LED TECHNOLOGY OVER CCFL

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Abstract- **One common thanks to extend the battery lifetime of a transportable device are to scale back the LCD backlight intensity. In distinction to previous approaches that minimize the facility consumption by adjusting the backlight intensity frame by frame to succeed in a specified image quality, the projected methodology optimizes the image quality for a given backlight intensity. Image is increased by performing brightness compensation and native contrast improvement. For brightness compensation, global image statistics and backlight level are thought-about to keep up the brightness of the image. For contrast improvement, to native contrast property of human visual system (HVS) is exploited to enhance the local image details. Additionally, a brightness prediction theme is projected to speed up the formula for display of video sequences. Experimental results are conferred to point out the performance of the formula.**

A 1-D LED backlight scanning and a 2-D native dimming technique for big LCD TVs are conferred. These techniques not only reduce the motion blur artifacts by means of impulse illustration of pictures in video however also increase the static contrast magnitude relation by means of native dimming within the image(s). each techniques exploit a singular feature of LED backlight in giant LCD TVs during which the complete panel is split into a pre-defined range of regions such that the luminosity in every region is severally controllable.

I. INTRODUCTION

In recent year the liquid crystal display (Liquid crystal Display) have cover the big space of the market thanks to the various benefits like high distinction magnitude relation, long lifetime, low Power Consumption, though liquid crystal display (LCD) could be a non emissive display devices it needs backlight unit (BLU) in monitor or TV application. in the case of TV application several backlights were used like CCFL(cold cathode fluorescent lamp), EEFL(external electrode fluorescent lamp), FFL(flat fluorescent lamp).

Recently for backlight unit (BLU) and different lighting applications there are light emitting diodes are used as a necessary candidate. In beginning the high cost and low efficiency make LED troublesome however as their cost minimized and efficiency improved led became appropriate resolution. For BLUs LEDs supply several potential formats for backlighting LCD panels like direct view or edge-light, white or RGB.The first led was made-up by OLEG LOSEV (1927), JAMES R. BIARD (1961) and NICK HOLONYAK (1962) individually.

LEDs are known as the fourth generation of light, candles, light bulbs and fluorescent lamps. An LED could be a conductor that emits light when electric current is versed it.

II. PRINCIPLE

LCD: This document can only discuss passive phase lcd displays (Liquid Crystal Display). These displays are sometimes constructed by sandwiching the liquid crystal between victimization glass plates. By mistreatment the voltage dependent, polarizing properties of the liquid crystal material, light transmission through the LCD glass is controlled. The display is usually built up by segments that may either block light or let it pass through depending on the voltage applied over the liquid crystal among that segment. By having a reflective coating on one aspect of the glass, close light will either be mirrored back to the user or blocked by the polarizer closest to the reflective layer. This blocking of light happens as a result of the liquid crystal in one state can change the polarization of the light to permit it to pass each polarizer. Within the different state it'll not have an effect on the polarization, and also the light is then blocked as a result of the 2 polarizers is orthogonally destined with regard to each other. This document can additional use the notion that a phase is "on" once it's blocking light and "off" once light will meet up with. Some displays invert this notion by holding light pass through the "on" segments, and having the "off" segments block light. Following figure illustrates however light polarization is affected when the light passes through the polarizers and liquid crystal with and while not a voltage applied over the liquid crystal.

LED

In an LED light electrode is made by change of integrity each P-type and N-type semi conductor along .As we all know p-type semiconductor have abundance of positively charged holes whereas n-type semiconductor have abundance of negatively charged electrons.When an LED chip is subjected to voltage, the holes and electrons attract one another they collide and join. Once they join, the energy possessed by the holes and electrons becomes smaller. The additional energy is reborn into light energy, and light is emitted. This can be the light emission principle of LED.

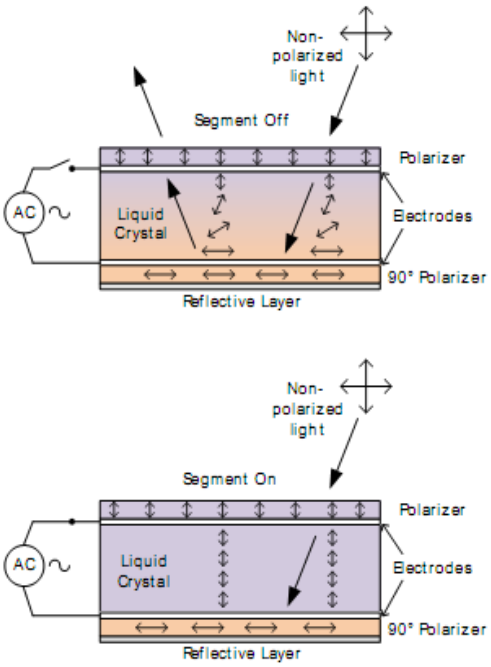

Fig. 1:Principle of LCD

In this approach, the LEDs themselves emit light, and that they have come to be used not only as space lights however also as backlights for LCD monitor.

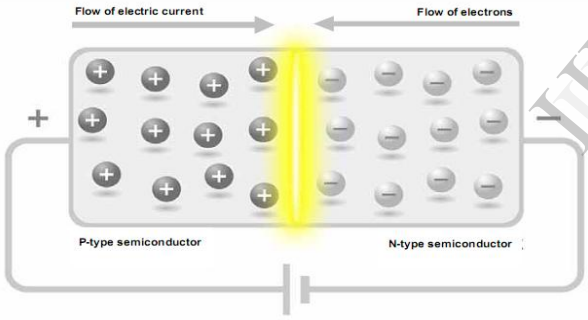

Fig. 2: Light emerging principle of LEDs

III. WORKING: LED USE AS BACKLIGHT BEHIND THE LCD

All LCD panels require backlight, In order to understand the principle of the LCD's we must Ist understand the idea of light's polarization. Light can travel as alignment of photons. These photonic alignment are a transverse (perpendicular) combination of E(Electrical) and M(Magnetic) fields. The electric and Magnetic fields are 90 degree angle to each other and to the direction of the Photonic propagation. Liquid crystal displays (LCDs) are display technology. This means they do not produce light; instead, they use the close light in the environment. After manipulating this light, they display images Exploitation very little power. Liquid crystal (LC) is associate an organic substance that has each a liquid form and a crystal molecular structure. In this liquid crystal the molecules are rod-shaped in a parallel array, and an electric field can be accustomed management the molecules.

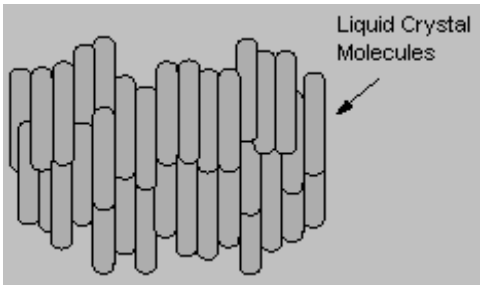

Fig. 3: Liquid Crystal Molecule

A liquid show (LCD) consists of 2 substrates that type a "flat bottle" that contains the liquid mixture. Within surfaces of the bottle or cell or coated with a compound that's buffed to align the molecules of liquid. The liquid molecules align on the surfaces within the direction of the buffing. the 2 surfaces are buffed orthogonal to the one another, forming a ninety degree twist from one surface to the opposite.

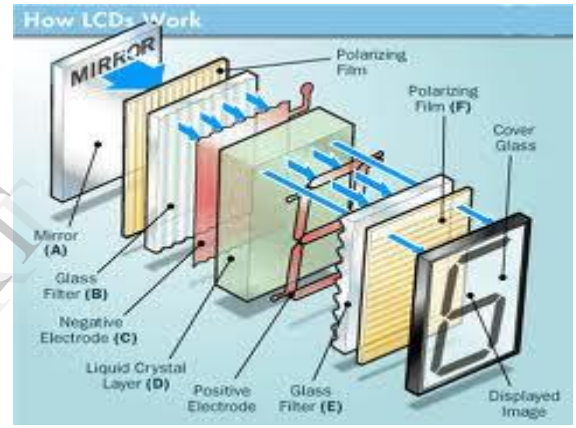

Fig. 4: The LCD works

This volute structure has the flexibility to manage light-wave. A polarizer is applied to the front of the LCD and an deanalyzer/reflector is applied to the rear of the cell. once indiscriminately polarized light-wave passes through the front polarizer it becomes linearly polarized. It then passes through the front glass and is revolved by the liquid molecules and passes through the opposite glass. If the analyzer is revolved 90 degrees to the polarizer, the wave light will go through the analyzer and be mirrored back through the cell. The observer can see the background of the show.

The liquid crystal display glass has clear electrical conductors plated onto both sides of the glass contact with the liquid crystal fluid and that they are used as electrodes. These electrodes are product of Indium-Tin chemical compound (ITO). Once an applicable drive signal is applied to the cell electrodes, an electrical field is about up across the cell. The liquid molecules can rotate within the direction of the electrical field. The incoming linearly polarized light wave passes through the cell unaffected and is absorbed by the rear analyzer. The observer sees a black character on a sliver grey background, see figure. Once the electrical field is turned off, the molecules relax back to their ninety degree twist structure. Tshis can be stated as a positive image,

reflective viewing mode. Carrying this basic technology, associate degree liquid crystal display having multiple selectable electrodes and by selection applying voltage to the electrodes, a spread of patterns may be achieved

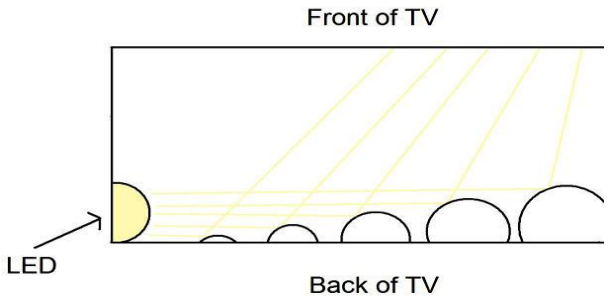

Fig. 5: LED as a backlight of The TV

This wondrous diagram shows a top-down cutaway read of the light wave edge-lit semiconductor diode LCD. The semiconductor diode (yellow here, as a result of white does not show abreast of a white background) fires on the dimensions of the TV. Light wave come back from the mirror towards the screen. Done dead, the middle of the screen (where the guide is tallest), is simply as bright because the edges.

Led means light emitting diode could be a semiconductor device that emits light rays when properly biased. The basic semiconductor diode in bias, the electrons and the holes in the led merge to release energy by a process called electroluminescence. The colour of the light is emitted by the energy gap of the semiconductor. a light rays emitting diode consists of multiple layers of semi-conducting material. Once the diode is getting used with dc, light is made with in the active layer. The light rays produced are decoupled directly or by reflections. in contrast to in distinction reflector lamps, That emits a never ending spectrum, an led emits light in a specific color. the light's color depends on the semiconductor material used. 2 material systems are in the main used, so as to supply led with a high degree of brightness in all together colors from blue to red and green, by means of luminescence conversion, also in white. Totally different voltages are necessary, to work the diode in forward bias.

LEDs are semiconductor crystals reckoning on the composition of the crystal compounds, they emit light rays in the colors of red, green, yellow and blue, when current flows through them with the 3 EGB colors, any number of color tones may be mixed by varying the proportions of the individual colors. In this way, the led light rays can create fascinating worlds of experience.

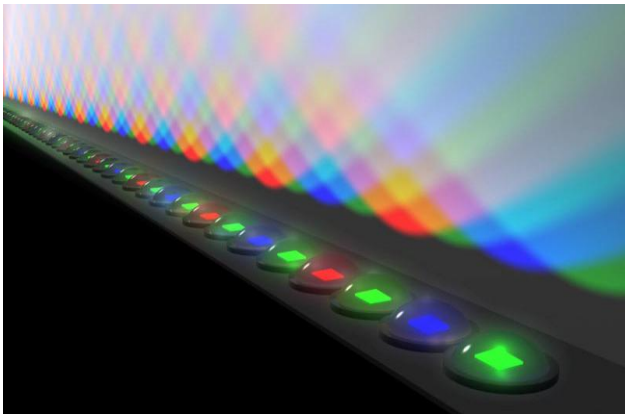

Fig. 6: Edge led

The Diode light's color, whether it is red, green, blue, etc., is not passionate about color filters or different methods however it is determined by the compounds comprising the semiconductor. What we will focus on here is white LEDs. The practical appliance of white LEDs has accelerated the application of LEDs in televisions, monitors and other different display devices. With LCD televisions and monitors, the LCD itself does not emit light, so a light source is required. The structure and many layers of an LCD monitor. The light source is positioned behind these layers, thus it is refer to a backlight. Up hitherto, CCFLs had primarily been used as the light source, but in recent years LEDs are becoming more popular, and these are called LED backlight.

There are 2 types of LED light

LED BACKLIGHT:

LED lights are placed behind the screen. With native dimming they're organized into team and the brightness of these team of LEDs is controlled one by one.

EDGE LED:

LEDs are placed around the edges of the TV or behind the screen and the light are distributed equally across the screen using light guidance of steering plates.

BUCK BOOST TOPOLOGY:

The buck-boost is a Portable circuit allowing the most dynamic changes in source voltage. The output can be higher or lower than the supply voltage and is opposite to that of the input voltage. The switch does not have a reference to ground.

IV. HOW LED IS BETTER THAN CCFL

The CCFL-based backlight world, LED-based backlights ar still too new to have any interconnection standardization. the amount of LEDs used can depend on the size of the electrical and optical performance of the LEDs themselves, the alphanumeric display panel performance, brightness needed and thermal management problems.

1) The main factor in the restricted generation of the CCFL is that the depletion of the inert gas and mercury

capsulated within the glass tube. this can be not the case with the LED.

2) LED's are easier to drive, use no high voltage or mercury vapor in their construction, operate at low temperatures and might be simply dimmed with none impact on life. On the down side they do have some issues with life at higher temperatures, whereas CCFL's have a proven life at higher temperatures, terribly high color stability. they are doing not perform well at cold and do use mercury vapor inside the lamp.

3) LEDs have a better bright efficiency than CCFLs, therefore once set to constant brightness, the ability consumption of AN LED backlight monitor is lower.

4) The high brightness, and ultra-high brightness necessities for middle to giant format LCD panels, larger numbers of LEDs are needed, which implies higher power. A lot of refined constant current supply approach is required to efficiently provide considerable amounts of power to those LEDs.

5) If there's a plate on that the LED drive circuitry will reside, Then engineering experience and resources in-house will design a circuit around chip style LED driver. These chips contain simply the "smarts" or operation, and also the remainder of the circuit should be designed and verified. For applications involving multiple parallel banks of series connected LEDs, may be used. But CCFL cannot mounted just a small board.

6) LED drivers are still power provides. Most system designers wouldn't entertain supply of planning their own system power provide, and ironically, light-emitting diode drivers need in all probability a lot of sophistication than the ability provide that's running the whole system. While not having power supply experience.

7) The LED driver should be ready to run from a DC voltage that's readily obtainable within the system. Some firms are promoting drivers supported a buck circuit, wherever the availability voltage for the LED drivers should be greater than the minimum needed to power the LED string (or the total forward drop of all the LEDs connected in series). In some cases, voltages needed are as high as 48Vdc.

8) Because the size of the display will increase, the amount of LEDs that are needed additionally will increase. in order to maintain some semblance of management of the amount of wires and interconnections, the driver design should be capable of with efficiency driving multiple parallel banks of series connected LEDs, and be capable of developing higher voltages for a single however larger group of series connected LEDs.

V. FUTURE SCOPE

As previously mentioned, although restricted, there are crystal rectifier LED commercially accessible to system designers these days for larger display formats (6" – 24" diagonal) or extra large digital display,

A number of LCD makers are currently offering panels with LED backlights from the factory. the simplest case situation would be for a system designer the right the proper size panel, that meets all of the performance specifications for the application, and that comes with a factory LED backlight that's capable of meeting or surpassing the required brightness for the appliance within the future.

The LEDs are terribly tiny however its series is extremely powerful and by this LEDs we will make the device moveable and really thin, within the future

1) LED for Business:

The next few years should see the primary effective LED solutions in specialized areas of the office, such as, reception and meeting areas, wherever a lot of decorative effects are needed. Within 3 to 5 years the primary solutions ought to become on the market which can compete with compact fluorescent technology on total cost of possession criteria and at intervals a decade LEDs should become a viable possibility for general lighting solutions.

2) LED light in Industry:

LED replacements/retrofits are already creating a little impact in industrial niche areas in the main involved with lighting in fire hazard and explosion risk areas. LEDs are ideal as a result of they operate at Safety additional Low Voltages (SELV) — usually 12V or 24V. Their reliableness, long life and instant flicker–free turn on are also major selling points. however kind of like the commercial market, general LED lighting solutions are still some years away.

3) LED light in Leisure field:

In the leisure sector, hotels and restaurants are installing LED lighting for ornamental functions in bars and reception and eating areas. Hotels are starting to use LED side and standing lamps and effective 3W LED down lighters, (designed to exchange 20W grouping versions), are expected at intervals a year some.

LEDs are getting used in building aggregation to exchange fluorescent, incandescent and neon lamps. Their low energy consumption, bright clear colors and long life make them ideal.

In the coming years, the light output of LEDs can still increase, enabling mass–market general lighting applications ahead. The primary effective general LED solutions to exchange incandescent can appear on the market over future 2 to 3 years, however initially they'll be comparatively costly.

VI. CONCLUSION

Thus we can say that LED is very important part of the Emerging Trends of the LCD, this colorful and White LED is used in the TV, mobile Watch etc. The LED works as a backlight behind the LCD panel, and this consume low Power or voltage & current but if we want large panel of LCD then we can use a series of LED that time we require more power, so for this Purpose we can use buck or boost circuit. And at last we can say that LED is smart today.

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