Electronic multipurpose scoreboard with synchronous clock

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Abstract – *The idea of electronics multipurpose scoreboard is about low cost efficient for various sports and games scoreboard and timer (Game clock, short clock).The scoreboard of any sports/games shows the status of the ongoing match or game by displaying data like timer and scores of each teams. Scoreboards are used for various features. Scoreboard is specially used for displaying scores of each team played between two teams. Some games can be a timer based or an untimed. Players and viewers rely on the numerical figures that are shown on the scoreboard especially the scores of each team and the game clock to determine which team is winning. This scoreboard displaying data in form of seven 7-segment displays by made up of LEDs that can be remotely controlled programmable clock and scoring board. In this scoreboard controlled clock and scoreboard status wired as well wireless. This paper has the future of multi-sport scoreboard that is cost efficient, portable, and easy to use.*

***Key Words*: Timer (Main Game clock and Short Clock), MCU, Communication Wired and wireless.**

1. INTRODUCTION

Mostly the scoreboard is single function or specific for particular games or sports only means limited function. As the function of any product improve with increases in cost. To implement such electronics digital multi function multi sport scoreboards come in picture. Which applied technology to the scoreboard because in the old timer, the scores are written on board which can be erased or even edited that may result to cheating? Traditional scoreboard uses a board with the team name placed at the top and the corresponding score below its name. The game time is only declared verbally by the announcer same with the shot clock. In the current playing games, players need to know the left time of each period match in main timer and team score etc. Electronic timer with the advantages of its convenient operation, compact size and visualization has been widely used in games like basketball, kabbadi, kho-kho these games are timed whereas volleyball, badminton these are untimed games.

2. LITERATURE SURVEY

NBA clock timer and score system was designed by using single chip of MCS-51.This system design based on timer counting, score counting, keys for controlling and display sub-systems (Luo-Sheng, 2004) [1].

A new game clock and scoring equipment for basketball match was designed and manufacturing by Chinese Basketball Association, used in 2004 CBA for league match played by NBA at Beijing, which was helpful for the present game clock and scoring equipment for sport purpose (Zhang et al.,2006)[2].

The control system for basketball digital scoreboard was designed based on single chip micro-control based with 16*16 matrix LED, which could be long-term operation and so on (Wei-Yu et al., 2008)[3].

The design of scoreboard system of game clock and scoreboard system was based on 89C51, which had the functions of the total timer in countdown, with its features of score modular design, simple structure and easy to prepare (Han et al., 2009)[4].

There also one reset button for making all values or status to their initial as define at the start of the match (Sandra Ilijin, 2015) [10].

The game clock or timer and score of each team are displayed by using seven segment LED based display driving in multiplexing interface. Display unit and the controlling unit are connected with max-485 wired communication and zigbee for wireless communication.

3. PRODUCT PERSPECTIVE

The major functionalities of this product are

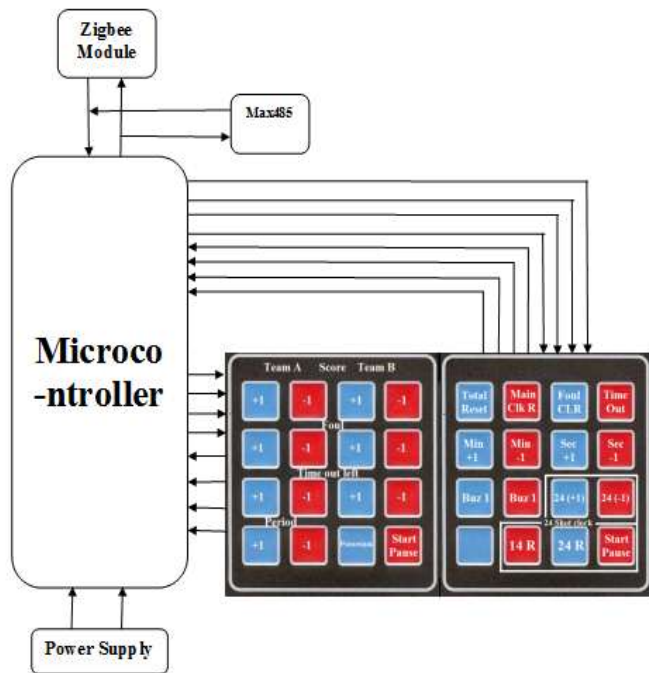Wired as well as wireless communication connectivity with control unit and display unit.

Easy to operate as special function keys are assigned for specific task.

Power efficient because of display digits made up og group of oval LEDs which will visible in outdoor and indoor games.

This product is used for games like bbasketball, kabbadi, kho-kho, volleyball, badminton etc.

4. SYSTEM BLOCK DIAGRAM AND WORKING

Block diagram of main console (control unit) is shown in fig.1 which is 4x8 matrix keypad interfacing with 89S52 microcontroller which made the controlling action data byte and transmit it to display unit via Zigbee or Max485 wired connectivity.
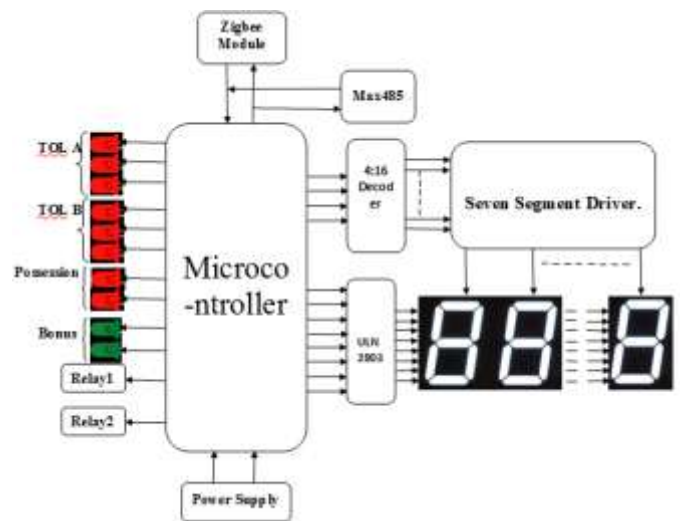

Fig -1: Block diagram of main console.(Control Unit)

Block diagram of main Scoreboard. (Display Unit) is shown in Fig 2. Which is driver a display section and it can be control its status via Zigbee or Max485 wired connectivity from the control unit. Controlling console is operated by scorekeeper and timer is control by timekeeper. As per user requirement size of seven segment display and led sign can be design according to visibility of spectators and viewers.

Current sourcing is done by the PNP transistor for small 0.56 inch seven segment display driven by BC557 transistor and big seven segment display driven BC327 transistor.

Current sinking is done by using ULN2803 IC. It is an array of eight NPN Darlington transistors capable of 500 mA, 50 V output

Fig -2: Block diagram of main Scoreboard.(Display Unit)

Scoring information displayed on fig.3 Main Scoreboard Display Unit.

Team A and Team B(Score): 3 - digit displays, 0-199

Team A and Team B(Foul/Set win): 1 - digit display, 0-9
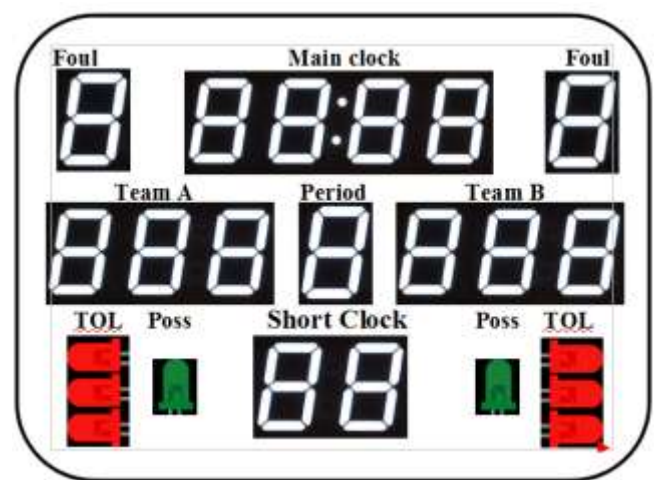
CLOCK: 4 - digit display, count down, 59:59-00:00.

SHOT CLOCK: 2- digit display, Countdown 24S,14S,30S.

PERIOD/SET: 1 - digit display, 1-5 for set, 1-4 and E for extra period.

POSSESSION/SERVICE Indication: 2 –Led arrow indicator.

Time Out: 3 time out indication.

Fig -3: Main Scoreboard Display Unit.

5. PROPOSED SYSTEM DESIGN

For design such a score board: An appropriate selection of microcontroller ,4:16 decoder for multiplexing, seven segment LED display with some LED sign for possession/Service indicator as well for time out left indication, a controller system, a communication (wired and wireless) system, and software for text editor for writing code and the programs.

5.1. HARDWARE IMPLEMENTATION

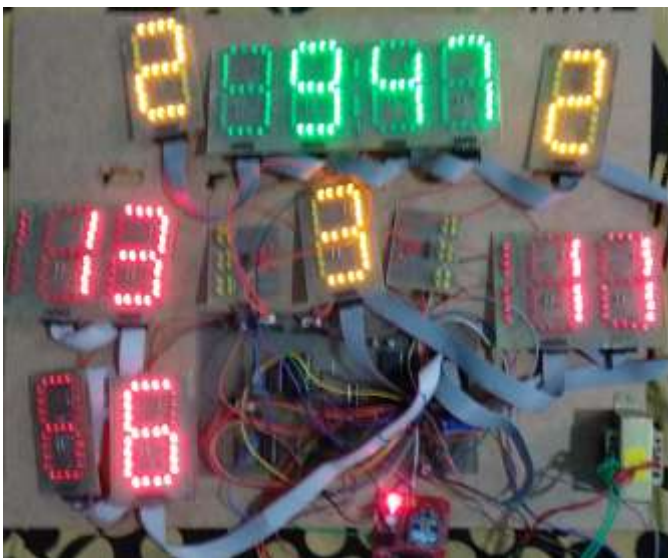The implementation prototype of the system is shown in the Fig -4 and Fig -5.

Fig -4: Prototype of Electronics multipurpose (Control unit).

Fig -5: Prototype of Electronics multipurpose (Display unit).

5.2. SOFTWARE IMPLEMENTATION

The Keil µVision IDE combines project management, run-time environment, build facilities, source code editing, and program debugging in a single powerful environment. Keil µVision IDE tool for the Microcontroller Architecture support every level of software developer from the professional applications engineer to the student just learning about embedded software development. Standard Keil C Compilers, Macro Assemblers, Debuggers, Real-time Kernels, Single-board Computers, and Emulators support all 8051 derivatives and help me to get my project completed on schedule.

6. CONCLUSION

This system is useful for display data for games like bbasketball, kabbadi, kho-kho, volleyball, badminton etc. It displayed scoreboard data of both teams that are competing team score, team fouls, remaining timeout these are for each team and main game clock timer as well shot clock and period for every quarter displayed. This system is cost efficient, portable, and easy to use power efficient and indoor outdoor purpose. The display values on the scoreboard are transmitted wireless as well as wired for long distance about 100 meters.

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