Test Project

Module 2.1 - High-definition LED Display System Installation, Configuration and Programme Playback

Optoelectronic Technology

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Introduction

Professional project context

In this module, the client requires a custom-shaped LED display for a WorldSkills-themed visitor display area. The display consists of square and triangular P2.5 full-colour LED module panels. The completed display must operate as one continuous 512 pix × 192 pix display area and play the specified dynamic programme content in asynchronous loop playback mode through the supplied media player.

This work is to be completed as a professional installation and commissioning work package. The final installation must be safe and reliable, mechanically secure, neatly wired, correctly configured and visually continuous, and must meet the client's handover inspection requirements.

Occupational context

High-definition LED display systems are widely used in exhibition booths, public information areas, commercial advertising displays, event stages, digital signage installations and visitor experience spaces. In real projects, an optoelectronic display technician must be able to interpret display layout drawings, identify the installation orientation of standard and custom-shaped LED modules, complete mechanical assembly, plan signal and power cable routes, configure receiving card parameters, verify display continuity and colour accuracy, and publish the specified media content to the playback system.

The Competitor will act as the assigned optoelectronic display technician responsible for installing, configuring, commissioning and handing over the custom LED display system. The work requires interpretation of the supplied layout and orientation information, mechanical assembly of square and triangular LED modules, signal and power distribution, receiving-card configuration, display verification, dynamic programme creation and asynchronous playback through the supplied media player.

Description of project and tasks

Competition time: 240 minutes.

- Task 2.1.1 High-definition LED Display Installation Planning and Assembly
- Task 2.1.2 Display Control System Parameter Configuration, Verification and Maintenance
- Task 2.1.3 Dynamic Programme Editing, Transmission and Asynchronous Playback

The client requires a complete custom-shaped LED display system that is mechanically secure, safely wired, correctly configured as one continuous 512 pix × 192 pix display area, and capable of playing the specified WorldSkills-themed programme in asynchronous loop playback mode for handover inspection.

Workstation number convention

Unless otherwise stated, XX represents the two-digit workstation number assigned to the Competitor (e.g. 01, 02). Workstation numbers shown in the reference images are examples only. Wherever a workstation number is required in the programme content or filenames, the Competitor must use their own two-digit workstation number.

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Drawings and materials information

The following drawings and visual references form part of the project requirements. Competitors must interpret and apply these materials during the work, together with the installation materials list and the programme effects production schedule, to complete the installation, configuration and programme handover required by the client.

Index of drawings, materials lists and programme references

Figure 2.1-1 Display installation orientation layout

Table 2.1-1 Installation materials list

Figure 2.1-2 Switching power supply wiring diagram

Figure 2.1-3 Display system programme control areas

Figure 2.1-4 Programme assets

Figure 2.1-5 Preconfigured programme effects on the equipment (no Competitor action required)

Figure 2.1-6 Programme design visual reference

Table 2.1-2 Programme effects production schedule

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Instructions to the Competitor

Project brief from the client

You may use only the supplied LED modules, receiving cards, media player, cables, mounting hardware, software, programme assets and project files. All installation, wiring, configuration, testing, programme editing, file saving and final playback work must be completed within the time allocated to this module.

The specified display area is 512 pix × 192 pix. The display must operate as one complete visual display surface. Incorrect module orientation, signal mapping, receiving card configuration or colour order; missing content; obvious image discontinuity; unsafe wiring; or failure to save the required project files may affect the assessment results.

This work comprises the following stages:

1. Install and assemble the square and triangular LED modules, receiving cards, media player, signal cables and DC output-side power distribution in accordance with the supplied layout and equipment requirements.
2. Configure and verify the LED display control system so that the physical installation operates as one continuous 512 pix × 192 pix display area, and save the required receiving card configuration files.
3. Create the specified WorldSkills-themed dynamic programme, transmit it to the media player for asynchronous loop playback, apply the required final brightness and colour temperature settings, and save the required PlayerMaster project file.

Technical requirements and conventions

Display and workstation conventions

The specified display area is 512 pix × 192 pix and must operate as one complete visual display surface. XX represents the Competitor's two-digit workstation number wherever it is required in programme content or filenames.

Electrical and software boundaries

The AC input wiring of the three DC switching power supplies has been pre-connected. Competitors must not modify the AC input wiring and carry out only the required DC output-side wiring. LEDSetting is used for display control-system configuration. LEDUpgrade is not used in this module and must not be run.

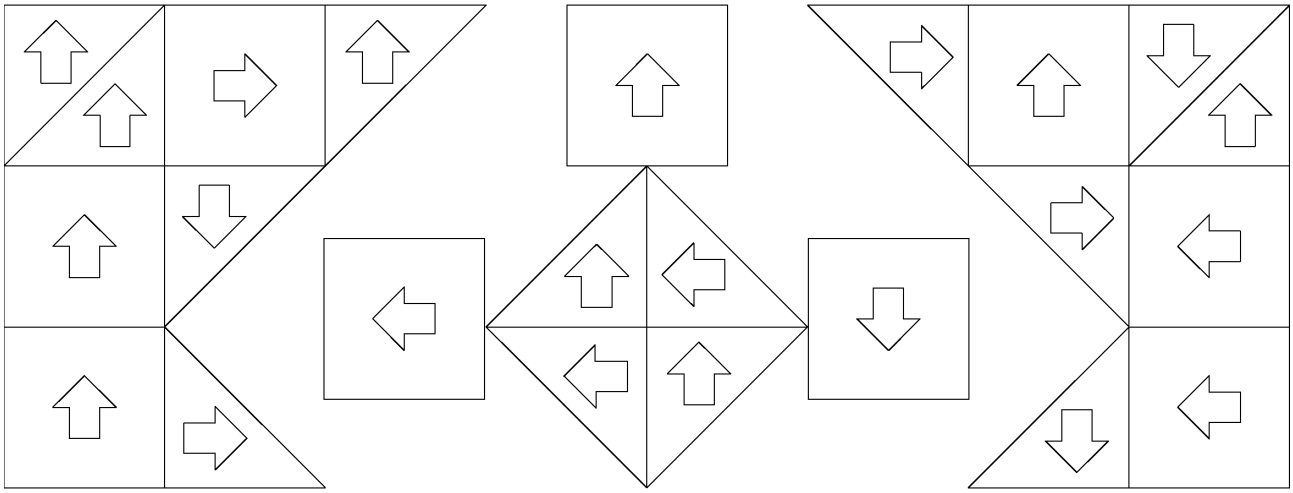
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Task 2.1.1 High-definition LED Display Installation Planning and Assembly

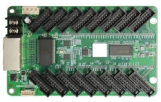
Client requirement

The client has provided the custom LED display layout drawing and the required installation materials. The supplied components may have different production batch identifiers or initial parameter data, but all competition equipment sets are functionally equivalent. Competitors must check the actual hardware supplied before configuration. Before assembly, examine Figure 2.1-1 and Table 2.1-1 carefully. The arrows shown on the LED module panels indicate the required module installation orientation and must be followed. Square and triangular LED modules must be installed in the positions and orientations shown in the drawing.

Figure 2.1-1 *Display installation orientation layout*



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NO.	NAME	UNIT	QTY	REFERENCE IMAGE
1	P2.5 triangular full-colour LED module panel (upper-left), 64*64	pc	7	
2	P2.5 triangular full-colour LED module panel (lower-right), 64*64	pc	7	
3	P2.5 square full-colour LED module panel, 64*64	pc	9	
4	Receiving card, VR002A	pc	2	
5	Media player, VP002A	pc	1	
6	Grey ribbon cable 1, pitch 2.54/FC-16P/1300	pc	23	
7	Grey ribbon cable 2, pitch 2.54/FC-16P/200	pc	2	
8	Switching power supply, DC5V	pc	3	
9	Red/black power cable for LED display modules	pc	13	
10	Externally threaded magnetic mounting post for LED displays, M3	pc	48	
11	Network patch cable, 1 m	pc	2	
12	Network patch cable, 5 m	pc	1	

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NO.	NAME	UNIT	QTY	REFERENCE IMAGE
13	Cable tie, 4*200mm	pc	100	
14	Cable tie mount, 2cm*2cm	pc	20	

Table 2.1-1 *Installation materials list*

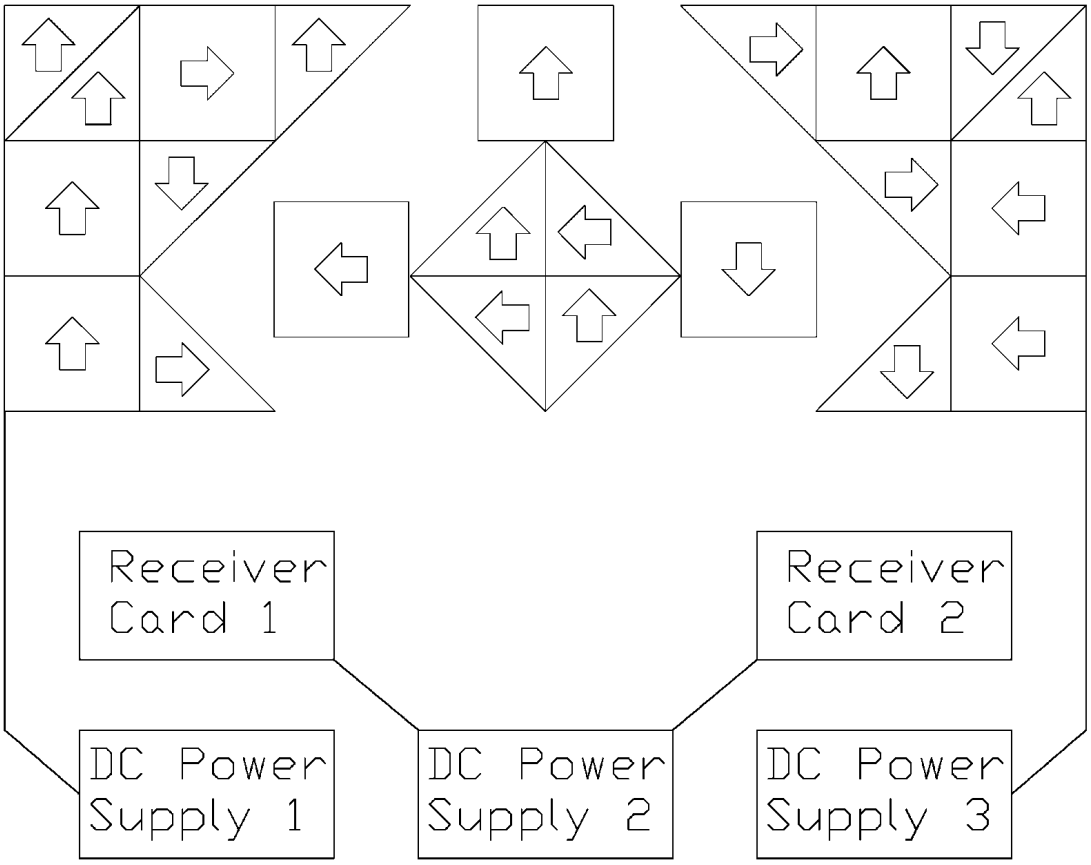


Figure 2.1-2 *Switching power supply wiring diagram*

The AC input wiring of the three DC switching power supplies has been pre-connected. Competitors must not modify the AC input wiring. Competitors are responsible for completing the DC output-side wiring.

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Work instructions and installation requirements

Complete the installation, wiring, initial commissioning and installation quality optimization of the LED display system using the materials listed in Table 2.1-1 and in accordance with the following requirements:

1. In accordance with **Figure 2.1-1**, install each LED module panel in the correct position, orientation and sequence. The completed display must match the specified shape, dimensions and module orientations shown in the drawing.
2. In accordance with **Figure 2.1-2**, this display control system requires 3 DC switching power supplies and 2 receiving cards. The 2 receiving cards must share one dedicated switching power supply, while the other two DC switching power supplies power the display modules. Receiving cards and display modules must not share the same switching power supply.
3. The client requires the number of display modules (full-colour module panels) controlled by each receiving card to be ≥2.
4. Before securing each module panel, confirm whether it is a square module, an upper-left triangular module or a lower-right triangular module. An incorrect installation position or rotational orientation may cause incorrect image mapping or an incomplete display.
5. Securely mount the LED module panels using the supplied magnetic mounting posts and mounting hardware. The display surface must be flat and orderly. The edges of adjacent modules must be aligned as closely as possible, without obvious misalignment, loose panels, tilted panels or unnecessary gaps.
6. Mount the receiving cards and media player in suitable positions to ensure safe cable routing and reliable signal transmission, and to provide access for configuration and inspection.
7. Plan and complete the signal cable routing. Competitors may determine the routes for the network cables and ribbon cables, including the receiving card port allocation. However, the completed display must be capable of being configured to show one continuous and correct 512 pix × 192 pix image.
8. Plan and complete the power distribution. Competitors may determine the number of power supply outputs used and the power cable routes, but the system must operate safely and stably. The power supply for the control cards and the power supply for the LED module panels must not be shared in a manner that contravenes the requirements of the supplied system.
9. Identify the polarity of all module power connections before energizing the system. Reversed polarity, short circuits, loose power connectors, exposed conductors, excessive cable tension and unsupported cable weight are not permitted.
10. Where practicable, route signal cables separately from power cables. Cables at the rear of the display must be organized by function, follow clear routes, and be secured where necessary using the supplied cable ties or cable clips, while avoiding contact with sharp edges or moving parts.
11. On completion of the installation, carry out a pre-energization inspection. The system may be energized only after the mechanical installation has been confirmed as secure and the power/signal connections have been checked and confirmed as correct.

Task 2.1.2 Display Control System Parameter Configuration, Verification and Maintenance

Client requirement

The purpose of this task is to make the physical LED display operate as one continuous, complete display area. The configuration must correspond to the actual module layout, receiving card allocation, signal cable routes and physical pixel orientation of the installed display.

Work instructions and configuration requirements

After installing the display modules, receiving cards, signal cables, power cables and media player, use the supplied LEDSetting software to configure the LED display control system.

LEDUpgrade is not used in this module. Competitors must not run this software.

1. Open the supplied LEDSetting software and complete the initial setup of the LED display.
2. Configure the display size as 512 pix × 192 pix.
3. Configure the receiving card connections and mapping so that the displayed image correctly corresponds to the actual installed physical layout shown in **Figure 2.1-1**.
4. Configure the relevant display parameters according to the supplied LED modules, receiving cards and control system. The display must have the correct image orientation, module sequence and colour order, and form a continuous display area.
5. Use the specified display test functions, test images or software display output to check image continuity, colour accuracy, module orientation and receiving card mapping.
6. After configuration, the display must show a continuous, complete image without obvious flickering, flashing pixels, ghosting, incorrect colour order, incorrect patterns, missing module areas, duplicated module areas or obviously disordered mapping.
7. Save the two completed receiving card configuration files using the specified storage location and filenames.

Configuration file saving requirements

Save the required receiving card configuration files to the desktop of the competition user account. Both of the following files must be submitted:
C:\Users\Competitor\Desktop\XX_01.rcvbp
C:\Users\Competitor\Desktop\XX_02.rcvbp

The saved configuration files must be usable for assessment. If the filename, file extension, storage location or workstation number is incorrect, the submission for the relevant assessment item may not be accepted.

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Task 2.1.3 Dynamic Programme Editing, Transmission and Asynchronous Playback

Client requirement

The client requires the completed LED display to play a WorldSkills-themed dynamic programme suitable for the visitor display area. Use the supplied media assets and PlayerMaster software to create the programme and publish it to the media player.

Design the programme for the complete 512 pix × 192 pix LED display area. The content layout must match the custom display shape and remain readable and visually balanced on the installed display.

The equipment for this module is restored to its factory configuration before the competition. This pre-competition preparation is not part of the Competitor's work.

Programme assets and visual references

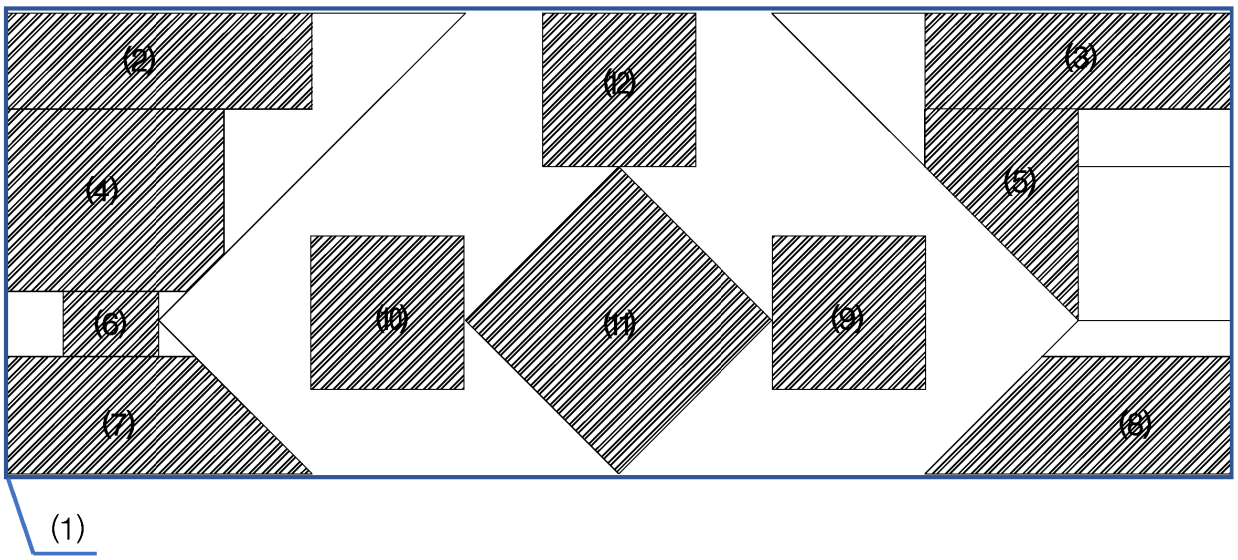


Figure 2.1-3 Display system programme editing and playback areas

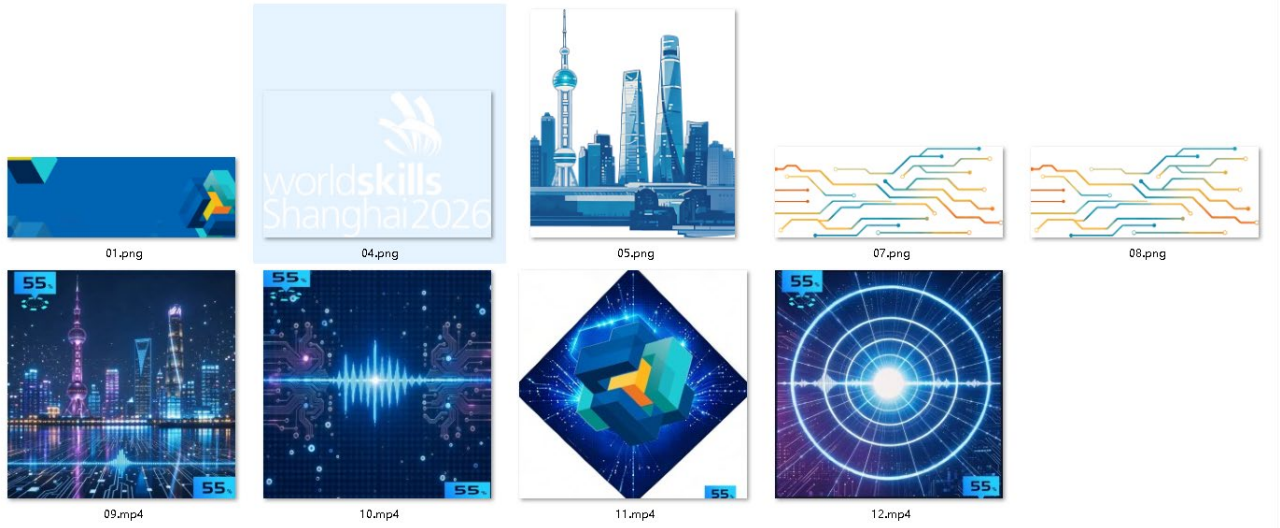


Figure 2.1-4 Programme assets

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Figure 2.1-5 Pre-installed static visual elements on the equipment (no Competitor action required)

Figure 2.1-5 shows the appearance of the printed static assets that have already been installed on the equipment. Competitors do not need to produce or configure this part. The programme content and parameters to be completed by Competitors are specified in **Table 2.1-2**.



Figure 2.1-6 Programme design visual reference

Figure 2.1-6 is provided only to illustrate the intended visual composition. Assessment of the programme effects is based on the programme parameters specified in **Table 2.1-2** and the final output on the physical LED display.

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Work instructions and programme requirements

Complete the programme editing and playback work in accordance with the following requirements:

1. Create a PlayerMaster programme and set the screen size to 512 pix × 192 pix.
2. Use the supplied background images and design assets as the basis for the programme effects.
3. The programme must include the following specified content: “WorldSkills Shanghai2026”, “Optoelectronic”, “Technology” and the Competitor’s workstation number.
4. Place the specified text and visual elements within the visible display area. Text must be clearly readable, correctly spelt and not cut off by the display boundaries or module shapes.
5. Create dynamic programme effects. The programme may include movement, transitions, layer overlays, appearance/disappearance or other appropriate effects, but the specified content must remain recognizable during playback. Where **Table 2.1-2** specifies entrance effects, entrance times and durations, these must be set as required in the table.
6. Send the programme to the media player using the asynchronous playback function.
7. In accordance with the client’s requirements, set the final display system brightness to 80% and the colour temperature to 6000 K. Both settings are verified in PlayerMaster.
8. After the programme has been sent to the media player, the LED display must play it in continuous loop playback mode without relying on real-time playback from the computer.
9. During playback, the display must show uniform colours and correct image output, without obvious colour errors, image distortion, missing programme areas, scaling errors or incorrect patterns.
10. Save the completed PlayerMaster project file using the specified storage location and filename.

Required PlayerMaster project file: C:\Users\Competitor\Desktop\XX.vsn

11. Using the supplied assets, create dynamic programme effects in accordance with the control areas shown in **Figure 2.1-3** and the programme production parameters given in **Table 2.1-2**, and set the programme to loop continuously.

CONTROL AREA	SIZE WIDTH/ HEIGHT	PROGRAMME CONTENT	PROGRAMME NAME: OPTOELECTRONIC TECHNOLOGY + WORKSTATION NUMBER	ENTRANCE (EFFECTS)	ENTRANCE TIME	DURATION PER PAGE
1	512×192	01<Picture>	B01	19:Split(Vertical In)	3S	6S
2	128×52	02<Text:Optoelectronic> Font: Microsoft Taile, font size: 10	B02	28:Move to Lower-Right Corner	2S	6S

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CONTROL AREA	SIZE WIDTH/ HEIGHT	PROGRAMME CONTENT	PROGRAMME NAME: OPTOELECTRONIC TECHNOLOGY + WORKSTATION NUMBER	ENTRANCE (EFFECTS)	ENTRANCE TIME	DURATION PER PAGE
3	128×52	03<Text：Technology> Font: Microsoft Taile, font size: 10	B03	27:Move to Lower-Left Corner	2S	6S
4	80×50	04<Picture>	B04	33：360°Clockwise	2S	5S
5	64×100	05<Picture>	B05	40:Zoom In(Top Left)	3S	6S
6	46×46	06<Text：Workstation number XX> Font: Microsoft Taile, font size: 15	B06	28:Move to Lower-Right Corner	2S	5S
7	128×46	07<Picture>	B07	24：Move Right	1S	1S
8	128×46	08<Picture>	B08	23：Move Left	1S	1S
9	64×64	09<Video>	B09	/	/	/
10	64×64	10<Video>	B10	/	/	/
11	128×128	11<Video>	B11	/	/	/
12	64×64	12<Video>	B12	/	/	/

Table 2.1-2 Programme effects production schedule

Video playback requirements (B09–B12): All four video elements must play for their original video durations and loop continuously while the programme page is playing. The "/" entries for video items in the table do not waive the video playback requirements specified in this paragraph.

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Required deliverables for Module 2.1

The client will inspect the completed display installation, control-system configuration, playback function and required saved files. The Competitor must ensure that the following deliverables are complete and available for verification.

DELIVERABLE	REQUIRED STATE FOR ASSESSMENT
LED display assembly	One physically assembled LED display that matches the supplied display layout and module orientation drawing.
LED display control system	One safely wired and properly organized LED display control system, including receiving cards, a media player, signal cables and power cables.
Configured display area	One correctly configured 512 pix × 192 pix display system that can operate as a continuous image display surface.
Receiving card configuration files	The two saved receiving card configuration files: C:\Users\Competitor\Desktop\XX_01.rcvbp C:\Users\Competitor\Desktop\XX_02.rcvbp
Dynamic display programme	One completed WorldSkills-themed dynamic display programme that can play in asynchronous loop mode through the media player.
PlayerMaster project file	The saved PlayerMaster programme file: C:\Users\Competitor\Desktop\XX.vsn
Final playback settings	The final display system brightness must be set to 80% and the colour temperature to 6000 K, with both settings verifiable in PlayerMaster.

Other

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General Safety and Quality Requirements

All work must be completed in accordance with electrical safety requirements and professional installation practices. Connecting or disconnecting while energized, unsafe wiring, exposed conductors, reversed polarity, short circuits, and any operation that could damage the LED modules, receiving cards, media player or other supplied equipment are not permitted.

In this module, Competitors carry out only the DC output-side wiring. Competitors must not modify the pre-connected AC input wiring of the three DC switching power supplies.

If a supplied component is suspected of having a pre-existing quality defect, the Competitor must raise their hand and inform an Expert. The component may be replaced only after verification and approval by an Expert.

If an LED module, receiving card, media player, cable, connector, power supply circuit or other electrical component is damaged through incorrect operation, incorrect wiring, unsafe handling or another Competitor error, the damaged item will not be replaced unless otherwise determined under the Competition Rules.

End condition for assessment

Before the end of this module, Competitors must ensure that the installed display, control system configuration, playback function and required saved files are ready for assessment.

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