

SPORTS HALL SCOREBOARD CONTROL UNITS

TECHNICAL SPECIFICATION

1. Scope and Purpose

This technical specification defines the mandatory technical and functional requirements for the supply, installation, and operation of scoreboard control units to be used in sports halls.

The scope includes conditions of use for indoor sports such as **Basketball, Volleyball, Handball, Futsal, different types of Hockey, and Water Polo.**

2. Standards and Compliance

- **FIBA approval is mandatory.**
 - International compliance: Must comply with **IHF** and **FIVB** rules.
 - Basketball modes: Must support **3x3, FIBA, NBA, and EuroLeague** competitions.
 - FIBA system integrations: Must work with the **FIBA Whistle System** and integrate with the **FIBA Data Protocol System**.
 - Major event usage requirement: The system must have been used in at least five major events such as **EuroLeague, EuroCup, AfroBasket, BAL (Basketball Africa League), and the World Championship.**
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3. System Architecture and General Requirements

- **Control Console Architecture:** Must operate on an embedded architecture without an operating system; independent of Android / iOS / Windows. This structure must ensure **high response speed and low latency.**
- **Communication Infrastructure:** Must have RF 868 MHz wireless communication and RS485 wired infrastructure when required. RS485 Half-Duplex must transmit game, player, and team information up to 1 km on a single line. Wireless (RF) connectivity must be available and can be disabled by software from the main console when necessary.
- **Update and Service:** The system must allow updates remotely and without opening the device.

- **Connection Elements:** Connectors must meet quality standards, be easy to attach/detach, and resistant to humidity.
- **Broadcast Data Output:** There must be data output available for broadcasters.
- **Electrical/Environmental Resistance:** Driver board must be protected against short circuits; operating temperature range must be $-40\text{ }^{\circ}\text{C}$... $+55\text{ }^{\circ}\text{C}$.
- **Electronic Components:** Integrated circuits/processors used must be from **ST, Toshiba, Texas, NXP, or Green Micro**.

4. Multilingual Interface and Character Set

- **Languages:** At least 4 languages must be supported: **Turkish, English, French, and Spanish.**
- **Special Character Support:** Full support must be provided in menus and for player/team names.

Uppercase characters: Ç, Ğ, İ, Ö, Ş, Ü, À, Á, Â, Ä, Æ, È, É, Ê, Ë, Ì, Í, Î, Ï, Ñ, Ò, Ó, Ô, Õ, Ù, Ú, Ý, Ž, Æ, Ø, ß

Lowercase characters: ç, ğ, ı, ö, ş, ü, à, á, â, ä, æ, è, é, ê, ë, ì, í, î, ï, ñ, ò, ó, ô, ù, ú, û, ý, ž, ə

5. Components and Functional Features

The system must consist of three different control units:

5.2. Main Console – Mandatory Features

- Must include aluminum front protection, waterproof printed long-life buttons, and a membrane keypad.
- Must allow external keyboard connection for entering player and team data without the need for a computer.
- Scoreboard light levels must be adjustable in **100 steps**; all indicators can be turned off, and LED/address tests can be performed.
- Game/timeout/period durations and basketball 24 s / 14 s rules must be customizable; timeout end warning time adjustable; period transitions and values automatically set according to FIBA rules.
- Team/media timeouts must start linked to return-to-field conditions.
- The time difference between the main console, scoreboard, and 24 s devices must be less than **0.05 s**.
- Must allow reset of only game, only player, or all data in a single operation.
- Player/team/time information must be stored in branch-specific separate memories.
- Score must be controllable with **+1, +2, +3, – buttons** by a single touch.
- Basketball: Up to 14 players; Handball: Up to 16 players must be shown and controlled.
- Handball: Consecutive penalties for the same player must be monitored on a single line by adding on existing time.
- Basketball: The last foul committed, jersey number, and foul count must be flashed for 10 s on the penalty panel.
- Audible warning signals and **Backboard Lights** must be controlled independently.
- Volleyball: Main screen or scoreboard must display clock / countdown timer; time section must remain dim when necessary.
- After a power cut, all data must be restorable in a single operation.
- On 24 s devices, display of timeout durations must be adjustable from the main console.
- Physical structure: Main console housing must be **aluminum**, protection class **IP54**.

5.3. Shot Clock Control (24 s) – Mandatory Features

- Must work synchronized with the main console.

- Must include **24 s, 14 s, Start, Stop** buttons; when 24 s and 14 s are pressed simultaneously, the shot clock display must turn off.
- Shot clock must stop synchronized when game time stops; must not start before the game begins.
- Weight < 0.5 kg; ABS material; protection class IP54.

5.4. Game Time Control – Mandatory Features

- Must work synchronized with the main console; must provide manual control of starting/stopping game time and audible warnings.
 - Weight < 0.5 kg; ABS material; protection class IP54.
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6. Special Branch Requirements (Summary)

- **Basketball:** 3x3 / FIBA / NBA / EuroLeague modes; independent horn-Backboard Lights; last foul flashing 10 s; 24/14 s logic and timeout display on shot clock; player/foul/penalty management; time synchronization < 0.05 s.
 - **Volleyball:** Clock / countdown display; ability to keep the time section dimmed when required.
 - **Handball:** 16 players; consecutive penalties for the same player accumulated and monitored on a single line.
 - **Futsal, Hockey types, Water Polo:** Branch selection must be possible on the main console; branch-specific memory must be supported.
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7. Power, Protection, and Durability

- **IP Protection:** Main console and auxiliary controls must have IP54 protection class.
 - **Materials:** Main console housing must be aluminum; auxiliary controls must be ABS.
 - **Operating Temperature:** -40 °C ... +55 °C.
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8. Certification and Deliverables

- **Quality and Compliance:** Manufacturer must hold ISO 9001 certificate; product must have RoHS and CE certificates.

- **Documentation and Warranty:** User manual and warranty certificate must be delivered; system must have a **2-year warranty**.

SUMMARY TABLE – System-Wide

Title	Mandatory Feature
Architecture	Embedded architecture without operating system; independent of Android / iOS / Windows; high response speed and low latency
Communication	RF 868 MHz wireless; RS485 wired (Half-Duplex, single line, up to 1 km)
FIBA Compliance	FIBA approval; integration with FIBA Whistle System & FIBA Data Protocol
Sport Modes	Basketball (3x3/FIBA/NBA/EuroLeague), Volleyball, Handball, Futsal, Water Polo, Hockey types; ≥13 sports supported
Main Console Display	Color TFT, ≥7 inch, ≥800×480 px
Indicators / Lights	Scoreboard light level adjustable in 100 steps; independent horn–Backboard Lights control
Timing Accuracy	Difference between main console, scoreboard, and 24 s < 0.05 s
Updates	Remote updates without device opening
Input Interfaces	Membrane keypad; external keyboard direct entry
Languages/Characters	Turkish, English, French, Spanish; full special character support
Durability	IP54 (all consoles); aluminum (main), ABS (auxiliary)
Broadcast Integration	Data output available for broadcasters
Field Operation	Easy connectors; moisture resistant; short-circuit protected driver; operating temp –40...+55 °C
Certification & Warranty	ISO 9001 (manufacturer), RoHS & CE (product); user manual + 2 years warranty
Event Usage	Must have been used in ≥5 major events (EuroLeague, EuroCup, AfroBasket, BAL, World Championship)