

MULTI-PURPOSE HALL SCOREBOARD & TIMING SYSTEM

TECHNICAL SPECIFICATION

1. Scope and Compliance

1.1

This specification defines the minimum technical requirements for the supply, installation, and operation of an electronic scoreboard, 24/14 **Shot Clock** devices, **Backboard Lights**, and control units to be used in multi-purpose indoor sports halls.

1.2

The system shall be usable for Basketball, Volleyball, Handball, Futsal, various Hockey branches, and Water Polo competitions.

1.3 Rules

All functions shall comply with **FIBA**, **IHF**, and **FIVB** rules of play.

1.4 FIBA Approval

The 24/14 **Shot Clock** devices shall have **FIBA Level 2** approval and be supplied with a design conforming to that approval. Approval documents shall be delivered at handover.

1.5 Experience in Major Events (to be documented)

The proposed brand's timing, videoboard, or scoreboard systems must be proven—by official references—to have been used in **at least five** of the following major events: **Euroleague, EuroCup, Afrobasket, Basketball Africa League (BAL), World Championship.**

1.6 Basketball Modes

FIBA, NBA, Euroleague, and 3x3 modes shall be supported.

1.7 Supported Sports (minimum 13)

Basketball, 3x3 Basketball, Volleyball, Handball, Futsal, Field Hockey, Indoor Hockey, Hockey 5S, Ice Hockey, Underwater Hockey, Rink Hockey, Roller Inline Hockey, Water Polo.

2. System Components

2.1. Main panel for **Score/Period/Game Time/Team Fouls/Timeout Duration and Player Fouls** (main board).

2.2. **24/14 Shot Clock** devices (including over-backboard mounting hardware).

2.3. Control units: **Main Console, Shot Clock Console, Game Time Console.**

2.4. Mounting brackets and fasteners for the scoreboard and 24/14 **Shot Clock** devices.

3. Scoreboard – Main Panel Technical Features

3.1 General layout

- **Center section:** Team scores (top), game time (bottom centered), period (centered below the game time), **Ball Possession Arrow** indicators (to the right/left of the period digit), team fouls and **Timeout** indicators.
- **Side panels:** Player jersey numbers and player fouls for both teams; symmetrical layout.
- Player rows may be left unlit depending on the roster size.

3.2 Score Indicators (per team)

- Number of digits: **3 (0-199).**
- Digit height: **≥ 25 cm.**
- Color: **Single uniform color for both teams.**
- Unused digit places shall remain off.

3.3 Game Time Indicator

- Format: **MM:SS**, total **4 digits**; count up/down.
- Range: **00:00-99:59** (adjustable).
- **Last 60 seconds:** display **1/10 second.**
- Tolerance: **±0.1 s / 100 min.**
- Audible signal at time expiry.
- Digit height: **≥ 25 cm.**
- Color: **(no mandatory color specified).**

3.4 Period/Set Indicator

- Digits: **1 (0-9).**
- Digit height: **≥ 20 cm.**
- Basketball overtime: shown with the letter **“O”.**

- On period/set change, the clock and **Timeout** indicators are auto-adjusted according to the sport.

3.5 Team Foul Indicators (per team)

- Digits: **1 (0-9)**.
- **Color: Red (mandatory)**.
- Digit height: **≥ 23 cm**.
- In basketball, after the **4th foul**, the relevant indicator is marked with a **square**.
- Team fouls increase automatically when a player foul is entered; manual correction is possible on the main console.
- Values are automatically reset/adjusted at period changes.

3.6 Timeout Indicators (per team)

- **Three square dots**, side **≥ 5 cm**.

3.7 Timeout Duration Indicator

- Digits: **2 (0-99)**.
- Digit height: **≥ 20 cm**.
- Countdown operation with flashing dot indicators during the **Timeout**.
- Audible signal at start/end; adjustable pre-end warning.
- Can be programmed from the console to be shown on the **24-second Shot Clock** devices if required.

3.8 Attack/Service Indicator (arrows)

- **1 arrow per team (Ball Possession Arrow / service direction)**.

3.9 Player Jersey Number (per player)

- Digits: **2 (00-99)**.
- Digit height: **≥ 10 cm**.
- Basketball/Handball: shows jersey number; Volleyball: may be used as set indicator.

3.10 Player Foul (per player)

- Digits: **1 (0-9)**.

- **Color: Red (mandatory).**
 - Digit height: ≥ 10 cm.
 - Basketball (FIBA & Euroleague): max. 5; Handball: max. 3.
 - At changes: at least 3 flashes.
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4. 24/14 Shot Clock Devices and Backboard Lights

4.1 Approval

Devices shall be **FIBA Level 2** approved and mounted over the backboards in accordance with standards; an overhead suspension alternative from the ceiling shall be provided.

4.2 Displays

- **Game time digit ≥ 13 cm; Shot Clock digit ≥ 25 cm.**
- Game time indicator color same as the main board's game time color; **Shot Clock is Red.**
- **Shot Clock range:** 0–99 s; start from **24 s** and **14 s**, stop, and resume from last value.

4.3 Time sync and rules

- When offense stops, game time may (where applicable) continue; when game time falls below **24 s**, the Shot Clock indicators operate either synchronized or off, as per the rule set.
- If the relevant buttons are used when the game time drops below **24/14 s**, the Shot Clock digits **turn off automatically**.
- Different-tone audible signals for end of game time and end of Shot Clock; ≥ 120 dBA (1 m).

4.4 Backboard Lights

- At **game time** expiry, **red Backboard Lights** are on for ≥ 2 s.
- At **Shot Clock** expiry, **yellow Backboard Lights** are on for ≥ 2 s.

4.5 League compliance

Hardware/software structure shall comply with **Euroleague** and **EuroCup** competition rules.

5. Control Units

5.1 Main Console

5.1.1 Architecture

Embedded architecture without an operating system; independent from Android / iOS / Windows, providing high responsiveness and low latency.

5.1.2 Display

Minimum 7" TFT color screen, $\geq 800 \times 480$ px.

5.1.3 Input Devices

Membrane keypad with aluminum front protection; team/player data (number, foul, score) can be entered directly via **external keyboard**.

5.1.4 Character Set (full support)

- **Uppercase:** Ç, Ğ, İ, Ö, Ş, Ü, À, Á, Â, Ã, Ä, Æ, È, É, Ê, Ë, Ì, Í, Î, Ï, Ñ, Ò, Ó, Ô, Õ, Æ, Ú, Û, Ý, Ž, Ñ, Ò, Ó, Ô, Õ, Æ, Ú, Û, Ý, Ž, Ñ
- **Lowercase:** ç, ğ, ı, ö, ş, ü, à, á, â, ã, ä, æ, è, é, ê, ë, ì, í, î, ï, ñ, ò, ó, ô, ò, ù, ú, û, ý, ž, ñ

5.1.5 Languages

Turkish, English, French, Spanish.

5.1.6 Connectivity

Wireless RF support (see Section 6); RF signals can be disabled via software.

5.1.7 Functions

- Sport selection and rule-compliant parameter customization (game/Timeout/Shot Clock durations, etc.).
- **100-step brightness** control; test/shutoff for all indicators.
- Automatic adjustment of foul and Timeout values at period transitions; automatic **Timeout** between periods.
- Team/player/time information stored in **branch-based memories**.
- Quick score entries (**Score +1/+2/+3, -**).
- Up to **14** players in Basketball and **16** in Handball for display and control.
- In Handball, cumulative tracking of penalties on a **single row**.

- In Basketball, display of the **last foul** on the penalty panel for **10 s** with jersey number and which foul it is.
- In Basketball, **audible signal** and **Backboard Lights** can be controlled independently.
- In Volleyball, clock / count-up can be shown on the main screen; the time area can be turned off if needed.
- Single-action data refresh after a power outage.
- Time difference between the console and the scoreboard/24 s devices < **0.05 s**.
- Software updates **remotely** and **without opening** the device.
- Protection class **IP54**; aluminum housing.

5.2 Shot Clock Console

- Synchronized with the main console.
- Buttons: **24s, 14s, Start, Stop**; pressing **24s + 14s** simultaneously turns the Shot Clock display **off**.
- When game time stops, the Shot Clock stops in sync; it cannot be started before the match.
- Weight ≤ **0.5 kg**; **ABS** housing; **IP54**.

5.3 Game Time Console

- Synchronized with the main console; **Start/Stop** and **manual control of audible signals**.
- Weight ≤ **0.5 kg**; **ABS** housing; **IP54**.

6. Communication and Connectivity Infrastructure

6.1 Wireless: **RF 868 MHz** wireless communication.

6.2 Wired: Via **RS485 Half Duplex** single line, game, player, and team data shall be transmitted up to **1 km**.

6.3 Connectors shall comply with quality standards, be easy to plug/unplug, and be moisture-resistant.

6.4 Remote update: The system shall have hardware capable of receiving **remote software updates without opening** the device.

7. General Mechanical and Electrical Provisions

7.1 Construction: Scoreboard body **aluminum**.

7.2 Dimensions (main panel): **Height \geq 150 cm, Width \geq 220 cm, Thickness \leq 8.5 cm.**

7.3 Indicators: **SMD LED, 7-segment** structure; in a segment fault, the entire segment shall **not** go dark.

7.4 Drive: All numeric indicators shall use **static drive** technology for broadcast/camera clarity.

7.5 Front Protection: Anti-glare transparent cover (reflect/lexan type).

7.6 Internal Wiring: Clean/tidy layout with **grouped data cables**; cables shall be continuous (no cuts/splices) and socketed.

7.7 Protection: Driver boards with **short-circuit protection**.

7.8 Power Supplies: **CE-certified; LED life \geq 50,000 hours**.

7.9 Component Brands: Integrated circuits/processors: **ST, Toshiba, Texas, NXP, Green Micro**.

7.10 Operating Temperature: **-40 °C ... +55 °C**.

7.11 Cabling/Drawings: External power and data cables per manufacturer-approved dimensions and standards; installation drawings and fuse values manufacturer-approved; data/power cables **protected and concealed**.

7.12 Installation: The scoreboard shall be firmly mounted on a secure base visible to spectators/referees/players; 24/14 devices mounted to the backboard or ceiling using suitable brackets; safe installation.

8. Certification and Conformity

8.1 Product compliance: **ROHS, CE**.

8.2 Manufacturer quality system: **ISO 9001**.

8.3 User manual and warranty certificate shall be delivered.

8.4 Warranty period: **2 years**.

9. Operation, Synchronization, and Safety

9.1 Via the main console, all indicators on the scoreboard and 24/14 **Shot Clock** devices can be tested; brightness adjustable in **100 steps**.

9.2 Period-end transitions can be automatic; **Timeout** durations can be granted automatically between periods and started with a start command once referees leave the court.

9.3 Ready/hold and start functions shall exist for team or media **Timeouts**.

9.4 Time difference between the main console and field devices shall be **below 0.05 s**.

SUMMARY TABLE – System Overview (Highlighted Mandatory Items)

A) Indicators – Colors and Sizes (mandatory info only)

Indicator / Section	No. of Digits & Range	Mandatory Color	Minimum Digit Height
Team Score (per team)	3 digits (0–199)	Not specified	25 cm
Game Time (main panel)	4 digits (MM:SS)	Not specified	25 cm
Period/Set	1 digit (0–9) / Basketball overtime: “0”	Not specified	20 cm
Team Foul (per team)	1 digit (0–9)	Red	23 cm
Timeout Indicators (per team)	3 square dots	Not specified	5 cm side
Timeout Duration	2 digits (0–99)	Not specified	20 cm
Attack/Service Arrows (per team)	—	Not specified	—
Player Jersey No (per player)	2 digits (00–99)	Not specified	10 cm
Player Foul (per player)	1 digit (0–9)	Red	10 cm
24/14 Device – Game Time	MM:SS (sync/off modes)	Same as main panel	13 cm
24/14 Device – Shot Clock	0–99 s	Red	25 cm
Backboard Lights – Game End	—	Red	≥ 2 s on
Backboard Lights – Shot Clock End	—	Yellow	≥ 2 s on

B) Mandatory Items (performance/compliance)

- **FIBA Level 2**-approved 24/14 **Shot Clock** devices; full compliance with **FIBA/IHF/FIVB** rules.
- Basketball modes: **FIBA, NBA, Euroleague, 3x3**.

- **RF 868 MHz** wireless + **RS485 Half Duplex** (single line, **1 km**).
- Embedded architecture with **no OS**; low latency / high responsiveness.
- Time synchronization < **0.05 s** (main console ↔ field devices).
- Static-drive LED operation (broadcast/camera clarity).
- Audible signal \geq **120 dBA (1 m)**; distinct tones for game vs **Shot Clock**.
- **100-step** brightness; test/shutoff for all indicators.
- **IP54** (consoles); operating **-40 °C ... +55 °C**.
- **CE, ROHS**, manufacturer **ISO 9001**; **2-year warranty**.
- Full special-character support (Ç, Ğ, İ, Ö, Ş, Ü...; à, á, â, ä, æ... etc.) and **Turkish/English/French/Spanish** interface.
- For the brand: documented use in **at least five** events such as **Euroleague/EuroCup/Afrobasket/BAL/World Championship**.