ABSTRACT

VEHICLE INFORMATION DISPLAY INSTRUMENT WITH A UNIVERSAL SERIAL BUS PORT

The present subject matter relates to a vehicle information display instrument that includes an Universal Serial Bus port connected to a connector of the vehicle information display instrument for charging portable devices by a compatible charger and an active matrix thin film transistor screen for displaying the status of the Universal Serial Bus port. The vehicle information display instrument is operated by an electronic circuit structure governing the operation and display of the Universal Serial Bus port of the vehicle. This electronic circuit structure includes an AC to DC converter for feeding the required power supply to a Universal Serial Bus port Controller via an interface, a microcontroller that receive signals from the Universal Serial Bus port Controller to decide the instruction received from the USB port and an USB-UART module that communicates between the microcontroller and the USB port to identify the correct instruction received. In an unique embodiment of the present subject matter, the status of the Universal Serial Bus port are transmitted to get visible on the active matrix thin film transistor screen in the vehicle information display instrument of the vehicle.

REFER : FIG. 3

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WE CLAIM:

1. A vehicle information display instrument **114** comprising:

   an Universal Serial Bus port provided with a connector of the vehicle information display instrument for charging portable devices by a compatible charger;

   an active matrix thin film transistor screen **208** for displaying the status of the Universal Serial Bus port:

   an electronic circuit structure **200** governing the operation and display of the Universal Serial Bus port of the vehicle comprising;

   an AC to DC converter for feeding the required power supply to a Universal Serial Bus port Controller via an interface;

   a microcontroller **204** that receive signals from the Universal Serial Bus port Controller to decide the instruction received from the USB port;

   an USB-UART module that communicates between the microcontroller and the USB port to identify the correct instruction received;

   the status of the Universal Serial Bus port are transmitted to get visible on the active matrix thin film transistor screen **208** in the vehicle information display instrument **114** of the vehicle **100**.

2. The vehicle information display instrument as claimed in claim 1, wherein the portable devices (mechanical, electrical and/or electronic) may includes, but not restricted to, mobiles, tablets, power banks, laptops, and the like.

3. The vehicle information display instrument as claimed in claim 1, wherein a tell tale symbol may also be visible on the active matrix TFT as an indication of the charging status of the said portable device.

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4. The vehicle information display instrument as claimed in claim 1, wherein an USB protective cover is provided on the the universal serial bus port to protect the universal serial bus port from the outside atmosphere, dust, water, etc.

5. The vehicle information display instrument as claimed in claim 1, wherein the "active-matrix TFT" provided with the vehicle information display instrument displays all the textual warning indicators and information such as, but not restricted to, distance traveled after each trip, average fuel consumption, trip time, audio songs being played during the travel, wireless devices (Wifi, bluetooth, etc), ambient temperature and pressure, time, and the like.

6. The vehicle information display instrument as claimed in claim 1 is provided with a mobile stand to hold the mobile or similar portable devices for charging the same during the travel of the operator.

7. The vehicle information display instrument as claimed in claim 1, wherein the mobile stand may be molded, attached and/or connected to the vehicle information display instrument.

8. The vehicle information display instrument as claimed in claim 1, wherein the electronic circuit structure is provided with a provision of detecting any possible fault in the power supply that is being supplied to the microcontroller.

9. The vehicle information display instrument as claimed in claim 1, wherein the possible fault in USB detection such as ERROR, CHARGING, CHARGED, USB NOT DETECTED, and the like are displayed on the active matrix thin film transistor screen.

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10. The vehicle information display instrument as claimed in claim 1, wherein the instructions may include exchanging data with an external device, accessing and editing the data present in the portable devices, listening music, and the like.

Dated this 27th day of April, 2016

For JNS INSTRUMENTS LTD.

AUTHORISED SIGNATORY

TO,
THE CONTROLLER OF PATENTS
NEW DELHI

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FIELD OF INVENTION

The present invention relates to a battery charger unit for two wheelers and more particular to the battery charger unit integrated with a vehicle information display instrument built-in with a thin film transistor.

BACKGROUND OF THE INVENTION

The statements in this section merely provide background information related to the present disclosure and may not constitute prior art(s).

Generally, the automotive vehicles are equipped with various kind of vehicle information display instruments that are uniquely provided with audio/visual warning indicators comprising information such as speed, the fuel level, telephone, bluetooth, rpm of the engine, tell tale symbols, turn signal indicator, hazard warning indicator and / or other indicators. In particular, a mechanical type vehicle information display instrument discloses the transmission of the rotation of a wheel of the vehicle or of a drive component of the transmission as a torsional impulse on a cable. This rotation of the wheel may be facilitated by a straight type movement or an angular type movement which becomes a part of a 'Movement Assembly' along with other components such as numbering wheels, gears, and the like. Parallely, the electronic type vehicle information display instrument discloses the above mentioned transmission by means of plurality of sensors, a microcontroller and multiple light emitting diodes that are represented on a liquid crystal display on the vehicle information display instrument of the vehicles. The vehicle information display instrument is provided with various other advanced features such as tell tale indicators on the liquid crystal display of the vehicle information display instrument, audible/visible warning indicators, colorful background and texts, three-dimensional dial plate, and many more. The vehicle information display instrument is also provided with a universal serial bus port for charging the portable devices such as but not restricted to mobile, tablets, laptop, and the like by a compatible charger during the ride of the two wheelers.

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However, the universal serial bus port provided on the vehicle information display instrument is fitted to function with the display on the liquid crystal display on the vehicle information display instrument. However, the usage of liquid crystal display in such arrangement makes it slightly difficult for the operator to read the status of the charge in the said portable devices, the instantaneous speed of the vehicle, warning indicators especially during daytime. Additionally, the application of liquid crystal display in displaying the information restricts the number of features that can be covered under infotainment system for vehicles. Nonetheless, even if multiple liquid crystal display devices are used to convey multiple warning indicators, the overall cost exceeds the limit, which has to be finally borne by the consumers.

Therefore, it is an object of the present invention to provide an advanced vehicle information display instrument which does not suffer from the foregoing drawbacks. Further, there is an urgent need for an improved method of display of warning indicators in the vehicle information display instrument where information are clearly visible to the operator of the vehicle without any complex optical and light transmission mechanism, especially during day time. Therefore, we need an advanced vehicle information display instrument without losing the basic requirements of reliability, safety, less extra cost, customers' satisfaction and the like.

BRIEF SUMMARY AND OBJECTIVES OF THE INVENTION

The present subject matter relates to a vehicle information display instrument that includes an Universal Serial Bus port provided with the vehicle information display instrument for charging portable devices by a compatible charger and an active matrix thin film transistor screen for displaying the status of the Universal Serial Bus port. The vehicle information display instrument is operated by an electronic circuit structure governing the operation and display of the Universal Serial Bus port of the vehicle. This electronic circuit structure includes an AC to DC converter for feeding the required power supply to a Universal Serial Bus port Controller via an interface, a microcontroller that receive signals from the Universal Serial Bus port Controller to decide the instruction received from the USB port and

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an USB-UART module that communicates between the microcontroller and the USB port to identify the correct instruction received. In an uniquc cmbodiment of the present subject matter, the status of the Universal Serial Bus port are transmitted to get visible on the active matrix thin film transistor screen in the vehicle information display instrument of the vehicle.

An objective of the present subject matter is to apply the present subject matter to the portable devices that are mechanical, electrical, electronic such as mobiles, tablets, power banks, laptop, and the like.

Another objective of the present subject matter is to provide a telltale symbol visible on the active matrix TFT as an indication of the charging status of the portable devices.

Another objective of the present subject matter is to provide an USB protective cover on the universal serial bus port to protect the universal serial bus port from the outside temperature, water, dirt, and the like.

Another objective of the present subject matter is to provide a mobile stand on the vehicle information display instrument to hold the mobile or similar portable device for charging the same during the travel of the operator.

Yet another objective of the present subject matter is to mold, attached, connect, the mobile stand with a connector of the vehicle information display instrument of the vehicle.

Yet another embodiment of the present subject matter is to provide a provision of detecting any fault during power supply being supplied to the microcontroller.

Another objective of the present subject matter is to highlight the status of the operation of the USB port on the active matrix TFT in the form of message such as ERROR, CHARGING, CHARGED, USB NOT DETECTED, and the like.

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Yet another objective of the present subject matter is to provide assent to the USB port to exchange data with an external device, accessing and editing the data present in the portable devices, listening music, and the like.

BRIEF DESCRIPTION OF DRAWINGS

The summary narrated above and the following detailed description of the invention can be understood with the drawings appended to this claim. The illustrations provide the details of the invention. However, it should be understood that the invention is not limited to the arrangements shown. In the drawings:

FIG. 1 show a perspective view of a two wheeler in an embodiment of the present subject matter.

FIG. 2 shows a front view of an active matrix thin film transistor screen provided with an Universal Serial Bus charging telltale displayed on an active matrix thin film transistor in an embodiment of the present subject matter.

FIG. 3 shows a bottom view of a vehicle information display instrument provided with an Universal Serial Bus port in an embodiment of the present subject matter.

FIG. 4 shows a front view of a vehicle information display instrument provided with a mobile stand in an embodiment of the present subject matter.

FIG. 5 shows an electronic circuit structure governing the advanced vehicle information display instrument in an embodiment of the present subject matter.

DETAILED DESCRIPTION OF THE INVENTION

The embodiments of the present subject matter are described in detail with reference to the accompanying drawings. However, the present subject matter is not limited to these embodiments which are only provided to explain more clearly the present subject matter to the ordinarily skilled in the art of the present disclosure. In the accompanying drawings, like reference alphabets and numerals are used to indicate like components.

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The present invention relates to a battery charger unit for two wheelers and more particular to the battery charger unit integrated with a vehicle information display instrument built-in with a thin film transistor. The following description is merely exemplary in nature and is not intended to limit the present disclosure, application, or uses. The present invention will hereinafter be described in detail below as applied to a motor cycle **100**. However, the principles of the present invention are also applicable to other two wheelers and vehicles **100** such as scooters, scooty, and the like. Upward, lower, front and rear directions (see the directions indicated by the arrows in **FIG. 1**) will be described with respect to directions as seated by the rider on the motorcycle **100**.

FIG. 1 illustrates a two wheeler **100** that may include a fuel tank **102** and an engine mounted ahead of a rider's seat **104**, a frame **106** and two relatively large sized wheels **108** on which the frame **106** rides. The structure is necessarily provided with a pair of left and right front fork members rotatably supported by a head pipe **110** on the front end of the vehicle frame. The steering of the two wheelers **100** is possible via a front wheel which is mounted on the front fork member whereas the rear wheel (drive wheel) is at the rear end. **FIG. 1** shows a handlebar **112** secured to an upper portion of the front fork member, and the front and rear portion of the handle bar **112** is covered with a handle cover which is further divided into forward and backward portions. The two wheeler **100** are also provided with various lights mounted externally on the vehicle to indicate certain information about the vehicle to other drivers and pedestrians. These lights mainly include brake lights and tail lights besides indicator light bulbs which are provided to indicate the driving direction of the two wheelers. The two wheeler **100** is further provided with the intelligent vehicle information display instrument **114** (as shown in **FIG. 3** later) (also known as a speedometer) located between the handle bars **112** of the two wheeler **100**. The vehicle information display instrument **114** may be viewable by the rider of the motor cycle **100** when the rider is seated on the seat **104** and operating the vehicle **100**. The vehicle information display instrument **114** may be disposed generally in front of the rider so that the rider can inspect or view a variety of information that form part of

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the vehicle information display instrument **114**, which information may indicate an operating condition or conditions of the vehicle. The vehicle information display instrument **114** may be provided with audio/visual warning indicators comprising information such as speed, the fuel level, telephone, bluetooth, rpm of the engine, tell tale symbols, turn signal indicator, hazard warning indicator and / or other indicators. **FIG. 1** further shows a headlight provided, as an attachment to the top middle of the handlebar of the motor cycle, to light the road ahead.

In an embodiment of the present subject matter, **FIG. 3** discloses a front perspective view of the vehicle information display instrument **114** of the vehicle. In a unique embodiment of the present subject matter, the vehicle information display instrument **114** is provided with a universal serial bus (hereinafter may be referred as USB) port **116** connected to a connector **130** of the vehicle information display instrument **114** for enabling the charging of the portable electronic devices **118** as shown in **FIG. 4**. In an embodiment of the present subject matter, the portable devices **118** (mechanical, electrical and/or electronic) may includes, but not restricted to, mobiles, tablets, power banks, laptops, and the like. In an exemplary embodiment of the present subject matter, the status of the charging of the portable devices **118** is also evident on an Active Matrix Thin Film transistor (often and hereinafter also referred as active matrix TFT) screen **120** as shown in **FIG. 2**. Alternatively, a tell tale symbol **122** may also be visible on the active matrix TFT screen **120** as an indication of the charging status of the said portable device **118**. In another embodiment of the present subject matter, the universal serial bus port **116** is protected from the outside atmosphere, dust, water, etc by a USB protective cover **124**. In an embodiment of the present subject matter, the position of the universal serial bus port **116** does not limit the scope of the present subject matter. Thus, the universal serial bus port **116** may be positioned on and around any feasible location of the vehicle information display instrument **114** of the motor cycle **100**.

Generally, a display is composed of a grid (or matrix) of picture elements ("pixels"). Thousands or millions of these pixels together create an image on the display. Thin-film transistors (TFTs) act as switches to individually turn each pixel

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"ON" (light) or "OFF" (dark). These TFTs are the active control elements, arranged in a matrix, on the display. Thus, these are termed as "active-matrix TFT". By principle, a back light (which is normally comprised of a number of flourescent tubes) is used for emitting any color out of the pixels present in the matrix as disclosed above. In order to light a single pixel, all that needs to be done is for a small 'door' or 'shutter' to open to let the light pass through. However, since the liquid crystals can change their molecular structure and therefore may allow varying levels of light to pass through them (or they can block the light), therefore two polarizer filters, color filters and two alignment layers determine exactly how much light is allowed to pass and which colors are created. The layers are positioned between the two glass panels. A specific voltage is applied to the alignment layer, creating an electric field - which then aligns the liquid crystals. Each dot on the screen (pixel) therefore requires three components, one for red, green and blue - just as for the tubes within cathode ray tube devices. In a similar way, these dots on the screen can even display a combination of these three primary colors also, thus providing a desired pattern on the "active-matrix TFT" in the vehicle information display instrument **114** of the vehicles **100**.

The "active-matrix TFT" in the vehicle information display instrument **114**, according to the present subject matter, is qualified to indicate various kind of textual information on the "active-matrix TFT" screen **120**. In a unique embodiment of the present subject matter, the "active-matrix TFT" provided with the vehicle information display instrument **114** that displays all the textual warning indicators and information such as, but not restricted to, distance traveled after each trip, average fuel consumption, trip time, audio songs being played during the travel, wireless devices (Wifi, bluetooth, etc), ambient temperature and pressure, time, and the like. In another embodiment of the present subject matter, the "active-matrix TFT" screen **120** also shows the first and last name of the caller along with the call duration and the call status of the call.

Additionally, the "active-matrix TFT" is also characterized to illustrate the speed in terms of the rpm on the colored segments so that the operator of the vehicle can easily identify the speed of the moving vehicle without deeply looking the

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instantaneous speed of the vehicle. The colored segments in graduations may be provided with an audible buzzer to further inform the operator of the vehicle about the exceeding speed of the vehicle. Furthermore, the fonts displaying the speed of the moving vehicle **100** are also programmed to vary in size on the basis of the instantaneous speed of the vehicle **100**. This enlarged font sizes of the instantaneous speed at high speed of the moving vehicle draws an instant attention of the operator of the vehicle **100** and would alert the operator to slow down the speed of the over speeding vehicle. In another embodiment of the present subject matter, the fonts are in various colors by virtue of the "active-matrix TFT". The colors of the fonts may be selected on the basis of the speed of the moving vehicles. The colors of the fonts displaying the instantaneous speed of the vehicle **100** may be selected from the three primary colors i.e. Red, green and blue and their combinations together. In an embodiment of the present subject matter, the vehicle information display instrument **114** is provided with a dial plate (not shown) to designate other information conveyed by the vehicle information display instrument **114** such as warning symbols, telltales, and the like. The position of the speed indicator on the "active-matrix TFT" in the vehicle information display instrument **114** is not relevant and thus not discussed with respect to the present subject matter. In a unique embodiment of the present subject matter, the vehicle information display instrument **114** is also provided with a mobile stand **126** to hold the chargeable portable devices **118**, as shown in **FIG. 3**, or similarly sized portable devices for charging the same during the travel of the operator. The said mobile stand **126** may be integrally molded to the vehicle information display instrument **114**. In another embodiment of the present subject matter, the mobile stand **126** may be connected or attached to the vehicle information display instrument **114**.

FIG. 5 discloses an electronic circuit structure **200** that governs the operation of the vehicle information display instrument of the vehicle in an embodiment of the present subject matter. The electronic circuit structure **200** illustrates a battery powered ignition switch **202** which when turned therein with an ignition key (not shown) activates an engine (not shown) of the motor cycle **100**. The electronic circuit

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structure **200** is provided with a MOSFET **204** that refine and supply a voltage of 3.3 V (from the battery supplying a voltage of 13 V) after the input alternating current is converted to direct current by an AC to DC converter **206**, in an embodiment of the present subject matter. The filtered input signals are fed to an USB port controller **208** that receives pre-programmed signals from a microcontroller **210**. The pre-programmed signals includes the enablement of USB port **116**, USB charging status, USB communicating parameters, and the like in an embodiment of the present subject matter. The USB port controller **208** further receives input signals from an USB port **116** which communicates with an USB-UART module **212** which acts as a communication protocol between the microcontroller **210** and the USB port **116** in a unique embodiment of the present subject matter. Thus, on receiving the appropriate instruction from the USB port **116**, the USB port controller **208** compares the signals received from the microcontroller **210** and the USB port **116** via the USB-UART module **212** and activates the corresponding instruction that are subsequently displayed on the "active-matrix TFT" screen **120** in an embodiment of the present subject matter. In an embodiment of the present subject matter, the instructions may include exchanging data with en external device, accessing and editing the data present in the portable devices, listening music, and the like. In an exemplary embodiment of the present subject matter, the electronic circuit structure **200** is further provided with a provision of detecting any possible fault in the power supply that is being supplied to the microcontroller **210**. For instances, if the power being supplied through the AC to DC converter **206** is more or less than the required power supply, the fault detecting circuit send the corresponding signals to the microcontroller **210** to subsequently indicate the further operation of the vehicle information display instrument **114** of the vehicle **100**.

The vehicle information display instrument **114** according to the present subject matter advantageously facilitates the provision of USB port on the vehicle information display instrument, thus providing an option of charging the portable devices such as but not restricted to mobile, tablets, laptop, and the like by a compatible charger during the ride of the two wheelers. The present subject matter

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also provides the option of a mobile stand for holding the mobile or any similar device for charging the same during the travel of the vehicle. Moreover, the advanced infotainment vehicle information display instrument with the integral "active-matrix TFT" according to the present subject matter enhances the visibility of the data to the operator without any complex optical and light transmission mechanism. The advanced infotainment vehicle information display instrument provided with the "active-matrix TFT" screen is furnished with the possibility of display of multiple warning information in the vehicle information display instrument at a single time. Additionally, the application of active matrix thin film transistor discourages the costly requirement of LEDs for signaling and indicating the indicators such as high revolution-per-minutes, warning indicators, tell-tale indicators, and the like. Furthermore, the present subject matter discloses an improved, advanced, reliable, customers' friendly and automatic speed alert indicator in the vehicle information display instrument for vehicles.

It will be appreciated by those skilled in the art that changes could be made to the embodiments described above without departing from the broad inventive concept thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description and all variations, substitutions and changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

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