



## Premium Scoring & Timing Solution for Ice Hockey



## 1. Introduction

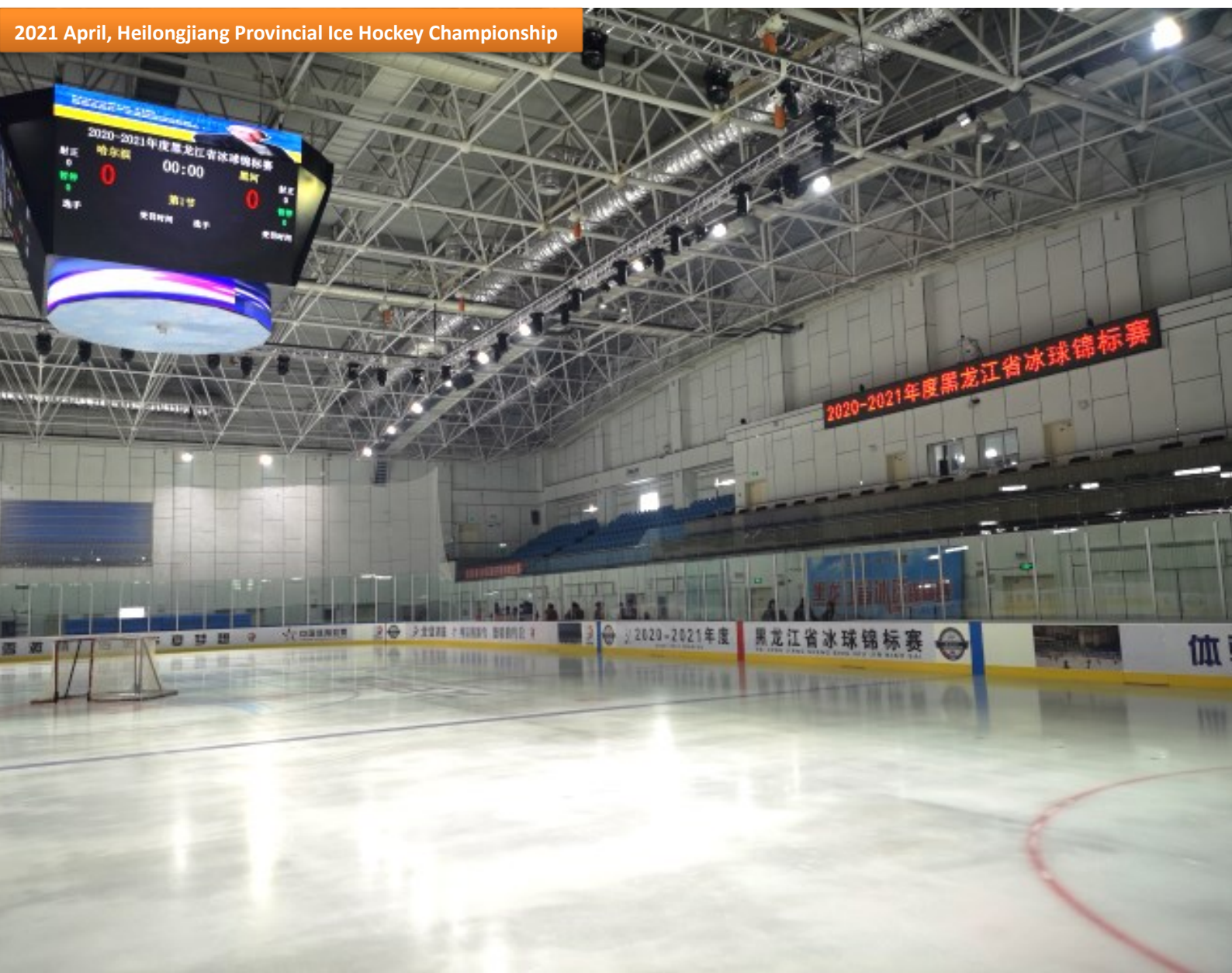
This is a professional solution for LED scoreboard display in Ice Hockey stadiums.

Mainly for large-scale Ice Hockey matches which held in professional sports venues.

The system functions conform to international competition rules.

Match arrangement, real-time scoring & timing display, players' & referees' info display, rank statistics export & print, slow motion video record & playback, and advertising display can be realized through the coordination of Match Scoring System, Meet Management System, Video Arbitration System, etc.

2021 April, Heilongjiang Provincial Ice Hockey Championship



## 1.1 System Architecture

The whole system is composed of several subsystems, including: Match Scoring System, Meet Management System and Video Arbitration System.

Each subsystem can not only work independently, but also work together to share the data.

It is flexible for customers to configure according to the actual application.

- **Match Scoring System**

Match Scoring System named ULTRA SCORE is composed of Ultra Score Software, Match Scoring & Timing Host, Referee Scoring & Timing Terminal, Light Indicator, Match Timer, Penalty Timer, etc.

It is mainly operated by the referees to realize the scoring and timing work and real-time scoreboard display.

The system functions conform to IIHF rules.

- **Meet Management System**

It is composed of Meet Management Server, On-Venue Results Workstation, Printer, etc.

Linking with Online Registration System and Match Scoring System, it can realize: participants management, match schedule, result management, court arrangement, rank statistics, etc.

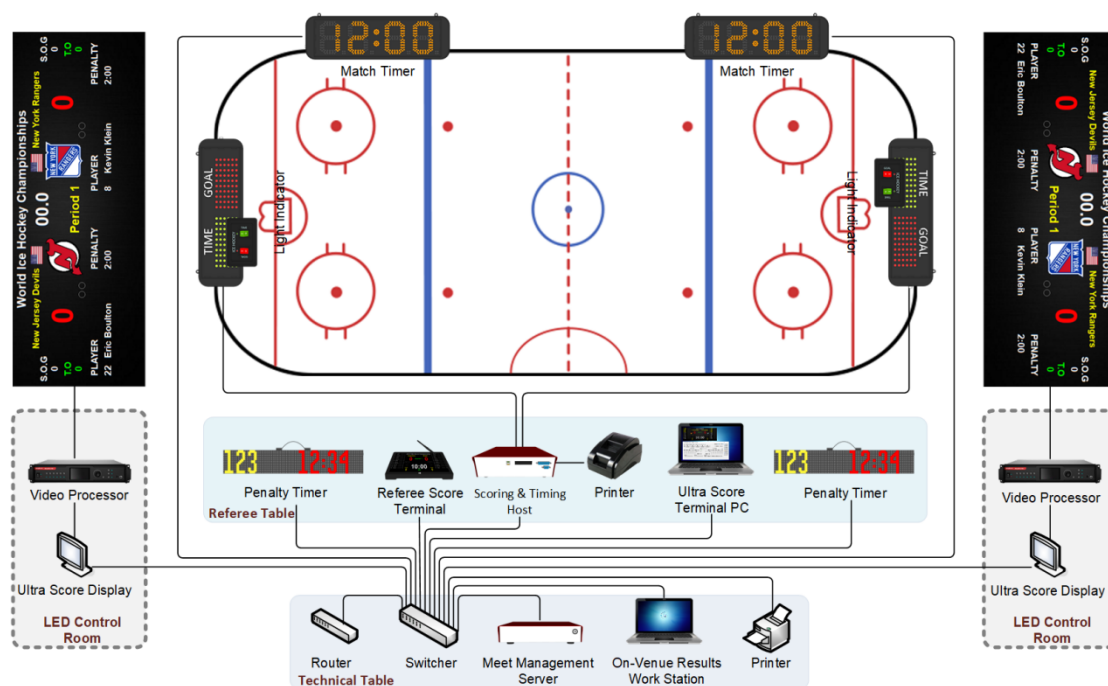
- **Video Arbitration System**

Video Arbitration System named PARROT is composed of video arbitration server, control panel and cameras.

It is operated by the referees during the match. When working with Match Scoring System, referee's score operation will be marked on the frame of video automatically, whilst playback them in slow motion with changes in speed.

It can be used to provide the technical support when dispute happens during the match so as to reduce the misjudging, to ensure fairness and justice of the match.

## 1.2 System Wiring Diagram



### System Description

- 1) **LAN:** A LAN is set up in the stadium. Connect the LED control PC, Ultra Score Terminal PC, Match Scoring & Timing Host, Referee Scoring & Timing Terminal, Meet Management Server, On-Venue Results Workstation and Printer to the LAN.
- 2) **LED Screen:** One or two LED screens are controlled by separate computers which connect with LED sending cards. Both of the LED screens can show the same contents or different contents as required.
- 3) **Match Scoring & Timing Host:** It is the core scoring & timing equipment which is installed in the Officials Table and has the function of hot backup. Use the special cables to connect the Light Indicators and Thermal Printer to the host.
- 4) **Referee Scoring & Timing Terminal:** Installed in the Officials Table for referee's operation of score and penalty. It can be connected to the LAN through network cable or WIFI.
- 5) **Light indicator:** Two light indicators are fixed on two sides of court respectively to indicate goals and match status.
- 6) **Penalty Timer:** Connect to the LAN and be used together with Ice-hockey Scoring Software. Display athlete's number and penalty time.
- 7) **Match timer:** Hanged on the court, display the match time synchronous with scoring system.
- 8) **Meet Management Server:** It is the core data processing equipment which is installed in the Technical Table and connected to the LAN by network cable.

## 2. Specification for Products

### 2.1 Match Scoring System

Match Scoring System named ULTRA SCORE is composed of Ultra Score Software, Match Scoring & Timing Host, Referee Scoring & Timing Terminal, Light Indicator, Match Timer, Penalty Timer, etc.

It is mainly operated by the referees to realize:

- 1) Timer functions: Timing in minute, second, tenth of a second, timing in countup and countdown, start, pause, reset, correct are available.
- 2) Scoring functions: Modify the score of the team and player.
- 3) Penalty functions: Player foul control, Player penalty timer of 2 Min, 5Min, and 10 Min, etc.
- 4) Real-time LED scoreboard display.
- 5) System functions conform to IIHF rules.

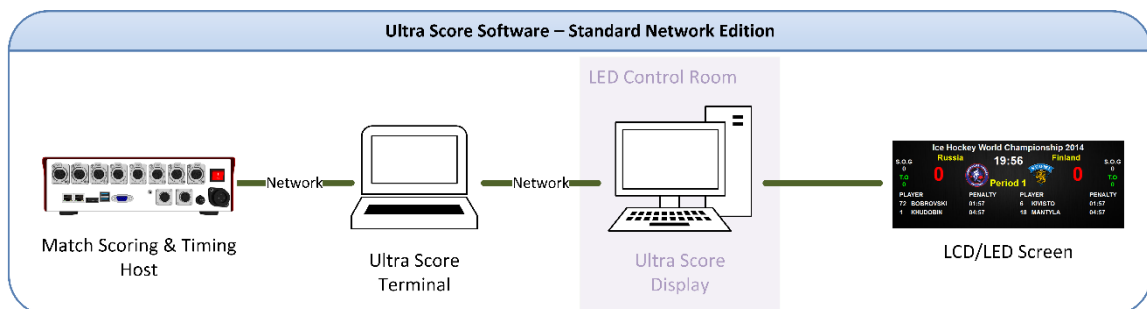
Products	Details
Standard network edition	<ul style="list-style-type: none"> <li>◆ Terminal + 1 Display</li> <li>◆ Supports: Ice Hockey</li> <li>◆ English version</li> <li>◆ Including 1 dongle</li> </ul>
Professional network edition	<ul style="list-style-type: none"> <li>◆ Terminal + Referee + 2 Display</li> <li>◆ Supports: Ice Hockey</li> <li>◆ English version</li> <li>◆ Including 1 dongle</li> </ul>

#### Difference:

##### Standard Network Edition:

Score terminal and media player functions can be installed on 2 PCs respectively. So that one independent PC can be setup on the courtside special for referee's operation, the other PC running as media player to manage the LED display.

- It is suitable for the stadium where has one screen, needs to do the scoring and timing on the courtside.

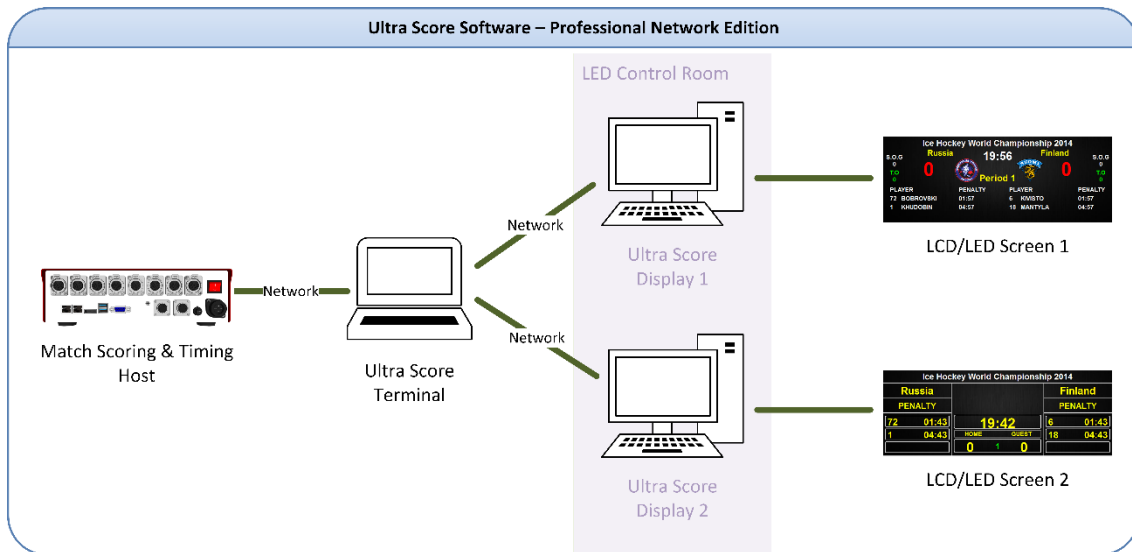


##### Professional Network Edition:

Except the function of score terminal, 1-3 media players can be equipped on PCs separately, in order to display different contents on several LED screens.

- It is suitable for the stadium where has more than 2 screens where referee need to do

scoring on the courtside and LED screens need to display different contents separately. (For example, one LED screen is for scoreboard and another is for advertising or player info).



#### Features:

- (1) Professional scoreboard display: Scoring and timing operation, layout of scoreboard can meet international game rules.
- (2) Match management: Information of match, team, team members and coaches can be saved in advance. And referee's scoring operation during the match can be recorded and output.
- (3) Scoring functions: Include operation and display of teams' and players' points, fouls and substitutions.
- (4) Timing functions: Include operation and display of game time, pause, break time, count down time and system time.
- (5) Convenient operation feeling: Referees can do operation on a special score console as well as by using shortcuts on the keyboard.
- (6) Powerful media player: Kinds of media formats are supported. It is easy to switch between scoreboard and video.
- (7) Notification: Rolling to display short notice on the screen which allows to set the speed, colors, fonts freely.
- (8) Customization: All contents on the scoreboard including fonts, color and layout can be modified to meet clients' needs.
- (9) Self-adaptation: With easy configuration, score information can be displayed on kinds of LED and LCD screen by using this system which can adjust the layout to meet any sizes of screen.
- (10) Security: Auto backup function will help you recover the match immediately from the computer fault.

Display Effects

Ice Hockey scoreboard 1:

**World Ice Hockey Championships**

**New Jersey Devils**      **20:00**      **New York Rangers**

S.O.G.      0      **0**                  0      S.O.G. 0

T.O.      0      **0**      **Period 1**      **0**      T.O. 0

<b>PLAYER</b>		<b>PENALTY</b>	<b>PLAYER</b>		<b>PENALTY</b>
22	Eric Boulton	2:00	8	Kevin Klein	2:00

Ice Hockey scoreboard 2:

**World Ice Hockey Championships**

<b>New Jersey Devils</b>		<b>New York Rangers</b>
<b>PENALTY</b>		<b>PENALTY</b>
<b>22 1:50</b>	<b>19:51</b>	<b>8 1:50</b>
	<b>HOME      GUEST</b>	
	<b>0    Period 1    0</b>	

Team info display:

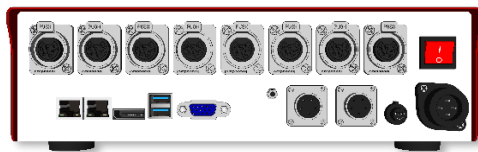
**World Ice Hockey Championships**

**New Jersey Devils**      **New York Rangers**

<p><b>Manager:</b></p> <p><b>Coach:</b></p> <table border="0"> <tr><td>No</td><td>Name</td></tr> <tr><td>1</td><td>Khudobin</td></tr> <tr><td>3</td><td>Zubarev</td></tr> <tr><td>22</td><td>Eric Boulton</td></tr> <tr><td>35</td><td>Vasilevski</td></tr> <tr><td>72</td><td>Bobrovski</td></tr> </table>	No	Name	1	Khudobin	3	Zubarev	22	Eric Boulton	35	Vasilevski	72	Bobrovski	<p><b>Manager:</b></p> <p><b>Coach:</b></p> <table border="0"> <tr><td>No</td><td>Name</td></tr> <tr><td>5</td><td>Ohtamaa</td></tr> <tr><td>8</td><td>Kevin Klein</td></tr> <tr><td>31</td><td>Koskinen</td></tr> <tr><td>32</td><td>Saros</td></tr> <tr><td>35</td><td>Rinne</td></tr> </table>	No	Name	5	Ohtamaa	8	Kevin Klein	31	Koskinen	32	Saros	35	Rinne
No	Name																								
1	Khudobin																								
3	Zubarev																								
22	Eric Boulton																								
35	Vasilevski																								
72	Bobrovski																								
No	Name																								
5	Ohtamaa																								
8	Kevin Klein																								
31	Koskinen																								
32	Saros																								
35	Rinne																								

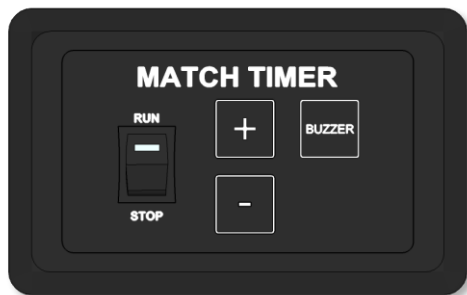
72	Bobrovski	32	Rinne
35	Vasilevski	35	Saros

## 2.1.2 Match Scoring & Timing Host



### Match Scoring & Timing Host

Type	KS-MONSTER
Size	260 x 280 x 80 (mm)
Support	Basketball, Volleyball, Soccer, Futsal, Handball, Water-polo, Ice-hockey
Other	Supports hot switching of the main and backup servers.



### Match Timer Handheld

Type	KS-G-MT
Size	120x80x25(mm)
Communication	Wired
Function	Match timer start, stop, modify and buzzer control.



### Detailed parameters

Item	Details	Item	Details
Product	Match Scoring & Timing Host	Type	KS-MONSTER
Size	260 x 280 x 80 (mm)	Net weight	3 KG
Material	Iron	Power	100W
CPU	Intel J3160	RAM	8GB
Communication	RJ45×2	Hard disk	64GB
Video output	VGA×1, DP×1	Input voltage	AC 100~240V
Working Temp	0-60°C	Relative humidity	5%-95%, non-condensing
Language	Chinese, English	Timing accuracy	<=10ms
Port	G-Port×8, Light Indicator port×2, Audio×1, USB port×2, Serial port×1		
Accessories	Match Timer Handheld *1		
Supporting games	Basketball, Volleyball, Soccer, Futsal, Handball, Water-polo, Ice-hockey, etc.		
Supporting rules	IIHF		
Functions	<ol style="list-style-type: none"> <li>1. Timer functions: Timing in minute, second, tenth of a second, timing in countup and countdown, start, pause, reset, correct are available.</li> <li>2. Scoring functions: Modify the score of the team and player.</li> <li>3. Penalty functions: Team foul control, Player foul control, Player penalty time control, Substitution control, etc.</li> <li>4. Supports match rule setup.</li> <li>5. Synchronous control of Light Indicator.</li> <li>6. Adjust the brightness of Light Indicator.</li> <li>7. Provides buzzer sound output, which can be connected to the venue's public address system or speakers.</li> <li>8. Supports hot switching of the main and backup servers. In case of the main server fails, just manually switch to the backup server to ensure the data intact. And in case of power failure, the previous screen will be restored after restarting.</li> <li>9. Supports the post-match celebration mode.</li> <li>10. Supports real-time data output, which can be used for live broadcast.</li> <li>11. Monitoring the status of scoring devices, providing convenient fault diagnosis (with a separate monitor).</li> <li>12. Anti-loose port ensure the safety of match data.</li> </ol>		

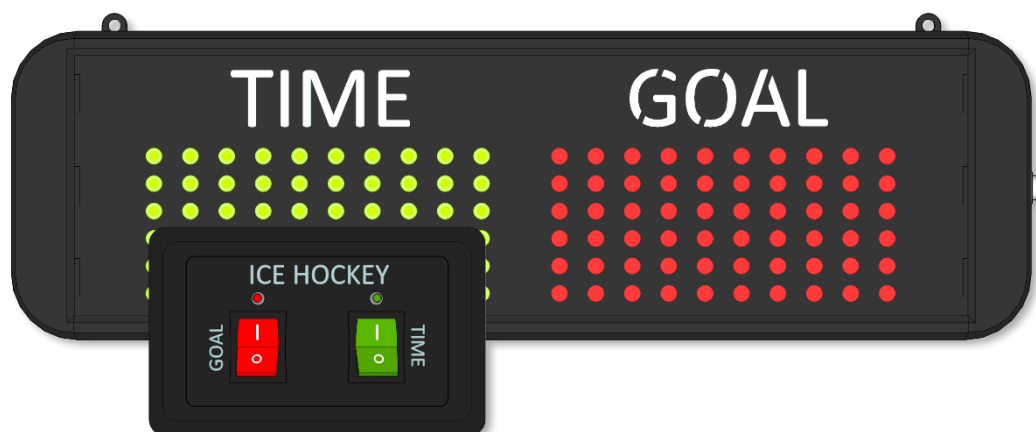
### 2.1.3 Referee Timing & Scoring Terminal



#### Detailed parameters

Item	Details	Item	Details
Product	Referee Timing & Scoring Terminal	Type	KS-GC18
Size	250 x 175 x 70 (mm)	Material	PVC
Touch LCD	10.8 inch	Resolution	1920*1280
OS	WIN 10	Battery Capacity	10000mAh
Communication	LAN / WLAN	Hard disk	64GB
Video output	HDMI*1	RAM	4GB
Functions	<ol style="list-style-type: none"> <li>1. Timer: Includes minute, second, decisecond, 14S and 24S timing function. And also have positive timing, countdown, start/pause/reset/correct timing functions.</li> <li>2. Scoring function: Modify the score of the team and player.</li> <li>3. Penalty function: Player individual foul control, Player Penalty control, Substitution control, etc.</li> </ol>		

## 2.1.4 Light Indicator



### Detailed parameters

Item	Details	Item	Details
Product	Light Indicator	Type	KS-ICLI
Size	620x190x45 (mm)	Material	PVC
Weight	4KG	Display color	Red, Green
Communication interface	Watertight air interface	Accessories	Cable*50M, Handheld*1
Functions	<ol style="list-style-type: none"> <li>1. It can be used alone to prompt goals and game status.</li> <li>2. It can be used in conjunction with the scoring console to prompt the goal, and the prompt record will be returned to the referee scoring console at the same time; The competition status can be controlled and displayed by the scoring console.</li> <li>3. Light red indicator to prompt a goal.</li> <li>4. Light green indicator during break.</li> </ol>		

### 2.1.5 Match Timing Display

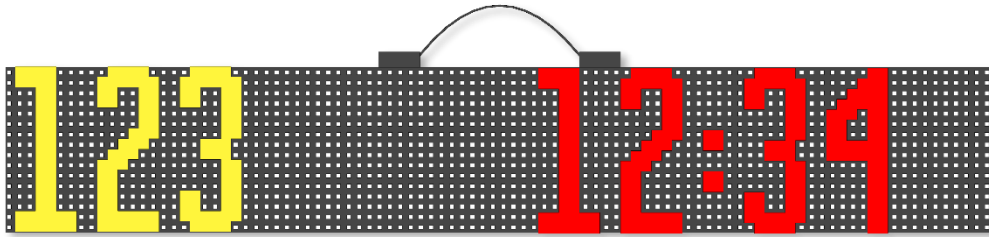


#### Detailed parameters

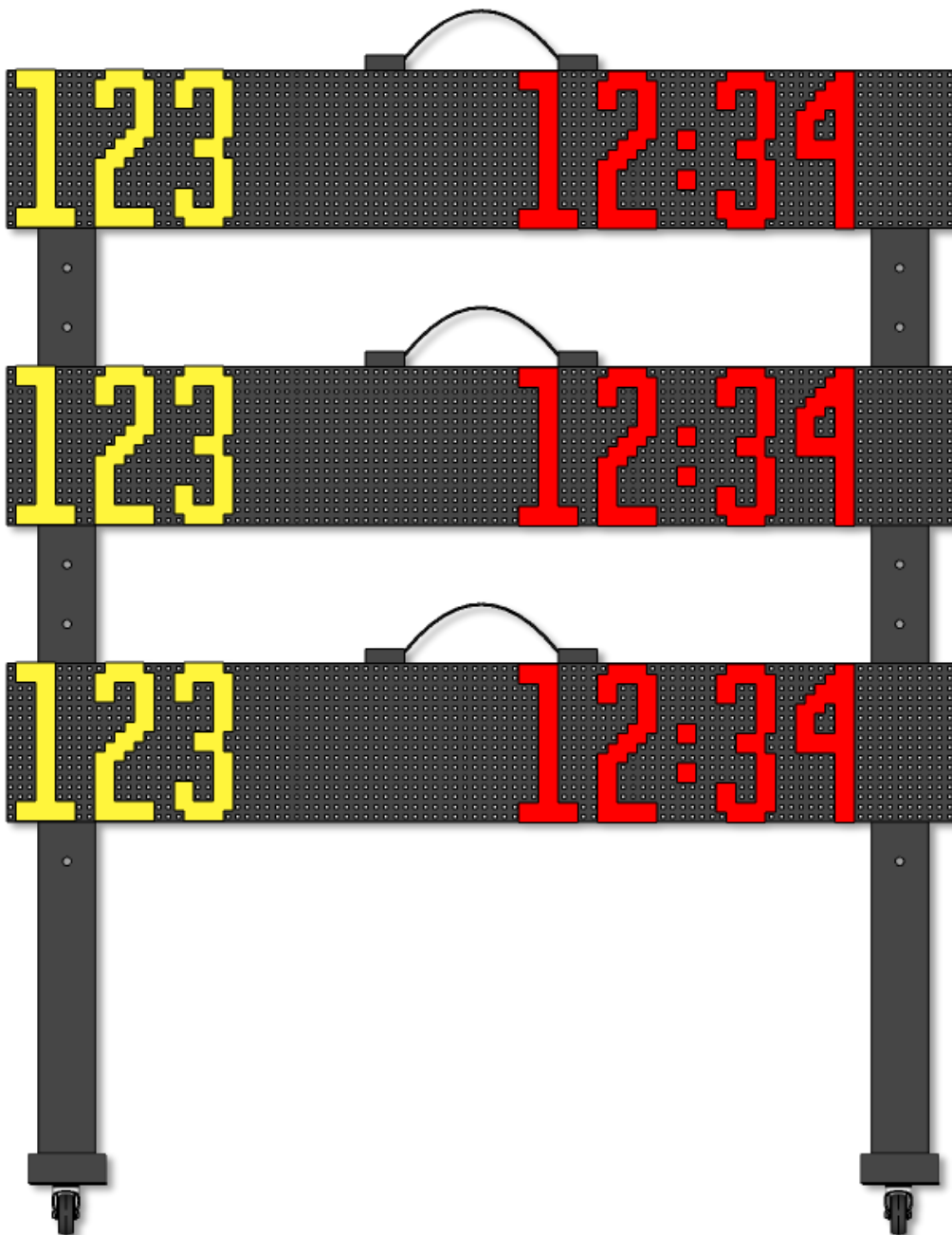
Item	Details	Item	Details
Product	Match Timing Display	Display color	Yellow
Type	KS-MT-G	Weight	0.6KG
Size	620x190x45(mm)	Communication interface	RJ45 network
Material	Aluminum + PVC		
Functions			
Work with Ultra Score System to display the match timing and break timing synchronously.			

### 2.1.6 Penalty Timing Display

KS-SCRN-LED960160-S



KS-SCRN-LED960160-T



### Detailed parameters

<b>Type</b>	<b>KS-SCRN-LED960160-S</b>
<b>Parameters</b>	
Dimension	960x160x100 (mm)
Material	Aluminum
Input Voltage	12V 5A DC
Lamp Color	Yellow, Red, Green
Brightness	800-1000MCD
Communication	LAN/RJ45 RS485
<b>Environmental</b>	
Operating Temp	-5~45°C
Relative Humidity	5~95 %, non-condensing
Storage Temp	-40~80°C
Power	8W
<b>Functions</b>	
	<ul style="list-style-type: none"><li>● Display athlete's number and penalty time.</li><li>● Match timing.</li></ul>
<b>Type</b>	<b>KS-SCRN-LED960160-T</b>
<b>Parameters</b>	
Single screen size	960x160x100 (mm)
Full screen size	960x1185x350 (mm)
Material	Aluminum
Lamp Color	Yellow, Red, Green
Brightness	800-1000MCD
Communication	LAN/RJ45 RS485
<b>Environmental</b>	
Operating Temp	-5~45°C
Relative Humidity	5~95 %, non-condensing
Storage Temp	-40~80°C
Input Voltage	AC 100V-240V
Power	24W
<b>Functions</b>	
	<ul style="list-style-type: none"><li>● Display three groups of penalty possession number and penalty time.</li><li>● Display three groups of athlete's number and penalty time.</li></ul>

### 2.1.7 Referee Chair



#### Detailed parameters

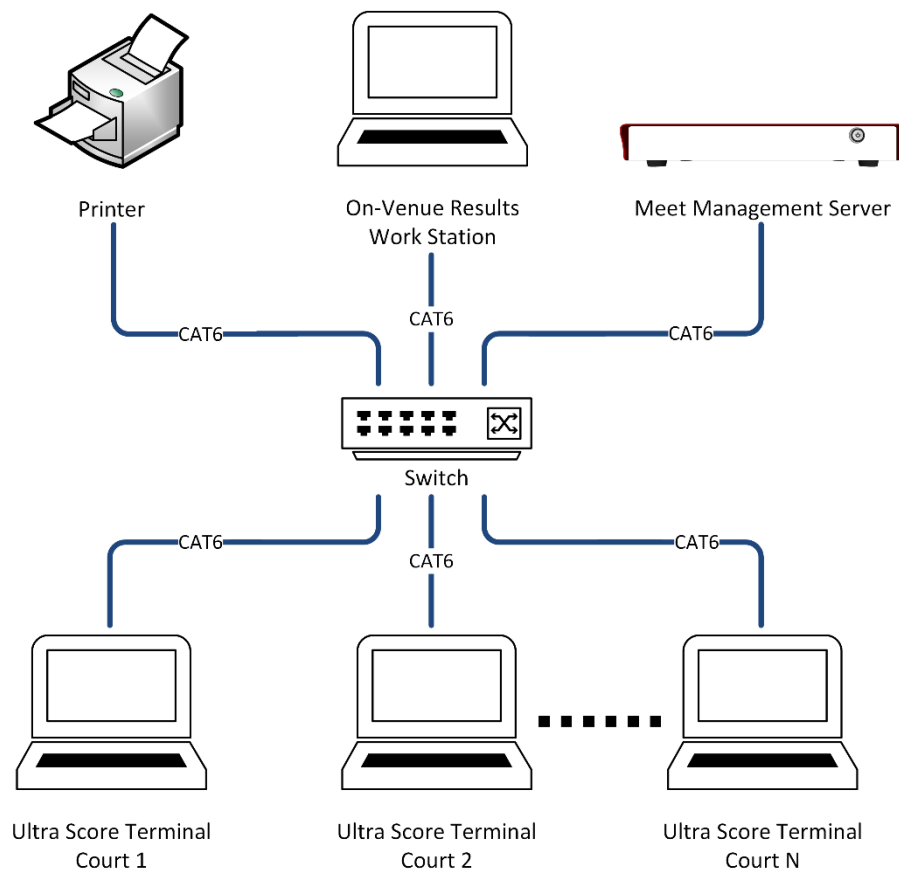
Item	Details	Item	Details
Product	Referee Chair	Type	KS-5050
Size	1700*900*2600 (mm)	Color	White/forest green
Material	Aluminum alloy		
Others	Providing fixing stands for light indicator.		

## 2.2 Meet Management System

It is composed of Meet Management Server, On-Venue Results Workstation, Printer, etc. Linking with Online Registration System, Match Scoring System and Basketball Stats System, it can realize:

- 1) **Participants Management:** Information management of players, teams and referees. Both import and input registration form are available. And auto generate the order form.
- 2) **Match Schedule:** Auto draw the players' lots. Multi-project arrangement make the schedule more smoothly. Auto generate the bracket, order form and round form.
- 3) **Result Management:** Receive or record the results. Determine the players' rank, admission or elimination at each stage. Print the results announcement and send to the LED display system, TV broadcasting system and comprehensive meet manage system.
- 4) **Technical Statistics Arrangement:** Combine with the basketball stats software, it can summarize the info of teams' score, teams' timeout, teams' foul, players' substitution, players' foul, players' comprehensive results, and generate the integrated report.

### 2.2.1 System Diagram





### 2.2.2 Meet Management Server

Products	Details
<b>Meet Management Server</b>	<p>Type: KS-MMS-MINI Size: 260x135x35 (mm) Weight: 1.0 KG Input Voltage: 12V DC RAM: 4GB CPU: Intel J3160 Hard Disk: 64G Communication: LAN*1 Port: VGA*1, DP*1, USB*2</p> <p>Features:</p> <ul style="list-style-type: none"><li>● Multi-court arrangement, auto generate the order form.</li><li>● Multi-project arrangement, make the schedule more smoothly.</li><li>● Monitor the status of each court in real time, including the current field, rotation and player info.</li><li>● Court adjustment, can manually modify the match court and session info.</li><li>● Summary and print integrated report.</li></ul>



### 2.3 Video Arbitration System

Video Arbitration System named PARROT is composed of video arbitration server, control panel and cameras.

It is operated by the referee during the match. When working with Match Scoring System, referee's score operation will be marked on the frame of video automatically, whilst playback them in slow motion with changes in speed.

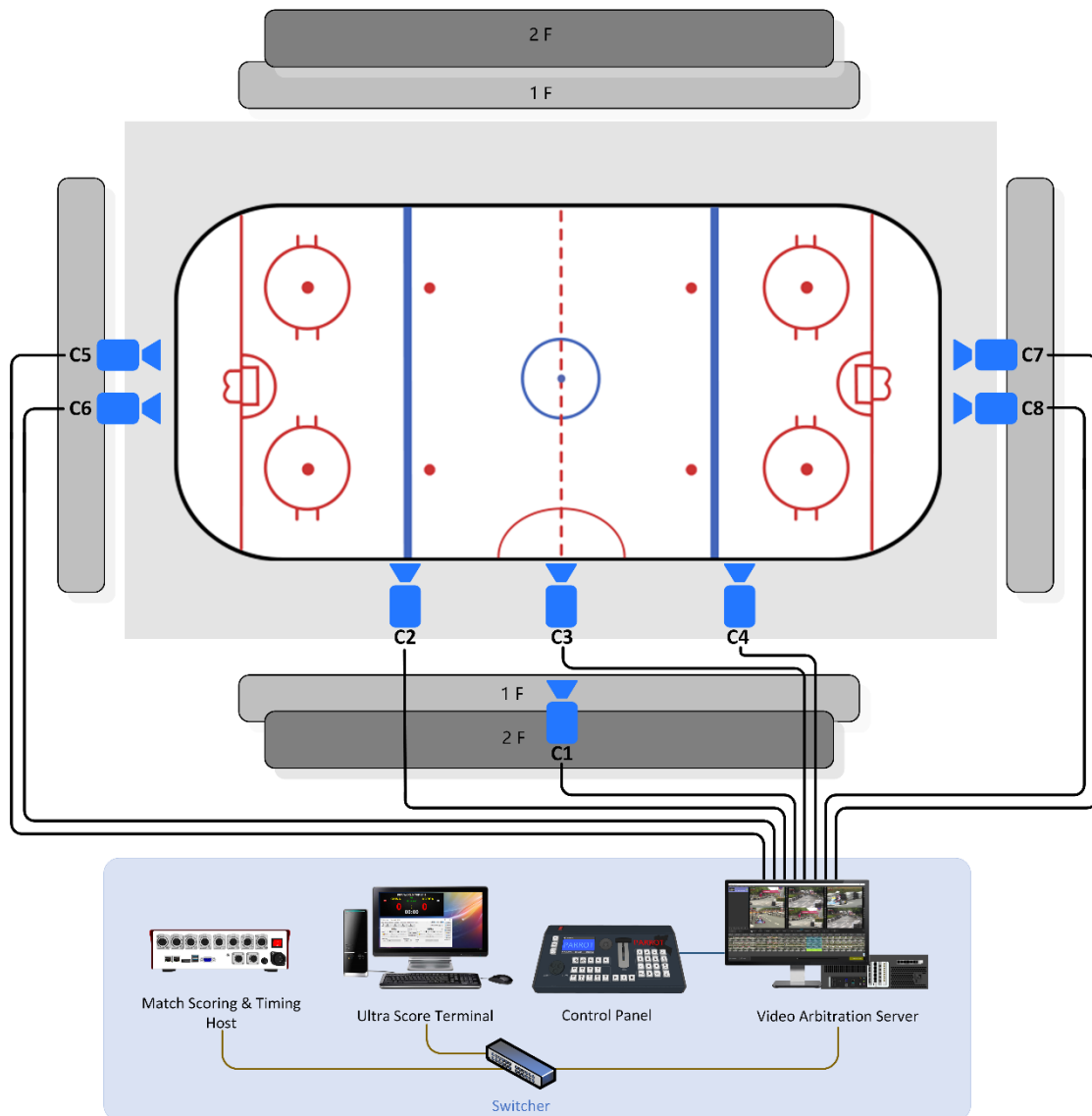
It can be used to provide the technical support when dispute happens during the match so as to reduce the misjudging, to ensure fairness and justice of the match.

Application:

Basketball, Volleyball, Soccer, Handball, Boxing, Wrestling, Wushu, Judo, Jujitsu, Karate, Taekwondo, Gymnastics, Swimming, Diving, Ice-hockey, Weightlifting, etc.



### 2.3.1 System Diagram



### 2.3.2 System Description

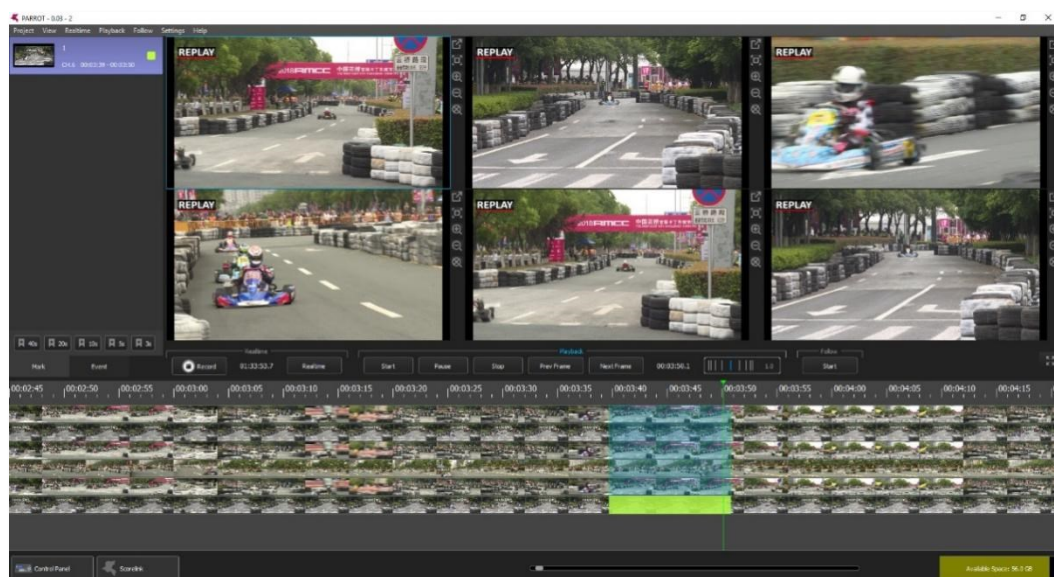
- 1) Ultra Score software is installed on the control computer. Connect the control computer and the video arbitration server to the local network.
- 2) 1-8 sets of HD cameras are installed around the count which connects to video arbitration server via SDI cable.
- 3) Control panel is connected to video arbitration server via a USB cable which makes referee easy to check the playback process and control the speed of slow motion.
- 4) Video arbitration server provides an output video signal which can be connected to LED/LCD display for live slow motion replay.

### 2.3.3 Functions

- 1) **Nonstop video recording in the background:** 1-8 channels of HD video are recorded simultaneously in the background, nonstop for 10 hours. Video retrieval and playback is unaffected.
- 2) **Synch-playback of multi-channel video:** Supports playback mode of single channel video in full screen and multi-angle video in 6 windows.
- 3) **Speed change in slow motion:** supports 20 frame/s video playback and capturing motion in a grid of 0.05s. The function of frame freeze, fast playback, 1/2 slow playback, 1/4 slow playback and dragging progress bar is available.
- 4) **Video event query:** video stream can be divided into several video events, storing in the event list, which can be renamed for retrieve easily.
- 5) **Video segment marker:** Important or controversial moments can be marked in video stream which will be replayed quickly when clicking the marked records.
- 6) **Professional playback control panel:** configuring T-bar, slow moving wheel, speed preset function keys to make the process more convenient.
- 7) **Video signal output:** provides 2 video output signals, one of which is for preview, the other of which can be connected to LED/LCD display for live slow motion replay.

#### Working with Ultra Score System to realize:

- 1) **Auto generate video event:** Video events will be generated automatically for quick query according to the match data that has been preset in Ultra Score.
- 2) Real-time match timer will be superimposed on the video.
- 3) **Referee's operation record:** Referee's every scoring and timing operation can be recorded into the video, showed below the frame when that moment happened.
- 4) **Player's point record:** Player's point can be recorded into the video, showed below the frame when that moment happened.
- 5) **Open developer API:** Just connect your own scoring system onto this Video Arbitration System, so you may record all kinds of events together with the videos.



### 2.3.4 Video Arbitration Server (up to 8 channels record and replay)



#### Detailed parameter

Item	Details	Item	Details
Product	Video Arbitration Server	Type	KS-PARROT-2C/4C/6C/8C
Input voltage	AC 100~240V	Power	35W
Size	483x430x90mm (2U)	CPU	Intel I7
RAM	2 channels: 8GB 4/6/8 channels: 16GB	Hard disk	2/4 channels: 800GB 6/8 channels: 2T
Input	SDI×2/4/6/8	Communication port	LAN×2
Output	DP×2	Other port	USB×4
Packing list	Host*1, Power cable*1, User manual*1		
Functions	<ol style="list-style-type: none"> <li>1. Nonstop video recording in the background for 10 hours. Video retrieval and playback is unaffected.</li> <li>2. Support 50 frame/s video playback and capturing motion in a grid of 0.02s.</li> <li>3. Support playback the video of the specified channel frame by frame, or at a set speed continuously.</li> <li>4. Important or controversial moments can be marked manually or auto create video marks by linkage with Ultra Score System.</li> <li>5. Zoom the playback screen of any channel to accurately observe the details.</li> <li>6. Provide 2 video output signals, one of which is for preview, the other of which can be connected to LED/LCD display for live slow motion replay.</li> <li>7. Working with Ultra Score System can realize real-time match data displaying on the video.</li> <li>8. Automatically synchronize with the match and tag the video, so as to provide convenience to find the match sessions or sets.</li> <li>9. Each single operation of the referees will be recorded together with the videos.</li> <li>10. Unique "Follow" mode, automatically replay the most recent screen with a 5-second delay to help the referee make decisions quickly.</li> <li>11. Open external control interface which can be controlled by 3rd-part system.</li> </ol>		

### 2.3.5 Control Panel



#### Detailed parameters

Item	Details	Item	Details
Product	Control Panel	Type	KS-PARROT-CP
Input Voltage	AC 100~240V	Net weight	1KG
Size	365 x 200 x 98 (mm)	Power	15W
Communication port	USB×1, RS232×1	Display	Color LCD(4.3Inch)
Packing list	Host* 1, Power cable*1, USB cable*1, User manual*1		
Functions	<ol style="list-style-type: none"> <li>1. Support one touch replay, deferred replay, in/out replay.</li> <li>2. Preset speed button.</li> <li>3. T-Bar for dynamic slow motion.</li> <li>4. Professional dynamic jog wheel.</li> <li>5. Key to mark the last 10s/20s of the video content.</li> <li>6. Flexible select the marked video and playback.</li> </ol>		

### 2.3.6 HD Camera



#### Device Specification

Product Type	KS-PARROT-CAMERA
Video output	3G-SDI
Effective pixels	3.0 million
Max Resolution	1920*1080
Max Frame rate	60FPS
Sensor	CMOS
Focal length	4.2MM
Size	62.5*50*50MM