

MULTI-PURPOSE HALL SCOREBOARD AND 24/14 SHOT CLOCK SYSTEM

TECHNICAL SPECIFICATION (WITH EXCLUSION TIME INDICATOR)

1. SCOPE

This technical specification defines the design, performance, control, and reliability requirements of the scoreboard and 24/14 Shot Clock systems to be supplied for indoor sports. The system shall be usable in Basketball (FIBA, NBA, Euroleague, 3x3 modes), Volleyball, Handball, Futsal, Water Polo, and different Hockey branches (Field Hockey, Indoor Hockey, Hockey 5S, Ice Hockey, Underwater Hockey, Rink Hockey, Roller Inline Hockey). The system shall fully comply with FIBA, IHF, and FIVB rules.

2. NORMATIVE COMPLIANCE AND DOCUMENTS

- **FIBA Compliance and Approval:** The system shall comply with FIBA rules of play. Valid approval certificates (e.g., Level 2 for Shot Clock/Backboard Lights) shall be submitted in the bid file for components requiring FIBA equipment approval.
- **Other Bodies:** Compliance with IHF and FIVB rules shall be ensured.
- **Product Documents:** CE and RoHS conformity certificates shall be provided.
- **Manufacturer Quality:** The manufacturer shall hold an ISO 9001 Quality Management System certificate.
- **User Manuals and Warranty:** User manuals and warranty documents in Turkish, English, French, and Spanish shall be delivered. The system shall have a minimum warranty of 2 years.

3. SYSTEM CONTENT

- Main Scoreboard including **Score, Period/Set, Game Time, Team Foul, Timeout, Ball Possession/Service, Exclusion Time, and Player Foul** indicators
- **24/14 Shot Clock** devices (for opposing backboards)
- Control Units: Main console, Shot Clock console, Game Time console
- Mounting brackets for 24/14 Shot Clock devices
- Mounting brackets for the scoreboard

4. MAIN SCOREBOARD

The main panel shall consist of three sections: game and team information in the center; player jersey number and player foul information on the right/left wings.

4.1 Layout

- Team names at the top; team scores beneath; centered **Game Time** at the bottom; to the right/left of the game time, **Timeout** rights (three dots each); below, the **Period/Set** indicator with **Ball Possession Arrow/service** arrows and team fouls on its right/left; at the very bottom, the **Exclusion Time** area with the penalized player's jersey number and **Exclusion Time**.
- Right/left wings arranged symmetrically; for both teams, **12 player rows** showing jersey number (two digits) and player foul count (one digit).

4.2 Indicators and Performance Criteria

a) Score

- Three digits per team (0–199)
- Color: White (same for both teams)
- Digit height: ≥ 25 cm
- Unused digit places shall remain off.

b) Game Time

- Format: MM:SS (4 digits)
- Supports count up/down; adjustable within 00:00–99:59
- 1/10 second display during the last 60 seconds
- Time tolerance: ± 0.1 s per 100 minutes
- Audible signal at expiration
- Color: Yellow
- Digit height: ≥ 25 cm

c) Period/Set

- Single digit (0–9)
- Color: White
- Digit height: ≥ 20 cm
- In basketball, overtime shall be shown with the letter "O".
- On increase/decrease of the value, the clock and Timeout indicators shall switch to automatic settings depending on the sport.

d) Team Foul

- One digit (0–9) per team
- Color: Red
- Digit height: ≥ 23 cm
- In basketball, per FIBA rules, after the 4th foul the indicator shall be marked with a square.
- When a player foul is entered, the team foul shall increase automatically; manual correction shall be possible from the main console.
- At period changes, values shall be automatically reset according to the sport.

e) Timeout

- 3 square dots per team
- Side length: ≥ 5 cm
- Color: Yellow

f) Ball Possession / Service Arrows

- 1 arrow per team
- Color: Red
- Indicates the attacking team in basketball / serving team in volleyball (**Ball Possession Arrow**).

g) Player Jersey Number

- Two digits (00–99) per player
- Color: Yellow
- Digit height: ≥ 10 cm
- Player numbers shall be shown in basketball and handball.
- If the roster has fewer rows than the panel, the unused rows can be fully off.
- In volleyball, this area may be used as a set indicator.

h) Player Foul

- One digit (0–9) per player

- Color: Red
- Digit height: ≥ 10 cm
- Maximum 5 in Basketball/Euroleague matches; maximum 3 in Handball.
- Off at the start of the game; when a foul is committed, only the related player's indicator becomes visible.
- On change, at least 3 flashes shall be given.

i) Exclusion Time

- For Handball, Hockey, Futsal, and Water Polo, display the penalized player's jersey number (two digits) and **Exclusion Time** (M:SS).
- One player's penalty per team shall be tracked on the panel (synchronized with game time).
- Jersey: 00–99; **Exclusion Time**: adjustable in the range 0:00–9:59.
- Digit height: ≥ 16 cm
- Color: Jersey number Yellow, **Exclusion Time** Red
- In Basketball, the jersey number of the player who received the last foul and which foul number it is shall flash for 10 seconds.

5. 24/14 SHOT CLOCK DEVICES

- There shall be one single-faced device per opposing basket.
- **FIBA Level 2** approved and designed in accordance with the relevant standards.
- When the Shot Clock stops, the game time shall continue to run.
- When game time drops below 24 s, the Shot Clock shall either not operate or operate synchronized with the game time.
- Shot Clock display range: 0–99 s; start from 24 s, stop, and resume from the last value shall be supported.
- Audible signal shall be given at expiration.
- Mounting: over the backboard as per FIBA standards; if not possible, suspended from the ceiling aligned above the backboard.
- Digit heights: Game time ≥ 13 cm (Yellow), Shot Clock ≥ 25 cm (Red).

- **Backboard Lights:** in compliance with FIBA; **red** (game time expiration) and **yellow** (Shot Clock expiration) lights shall remain on for at least 2 s.
- End-of-attack/end-of-game signals shall have different tones.
- Sound level: ≥ 120 dBA (1 m).
- When the **24s** and **14s** buttons are pressed simultaneously, the Shot Clock display shall remain off.
- If the relevant buttons are used when game time drops below **24 s** or **14 s**, Shot Clock digits shall automatically turn off.
- Software/Hardware shall be configurable to comply with Euroleague and EuroCup league rules in basketball.

6. CONTROL UNITS

6.1 Main Console

- Shall support the Shot Clock and Game Time consoles.
- Sport selection and parameter settings shall be easy and quick.
- Supported sports: basketball (FIBA, Euroleague, 3x3, NBA), volleyball, handball, futsal, field hockey, indoor hockey, hockey 5S, ice hockey, underwater hockey, rink hockey, roller inline hockey, water polo and equivalent indoor sports (minimum 13 branches).
- Front panel color TFT display ≥ 7 inches, minimum resolution 800×480 pixels.
- Keypad: Long-life printed waterproof buttons; membrane keypad affixed to an aluminum front guard.
- Input: Team/player names, numbers, fouls, and scores shall be entered without a PC via external keyboard and membrane keypad.
- Language support: Turkish, English, French, Spanish.
- Special character set (directly usable in menus and names):
 - **Uppercase:** 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, ß
 - **Lowercase:** 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, æ
- Connectivity: Wireless RF connection; the signal can be disabled via software from the main console.
- Brightness: **100 levels** of light adjustment on the scoreboard.

- Test: All LED and address tests can be performed from the console; all indicators can be switched off with a single command.
- Time settings: Comprehensive customization of game/Timeout/halftime/24s/14s etc. per sport rules.
- Alerts: The Timeout end warning time can be adjusted.
- Period transitions: Automatic transition option; foul and Timeout values automatically adjusted according to FIBA.
- Media/team Timeouts: Preconfigured and start begins the countdown.
- Time sync: Difference between the time on the console and the scoreboard and 24s devices < **0.05 s**.
- Reset options: Single-action reset of only game data, only player data, or all data.
- Memory: All team/player/time data for basketball, volleyball, handball, futsal, hockey, water polo are stored separately.
- Score control: Quick entry via **Score +1/+2/+3** and **Score -** keys.
- Player capacity: Control of up to **14** players in basketball and **16** in handball.
- Penalty tracking: In handball, simultaneous **Exclusion Time** tracking for up to **5** different players; if an additional penalty is given to the same player, cumulative display on the same row.
- Basketball-specific: The last foul's jersey number and which foul it is shall flash for **10 s** on the scoreboard's penalty panel.
- Sound and Backboard Lights: Independent control (in Timeout/manual warnings, sound can be heard without activating Backboard Lights).
- Clock/Time: In volleyball, clock or count-up can be shown on the main screen and scoreboard; it can be turned off if necessary.
- After power loss: Data on the console can be resent to the scoreboard with a single action.
- Wired communication: Via **RS485 Half Duplex** single line, game/player/team data can be transmitted up to **1 km**.
- Field updates: All updates not requiring physical changes on the scoreboard are performed via console software.
- Displaying Timeout durations on 24s: Can be shown on the 24-second devices by setting from the main console.

- Remote update: The system shall have hardware capable of receiving updates remotely **without opening the device**.
- Case and Protection: Main console housing aluminum; protection class **IP54**.

6.2 Shot Clock Console

- Shall operate synchronized with the main console.
- Buttons: **24s, 14s, Start, Stop**.
- When **24s and 14s** are pressed simultaneously, the Shot Clock indicator turns off.
- When game time stops, the Shot Clock stops in sync.
- The Shot Clock cannot be started before the match.
- Weight: **≤ 0.5 kg; ABS material; IP54**.

6.3 Game Time Console

- Shall operate synchronized with the main console.
- Start/stop the game time and manual control of audible warnings.
- Weight: **≤ 0.5 kg; ABS material; IP54**.

7. CONTROL CONSOLE – SYSTEM ARCHITECTURE (MANDATORY)

- **Embedded Architecture:** The control console shall operate on an embedded architecture without an operating system; independent of Android/iOS/Windows platforms. This structure shall provide high responsiveness and low latency.
- **Communication:** Wireless **RF 868 MHz** and, when required, wired **RS485** infrastructure for communication.
- **Input Interface:** The console shall include a membrane keypad; team and player data (number, foul, score) can be entered directly via an external keyboard.
- **Language Support:** Turkish, English, French, and Spanish shall be provided as built-in languages.

8. GENERAL TECHNICAL PROVISIONS

- The scoreboard body shall be **aluminum**.
- Dimensions: **Height ≥ 150 cm, width ≥ 220 cm; thickness ≤ 8.5 cm**.
- **SMD LED, 7-segment** digit structure shall be used in the indicators.

- Segment integrity shall be maintained in case of LED failure (even if several LEDs fail, the whole segment shall not go dark).
- All numeric indicators shall feature **static drive** technology for clarity in camera recordings.
- The scoreboard shall be mounted on a secure base visible to spectators/referees/players.
- Connectors shall be easy to plug/unplug and moisture-resistant.
- Front surface anti-glare protection: special reflective or **lexan-type** transparent anti-glare plexiglass.
- Internal cabling shall be tidy/clean with **grouped data cables**; no cut/spliced/unsocketed cables shall be present.
- Driver boards shall be protected against short circuits.
- Power supplies shall be **CE-certified**.
- **LED lifetime: ≥ 50,000 hours.**
- Integrated circuits/processors used: **ST, Toshiba, Texas, NXP, or Green Micro.**
- Operating temperature: **-40...+55 °C.**
- External power and data cables shall be per manufacturer-approved dimensions/standards.
- Installation diagram and fuse values shall be manufacturer-approved.
- Data and power cables shall be **sheathed and concealed**.
- The user manual and warranty certificate shall be delivered.

9. EXPERIENCE IN MAJOR EVENTS (MANDATORY)

The proposed brand's timing, videoboard, or scoreboard systems shall have been used in **at least five** major events such as **Euroleague, EuroCup, AfroBasket, Basketball Africa League (BAL), FIBA World Championship/FIBA World Cup**. This shall be substantiated with official documents submitted with the bid.

10. SPORTS MODES (BASKETBALL FOCUS)

- Basketball modes: **FIBA, NBA, Euroleague, 3x3.**
- Modes for volleyball, handball, futsal, water polo; field/indoor/ice/underwater/rink/roller inline hockey and hockey 5S shall be supported.

SUMMARY TABLE – System Overview (Highlighted Mandatory Items)

Component / Indicator	Qty/Location	Digit Height	Color	Mandatory Features
Team Score	2 teams × 3 digits	≥ 25 cm	White	0–199; unused places off
Game Time (Scoreboard)	Center section	≥ 25 cm	Yellow	MM:SS; last 60 s 1/10; ±0.1 s/100 min; end-of-time sound
Period/Set	1 digit	≥ 20 cm	White	0–9; overtime “O”
Team Foul	2 × 1 digit	≥ 23 cm	Red	Square after 4th foul; auto increase/reset
Timeout Rights	2 × 3 dots	≥ 5 cm side	Yellow	Separate display
Ball Possession/Service Arrows	2 arrows	—	Red	Ball Possession/Service indicator
Player No.	2 × 12 players × 2 digits	≥ 10 cm	Yellow	00–99; off-row management
Player Foul	2 × 12 players × 1 digit	≥ 10 cm	Red	Max 5 (basketball/Euroleague), max 3 (handball); flash warning
Exclusion Time – Jersey No.	2 teams × 1 player × 2 digits	≥ 16 cm	Yellow	00–99
Exclusion Time – Time	2 teams × 1 player × 3 digits	≥ 16 cm	Red	0:00–9:59; synchronized with game time
24/14 – Game Time	Over backboard	≥ 13 cm	Yellow	FIBA compliant; red Backboard Lights (≥ 2 s)
24/14 – Shot Clock	Over	≥ 25	Red	0–99 s; 24s/14s; end sound; yellow

Component / Indicator	Qty/Location	Digit Height	Color	Mandatory Features
	backboard	cm		Backboard Lights (≥ 2 s)
Sound Level	—	—	—	≥ 120 dBA @1 m; distinct tones for Shot Clock/game end
Time Sync	—	—	—	Main console–scoreboard–24s difference < 0.05 s
Communication	—	—	—	RF 868 MHz + RS485 (1 km)
Console Architecture	—	—	—	OS-less embedded, low latency, high responsiveness
Input Interface	—	—	—	Membrane keypad + external keyboard
Language/Alphabet	—	—	—	TR/EN/FR/ES; character set: Ç, Ğ, İ, Ö, Ş, Ü, À, Á, Â, Ã, Ä, Å, Æ, È, É, Ê, Ë, Ì, Í, Î, Ï, Ñ, Ò, Ó, Ô, Õ, Æ, Ú, Û, Ý, Ž, ß, ç, ğ, ı, ö, ş, ü, à, á, â, ã, ä, å, è, é, ê, ë, ì, í, î, ï, ñ, ò, ó, ô, ù, ú, û, ý, ž, æ
Brightness/Test	—	—	—	100 levels; LED/address tests from console
Protection	—	—	—	Consoles IP54; anti-glare plexi front
Body/Dimensions	—	—	—	Aluminum; $\geq 150 \times 220$ cm; ≤ 8.5 cm
Endurance	—	—	—	LED $\geq 50,000$ h; $-40 \dots +55$ °C
Compliance	—	—	—	FIBA/IHF/FIVB rules; CE/ROHS
Event Experience	—	—	—	Use in ≥ 5 major events: Euroleague, EuroCup, AfroBasket, BAL, FIBA World Championship/World Cup