

ASTROTURF SCOREBOARD SYSTEM – TECHNICAL SPECIFICATION

1. Scope and Purpose

This technical specification defines the minimum design, performance, and quality requirements for scoreboard systems to be supplied for astroturf pitches and schools. The system consists of the Game Time & Score Panel, the Control Unit, and Mounting Hardware.

2. System Components

- Game Time & Score Panel
 - Control Unit
 - Mounting Hardware for the Scoreboard
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3. Game Time & Score Panel

3.1 General Layout

- The game time is positioned on the central axis of the panel; the two teams' score displays are located beneath the game time.

3.2 Game Time Indicator

- **Time format:** MM:SS displayed with 5 characters (two digits minutes, ":" separator, two digits seconds).
- **Operating mode:** Count-up or count-down selectable in accordance with the rules of the game.
- **Adjustable range:** 00:00 – 99:59.
- **Time accuracy:** ± 0.1 s tolerance within 100 minutes.
- **Signal:** Audible horn at end of time.
- **Clock-of-day:** The time indicators can display the time of day.
- **Digit height:** ≥ 16 cm.
- **Color:** Red is the preferred color for time digits.

3.3 Score Indicators

- **Digits per team:** Two (2) digits per team.
- **Range:** 0 – 99.

- **Digit height:** ≥ 16 cm.
 - **Color:** Scores for both teams shall be the same color; red is preferred.
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4. Control Unit (Control Console)

4.1 Functional Requirements

- Control of the entire match flow and all scoreboard functions from a single console.
- **Sport mode:** Football / astroturf football support.
- **Time and score control:** Game time and scores adjustable from the console.
- **Quick score change:** Team scores controlled instantly via **Score +** and **Score –** keys.
- **Clock/Scoreboard mode:** Scores may be shown while operating in clock mode.
- **Reset:** One-touch bulk reset of match information.
- **Period management:** Period count and period duration configurable; period transitions, match start, and new-match transitions can be automated.
- **Count direction:** Time may run up or down; horn sounds when time ends.

4.2 Hardware Requirements

- **Keypad:** Long-life printed waterproof buttons; function markings on buttons compliant with international norms.
 - **Enclosure:** ABS plastic housing.
 - **Protection class:** IP54.
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5. General Technical Features (Panel and System)

- **Enclosure:** Panel body fully aluminum construction.
- **Dimensions:** Height ≥ 60 cm, width ≥ 120 cm, thickness ≤ 12 cm.
- **Display technology:** SMD LED, 7-segment arrangement.
- **Fault safety:** A failure of any single LED shall not extinguish the entire segment.
- **Camera compatibility:** Numeric indicators shall use static-drive technology.

- **Installation:** Safe mounting on a solid surface visible to spectators, referees, and players; panel shall also be suitable for portable use.
 - **Connections:** Connectors shall be easy to plug/unplug and resistant to moisture.
 - **Front protection:** Lexan-type anti-glare front protector.
 - **Internal wiring:** Grouped data harnesses and a clean, tidy internal layout for service; for safety, no cut/spliced cables and no solder-only (connector-less) joints inside the panel.
 - **Protection circuits:** Driver boards protected against short circuits.
 - **Power supplies:** CE compliant.
 - **LED lifetime:** $\geq 50,000$ hours.
 - **ICs:** Integrated circuits/microcontrollers shall be ST, Toshiba, Texas Instruments, NXP, or Green Micro.
 - **Operating temperature:** $-40\text{ }^{\circ}\text{C} \dots +55\text{ }^{\circ}\text{C}$.
 - **External cabling:** External power and data cables shall conform to manufacturer-approved sizes and standards.
 - **As-built documentation:** Wiring diagram and fuse ratings approved by the manufacturer.
 - **Cable routing appearance:** Data and power cables shall be protected and not exposed.
 - **Quality & compliance:** Product shall have RoHS and CE certificates.
 - **Documentation & warranty:** User manual and warranty certificate to be delivered; system warranted for at least 2 years.
 - **Quality management:** Manufacturer shall hold ISO 9001 Quality Management System certification.
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6. Installation and Delivery

- Installation is performed per site survey and installation plan; mechanical fixation, electrical connections, and functional tests are completed.
 - Upon delivery, the system is commissioned and basic user training is provided.
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7. Acceptance Criteria (Minimum)

- **Visual & mechanical inspection:** dimensions, layout, front protection, cable shielding.
- **Electrical/functional tests:** MM:SS time format, count directions, period automation, horn, score increment/decrement, score visibility in clock mode.
- **Readability test:** Clarity and brightness at typical viewing distances covering the field.
- **Environmental test:** Verification of functionality across the operating temperature range.

8. Maintenance and Service

- Internal layout and cable grouping shall be arranged to facilitate periodic maintenance and service.
- A spare parts and consumables accessibility plan shall be provided.

SUMMARY TABLE – System-Wide (Key Mandatory Items)

Category	Mandatory Item
Time Format	MM:SS (5 characters); 00:00–99:59; accuracy ±0.1 s/100 min
Visualization	SMD LED, 7-segment; digit height ≥ 16 cm
Layout	Game time centered; two team scores below
Score Range	0–99 (2 digits per team)
Signal & Modes	Horn at end of time; count up/down; scores visible in clock mode
Period	Period count & duration configurable; transitions automatable
Panel Construction	Aluminum body; ≥60 × ≥120 × ≤12 cm; Lexan front protector
Reliability	Segment not fully off on single-LED failure; static drive (camera-friendly)
Protection &	Short-circuit-protected drivers; shielded cabling; moisture-resistant

Category	Mandatory Item
Cabling	connectors
Console	ABS housing, IP54; waterproof printed keypad
Compliance	CE and RoHS
Durability	-40 °C ... +55 °C operating; LED life $\geq$ 50,000 h
Warranty & Quality	$\geq$ 2-year warranty; manufacturer ISO 9001