International Journal of Technical Research and Applications e-ISSN: 2320-8163,
www.ijtra.com, Special Issue 42 (AMBALIKA) (March 2017), PP. 65-67

TRANSPARAENT NAVIGATIONAL SYTEM WITH ORGANIC LED USING ACTIVE MATRIX METHOD

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***Abstract*— Electronics has entered ever where, in all fields and applications without any limitation or exception and has helped in improving the life of each and every person without any discrimination. With advancement in technologies and new researches new applications have been emerging since over 60-70 years in Electronics. With OLED new applications are being innovated . Aim of this paper is to use OLED to make Flexible Colour Display with reduced power consumption for Navigation purpose for Military and Remote areas. This will give transparent flexible electronics using AMOLED giving information in all desired colours and will remain invisible when not in use.**

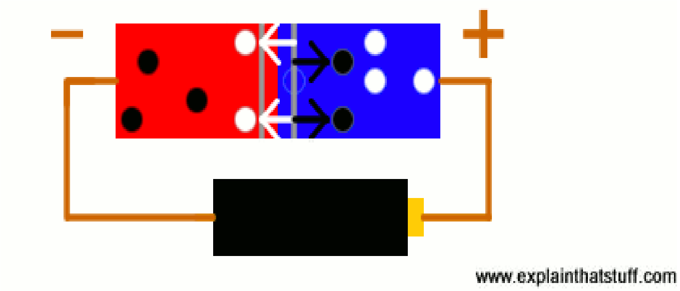
***Index Terms*—** OLED, DISPLAY SYSTEM, NAVIGATION, TRANSPERENT.

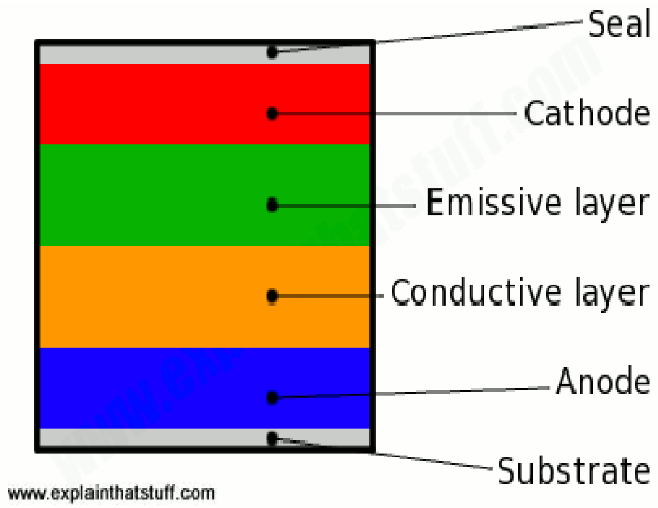
I. INTRODUCTION

LEDs (light-emitting diodes) are very small sized electronic component used to emit light and is used display light for various small and big applications, varying small only presence of light to big panels to display even live matches. LED are energy efficient and reliable than incandescent lamps and draws very less current, in milli-ampere. They are made of solid material and doping of different materials is used for generating differentcolours.
In an OLED light is produced ("emitted") by organic molecules. Organic molecules are simply based around layers of carbon atoms, that includes plastics, wood, alcohol and sugar etc.

II. HOW DOES AN ORDINARY LED WORK?

To understand an OLED, it will be better to understand conventional LED working. Something like silicon or germanium are used for making LED. On rich in electrons, called n-type, and one poor in electrons, called p-type.
When n-type and p-type slabs together are joined, where they meet, you get a kind of neutral, no-man's land forming at the junction where surplus electrons and holes cross over and cancel one another out.
When power is connected between the two slabs, Electrons flows are crosses the junction, if polarity of power is proper, and pairing of electrons and holes generate energy in the form of light.
We explain all this more clearly and in much more detail in our main article ondiodes.



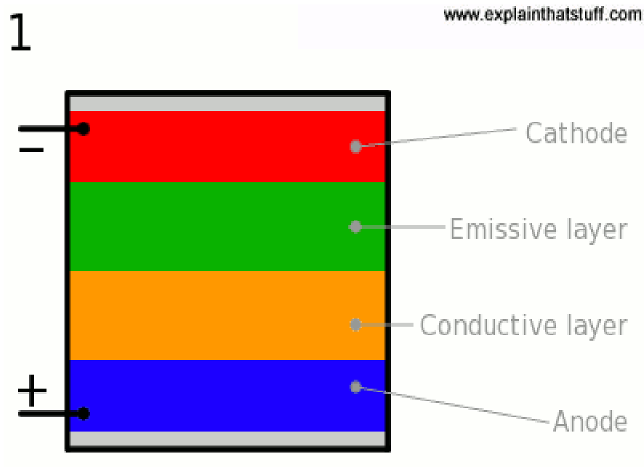


III. HOW DOES AN OLED WORK?

Working of OLEDs is similar to that of conventional LEDs, but they use organic molecules instead of semiconductor material to produce their electrons and holes. A OLED is made up of 6 different layers. Protective layers are provided on top and bottom by plastic or glass. Seal is top layer and bottom layer is known as substrate. In between these two are cathode and anode terminals. Emissive layer and conducting layers are fabricated.
OLED light up when we simply attach a voltage (potential difference) across the anode and cathode.
When electricity flows, power source provides electrons to cathode more than anode losses.
Electrons are less mobile than holes, positive in nature. Holes jumps boundary from conductive layer to emissive layer to combine with electrons to generate energy . This energy is converted in the light

due nature of substance. This happens number of times per unit time and continuous light get produced.

Coloured light can also be produced by OLEDs if colour filters are added in to plastic sandwich below the bottom or top of glass/plastic layer. Thousands OLEDs, of prime colours, of red, green and blue, can be put to generate any colour.

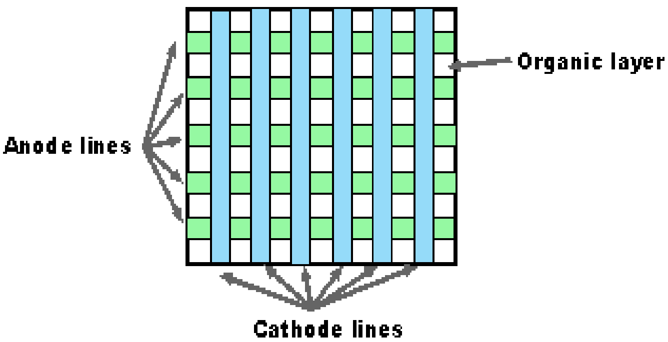


IV. OLED:

Basically OLED are of two types
1. PMOLED (Passive Matrix OLED)
2. AMOLED (Active Matrix OLED)

V. PMOLED BASICS

The PMOLED is arranged in a the form of rows and columns. Rows are anode and columns are structured as cathode.
This way individual pixel can be activated on respective intersection.



PMOLED Structure

The organic material is set down between the anode and cathode - with both the organic material and cathode metal regions being deposited using relatively standard processes. This enables large scale manufacturing to be achieved in a relatively cheap manner.

In terms of their structure, the layers of organic material are set down in a form of ribbed structure with columns and rows obviously running in different directions.

Although the concept of the PMOLED structure is relatively straightforward to design and fabricate, they require relatively complicated drive arrangements because each line needs to have the current limited for each diode - this will change according to the number of diodes in a given row that are activated.

In addition to this, the PMOLEDs require a significantly higher power consumption level than their active AMOLED counterparts. As a result PMOLEDs are normally most suited to display applications where the display size is less than about 50 mm to 80 mm across the diagonal or where there are less than about 100 rows.

VI. AMOLED BASICS

PMPLED provide less flexibility as compared to that AMOLED can provide..

The AMOLED display consists of a matrix of OLED pixels, layer of thin film transistor array is provided between anode and cathode to control the current of each pixel, to activate the individual pixel to generate the light.

Each pixel uses two transistor- one to turn the charge to the pixel on and off, and a second to provide the constant current. This reduces the high current required by PMOLED and are power efficient.

VII. AMOLED LIFE EXPECTANCY

One of the chief issues with AMOLED displays is the lifetime. Although much has been achieved to improve the displays, the first ones to be introduced commercially only had lifetimes of around 15 000 hours.

Figures of this order are quite acceptable for mobile phones which are replaced fairly regularly and the display may only be on for relatively short periods, but for televisions or computer monitors that have much higher usage rates, the half life becomes an issue.

A. Screen technologies Comparison:

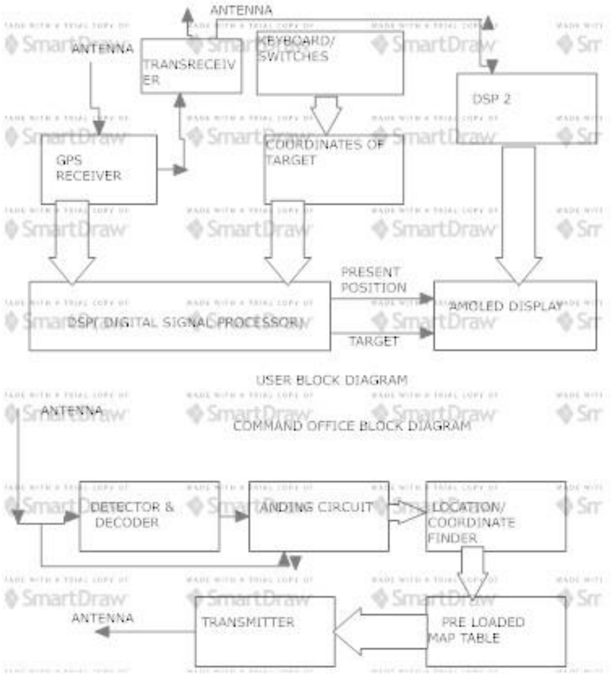
Screen technologies are many and in use for different purpose. Each having its own advantage and disadvantages. CRT are out of date and not used now a days. AMOLED can be compared with PLASMA and LCD, just for reference.

PLASMA	LCD	AMOLED
Highest power consumption	Lower power consumption than plasma	Consumes lowest power (when backlight of others included)
Requires backlight	Requires backlight	Self emissive
Displays a very deep black	Colour range not good	Displays wider colour range than LCD
Screen burn potential	No screen burn potential	No screen burn potential
Half life ~ 60 k hours	Backlight bulb typically requires replace at around 60 k hours	Shorter overall life (red and green half life ~ 10 - 40 k hours, blue ~ 1-k hours
Highest cost	Medium cost	Potentially the lowest cost

VIII. OLED IN NAVIGATION:

Navigation can be done using transparent AMOLED . It can easily be put in any hand, below elbow, or any other place suitable as this has much more flexibility and can be detected till not in use.

Block diagram for this is given below:



References

[1] Small GPS receiver: It receives the signal from GPS satellites and gives coordinates information, in 2 or 3 dimensions as desired, in digital form. Output of this is fed to DSP, Difference finder and Transreceiver.

[2] Target coordinates can be set by key board or set of switches- displaying selected coordinates on LCD/OLED display. Output of this given to DSP and difference finder.

[3] DSP , taking inputs from GPS Receiver and set coordinates, processes the data and provides present location and target point and display on AMOLED SCREEN in rectangular display manner as displayed in monitor.

[4] Transreceiver, on getting coordinates information from GPS Receiver adds it own address(or ID) and transmit on RF frequency to local Command office for updating local area map. This is to make system cheap and needing less power and memory requirements.

[5] Local Command office receives this and detect and decode received information. On confirming authenticity , find the coordinates send by user. It then loads the local area from preloaded Table, selectable in the steps, say from +/-0.1 degree to +/-1.0 degree.

[6] This is then send to user with same ID/Address for use.

[7] OLED Navigation detects this and send the information to another DSP for processing and sending data AMOLED.

[8] AMOLED displays the data showing map , present position and target position.