

MULTI-PURPOSE ARENA SCOREBOARD SYSTEM

TECHNICAL SPECIFICATION

1) SCOPE and PURPOSE

This specification defines the procurement, installation, commissioning, and acceptance conditions for a professional scoreboard system and auxiliary equipment to be used in multi-purpose indoor sports halls for Basketball (with FIBA, NBA, EuroLeague, and 3x3 modes), Volleyball, Handball, Futsal, Water Polo, and various hockey disciplines (field hockey, indoor hockey, Hockey 5S, ice hockey, underwater hockey, rink hockey, roller inline hockey, floorball).

2) STANDARDS and COMPLIANCE REQUIREMENTS

FIBA Approval (Level 1): The main scoreboard panel and the 24/24–14 second Shot Clock devices shall have FIBA Level 1 approval.

Other sport standards: Compliance with IHF (handball) and FIVB (volleyball) rules shall be ensured.

International reference requirement: The proposed brand's timing, videoboard, or scoreboard systems shall have been used in at least five international events such as EuroLeague, EuroCup, AfroBasket, BAL (Basketball Africa League), and the FIBA World Cup; such use shall be documented with official reference letters, broadcast footage, or organizer confirmation letters.

Electrical/application compliance: CE and RoHS requirements shall be met. The manufacturer shall hold an ISO 9001 Quality Management System certificate.

3) SYSTEM ARCHITECTURE and MAIN COMPONENTS

- Team Name Panels
- Score and Game Time Panel
- Period / Team Foul / Timeout Panel
- Player Information Panels
- Cube 24 / 24–14 Shot Clock Devices (above the backboard) and mounting sets
- Control Console (Main controller) + Shot Clock Controller + Game Time Controller
- Ball Possession Arrow Indicator
- Digital Team Foul Markers
- Time Keeper For Locker Rooms
- Main mounting brackets for the scoreboard

4) CONTROL CONSOLE and CONTROLLERS

4.1. Control Console (Main Controller) – Embedded, OS-less Architecture

- Shall run on an embedded architecture with **no** operating system; independent of Android / iOS / Windows. It shall provide high response speed and low latency.
- **Communication:** Built-in RF 868 MHz wireless; when required, RS485 (Half-Duplex, single line, up to 1 km). Wireless transmission can be disabled in software.
- **Input:** A membrane keypad shall be present; by connecting an external keyboard, team/player names, numbers, fouls, and scores can be entered directly.
- **Display:** Color TFT $\geq 7"$, resolution $\geq 800 \times 480$.
- **Power:** ≥ 7 hours of continuous operation with Li-ion battery; full charge in ≤ 2 hours via CE-certified adapter.
- **Language Support (for menus and data entry):** Turkish, English, French, Spanish.
- **Special Characters:** The following characters shall be fully supported in all text fields (without abbreviation):
Uppercase: Ç, Ć, İ, Ö, Ş, Ü, Â, Á, Â, Ä, Æ, È, É, Ê, Ë, Ì, Í, Î, Ï, Ñ, Ò, Ó, Ô, Õ, Æ, Ú, Û, Ý, Ž, Æ, ß
Lowercase: ç, ģ, ĩ, 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, æ
- **Sport/Mode Support:** For basketball: FIBA, EuroLeague, 3x3, NBA; plus volleyball, handball, futsal, water polo, and various hockey types.
- **Time sync:** Time difference between the console, scoreboard, and 24s devices shall be < 0.05 s. Total tolerance of the game clock within 100 minutes shall be ± 0.1 s.
- **Functionality:** 100-level brightness, test/blackout of all indicators, automatic foul/Timeout handling at period transitions (FIBA), saving team/player data to memory, adjustable warning signal times, compatibility with media/TV data output, on-site software updates without opening the device.
- **Enclosure/Durability:** Aluminum body, IP54.

4.2. Shot Clock Controller

- Operates synchronized with the main controller.
- Buttons: **24s / 14s / Start / Stop**; when **24s+14s** are pressed simultaneously, the Shot Clock display turns off.
- The Shot Clock cannot be started before the match begins.
- < 0.5 kg, ABS enclosure, IP54.

4.3. Game Time Controller

- Start/Stop and manual control of audible warnings; synchronized with the main controller.
- < 0.5 kg, ABS enclosure, IP54.

5) DISPLAY PANELS

5.1. Team Name Panels

- Separate panel for each team; LED module construction.
- Character height ≥ 32 cm; ≥ 12 characters (depending on width).
- Input via membrane keypad or external keyboard.
- Language/alphabet and special character support (see 4.1).

5.2. Score and Game Time Panel

Layout: Scores on top right/left, centered game time beneath.

Score:

- 3 digits per team, 0–199; digit height ≥ 40 cm; unused digits remain off.

Game Time:

- **MM:SS (4 digits)**; count up/down; 00:00–99:59; **1/10 s** display during the last 60 s; audible signal at end; digit height ≥ 40 cm.

5.3. Period / Team Foul / Timeout Panel

Top right/left **Team Foul**, center **Period** with two attack/service arrows; bottom right/left **Timeout rights (3 dots)** and centered **Timeout Duration**.

Period/Set:

- 1 digit, 0–9, ≥ 30 cm; in basketball, overtime shown as “**O**”; automation depending on period/set increase.

Team Foul:

- 1 digit per team, 0–9, **red**, ≥ 35 cm; after the 4th team foul, square indicator per FIBA rule; automatic increment linked to player foul entry; automatic reset on period change.

Timeout Rights:

- 3 squares per team, edge ≥ 5 cm.

Timeout Duration:

- 2 digits, 0–99, ≥ 30 cm; countdown; audible signal at start/end; additional adjustable early-warning time; during a Timeout, the dot indicators flash; the Timeout duration can be shown on Shot Clock devices via the main controller.

Attack/Service Arrows (Ball Possession Arrow / service):

- 1 arrow per team.

5.4. Player Information Panels (Up to 12 players per team)

Names:

- 12 rows, character height ≥ 16 cm; color: yellow; if the roster is smaller, unused rows fully off.

Jersey No.:

- 2 digits per player, 00–99, ≥ 15 cm; (basketball/handball); in volleyball can be used for set indication; unused rows off.

Player Foul:

- 1 digit per player, 0–9, **red**, ≥ 15 cm; max 5 for Basketball/EuroLeague, max 3 for Handball; flashes ≥ 3 times on change.

Player Score:

- 2 digits per player, 0–99, ≥ 15 cm; team score increases automatically; flashes ≥ 3 times on change; off at start for basketball/handball, becomes visible when a value is entered; in volleyball can be used for set scores.

6) CUBE 24 / 24–14 SHOT CLOCK DEVICES (Above Backboard)

- **FIBA Level 1** approved; for a single backboard, **2×2 faces** or **1×4 faces**; mounted above the backboard (or from the ceiling aligned above the backboard if required).
- Shot Clock 0–99 s; start from 24, stop/resume; 14 s short reset.
- When game time drops below 24 s, the Shot Clock display is either hidden or synchronized with the game time.
- **Digit heights:** game time ≥ 13 cm, Shot Clock ≥ 25 cm.
- **Colors:** game time yellow, Shot Clock red.
- **Backboard Lights:** red (game time) and yellow (Shot Clock) remain on for ≥ 2 s.

- End-of-period tones differ; ≥ 120 dBA @1 m.
- On the 24s controller, pressing **24 + 14** together blanks the Shot Clock.
- If the game time is below 24/14 and the relevant buttons are used, Shot Clock digits switch off automatically.
- Hardware/software compatible with **EuroLeague / EuroCup** competition rules.

7) BALL POSSESSION ARROW INDICATOR

- Arrow-shaped indicator; red; width/height ≥ 11 cm; 12 V; rear LED/LED group indicating direction; direction selected by a switch; **FIBA approved**.

8) DIGITAL TEAM FOUL MARKERS (Scorer's Table)

- Synchronized with the console or independent operation; red; digits ≥ 25 cm, width 12.5 cm; aluminum enclosure, no sharp edges; **FIBA approved**.
- Numeric display up to the 4th foul; after the 4th, when play restarts, full red screen.

9) TIME KEEPER FOR LOCKER ROOMS

- Synchronized with the scoreboard game time; **MM:SS (4 digits)**, 00:00–99:59; digits ≥ 13 cm; **1/10 s** display during the last 60 s.

10) GENERAL TECHNICAL MATTERS (Mechanical/Electrical/Service)

- Aluminum panel; **H ≥ 310 cm, W ≥ 650 cm, thickness ≤ 8.5 cm.**
- SMD LED, 7-segment digits; a single LED failure shall not darken the entire segment; static drive for clear camera capture.
- **Installation:** Solid base with proper sight lines; connectors quick-release and moisture resistant.
- **Front protection:** Anti-glare plexi (special reflective or lexan type).
- **Internal wiring:** Grouped data cables, clean/tidy interior; cables uncut and socketed; driver boards short-circuit protected.
- **Power supplies:** CE-certified; LED lifetime $\geq 50,000$ hours.
- **Component brands:** ST, Toshiba, Texas, NXP, Green Micro.
- **Operating temperature:** $-40...+55$ °C.
- External power/data cables and wiring diagram/fuse ratings manufacturer-approved; cables in protective conduits and hidden from view.

- A data output for broadcasters shall be available on the console.
- **Rigging:** ≥ 500 kg capacity chain hoist or motor; suspended from at least two points.
- **Warranty:** 2 years; delivery of user manual and warranty certificate.

11) ACCEPTANCE, TESTING, and CERTIFICATION

- **Type/Functional tests:** Timing, flash/warning, synchronization, brightness, character sets, all mode/sport scenarios.
- **Site acceptance:** Viewing angle/readability, Backboard Lights–sound sync, 24/14s behavior, period/Timeout automations, RF and RS485 communications.
- **Document/reference delivery:** FIBA Level 1 approval certificates; IHF/FIVB rule-compliance declarations; reference set proving use in at least 5 major international events.
- **Training & Documentation:** User and maintenance manuals; operator training records.

12) SUMMARY TABLE

Component / Area	Digit/Char. Structure	Height (min)	Color (Definitive)	Value Range / Feature	Other Definitive Notes
Team Name	Alphabetic LED	32 cm	White	≥ 12 characters	Full support for special characters
Score (per team)	3 digits	40 cm	White	0–199	Unused digits off
Game Time (Main Panel)	4 digits (MM:SS)	40 cm	Yellow	00:00–99:59; last 60 s: 1/10 s	Audible at end
Period/Set	1 digit	30 cm	White	0–9; overtime “O”	Automation by sport
Team Foul (Panel)	1 digit	35 cm	Red	0–9	Square after 4th foul
Timeout Rights (Dot)	3 squares / team	≥ 5 cm edge	Yellow	—	Flash during Timeout
Timeout Duration	2 digits	30 cm	Yellow	0–99 countdown	Start/end alerts
Player Names	Alphabetic LED	16 cm	Yellow	12 rows	Unused rows off
Player Jersey No	2 digits	15 cm	Yellow	00–99	For volleyball set display
Player Foul	1 digit	15 cm	Red	0–9	≥ 3 flashes on change

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Player Score	2 digits	15 cm	White	0–99	≥ 3 flashes on change
Shot Clock (24/14 s)	2 digits	25 cm	Red	0–99 s; 24/14 reset	24+14 = indicator off
Game Time (on Shot Clock unit)	2 digits	13 cm	Yellow	Synchronized	Sync/hidden below 24/14
Backboard Lights	Backboard frame	—	Red/Yellow	—	On for at least 2 s
Ball Possession Arrow	Arrow-shaped LED	≥ 11 cm	Red	Left/Right	12 V, switch-select
Digital Team Foul Markers (scorer's table)	1 digit	25 cm	Red	—	Full red after 4th foul
Time Keeper For Locker Rooms	4 digits (MM:SS)	13 cm	Yellow	00:00–99:59; last 60 s: 1/10 s	Synchronized with scoreboard