. device location.
- back screen output provides Notifications.
- 5 • back screen output provides Operator Push output.
- back screen output provides news provided by a news service.
- back screen output provides social messages provided by a social messaging service.
- back screen output provides an indication of mobile phone signal strength.
- 10 • back screen output provides an indication of battery charge state.
- back screen output provides calendar information.
- back display of the device assembly is the only operational display of the device assembly when the device assembly operates in a low power notification mode.
- when the device assembly operates in a low power notification mode, the back display of the device assembly displays content updates of one or more categories.
- 15 • when the device assembly operates in a low power notification mode, the back display of the device assembly displays content updates of one or more categories, the categories including one or more of news, social messages, an emergency notification, financial news, earthquake, tsunami or weather.
- 20 • when the device assembly operates in a low power notification mode, the back display of the device assembly displays content updates of one or more categories, wherein the categories are preselected
- when the device assembly operates in a low power notification mode, the back display of the device assembly displays content updates of one or more categories, wherein the categories are preselected by a user
- 25 • when the device assembly operates in a low power notification mode, the back display of the device assembly displays content updates of one or more categories, wherein the categories are preselected by a network services provider.
- Bar form factor display device assembly, wherein an application or service executing on the device assembly is able to display a notification on the first screen.
- 30 • Bar form factor display device assembly, wherein any application or service executing on the device assembly is able to display a notification on the first

screen.

- Bar form factor display device assembly, wherein a message is provided on first screen and on second screen.
- 5 • Bar form factor display device assembly, wherein the second display screen output provides a social network screen.
- Bar form factor display device assembly, wherein the second display screen output provides social aggregator output or social network output.
- Bar form factor display device assembly, wherein the social aggregator output or social network output is a Facebook page.
- 10 • Bar form factor display device assembly, wherein the second display screen output provides a Google search page.
- device assembly is portable.
- device assembly is a mobile phone, a portable digital assistant, a laptop, or a tablet computer.
- 15 • device assembly includes a virtual keyboard.
- device assembly has a touch screen.
- device assembly has two screens each of which is a touch screen.
- bi-stable screen is a touch screen.
- bi-stable screen is not a touch screen.
- 20 • A screen that is not a bi-stable screen is a touch screen.
- device assembly includes a second bi-stable screen.
- device assembly includes a second bi-stable screen which is a touch screen.
- device assembly includes a second bi-stable screen which is not a touch screen.
- bi-stable screen occupies greater than 70% of the area of the major face of the device assembly on which it is located.
- 25 • bi-stable screen occupies greater than 90% of the area of the major face of the device assembly on which it is located.
- bi-stable screen occupies greater than 95% of the area of the major face of the device assembly on which it is located.
- 30 • screen other than the bi-stable screen occupies greater than 70% of the area of the major face of the device assembly on which it is located.
- screen other than the bi-stable screen occupies greater than 90% of the area of the major face of the device assembly on which it is located.

- screen other than the bi-stable screen occupies greater than 95% of the area of the major face of the device assembly on which it is located.
 - A second bi-stable screen occupies greater than 70% of the area of the major face of the device assembly on which it is located.
 - 5 • A second bi-stable screen occupies greater than 90% of the area of the major face of the device assembly on which it is located.
 - A second bi-stable screen occupies greater than 95% of the area of the major face of the device assembly on which it is located.
 - device comprises a single backlight module situated between its two major faces.
 - 10 • single backlight module illuminates one display on one major face.
 - single backlight module illuminates two displays each of which is situated on a different major face of the device assembly to the other display
 - device comprises two backlight modules, each of which illuminates a display situated on a major face of the device assembly
 - 15 • the two backlight modules each illuminates a respective display on a respective major face of the device assembly
 - The two backlight modules are situated between two displays of the device assembly, where each display is situated on a different major face of the device assembly to the other display.
 - 20 C. Method of providing notification messages in a bar form factor display device assembly at low power
- Method of providing notification messages on a display device assembly including a bar form factor display device and a detachable casing, the device assembly operable at low power, the assembly when assembled comprising front and back major faces, wherein the
- 25 front major face is arranged to present a first display screen which forms part of the bar form factor display device, and wherein the back major face is arranged to present a second display screen different to the first display screen which forms part of the detachable casing, wherein the second display screen is a low power display screen, comprising the steps of:
- 30 i) Executing software on the device assembly, the software operating the device assembly in a low power notification mode in which the first display screen is off and in which the device assembly is operable to receive a notification message;

- ii) The software on the device assembly receiving a notification message, and
- iii) Displaying the notification message on the low power display screen.

The first display screen may be called the front display screen. The second display screen may be called the back display screen. The above may include additionally any of the following, alone or in combination:

- Low power display screen is a bi-stable display screen.
- The software determines if the notification message is a new notification message, and the bi-stable display screen is updated only if the notification message is a new notification message.
- notification messages are from a notification message provider.
- The software on the device receiving a notification message from a notification message provider.
- Displaying the notification message on the bi-stable display screen at a low screen update frequency.
- the notification message comprises an image.
- the notification message comprises text.
- an application or service executing on the device assembly is able to display a notification message on the back screen.
- any application or service executing on the device assembly is able to display a notification message on the back screen.
- Notification message display time is not limited, because a bi-stable display is used.
- Notification message remains on the back screen even when the phone itself is switched off.
- the back face has an E-ink bi-stable display.
- back screen is: Electronic Paper Display under glass.
- back screen uses interferometric modulation display technology.
- back screen resolution is similar to front display resolution.
- back screen provides approximately at least 1000 full screen updates using 300 mAh of charge for a screen size of approximately 4 inches.
- back screen update rate is the order of twice per minute.
- Notification message is of one or more categories, the categories including one or more of news, social messages, an emergency notification, financial news,

earthquake, tsunami or weather.

- Notification message is a social network message provided on a social network screen.
- Notification message is a social network message provided on a Facebook page.
- 5 • Notification message is a social message provided by a social messaging service.
- Notification message is a social message provided by a social networking service.
- Notification message is of one or more categories, wherein the categories are preselected.
- Notification message is of one or more categories, wherein the categories are
10 preselected by a user.
- Notification message is of one or more categories, wherein the categories are preselected by a network services provider.
- Notification message is text message from a blog site.
- Notification message is privacy controlled.
- 15 • Maximum screen update frequency is a user settable parameter in the software.
- device assembly is portable.
- the device assembly is a mobile phone, a portable digital assistant, a laptop, a digital audio player (eg. ipod), or a tablet computer (eg. ipad).
- device assembly includes a virtual keyboard.
- 20 • device assembly has a touch screen.
- Including the step of changing the skin of the bi-stable display screen.
- The step of changing the skin of the bi-stable display screen comprises providing a skin which is one or more of: wallpaper, photos, movies, or user-customized content.
- 25 • Including the step of providing context-related content on the bi-stable display screen.
- The step of providing context-related content on the bi-stable display screen includes providing location-based advertising.
- The step of providing context-related content on the bi-stable display screen
30 includes providing results of a location-based search.

CLAIMS

1. Display device assembly including a bar form factor display device and a detachable casing, the assembly operable to be assembled wherein the detachable casing is in attachment with the bar form factor display device, the assembly when assembled comprising front and back major faces, wherein the front major face is arranged to present a first display screen which forms part of the bar form factor display device, and wherein the back major face is arranged to present a second display screen different to the first display screen, which forms part of the detachable casing.
2. Display device assembly of Claim 1, wherein the bar form factor display device includes a first battery and wherein the detachable casing includes a second battery.
3. Display device assembly of Claim 2, wherein when the assembly is assembled, the second battery is operable to charge the first battery.
4. Display device assembly of Claims 2 or 3, wherein when the assembly is assembled, the second battery is operable to power the bar form factor display device.
5. Display device assembly of any previous Claim, wherein when the assembly is assembled, a data connection is formed between the bar form factor display device and the detachable casing.
6. Display device assembly of Claim 5, wherein the data connection is a wired data connection.
7. Display device assembly of Claim 5, wherein the data connection is a wireless data connection.
8. Display device assembly of any of Claims 5 to 7, wherein the bar form factor display device includes a first port and the detachable casing includes a second port, wherein when the assembly is assembled the first port is in connection with the detachable casing, and the second port provides a connectivity of the assembly which is equivalent to a connectivity of the first port when the bar form factor display device is in isolation.
9. Display device assembly of Claim 8, wherein the second port provides a connectivity of the assembly which is a wired connectivity.
10. Display device assembly of Claim 8, wherein the second port provides a connectivity of the assembly which is a wireless connectivity.
11. Display device assembly of any previous Claim, wherein one of the bar form factor display device and the detachable casing includes a magnet and the other of the bar form factor display device and the detachable casing includes a material capable of magnetic

attraction, wherein the bar form factor display device and the detachable casing are arranged such that a magnetic force between the magnet and the material capable of magnetic attraction is sufficiently large to pull the detachable casing firmly into contact with the bar form factor display device.

5 12. Display device assembly of Claim 11, wherein the bar form factor display device and the detachable casing comprise mating guide surfaces which are arranged to guide the detachable casing to a correct position for connection with the bar form factor display device.

10 13. Display device assembly of Claims 11 or 12, wherein the bar form factor display device includes external electrical contact elements and the detachable casing includes external electrical contact elements.

14. Display device assembly of Claim 13, wherein the contact includes an electrical contact between the external electrical contact elements in the detachable module and in the device.

15 15. Display device assembly of any previous Claim, wherein the second display screen is a low power display screen.

16. Display device assembly of Claim 15, wherein the low power display screen is a bi-stable display screen.

20 17. Display device assembly of Claim 15, wherein the low power display screen is Electronic Paper Display under glass.

18. Display device assembly of Claim 15, wherein the low power display screen uses electrowetting technology.

19. Display device assembly of Claim 15, wherein the low power display screen is a grayscale panel.

25 20. Display device assembly of Claim 15, wherein the low power display screen is an interferometric modulation technology panel.

21. Display device assembly of Claim 15, wherein the low power display screen is a transflective LCD panel.

30 22. Display device assembly of Claim 15, wherein the low power display screen is an AMOLED panel.

23. Display device assembly of any previous Claim, wherein the bar form factor display device is a slate device.

24. Display device assembly of any of Claims 1 to 22, wherein the bar form factor display device is a bar or candybar device.

25. Display device assembly of any of Claims 1 to 22, wherein the bar form factor display device is a slab-shaped form.
26. Display device assembly of any previous Claim, wherein the display device assembly detachable casing is operable to display an image in a low power notification mode.
27. Display device assembly of any of Claims 1 to 17, wherein the display device assembly detachable casing is operable to display an image in an off state.
28. Display device assembly of Claim 27, wherein the display device assembly detachable casing is also operable to display an image in a low power notification mode.
29. Display device assembly of any previous Claim, wherein the display device assembly first display screen is a liquid crystal display screen.
30. Display device assembly of any of Claims 1 to 28, wherein the display device assembly first display screen is an active-matrix organic light-emitting diode display screen.
31. Display device assembly of any previous Claim, wherein the device assembly appearance is context related.
32. Display device assembly of Claim 31, wherein the context related device assembly appearance includes location-based advertising.
33. Display device assembly of any of Claims 31 or 32, wherein the context related device assembly appearance includes results of a location-based search.
34. Display device assembly of any previous Claim, wherein any application or service executing on the display device assembly is able to display a notification on the second display screen.
35. Display device assembly of any previous Claim, wherein the first display screen is a touch screen.
36. Display device assembly of any previous Claim, wherein the second display screen output provides one or more of: Interactions, Control, Use cases, Personalization, Widgets, Privacy.
37. Display device assembly of any previous Claim, wherein the second display screen output provides Social aggregator output.
38. Display device assembly of any previous Claim, wherein the second display screen output provides Latitude & Longitude.
39. Display device assembly of any previous Claim, wherein the second display screen output provides Location, for example device assembly location.

40. Display device assembly of any previous Claim, wherein the second display screen output provides Notifications.
41. Display device assembly of any previous Claim, wherein the second display screen output provides Operator Push output.
- 5 42. Display device assembly of any previous Claim, wherein the second display screen output provides news provided by a news service.
43. Display device assembly of any previous Claim, wherein the second display screen output provides social messages provided by a social messaging service.
44. Display device assembly of any previous Claim, wherein the second display screen
10 output provides calendar information.
45. Display device assembly of any previous Claim, wherein the second display screen output provides content updates of one or more categories, wherein the categories are preselected.
46. Display device assembly of Claim 45, wherein the categories are preselected by a
15 user.
47. Display device assembly of Claim 45, wherein the categories are preselected by a network services provider.
48. Display device assembly of any previous Claim, wherein the display device assembly is portable.
- 20 49. Display device assembly of any previous Claim, wherein the display device assembly is mobile.
50. Display device assembly of Claim 49, wherein the display device assembly is a mobile phone.
51. Display device assembly of any previous Claim, wherein the detachable casing
25 includes a backlight module for illuminating the second display screen.
52. Detachable casing for a display device assembly including a bar form factor display device and the detachable casing, the assembly operable to be assembled wherein the detachable casing is in attachment with the bar form factor display device, the assembly when assembled comprising front and back major faces, wherein the front major
30 face is arranged to present a first display screen which forms part of the bar form factor display device, and wherein the back major face is arranged to present a second display screen different to the first display screen, which forms part of the detachable casing.
53. Detachable casing of Claim 52, wherein the detachable casing includes a battery.
54. Detachable casing of Claims 52 or 53, wherein the detachable casing is operable to

form a data connection, such that when the assembly is assembled, a data connection is formed between the bar form factor display device and the detachable casing.

55. Detachable casing of Claim 54, wherein the detachable casing is operable to form a wired data connection.

5 56. Detachable casing of Claim 54, wherein the detachable casing is operable to form a wireless data connection.

57. Detachable casing of any of Claims 52 to 56, wherein the detachable casing includes a first port, wherein when the assembly is assembled a second port of the bar form factor display device is in connection with the detachable casing, and the first port provides
10 a connectivity of the assembly which is equivalent to a connectivity of the second port when the bar form factor display device is in isolation.

58. Detachable casing of Claim 57, wherein the first port provides a wired connectivity.

59. Detachable casing of Claim 57, wherein the first port provides a wireless
15 connectivity.

60. Detachable casing of any of Claims 52 to 59, wherein one of the bar form factor display device and the detachable casing includes a magnet and the other of the bar form factor display device and the detachable casing includes a material capable of magnetic attraction, wherein the bar form factor display device and the detachable casing are
20 arranged such that a magnetic force between the magnet and the material capable of magnetic attraction is sufficiently large to pull the detachable casing firmly into contact with the bar form factor display device.

61. Detachable casing of Claim 60, wherein the bar form factor display device and the detachable casing comprise mating guide surfaces which are arranged to guide the
25 detachable casing to a correct position for connection with the bar form factor display device.

62. Detachable casing of Claims 60 or 61, wherein the detachable casing includes external electrical contact elements.

63. Detachable casing of any of Claims 52 to 62, wherein the second display screen is a
30 low power display screen.

64. Detachable casing of Claim 63, wherein the low power display screen is a bi-stable display screen.

65. Detachable casing of Claim 63, wherein the low power display screen is Electronic Paper Display under glass.