

**Federal National Council
Broadcast Network Infrastructure Cabling System**

Abu Dhabi, United Arab Emirates

**PROJECT SPECIFICATIONS
PROJECT DESIGN: BILL OF MATERIAL
PROJECT DESIGN: RELATED DRAWINGS**

PROJECT SPECIFICATIONS

GENERAL

Related Documents

- A. Drawings and general provisions
- B. All the requirements are presented in the below-listed specification section shall be applied.
- C. The contractor/system integrator should provide technical support letter from the SMPTE connector manufacturer and undertaking letter for testing of SMPTE connectivity.

Summary

The requirements include the following:

- Broadcast Network Infrastructure Cabling
- Camera Boxes & OB Van Panel
- Connectors, Termination Accessories, Active Devices
- Standard Cleaning Tools Set

Reference Standards

- A. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:
 - SMTPE 311M: This standard specifies the characteristics of hybrid electrical, and fiber optic cables used in broadcast and video production applications. These cables are designed to carry both power and signals, combining electrical conductors with fiber optic elements to transmit data and video signals over long distances.
 - SMPTE 304M: This standard defines the connectors used for hybrid electrical and fiber optic cables. These connectors are designed to ensure reliable connections and to withstand the rigors of professional broadcast environments.
 - ISO/IEC: International Standards Organization/ International Electrotechnical Commission
 - Relevant Sports Federations Guidelines

- B. Local regulations and standards, where enforced and relevant, are to have precedence over the Standards.
- C. Specific reference in specifications to codes, rules, regulations, standards, manufacturer's instructions, or requirements of regulatory agencies shall mean the reference to the latest printed edition of each.
- D. Materials and equipment shall comply with applicable local regulations and code requirements of Authorities having jurisdiction. These shall have precedence over other codes and standards indicated, unless otherwise approved by the Employer, in writing.
- E. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

Scope of Work

The scope of work are as follows:

- A. Media Broadcast System material supply, engineering, and installation within designated spaces of the Project as shown on Drawings. Systems shall include all devices, equipment, installation, programming, and commissioning in accordance with requirements of the contract documents and drawings.
- B. Work includes providing all materials, equipment, accessories, services, and tests necessary to complete and make ready for operation of the TV Broadcasting Network in accordance with SMPTE Standard and the TV Broadcasting Authority Requirements, Drawings and Specifications.
- C. Work detailed within the Contract Documents has been specified to meet certain requirements for performance, appearance, and cost. It shall be the responsibility of the Contractor to implement the guidelines and requirements contained in the Contract Documents and translate them into a complete system containing all elements necessary for a complete, operational, and functional Broadcast System infrastructure.
- D. The works shall be to supply, install, configure, commission, and warranty the Media Broadcast Infrastructure System, including all wiring and equipment nominated in this specification and shown on the drawings in accordance with SMPTE Standards and the TV Broadcasting Authority Requirements.

E. The system shall include but not be limited to the following components as a minimum and final list should be cited in the Bill of Material section.

- Broadcast Camera Boxes (CB) at nominated camera locations
- Camera Boxes should be equipped with designed connectors and power outlet as specified.
- All cabling between CB's control rooms, and OB Van panels.
- Patch leads and patch cords at rack locations.
- Equipment Racks, patch panels
- Needed converters, embedders for long distance connection as specified.
- Recommended cleaning tools for Hybrid fiber optic and single mode fiber optic connectors.
- Termination and testing of all connectivity should be done by system manufacturer.

Products and Work by Others

- A. Coordinate layout and installation of media broadcast cabling with facility's telecommunications and service contractors.
- B. Coordinate with service contractors to secure the power source for each power socket outlets inside the Camera Boxes.
- C. Coordinate with service contractors for cable pulling, fit out and containment installation including decorative works.

Submittals

A. Material Submittal

The material submittal should be provided and approved prior to supply.

B. Cable Pulling Plan

- The Contractor shall submit a detailed cable pulling plan, which includes:
 1. A schematic layout of the installed conduit, indicating junction boxes and distances between them.
 2. Contents of each conduit.
 3. Cable pulling calculations, conduit fill ratios, and actual cable runs and tensions.
 4. Detailed construction sequence and schedule for communications rooms

Cabling installation shall not commence until the pulling plan and calculations have been approved by the Engineer.

C. Termination and Splice Plan

The Contractor shall submit shop drawings indicating:

- The method of installation for termination and splice points
- Mounting methods and equipment list

D. Testing Plan

The Contractor shall provide a detailed testing plan, including certificates of specialized Testing Engineers/Supervisors approved or by the system manufacturer.

E. Testing Reports

- The Contractor shall submit cable test reports provided by the system manufacturer for SMPTE end-to-end connectivity.
- The same SMPTE end-to-end test procedures shall be applied for Fiber Optic connectivity.
- 100% connectivity testing shall be performed for all links.
- The Contractor shall provide test tools, procedures, and documentation in accordance with system standards and manufacturer recommendations. This includes all necessary tests/tools required to facilitate system acceptance and ensure manufacturer warranty, under the responsibility of the system manufacturer.

F. Cable Assemblies

The contractor shall supply factory-assembled cable assemblies, patch leads, patch cords and camera cables for SMPTE and fiber optic with manufacturer cable assembly certificate with separate Warranty from the manufacturer for two (2) years.

Quality Assurance

- A. Project material will be supplied according to a specific vendor list provided as part of this specifications.
- B. The system installer shall be in operation for the least five (5) years and should be involved as systems integrator in successful development and implementation of minimum three (3) installations that are actively using the same or similar products and systems.

- C. All members of the installation team shall be qualified as having completed the necessary training to complete their part of the installation. Resumes of the entire team shall be provided along with documentation of completed training courses. The termination should be done under supervision of the system manufacturer.

- D. Testing of the main elements of TV Broadcasting Network (SMPTE & Fiber Optic) should be done by the Manufacturer and Test Reports should be Approved from the Manufacturer.

Equipment Warranty

- A. Warranty for equipment furnished under these specifications against defective parts and workmanship under terms of the manufacturers and dealer's standard warranties for a period of not less than five (5) years from date of initial start-up and Engineer acceptance of the system and include labour and travel time for necessary repairs at the job site.

- B. Two (2) years warranty certificate for the SMPTE Connectors should be provided from the connector manufacturer including cable assemblies and camera cables

PRODUCTS

General Requirement

- A. Drawings / Specifications provide general guidelines for the TV Broadcasting Network minimum requirements, Contractor should be qualified installer to provided complete TV Broadcasting Network as per SMPTE Standard and Authority Requirements.

- B. High Quality Connectors shall be provided at both Cable ends ensuring full compliance with the specified cable specifications and according to the provided vendor list

- C. The Contractor shall check the distance limitation for each cable type and consider the minimum requirements specified below and to provide the proper cable type / size as per cable length, function, and site conditions. In case the cable run exceeded the maximum allowable run, the connectivity should be converted to a fiber optic line to meet long distance requirements.

- D. All the used Cables shall have LSZH outer Jacket.

Broadcast Camera Box

- A. Supply, install, test and commission the Broadcast Camera Box as described herein and shown on the drawings. Each CB shall be fitted out with the number and type of connectors as shown on the schedule within the drawings. The CBs shall be sized to suit the number and configuration of connectors and as per IP degree as per the design provided. Coordinate with the MEP service contractor for the provision of electrical power outlets.
- B. Broadcasting Camera Box shall be with hinged door for protection of the connectors when not in use, exact finishes and colors shall be as approved by the Interior Designer (ID).
- C. CBs shall be manufactured by a specialist Broadcast Panel and enclosure manufacturer.
- D. The CBs shall be of welded 1.5mm thick steel construction, power coated and IP55 rated for indoor use and IP65 rated for outdoor locations. Each CB shall have a lockable front door.
- E. Broadcasting Camera Box shall be furnished and prepared by a specialist Broadcast Panel and enclosure manufacturer to prepare the proper connectors plates and patches according to SMPTE standard.
- F. Main TV Broadcasting connector SMPTE 311M LEMO 3K.93C Connectors Pigtails (Male), Assembly of the cables with connectors should be done in the factory with Assembly Certificate.
- G. Provide full shop drawings of all BWBs prior to manufacture. Shop drawings shall indicate all connector types.

Patch Panels

- A. Rack Mounted, High Quality Patch Panels shall be provided at the Communication Room and OB Van Room Racks for Termination of Broadcasting cables.
- B. All broadcast cabling patch panels shall:
 - Be 1U/2U suitable for 19" rack mounted.
 - Rigid metal construction
 - Be complete with lacing bar for each row of connectors.
 - Fitted with Push-Pull, gold-plated contacts connectors.
 - Endurance > 20,000 Cycle for SMPTE Connectors.
 - Be permanently machine labelled. Handwritten labels not acceptable

- Each 2U patch panel shall be populated with a single type of connector per row. Shall not be mixed.

C. LEMO Hybrid Fiber Patch Panels

- Shall be populated with maximum 8 of LEMO 3K.93C type stainless steel hybrid Fiber optic connectors and complete with cable management, splice cassette and pigtails with blanking cap fixed to socket/plug with lanyard.
- Shall be SMPTE 311M compliant.
- Splice cassettes shall be provided for fiber connections to facilitate future replacement of damaged units.
- Patch panels should be supplied as ready-made splice trays manufactured, assembled, and tested by the connector manufacturer with manufacturing/assembly certificate.
- Splice trays have 3 years warranty from the manufacturer.

D. Fiber Optic Patch Panels

- Shall be Splice Tray populated with duplex single mode fiber optic connector and complete with cable management, splice cassette and pigtails with connector cover.
- Splice cassettes shall be provided for fiber connections to facilitate future replacement of damaged units.
- Patch panels should be supplied as ready-made splice trays manufactured, assembled, and tested by the connector manufacturer with manufacturing/assembly certificate.
- Splice trays have 3 years warranty from the manufacturer.

Connectors

A. SMPTE Hybrid Fiber Optic Connectors

- Shall be LEMO 3K.93C panel mount stainless steel type.
- SMPTE 311M compliant
- Push-pull latching system.
- Connectors should be LEMO 3K.93C Series factory-assembled with assembly certificate.

B. Fiber Connectors

- Shall be single mode duplex.
- Panel mount type.
- Connectors and accessories should be OPTOKON, SENKO or approved equal.

Cables

A. SMPTE Hybrid Fiber Optic Cables

- The cable shall consist of 2 single mode optical fiber cores (for audio and video signals), 2x24 AWG tinned copper conductor (for control) and 4x20 AWG Tinned copper conductors (for power), and overall Braid shield.
- Shall be compliant with SMPTE 311M.
- The Cables shall be provided with LSZH outer jacket.
- Shall be connected to LEMO 3K.93C series (Male/Female) connectors on both sides panel mount with cap.
- Cable should be LEMO, Northwire, Furukawa or approved equal.

B. Optical Fiber Cables

- Shall be single mode 9/125micron tight buffer.
- Shall be connected to duplex LC connectors – panel mount with cap.
- Cable should be Optokon, Belden, CommScope or approved equal.

Converters

In case the connectivity exceeded the maximum allowable cable run, the connectivity should be converted to a fiber optic line to meet long distance requirements.

Maximum cable run should be determined and confirmed before selecting the cables.

Media converter selection should be approved for each type of signal.

Converters should be OPTOKON, Yellobrik or approved equal.

Rack Cabinet

- The Rack Cabinet shall be 19", Free Standing, (42U, Rack Cabinet 800x800 mm) or any suitable dimensions approved by consultant to complete with all required mounting hardware, label kits, silent type ventilation fans, Velcro style fasteners and all needed ancillary devices.
- The Rack Cabinet can be Indoor or Outdoor based on the project situation.

- C. For Outdoor Rack Cabinet it should be IP65, Preferable to be GRP Material, Manufactured by Certified Panel Manufacturers with IP Test Certificate.
- D. The Rack Cabinet shall be furnished and prepared by a specialist Broadcast Panel and enclosure manufacturer to prepare the proper connectors plates and patches according to SMPTE standard.
- E. Rack shall be complete with lockable perforated metal front door, rear perforated metal door and removable side panels, the rack shall be able to support cable entrance from both top and base.
- F. Provide adequate cable management facilities within the racks to support the cables and ensure that cables are properly secured to prevent stress.
- G. Doors include keyed swing handles
- H. Side panels include keyed pushbutton latches for indoor rack cabinets.
- I. Adjustable equipment mounting rails with painted rack space identification
- J. Durable black polyester epoxy powder coat finish for indoor rack cabinets and for outdoor, according to IP65 specification.

Cleaning and Maintenance

- A. To ensure optimal performance and functionality of fiber optic contacts, it is essential that the ferrule end faces are free from any debris and thoroughly cleaned. Regular on-site inspection of the contacts using a video inspector is necessary.

If there is an unexpected increase in insertion loss during general usage, indicating improper maintenance of SMPTE connectors and causing system malfunctions, it is recommended to clean all fiber optic contact end faces.

To maintain the SMPTE connectors effectively and ensure their longevity, it is important to provide them with a comprehensive cleaning and maintenance kit. Additionally, routine maintenance should be carried out by professionals.

This necessary step is crucial for safeguarding the connectors and ensuring the prolonged durability of SMPTE stainless steel robust connectors.

- B. Contractor shall provide minimum the below cleaning and maintenance tools.

- LEMO - DCS.F2.N02.PA Fiber Optic one-click cleaner (Quantity: 10 pcs) The Cleaner uses a mechanical push action to advance an optical grade cleaning tape; the tool is suitable for 500+ cleaning process.
- LEMO DCS.F2.035.PN Alignment device tool (Quantity: 2 pcs) Simple tool with two threaded ends for installation/extraction of the F2 contact alignment device. For use with WST.KI.125.34 kit.
- LEMO WST.FB.C11.10US2 Video inspection viewer (Quantity: 1 pc) LCD display, ferrule tips for LEMO contacts & software & United States - AC power supply all in a rugged case.
- OPTOKON. WST.TE. HDTV Cable Checker Set for LEMO 3K.93C (Quantity: 1 pc): Consists of SMPTE cable measuring unit and SMPTE loopback. The hybrid cable checker is designed for testing attenuation in optical fiber and the continuity of copper wires in hybrid cables. It combines an optical light source, an optical detector, and a copper wires checker.

EXECUTION

Inspection

The Contractor will provide timely written requirements for the areas and conditions under which the network is to be installed. The Contractor will notify in writing if the conditions are found to be detrimental to proper completion of the work, prior to installation

Installation

- Verify that critical dimensions are correct, and conditions are acceptable. Proceed with installation only after unsatisfactory conditions have been coordinated.
- Ensure the power and communications service locations are coordinated prior to installation of equipment.
- Cover and protect systems equipment from damage and soiling during installation, demolition, removal and/or alteration work, including equipment to be salvaged and stored.
- Ensure that all equipment, components, and materials, are free from defects.
- Install all equipment according to manufacturer's written instructions, placement drawings and to the acceptance of consultant.
- Execute all work in accordance with all local codes, ordinances, and regulations.

Testing and Commissioning Strategy

- 100% Testing shall be provided for all end-to-end connectivity by System Manufacturer with signed and stamped Certificate.

- B. Contractor shall use test tools, procedures, and documents according to the SMPTE/LEMO standards & manufacturer recommendations. This is to include all needed tests / tools required to facilitate system acceptance / Manufacturer warranty.

- C. Test report should be provided with 3 years warranty against manufacturing defect with written certificate from SMPTE connector manufacturer.

PROJECT REQUIREMENTS: BILL OF MATERIAL

S.N	Panel Name/ Location	Description	Qty	Total Qty
CB-01	Entrance	Customized Outdoor Camera Box including inside preparations and face plates for the below contents.	1	1
		LEMO - Pre Terminated FXW - 0.5 Meter -SC	4	
		LEMO Splice Box 4 WAY SC	1	
		Fiber Optic Duplex LC	4	
		1.5meter Pigtail for LC single mode Fiber Optic	8	
		Fiber Optic Splice Cassette and Lid	8	
		Splice Sleeve for FO Pigtails	8	
		Power Socket 13Amp	2	
CB-02 CB-04	Entrance	Customized Outdoor Camera Box including inside preparations and face plates for the below contents.	1	2
		LEMO - Pre Terminated FXW - 0.5 Meter -SC	3	
		LEMO Splice Box 4 WAY SC	1	
		Fiber Optic Duplex LC	2	
		1.5meter Pigtail for LC single mode Fiber Optic	4	
		Fiber Optic Splice Cassette and Lid		
		Splice Sleeve for FO Pigtails	4	
		Power Socket 13Amp.	1	
CB-03 CB-05	Entrance Reception	Customized Outdoor Camera Box including inside preparations and face plates for the below contents.	1	2
		LEMO - Pre Terminated FXW - 0.5 Meter -SC	2	
		LEMO Splice Box 2 WAY SC	1	
		Fiber Optic Duplex LC	1	
		Fiber Optic Splice Cassette and Lid	1	
		1.5meter Pigtail for LC single mode Fiber Optic	2	
		Splice Sleeve for FO Pigtails	2	
		Power Socket 13Amp.	1	
AB-06	GF Entrance/Dome	Customized Indoor Camera Box including inside preparations and face plates for the below contents.	1	1
		LEMO - Pre Terminated FXW - 0.5 Meter -SC	2	
		LEMO Splice Box 2 WAY SC	1	
		Fiber Optic Duplex LC	1	
		1.5meter Pigtail for LC single mode Fiber Optic	2	
		Fiber Optic Splice Cassette and Lid	1	
		Splice Sleeve for FO Pigtails	2	
		3.0-3.7 Ghz Omni directional Dome Antenna	2	
		Fibre TX Head Unit	1	
		Down Converter DCBGS-310360 2750MHz, Low side LO	2	
		Power Socket 13Amp.	2	

AB-07	GF Reception	Customized Indoor Camera Box including inside preparations and face plates for the below contents.	1	1
		LEMO - Pre Terminated FXW - 0.5 Meter -SC	2	
		LEMO Splice Box 2 WAY SC	1	
		Fiber Optic Duplex LC	2	
		1.5meter Pigtail for LC single mode Fiber Optic	4	
		Fiber Optic Splice Cassette and Lid	1	
		Splice Sleeve for FO Pigtails	2	
		3.0-3.7 Ghz Omni directional Dome Antenna	2	
		Down Converter DCBGS-310360 2750MHz, Low side LO	2	
		Fibre TX Head Unit	1	
		Bolero Antenna	1	
		ODU (camera control outdoor unit)	1	
		RJ45-LC F.O converter	1	
		Power Socket 13Amp.	2	
AB-08 AB-09	Meeting Room/1st Floor Lounge / 1st floor	Customized Indoor Camera Box including inside preparations and face plates for the below contents.	1	2
		LEMO - Pre Terminated FXW - 0.5 Meter -SC	2	
		LEMO Splice Box 2 WAY SC	1	
		Fiber Optic Duplex LC	1	
		1.5meter Pigtail for LC single mode Fiber Optic	2	
		Fiber Optic Splice Cassette and Lid	1	
		Splice Sleeve for FO Pigtails	2	
		3.0-3.7 Ghz Omni directional Dome Antenna	2	
		Down Converter DCBGS-310360 2750MHz, Low side LO	2	
		Fibre TX Head Unit	1	
		Power Socket 13Amp.	2	
		AB-10	Presidents Reception	
LEMO - Pre Terminated FXW - 0.5 Meter -SC	2			
LEMO Splice Box 2 WAY SC	1			
Fiber Optic Duplex LC	2			
1.5meter Pigtail for LC single mode Fiber Optic	4			
Splice Sleeve for FO Pigtails	4			
Fiber Optic Splice Cassette and Lid	1			
3.0-3.7 Ghz Omni directional Dome Antenna	2			
Down Converter DCBGS-310360 2750MHz, Low side LO	2			
Fibre TX Head Unit	1			
Bolero Antenna	1			
ODU (camera control outdoor unit)	1			
RJ45-LC F.O converter	1			
Power Socket 13Amp.	2			
CB-11	Presidents Reception	Customized Indoor Camera Box including inside preparations and face plates for the below contents.	1	1
		LEMO - Pre Terminated FXW - 0.5 Meter -SC	2	
		LEMO Splice Box 2 WAY SC	1	

		Fiber Optic Duplex LC	1	
		Fiber Optic Splice Cassette and Lid	1	
		1.5meter Pigtail for LC single mode Fiber Optic	2	
		Splice Sleeve for FO Pigtails	2	
CB-12	Zayed Hall	Customized Indoor Camera Box including inside preparations and face plates for the below contents.	1	6
CB-13		LEMO - Pre Terminated FXW - 0.5 Meter -SC	2	
CB-14		LEMO Splice Box 2 WAY SC	1	
CB-15		Fiber Optic Duplex LC	1	
CB-16		Fiber Optic Splice Cassette and Lid	1	
CB-17		1.5meter Pigtail for LC single mode Fiber Optic	2	
		Splice Sleeve for FO Pigtails	2	
		Power Socket 13Amp	1	
CB-18	Gallery	Customized Indoor Camera Box including inside preparations and face plates for the below contents.	1	1
		Fiber Optic Duplex LC	6	
		Fiber Optic Splice Cassette and Lid	1	
		1.5meter Pigtail for LC single mode Fiber Optic	12	
		Splice Sleeve for FO Pigtails	12	
	Control Room	1.5U, 19" 12 hole Fiber Optic Splice Tray	1	1
		Fiber Optic Duplex LC	6	
		Fiber Optic Splice Cassette and Lid	2	
		1.5meter Pigtail for LC single mode Fiber Optic	12	
		Splice Sleeve for FO Pigtails	12	
	OB-Van Panel	Outdoor OB Van Enclosure including inside preparations and face plates for the below contents.	1	1
		LEMO Splice Tray Rack-Mounted with 8*LEMO EDW Connector	5	
		1.5U, 19" 12 hole Fiber Optic Splice Tray	3	
		Fiber Optic Duplex LC	36	
		Fibre RX Base Unit	5	
		IDU with 19 inch extender	2	
		LC F.O-RJ45 converter	2	
		Portable Mobile Rack 12U with shelving	1	
	Patch Cords	BNC to BNC Patch Cord for Dome Antenna 10m	10	
		LC to LC Fiber Optic Patch Cord 2m	30	
		RJ45 to RJ45 2m	6	
	Cables	SMPTE Hybrid Fiber Optic Cable LSZH	12000	
		12 Core Fiber Optic Cable, SM	6000	

PROJECT REQUIREMENTS: RELATED DRAWINGS



