

MULTI-PURPOSE HALL SCOREBOARD AND 24/14 SECOND SYSTEM

TECHNICAL SPECIFICATION (WITH EXCLUSION TIME INDICATOR)

1. SCOPE

This technical specification defines the principles for procurement, installation, testing, commissioning, and delivery for indoor sports. The system shall be used in Basketball (including 3x3, FIBA, NBA, EuroLeague modes), Volleyball, Handball, Futsal, Water Polo, and various Hockey branches. The system shall be fully compliant with **FIBA, IHF, and FIVB** rules. The system shall be **FIBA-approved** (within the scope of FIBA Equipment Approval). In addition, it is required that the proposed brand's timing, videoboard, or scoreboard systems have been used in **at least five** major events: **EuroLeague, EuroCup, AfroBasket, Basketball Africa League (BAL), FIBA World Cup**.

2. APPLICABLE STANDARDS AND APPROVALS

- **FIBA** rules and approval (including Basketball and 3x3 modes).
- **IHF** rules (Handball).
- **FIVB** rules (Volleyball).
- Product compliances: **CE** and **RoHS**.
- Manufacturer quality management: **ISO 9001**.

3. SYSTEM COMPONENTS

- a) **Main Scoreboard:** Includes score, game time, period/set, team fouls, **Timeout** indicators, attack/service direction, **Exclusion Time** panels.
- b) **24/14 Second Shot Clock Devices** (mounted above/opposite backboards).
- c) **Control Units:** Main Console, **Shot Clock** Console, Game Time Console.
- d) **Mounting Kits:** Backboard/ceiling/wall connection sets for the scoreboard and 24/14 second devices.

4. MAIN SCOREBOARD PANEL (Score–Period–Time–Foul–Exclusion)

4.1 Layout and Function

- Right/left: **Team scores**.
- Bottom center: **Game time**.
- Bottom right/left of game time: **three Timeout indicators** per team.

- Bottom row: **Period/Set**, with **attack/service arrows** to its right/left and **team fouls**.
- Very bottom: **Exclusion Time** display of player jersey number and exclusion duration (suitable for Water Polo, Futsal, and Hockey branches).

4.2 Score Indicators

- **3 digits per team**, range **0–199**.
- **Digit height ≥ 25 cm**.
- **Color: White** (same color for both teams).
- Unused positions shall remain **blank**.

4.3 Game Time Indicator

- **MM:SS**, total **4 digits**; supports count up/down; adjustable (**00:00–99:59**).
- **1/10 second** display during the **last 60 seconds**.
- Time tolerance $\leq \pm 0.1$ s / **100 min**.
- **Audible signal** at expiry.
- **Digit height ≥ 25 cm, color: Yellow**.

4.4 Period / Set Indicator

- **Single digit, 0–9; height ≥ 20 cm, color: White**.
- In basketball, **overtime** is indicated by the letter **“O”**.
- On period/set increase–decrease, the clock and **Timeout** indicators are auto-adjusted according to the sport.

4.5 Team Foul Indicators

- **1 digit per team, 0–9, height ≥ 23 cm, color: Red**.
- In basketball, the situation after the **4th foul** is indicated by a **square symbol** in accordance with FIBA rules.
- Automatic increment linked to player-foul entry; manual correction via the main console is possible.
- **Automatic reset/adjustment** at period changes.

4.6 Timeout Indicators

- **Three square dots per team; side ≥ 5 cm, color: Yellow.**

4.7 Attack / Service Indicators

- **1 arrow per team** (indicates the attacking team in basketball / the serving team in volleyball).
- **Color: Red.**
(As a dedicated unit this is referred to as the **Ball Possession Arrow**; when panelized, **Ball Possession Arrow Indicator**.)

4.8 Exclusion Time Indicators (Handball, Hockey types, Futsal, Water Polo)

- **One player exclusion shown simultaneously per team: 2-digit jersey number + 3-digit time.**
- Jersey number range: **00–99**, Exclusion duration: **0:00–9:59**.
- **Digit height ≥ 16 cm.**
- **Jersey number: Yellow, Exclusion Time: Red.**
- Exclusion countdown is **synchronized with game time**.
- In basketball (informational): **last foul**—player number and the ordinal of the foul—**flashes for 10 s** on the **Exclusion Time Indicator** panel.

5. 24/14 SECOND SHOT CLOCK DEVICES (Backboard-Top)

- Mounted to **opposite backboards**; if mounting is not possible, aligned from the **ceiling** above the backboard.
- Range **0–99 s**; **start from 24 s**, pause, and **resume from the same value**.
- When **game time** falls below **24 s**, **Shot Clock** indicators either **blank** or **synchronize** (as per the rule set).
- **Digit height ≥ 25 cm, color: Red.**
- **Audible signal** at expiry.
- On the console, pressing **24s** and **14s** **simultaneously** turns the **Shot Clock** display **off**.
- If game time drops below **24/14**, using the relevant keys triggers **automatic blanking**.

6. CONTROL UNITS

6.1 Main Console (Embedded)

Architecture and Communication

- Operates on an **embedded architecture without an operating system**; independent of Android / iOS / Windows; ensures **high responsiveness and low latency**.
- Supports **RF 868 MHz** wireless and, when required, **RS485** wired infrastructure (**Half Duplex**, single line, up to **1 km**). Wireless signals can be **software-disabled**.
- Includes a **membrane keypad**; by connecting an **external keyboard**, team and player data (number, foul, score) can be entered directly.

Display and Interface

- At least **7" TFT color display, 800×480** resolution.
- Buttons are waterproof printed type; keypad adhered on **aluminum** front protection.
- Language support: **Turkish, English, French, Spanish**.
- Special character support in the UI and naming (menus, team/player 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, Æ, Ú, Û, Ý, Ž, Ñ, Æ

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

Sport and Mode Support

- At least **13 branches** including Basketball, Volleyball, Handball, Futsal, **3x3 Basketball**, Field Hockey, Indoor Hockey, Hockey 5S, Ice Hockey, Underwater Hockey, Rink Hockey, Roller Inline Hockey, Water Polo.
- Basketball modes: **FIBA, EuroLeague, 3x3, NBA**.

Timing and Control Functions

- Time difference with the scoreboard and 24/14 devices **< 0.05 s**.
- **Game/Timeout/halftime and 24/14** durations customizable; **period transitions, foul**, and **Timeout** values auto-adjusted per **FIBA** rules.
- **Team/Media Timeouts** and **inter-period Timeouts** are predefined, start with the **start** command; **pre-end warning** duration is adjustable.
- In volleyball, a **clock** or **count-up** can be shown on the main screen and the scoreboard; timing area can be blanked if needed.

- **Score keys:** **Score +1 / +2 / +3** and **Score -**.
- Player capacity: up to **14 players** in basketball, **16 players** in handball.
- In handball, when a new **Exclusion Time** is given to the same player, times are **added** and displayed on a **single row**.
- In basketball, **audible signals** and **Backboard Lights** are controlled **independently**.

Lighting and Test

- **100-step brightness** on the scoreboard.
- **Switch-off all** indicators, **LED/address test** functions.
- After a power failure, all data on the console are **resent with a single action**.

Update and Enclosure

- Console and system support **remote updates** without opening the device.
- **Aluminum** enclosure, protection class **IP54**.

6.2 Shot Clock Console

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

6.3 Game Time Console

- Operates **in sync** with the main console.
- **Start/Stop** and **manual control of audible signals**.
- **Weight ≤ 0.5 kg, ABS housing, IP54**.

7. GENERAL TECHNICAL CONSIDERATIONS

- Panel manufactured **entirely of aluminum**.
- Dimensions: **Height ≥ 120 cm, Width ≥ 200 cm, Thickness ≤ 8.5 cm**.

- Indicators: **SMD LED, 7-segment** structure; **static driving technology** for camera recordings.
- A failure of one or more LEDs **shall not** extinguish the entire segment.
- **Anti-reflective transparent front protection** (special reflect or lexan type plexiglass).
- **Easy-to-plug/unplug**, moisture-resistant connectors.
- Internal wiring: **grouped data cables**, neat/clean interior; **no cut/splice/unsocketed** cable connections.
- **Short-circuit protected** driver boards.
- **CE-certified** power supplies.
- **LED lifetime ≥ 50,000 hours**.
- Integrated circuit/processor brands: **ST, Toshiba, Texas, NXP, or Green Micro**.
- Operating temperature: **-40 °C ... +55 °C**.
- External power and data cables, and installation/fuse values shall be **manufacturer-approved**.
- Data and power cables shall be **protected** and **hidden**; the application shall be submitted for manufacturer approval.
- The scoreboard shall be **securely mounted** on a solid base where spectators/referees/players can view it comfortably, with safety observed.

8. CERTIFICATION, DOCUMENTATION, AND WARRANTY

- **CE and RoHS** product compliances shall be delivered.
 - **User manual** and **warranty certificate** shall be delivered.
 - The system shall have a **minimum warranty of 2 (two) years**.
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SUMMARY TABLE – System Overview (Highlighted Mandatory Items)

A) Indicators – Color and Dimensions (Definitive)

Item	Mandatory Feature
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Item	Mandatory Feature
Sports Support	Basketball (3x3, FIBA, NBA, EuroLeague), Volleyball, Handball, Futsal, Water Polo, Field/Indoor Hockey, Hockey 5S, Ice/Underwater/Rink/Roller Inline Hockey (minimum 13 branches)
FIBA Approval	Approved within the scope of FIBA Equipment Approval
Major Events Requirement	Used in ≥ 5 major events including EuroLeague, EuroCup, AfroBasket, BAL, FIBA World Cup
Score Digits	3 digits per team (0–199), ≥ 25 cm, White
Game Time	MM:SS (4 digits), ≥ 25 cm, Yellow ; last 60 s with 1/10 s ; tolerance ≤ ±0.1 s / 100 min ; audible signal at expiry
Period/Set	1 digit (0–9), ≥ 20 cm, White ; overtime “O”
Team Fouls	1 digit per team (0–9), ≥ 23 cm, Red ; square symbol after 4th foul
Timeout Indicator	3 square dots per team; side ≥ 5 cm, Yellow
Attack/Service Arrows	1 per team; Red
Exclusion Time Panel	Jersey No. (2 digits, Yellow) + Time (3 digits, Red), ≥ 16 cm; 0:00–9:59
24/14 Devices	≥ 25 cm, Red; 0–99 s; 24/14/Start/Stop; 24+14 pressed simultaneously → off ; audible signal at expiry
Console Architecture	OS-free embedded; RF 868 MHz + RS485 Half Duplex (1 km)
Input/Interface	Membrane keypad + external keyboard; 7” TFT 800×480
Language & Characters	Turkish, English, French, Spanish ; special 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, Æ, Ú, Û, Ý, Ž, ß, 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
Lighting/Test	100-step brightness; switch-off all; LED/address test
Independent	Audible signals and Backboard Lights independent

Item	Mandatory Feature
Control	
Enclosure/Climate	Scoreboard: Aluminum panel ($\geq 120 \times \geq 200 \times \leq 8.5$ cm) ; anti-reflective lexan/plexi; IP54 (consoles); operation -40...+55 °C
Electrical/EMC	SMD 7-seg, static drive ; CE power supplies; LED life $\geq 50,000$ h ; short-circuit protected driver boards
Wiring/Mounting	Grouped cabling; protected/hidden cables; manufacturer-approved cable/fuse; secure base installation
Warranty	Minimum 2 years