

Page 1 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			



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**RDSO SPECIFICATION
FOR
TRUE COLOUR VIDEO-CUM-TRAIN INFORMATION
DISPLAY SYSTEM**

SPECIFICATION No.: RDSO/SPN/TC/67/2013

Revision 3.0

Number of Pages: **49**

**TELECOM DIRECTORATE
RESEARCH DESIGNS & STANDARDS ORGANISATION
LUCKNOW - 226011**

Page 2 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

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Abstract	
<p>This document specifies the technical specification for “True Colour Video-cum-Train Information Display System” consisting of networked Indoor & Outdoor Video Display Boards, Train Information Displays, Coach Guidance Displays and PC Based Announcement System. In addition to displaying train related information like arrival/departure timings, this system is also used for showing commercial advertisements and video information.</p>	

Page 3 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

DOCUMENT CONTROL SHEET

Name	Organization	Function	Level
Director/ Telecom-II	RDSO	Member	Prepare
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TABLE OF CONTENTS

S. No.	Name of the Content	Page No.
I	Summary	5
II	Source	5
III	Foreword	5
1.0	Scope	6
2.0	System Description	6
3.0	System Specifications	7
3.1	Hardware Requirements	7
3.2	Central Data Controller	7
3.3	Platform Data Controller	10
3.4	Platform Display Board	10
3.5	Coach Guidance Display Board	16
3.6	Video Display Controller	18
3.7	General Requirements of Video Display Board	19
3.8	Outdoor Video Display Board	20
3.9	Indoor Video Display Board	21
4.0	Specification of LED	22
5.0	Software Requirements	27
6.0	Data Communication Protocol	34
7.0	Power Supply	34
8.0	Test Requirements	36
9.0	Test Procedure	39
10.0	Quality Assurance	43
11.0	Marking & Packing	43
12.0	Information to be supplied by Manufacturer	44
13.0	Information to be supplied by Purchaser	45
14.0	Diagrams	45
14.1	Diagram 1 (Sheet 1 of 2)	46
14.2	Diagram 1 (Sheet 2 of 2)	47
14.3	Diagram 2	48
14.4	Diagram 3	49

I. SUMMARY:

This document covers the technical requirements of True Colour Video -cum-Train Information Display System suitable for displaying Train Arrival/Departure Indication, Coach Guidance, and PC Based Announcement System and for showing True Colour Commercial Advertisements & Video Displays.

II. SOURCE:

Revision '3.0' to the specification No. RDSO/SPN/TC/67/2013 has been prepared as per the Railway Board's guidelines issued vide letter no. 2011/Tele/9(1)/1/Pt.1, dated 26.10.2012.

III. FORWARD:

1.0 RDSO specification No. RDSO/SPN/TC/67/2006, Revision 0.0 was initially prepared based on the requirement of railways and discussion with the manufacturers of such display systems. Subsequently, this specification was revised as specification No. RDSO/SPN/TC/67/2008, Revision 1.0 based on the recommendation of 34th TCSC meeting as approved by Railway vide letter No. 2004/Tele/TCM/1 dated 01/06/2007.

2.0 This specification requires the reference to the latest version of the following specifications:

RDSO/SPN/144	The Safety and reliability requirement of electronic signaling equipment
IS:9000	Basic environmental testing procedures for electronic and electrical items

3.0 Wherever, reference to any specifications appears in this document, it shall be taken as a reference to the latest version of that specification unless the year of issue of the specification is specifically stated.

Page 6 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

**RESEARCH DESIGNS & STANDARDS ORGANISATION
MINISTRY OF RAILWAYS
MANAK NAGAR, LUCKNOW**

**RDSO SPECIFICATION FOR
TRUE COLOUR VIDEO -CUM- TRAIN INFORMATION DISPLAY SYSTEM**

RDSO SPECIFICATION NO.: RDSO/SPN/TC/67/2013, Revision 3.0

1.0 SCOPE:

This document covers the technical specifications of “True Colour Video -cum-Train Information Display System” used for giving train arrival/departure information and any other video information to passengers. It specifies the requirements for PC based announcement system and true colour display boards; namely platform display boards, coach guidance display boards, indoor video display boards and outdoor video display boards; placed at various places of a station with the feature of networking and operation from a central place.

2.0 SYSTEM DESCRIPTION:

- 2.1 The True Colour Video -cum- Train Information Display System shall consist of Central Data Controller with standby, Platform Data Controller, True-Colour Display Boards of different sizes (for Indoor Video Display & Outdoor Video Display), Single Colour Display Boards of different sizes (for Platform Display & Coach Guidance Display) and input signals to CCTV and Audio Announcement System as shown in Diagram 1 (Sheet 1 and 2). Central Data Controllers and all other devices are to be pre-loaded with the required software for user interface for display and announcement. The Coach Guidance display boards & Indoor video display boards shall be of SMD Type LED. Platform display boards shall be of SMD/ Leaded Type LED. Outdoor display boards shall be of Leaded Type LED based daytime visible and with suitable structure to mount the display boards.
- 2.2 The display system shall display train number, name of train, expected time, arrival/departure and platform number for multiple trains at a time on Indoor or Outdoor Video Display Boards. The Platform Display system shall display the information of one train at a time scheduled for that platform. It should also be possible to give at-a-glance display on a Platform Display for coach guidance to passengers, indicating the coach composition of the train scheduled for that platform.
- 2.3 The true colour Indoor and Outdoor Video Displays shall display train information, commercials, entertainment programs and other information for passengers. The system shall allow programming the video information to display from a remote place through LAN (Local Area Network)/WAN (Wide Area Network).
- 2.4 The system shall provide an interface suitable to integrate with the existing CCTV network of the railway station to display the train information on existing CCTV similar to that displayed on display boards. The system shall also provide an interface suitable to integrate with an audio announcement system of the railway station to announce the train information and any other types of announcements.

Page 7 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

3.0 SYSTEM SPECIFICATIONS:

3.1 Hardware Requirements:

The system consists of following units/subsystems:-

- a) Central Data Controller (CDC)
- b) Platform Data Controller (PDC)
- c) Platform Display Board (PFD)
- d) Coach Guidance Display Board (CGD)
- e) Video Display Controller (VDC)
- f) Indoor Video Display Board (IVD)
- g) Outdoor Video Display Board (OVD)

3.2 Central Data Controller (CDC):

3.2.1 The Central Data Controller (CDC) shall comprise of two Workstations (PCs), One 17" (minimum) Colour LCD/TFT monitor, one Central Data Switch (CDS), one passive Keyboard-Video-Mouse (KVM) switch, Audio & Video selection device and one speaker and microphone.

3.2.2 The Workstations of CDC shall be of preferably **DELL or IBM or HP or FUJITSU or SUN** make or as specified by purchaser having following minimum configuration:

- a) i5 processor or equivalent or higher processor
- b) 8 GB RAM
- c) 250GB SATA HDD
- d) DVD R/W Drive
- e) Standard I/O Ports (1 Serial, 1 VGA and 4 USB)
- f) Windows 7 or higher version Operating System (OS)
- g) 10/100/1000 Mbps Ethernet Interface
- h) Audio Out and Audio In ports
- i) Keyboard & Optical Mouse
- j) SQL server 2000 or higher or any other industry standard data base package for back end data base
- k) 2GB Graphic Card with suitable Video Output interface for CCTV network

3.2.3 The workstations shall be pre-loaded with all the software and services required. There shall be continuous data synchronization between these two workstations through a LAN link. User should be able to avail the service from either of the systems and data is to be synchronized for every transaction in both the workstations.

3.2.4 The active workstation shall generate video output for the display of multiline train information on monitors of CCTV network.

Page 8 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

- 3.2.5 Only one set of input and output devices (Keyboard, Monitor and Mouse), shall be used for both the active & passive workstations of CDC. The other set of input and output devices shall be kept as spare. Suitable “KVM switch” shall be used to connect these devices to the active workstation. It shall have a provision to select connections to the passive workstation.
- 3.2.6 The Keyboard, Mouse and Monitor shall be placed inside the cabinet at appropriate height for easy and comfortable operation. Keyboard and Mouse shall be provided with sliding tray arrangement.
- 3.2.7 The CDC shall be provided with suitable voice recording and voice playback facility for making PC based audio announcement. There shall be provision for one speaker of minimum 5W of reputed make like **i-ball or Intex or Zebronics or Creative or JBL** with volume control to monitor the announcement.
- 3.2.8 The selection of “audio output for PC based announcement” and “video output for CCTV display” from the main and standby workstations shall be automatic/manual with the help of a suitable 19” rack mountable Audio & Video selection device. This device shall provide properly isolated audio output which can be interfaced with the public address system (audio amplifier) of the railway station. It shall also provide video signal for CCTV display network of the railway station.
- 3.2.9 UPS shall be preferred to be provided for uninterrupted operation during interruption of AC source. UPS of suitable capacity shall be provided by the purchaser.
- 3.2.10 Standard cabinet of minimum 19” internal width shall be provided to house the equipment as specified in 3.2.1 with associated accessories. The typical arrangement of the CDC rack is shown in Diagram 2.
- 3.2.11 Cabinet should be of standard design and made of CRCA (Cold Rolled Closed Annealed) sheet of minimum 18 SWG thickness with modular and ergonomic design for good maintainability. The cabinet should be rust free and powder coated in ivory/gray colour. Shelves of suitable height shall be provided to accommodate the equipment. Proper power supply distribution with plugs & sockets of appropriate capacity and earthing connection point shall be provided on the cabinet. Gland plates shall be provided on the top and bottom panel of cabinet for cable entry.
- 3.2.12 The cabinet shall have the front and back doors locking facility for equipment safety. Front side of the cabinet shall have two or three doors, such that only keyboard & mouse and/or monitor are only accessible to operator where as the other equipments are kept in locked condition. The top door which covers the monitor shall have toughened glass for visibility even when the door is closed.
- 3.2.13 Pressing the ON/OFF button on CDC cabinet of the central data controllers (main/standby) should switch on the system with auto running of software. Again pressing the button should switch off the central data controller. Central Data Controller is to be switched off only after closing the programs and with proper shut down operation.

Page 9 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

- 3.2.14 It shall be possible to upload the database, like train information, text messages, images, etc., from the CDC to display board(s) through display controller on the same communication link used for train arrival/departure display boards.
- 3.2.15 The time required to transfer a block of 1M Bytes database to Platform Data Controllers and Video Display Controllers from the CDC shall not exceed FIVE seconds.
- 3.2.16 The response time of the Platform & Coach Guidance Display Boards to the CDC commands, like train arrival/departure display on PFD, coach numbers display on CGD, text message display, image display, display on/off etc., shall not exceed FIVE seconds. Similarly, the response time of the Display Controller of Video Display Board to the CDC commands, like multiline train arrival/departure display, video display, image display, etc. shall not exceed FIVE seconds.
- 3.2.17 Central Data Switch:**
- 3.2.17.1 The Central Data Switch (CDS) shall provide Ethernet based IP data communication between workstations of CDC and multiple video display boards & Platform Data Controllers of the station.
- 3.2.17.2 12-port or 24-port Layer 3 switch (as per site requirement) shall be used as CDS. Switch shall be either **CISCO or HP or Juniper or Brocade or IBM or Alcatel-Lucent or Avaya (Nortel) or Extreme or Enterasys** make or as specified by the purchaser.
- 3.2.17.3 Data communication between Central Data Switch to Platform Data Controller and Display controller of display board shall be on Optic Fibre or CAT 5e or better cable if the distance is permissible for Ethernet communication. CAT 5e cable should be compliant with TIA/EIA-568 C.2 standards or latest.
- 3.2.17.4 Switch should have 10/100/1000 Base X SFP ports (fibre ports) depending upon number of field devices to be connected on optic fibre cable and additional two SFP ports as spare. Remaining ports shall be Ethernet ports.
- 3.2.17.5 Required numbers of Small Form-factor Pluggable (SFP) modules, compact optical transceivers used in single mode optical communications, shall be supplied along with each switch. The range of the operation of SFP module shall be minimum 10km.
- 3.2.17.6 Necessary diagnostic tools shall be provided in CDC with the help of which operator shall be able to avail the information regarding the faulty ports of CDS.
- 3.2.17.7 Layer 2 switches shall be used as repeater incase the length of the copper cable between the CDS and field devices is more than the permissible limit. Switch shall be either **CISCO or HP or Juniper or Brocade or IBM or Alcatel-Lucent or Avaya (Nortel) or Extreme or Enterasys** make or as specified by the purchaser.
- 3.2.17.8 Suitable hardware & software shall be provided in the system for taking data & required information from train information system like Train Time Charting Server, Train Management System (TMS) and National Train Enquiry System (NTES) etc. for displaying train information on various types of display boards and for making announcement, if specified by purchaser. For developing suitable

Page 10 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

hardware & software, interface protocol of train information system shall be arranged by the purchaser.

3.3 Platform Data Controller (PDC):

- 3.3.1 The Platform Data Controllers shall drive Platform display boards and Coach guidance display boards.
- 3.3.2 The Platform Data Controller design shall be based on minimum 32-bit microcontroller or higher processor.
- 3.3.3 One Platform Data Controller shall be preferably installed on each or shared platform preferably at the halfway length of the platform to drive the respective downstream display devices such as Platform and Coach Guidance display boards.
- 3.3.4 The PDC shall route the data/ instructions coming from the Central Data Controller to the downstream display devices; and health/ diagnostics information from the display devices to CDC.
- 3.3.5 The PDC unit shall be installed in wall mountable standard 19" Euro Rack of suitable height to accommodate Platform Display Controller, fibre termination box etc.
- 3.3.6 The PDC shall be protected against environmental hazards such as dust and water conforming to IP54 standards.
- 3.3.7 The PDC should have at least two Ethernet interfaces for interfacing to the CDC and minimum four serial interface for driving Platform Display boards and Coach Guidance Display boards of the platform(s). Out of two Ethernet interfaces, one shall be with single mode optical interface and the other one with copper interface. The unit should have LED indications for monitoring the communication status of the connected ports.
- 3.3.8 The serial port connection to the display devices shall be daisy chained and in case of failure (like power down) of device, the extension of communication link shall not be affected. Also in case of removal of any Platform Display Board or Coach Guidance Display Board for repair, provision shall be there to bypass/extend the communication link.
- 3.3.9 The PDC shall communicate with the CDC and display devices on a properly isolated interface.

3.4 Platform Display Boards (PFD):

- 3.4.1 The Platform Display board (PFD) shall display the arrival/departure information of a train scheduled for that platform. If the platform display board is common between two platforms, it shall be able to display the train information of trains scheduled on both the platforms alternatively.
- 3.4.2 The platform display board shall also give at-a-glance information with coach composition details of the train arriving/departing on a platform. For the PFDs to be installed on the foot over bridges, it shall be possible to indicate/ display the location of the PFD (with respect to its platform) to guide the passengers to proper direction for their location of coaches.

Page 11 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

- 3.4.3 The platform display board shall display only one train information at a time scheduled to arrive on / depart from a platform. If the multi train information is to be displayed, it shall be done on time sharing basis.
- 3.4.4 The titles, like, train number, name, expected time, arrival/departure, platform number etc. shall be screen printed (or stickered) on the casings. The character size of these titles shall be of minimum 6 cm height. Colour of these characters should be preferably in white/ yellow.
- 3.4.5 There shall be provision to display the status of train like late, rescheduled, cancelled, indefinite late, diverted etc.
- 3.4.6 The information on display boards shall be displayed in turn in English, Hindi and if so required by the purchaser in a regional language.
- 3.4.7 The display boards shall be protected against environmental hazards such as dust and water, conforming to IP54 standards.
- 3.4.8 The display boards shall have inbuilt minimum 2 MB Flash type of nonvolatile memory required for the storage of database required to display text and graphics information on these boards.
- 3.4.9 Display on all types of the boards shall be flicker free.
- 3.4.10 The display board shall function satisfactorily in RE traction area.
- 3.4.11 Each display shall last for a specific period of up to 60 seconds and shall be adjustable in steps of one second from the Central Data Controller.
- 3.4.12 SMD or Leaded type LEDs with equal fringe and uniform intensity are to be used to ensure that the information to be displayed is with excellent contrast so that no black patches are visible on the display screen.
- 3.4.13 Display boards shall be constructed using PCB modules of suitable LED matrixes. The mechanical mounting of these modules shall be such that easy replacement of PCB module is possible in case of repair. Such replacement shall not call for removing any other PCBs.
- 3.4.14 The construction of different type of display boards should be modular, such that any module (i.e. PCB, connector, cable, power supply unit etc.) can be easily removed when defective and a fresh module is fixed to make the system functional again. Wiring between different modules should be done with the help of male/female type of connectors. There should not be any requirement of rewiring, re-soldering/ de-soldering or opening and reconnections of wiring etc. during the maintenance, unless there is damage to the wiring. Proper cable guides are to be provided inside the display board for drawing cables and wires neatly.
- 3.4.15 All the power supply modules are to be mounted at appropriate locations inside the display board with enclosure for easy maintenance and accessibility. Display controller/driver modules of display board should also be easily accessible.
- 3.4.16 Intensity of display board shall be adjustable in manual mode and automatic timer mode. The selection of mode shall be user configurable. It shall be possible to adjust intensity of selected display boards through software from CDC in steps of maximum 10% in the range from 10% to 100%.

Page 12 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

- 3.4.17 Suitable 'Earthing' point shall be provided for earthing the body of display board. In this regard brass bolt of 6 mm dia. shall be provided at appropriate place for earth connection.
- 3.4.18 The relevant ICs for the display board should be preferably of surface mounted device (SMD) to ensure high reliability.
- 3.4.19 The display board shall communicate with the Platform Data Controller on a properly isolated interface in a wired network.
- 3.4.20 The display boards should not display any garbage until the required information is available from the Platform Data Controller. The boards shall have proper recovery mechanism built-in to recover automatically in case the processor goes haywire.
- 3.4.21 Material used for the printed circuit board (PCB) shall be copper clad glass epoxy of grade FR-4 or equivalent. The PCB thickness shall be minimum 1.6 mm (measurement tolerance ± 0.1 mm).
- 3.4.22 Assembled and tested printed boards should be given a conformal coating to enable them for functioning under adverse environmental conditions. The coating material should be properly chosen to protect the assembly from the following hazards.
- a) Humidity
 - b) Dust and dirt
 - c) Airborne contaminants like smoke and chemical vapors
 - d) Conducting particles like metal clips and filings
 - e) Accidental short circuit by dropped tools, fasteners etc.
 - f) Abrasion damage
 - g) Vibration and shock (to a certain extent)
- 3.4.23 The solder masks (green/black) shall be applied on the solder side and component side of the card.
- 3.4.24 The following description shall be screen printed on the component side of the PCB
- a) Component outline in the proximity of the component
 - b) Manufacturer's name
 - c) PCB name
 - d) PCB number
- 3.4.25 The following description shall be marked permanently on the PCB
- a) The manufacturing serial number
 - b) Month and year of manufacture
- 3.4.26 The Platform display board should have preferably the following character sizes:
- a) Character Size on display board with 16 Rows of LEDs:

For English and Digits, the character size shall be preferably of 12x16 LED matrix. There should be a gap of min. 1x16 LED matrix between two consecutive characters and 3x16 LED matrix between two consecutive fields. However, actual character size and gap will depend on the font type.

b) Character Size for coach composition data display:

For English, the character size shall be preferably of 5x7 LED matrix. There should be a gap of minimum 1x8 LED matrix between two consecutive characters and 3x8 LED matrix between two consecutive fields. However, actual character size and gap will depend on the font type.

3.4.27 UTP CAT5e or higher grade cable shall be provided for data communication between Platform Display Controller and its Display Units (PFDs and CGDs). CAT 5 cable should be compliant with latest TIA/EIA-568 C.2 standards.

3.4.28 In data communication, Class-D surge protection circuit should be provided in each platform display board, coach guidance display board and platform data controller as per clause no. 5.7 of RDSO specification no. RDSO/SPN/TC/98/2011 Rev.0.0. The applicable parameters are given below:

- i) Max. continuous DC Voltage: 13 V DC
- ii) Total Nominal discharge current (8/20µs) line-Ground: 5 kA or equivalent for 10/1000 µs pulse.
- iii) Impulse limiting voltage/ Let through Voltage Line – Line (1kV/µs pulse or 8/20 µs pulse or 10/1000 µs pulse): 40V
- iv) Impulse limiting voltage/ Let through Voltage Line – Ground (1kV/µs pulse or 8/20 µs pulse or 10/1000 µs pulse): 1000 V
- v) Nominal load current: 100 mA

3.4.29 Platform Display Board – Type A (384x16)

3.4.29.1 Display format of 384x16 Platform Display Board with Single Line Display shall be as under:

TRAIN No.	TRAIN NAME	EXPT. TIME	A/D	PF No.
15046	GORAKHPUR Exp.	18:20	D	4

3.4.29.2 Field format of Platform Display board with LED matrix of 384x16 shall be preferably as per following format. However, actual format will depend on the font type and information to be displayed.

Field Format of PFD (Type A)										
64	3	205			3	53	3	12	3	38
Train No.		Train Name				Expt. Time		A/D		PF No.
5 Digits		Min. 15 Characters				4 Digit + Colon		1 Char.		2 Digit + 1 Char.
44444		AAAAAA	AAAAA	EXP		20:45		A		10A

3.4.29.3 Mechanical Specification of Platform Display board shall be as under:

Parameter	Specified Value
Physical dimensions of casing (in mm)	4100(L) x 350(H) x 220(D) (Maximum) – for both single and double sided boards.
Case Material	CRCA Sheet
Thickness (min.)	18 SWG
Mounting Provision	Wall Mounting / Over Hanging (as specified)
Color	Black
Finish	Powder Coated
Enclosure IP Rating	IP54

3.4.29.4 Specifications of Platform Display board shall be as under:

Parameter	Specified Value
Display Matrix	384x16 for - Train Arrival / Departure Information and - At-a-glance Coach Composition Information
No. of Lines	<ul style="list-style-type: none"> • Single for Train Arrival / Departure Information • Two for Coach Composition Information
No. of Sides	Single Face or Double Face (as specified)
Pixel Pitch	10 mm (± 0.5mm)
LED	SMD/Leaded LED as per Clause No. 4.1.3 or 4.2.(b)
Color	Single Colour (RED or ORANGE or GREEN or WHITE)
Languages Displayed	English, Hindi and Regional Language
Intensity Control	Manual and Automatic Timer Mode
PCB	Glass epoxy FR-4 Grade
Power Supply	230V AC, 50Hz

3.4.29.5 It shall be possible to give At-a-glance Coach Composition information on a Platform Display board as a two line LED matrix of each 384x8. The display shall preferably be as per the following format. Train information & coach composition information are to be shown alternatively.

TRAIN No.	TRAIN NAME	EXPT. TIME	A/D	PF No.
15046	ENG GEN GEN S1 S2 S3 S4 S6 S7 S8 B1 B2 B3 A1 A2 ...			
	... H1 S9 S10 S11 S12 GEN GEN SLR			

3.4.30 Platform Display Board – Type B (192x32)

3.4.30.1 Display format of 192x32 Platform Display Board with Double Line Display shall be as under:



3.4.30.2 Field format of Platform Display board with LED matrix of 192x32 shall be preferably as per following format. However, actual format will depend on the font type and information to be displayed.

Field Format of PFD (Type B)						
64	3	53	3	28	3	38
Train No.		Expt. Time		A/D		PF No.
5 Digits		4 Digit + Colon		1 Char.		2 Digit + 1 Char.
44444		20:45		A		10A

3.4.30.3 Mechanical Specification of Platform Display board shall be as under:

Parameter	Specified Value
Physical dimensions of casing (in mm):	2150(L) x 550(H) x 220(D) maximum – for both single and double sided boards.
Case Material	CRCA Sheet
Thickness (min.)	18 SWG
Mounting Provision	Wall Mounting / Over Hanging (as specified)
Color	Black
Finish	Powder Coated
Enclosure IP Rating	IP54

3.4.30.4 Specifications of Platform Display board shall be as under:

Parameter	Specified Value
Display Matrix	192x32 for - Train Arrival / Departure Information and - At-a-glance Coach Composition Information
No. of Lines	<ul style="list-style-type: none"> • Two for Train Arrival / Departure Information • Four for Coach Composition Information
No. of Sides	Single Face or Double Face (as specified)
Pixel Pitch	10 mm (± 0.5mm)
LED	SMD/Leaded LED as per Clause No. 4.1.3 or 4.2.(b)
Color	Single Colour (RED or ORANGE or GREEN or

Parameter	Specified Value
	WHITE)
Languages Displayed	English, Hindi and Regional Language
Intensity Control	Manual and Automatic Timer Mode
PCB	Glass epoxy FR-4 Grade
Power Supply	230V AC, 50Hz

3.4.30.5 It shall be possible to give At-a-glance Coach Composition information on a Platform Display board as a four line LED matrix of each 192x8. The display shall preferably be as per the following format. Train information & coach composition information are to be shown alternatively.

TRAIN No.	EXPT. TIME	A/D	PF No.
15046	ENG GEN GEN	S1 S2 S3	S4
	S5 S6 S7	B1 B2 B3	A1
	A2 H1 S8	S9 S10 S11	S12
	GEN GEN SLR		

3.5 Coach Guidance Display Board (CGD):

- 3.5.1 The Coach Guidance Display (CGD) Board shall display the coach number of a train scheduled on a platform under the control of Platform Data Controller.
- 3.5.2 Coach guidance display boards shall comply with Clauses 3.4.7 to 3.4.28 except Clause No. 3.4.11 & 3.4.26.
- 3.5.3 The coach guidance display boards shall have both side displays.
- 3.5.4 Individual Coach guidance display boards across the platform should show the position of the coaches like GEN, D1, S10, B1, A1, H1 in English and “अना., डी-1, एस-10, बी-1, ए-1, एच-1” etc. in Hindi and train number alternatively with a time difference which should be programmable as per requirement.
- 3.5.5 Coach Guidance Display board shall be of following specifications. The actual character size will depend on the character and font type.

Parameter	Specified Value
LED Matrix	48x16
No. of Lines	1 Line
No. of Sides	Double Face
Pixel Pitch	10 mm (\pm 0.5mm)
LED	As per Clause No. 4.1.3 or 4.2.(c)
Color	white
Languages Displayed	Alpha Numeric, English and Hindi
Character size (WxH)	150 mm x 90 mm (min.)
No. of characters	Up to 5 Characters
Intensity Control	Manual and Automatic Timer Mode
PCB	Glass epoxy FR-4 Grade
Power Supply	230V AC, 50Hz

3.5.6 Mechanical Specifications of Coach Guidance Display shall be as under:

Parameter	Specified Value
Physical dimensions of casing (without canopy) (in mm)	600(L) x 350(H) x 220(D) (maximum).
Case Material	CRCA Sheet
Thickness (min)	18 SWG
Mounting Provision	Wall Mounting / Over Hanging
Color	Black
Finish	Powder Coated
Enclosure IP rating	IP54

- 3.5.7 Canopy of suitable design made of CRCA (Cold Rolled Closed Annealed) sheet of minimum 18 SWG thicknesses duly powder coated in black colour shall be provided on the top of coach guidance board.
- 3.5.8 The faces of Coach Guidance Display board shall be tilted from the vertical plane by 5° (nominal) downwards.
- 3.5.9 Coach Guidance Display board shall be covered with U.V. stabilized polycarbonate sheet with thickness of minimum 3mm in order to give good visibility and protection against dust and water. Single polycarbonate sheet without any joint should cover the Display board.
- 3.5.10 The Coach Guidance Display boards shall be protected against environmental hazards such as dust and water, confirming to IP54 standards.
- 3.5.11 The title 'Train / Coach No.' shall be screen printed on the CGD casing. The character size of these titles shall be of minimum 3 cm height. Colour of characters should be preferably in "white or yellow".

3.5.12 Fields format of Coach Guidance Display board shall be as under:



3.5.13 It shall be possible to display welcome messages on CGD during idle time.

3.6 Video Display Controller (VDC):

- 3.6.1 The Video Display Controllers shall drive video display boards. Each video display board shall have an individual Display Controller.
- 3.6.2 The Video Display Controller design shall be based on minimum 32 bit microcontroller or higher processor.
- 3.6.3 Video Display Controller shall have two Ethernet interfaces for CDC connectivity. Out of two Ethernet interfaces, one shall be with single mode optical interface and the other one with copper interface.
- 3.6.4 Suitable hardware and software shall be provided with the display controller to receive data from CDC on Ethernet interface for control and to display train/video information on the display board.
- 3.6.5 The display controller shall have internal flash memory of 4GB capacity to store the active schedule content (video, image and data) and shall play the content as per the schedule configured from the CDC.
- 3.6.6 The display controller shall continue to play the locally stored content on the respective display board (except data related to train information) even there is a link failure with the CDC.
- 3.6.7 The display controller shall monitor, capture and maintain the configuration, health and diagnostics information of the connected Video Display Board.
- 3.6.8 Audio output shall be available from display controller which may be connected to a suitable audio amplifier.
- 3.6.9 The display controller along with the display board interface electronics, power supply and optical termination unit shall be either housed inside display board casing or in a wall/pole mountable rack of 19" standard Euro Rack of suitable height.
- 3.6.10 Local access to the display controller shall be possible for configuration and maintenance activities.
- 3.6.11 The cable entry for power, optical and data cables to display controller rack shall be through suitable glands.
- 3.6.12 The display controller shall be protected against environmental hazards such as dust and water, conforming to IP 54 standards.

Page 19 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

3.7 General Requirements of Video Display Board:

- 3.7.1 Video display board shall be of the following size for Outdoor and Indoor application:
- a) Outdoor application: **16 mm** pitch '**Outdoor**' type display board.
 - b) Indoor application: **10 mm** pitch '**Indoor**' type display board.
- 3.7.2 The display board shall function satisfactorily in RE traction area.
- 3.7.3 LEDs with equal fringe and uniform intensity shall be used on display board to ensure that the information to be displayed will be with excellent contrast.
- 3.7.4 Intensity of display board shall be adjustable in manual mode and automatic timer mode. The selection of the mode shall be user configurable. It shall be possible to adjust intensity of selected display boards through software from CDC in steps of maximum 10% in the range from 10% to 100%.
- 3.7.5 The relevant ICs which are to be used in display board shall be preferably of surface mount device (SMD) type to ensure high reliability.
- 3.7.6 Material for the Printed Circuit Board shall be copper clad glass epoxy of grade FR-4 or equivalent. The PCBs thickness shall be minimum 1.6 mm (measurement tolerance ± 0.1 mm).
- 3.7.7 The LED video display board shall be made up of multiple LED modules and cabinets. Each module shall consist of LEDs and respective drivers. LED modules/cabinets shall be arranged vertically and horizontally to construct the actual display. These LED modules shall be interchangeable and shall be used anywhere.
- 3.7.8 There shall be no need of new type of electronics to add extra modules to the display boards to increase the board size from lower line capacity to higher line capacity as mentioned in the respective video board's specifications.
- 3.7.9 Fans shall be provided for circulation of air inside the cabinets of the display board. Air filters are also to be provided to avoid dust entry into these cabinets.
- 3.7.10 Conformal Coatings shall be given to assembled and tested printed boards to enable them for perfect functioning under adverse environmental conditions. The coating materials should protect the assembly from the following hazards.
- a) Humidity
 - b) Dust and dirt
 - c) Airborne contaminants like smoke and chemical vapors
 - d) Conducting particles like metal clips and filings
 - e) Accidental short circuit by dropped tools, fasteners etc.

3.7.11 Multi-line train info display format on Video Display Board shall be as under:

TRAIN NO.	TRAIN NAME	EXPT. TIME	A/D	PF NO.
17031	HYDERABAD EXP.	10:45	A	10
15046	GORAKHPUR EXP.	18:20	A	04
57642	REPALLY PASSENGER	18:20	D	04
12236	GUWAHATI RAJDHANI EXP.	CANCELLED		
12004	SWARN SHATABDI EXP.	06:15	D	01
12229	LUCKNOW MAIL	22:10	D	01

3.7.12 The display of the fixed titles viz. train number, name, expected time, arrival/departure, platform number etc. should be screen printed or stickered in capital letters on a CRCA (Cold Rolled Closed Annealed) sheet of minimum 1.2 mm thicknesses duly power coated in black colour. Color of characters should be preferably in “yellow / white”.

3.8 Outdoor Video Display (OVD) Board:

3.8.1 Outdoor video display boards of pitch **16 mm** as per the following specifications shall be provided.

S. No.	Description	Specifications		
		6-Line OVD	12-Line OVD	18-Line OVD
3.8.1.1	Pixel Pitch	16 mm (± 0.5 mm)		
3.8.1.2	Pixel LED	4 Leaded LEDs (2R+G+B) or 3 Leaded LEDs (R+G+B)		
3.8.1.3	Pixel Resolution (W x H)	320 x 80	320 x 160	320 x 240
3.8.1.4	Display Area (Width x Height) (+/- 10%)	5120mm x 1280mm	5120mm x 2560mm	5120mm x 3840mm
3.8.1.5	Typical Display Viewing Angle (minimum)	Horizontal: 110°, Vertical: 50°		
3.8.1.6	Color Processing	12-Bit per color or more		
3.8.1.7	Surface Luminance (Brightness calibrated) for white balance	7500 cd/m ² or more		
3.8.1.8	Power Consumption @ 7500 cd/m ²	8 KW approx.	16 KW approx.	24 KW approx.
3.8.1.9	IP Rating	IP 56		
3.8.1.10	Line Height	12 pixels		
3.8.1.11	No. of lines (For English Language).	6	12	18

3.8.2 Each cabinet shall have water and dust proof gland to accommodate data in and data out and power cables. Water proof connector shall be provided to connect AC input.

- 3.8.3 Display cabinets should be constructed by using LED modules of suitable matrix. The mechanical mounting of these modules should be easy for replacement of LED module in case of repair. Such replacement shall not effect operation of any other modules of the system.
- 3.8.4 Front side of LED Modules shall be protected from rain and dust with suitable protective material.
- 3.8.5 Glass filled nylon / PC-ABS based LED trays shall be used to fix LED panels.
- 3.8.6 Display Board cabinet shall be made up of minimum 1.6 mm thick Aluminum alloy sheet with powder coated.
- 3.8.7 For easy maintenance, rear side door shall be provided with 3-point cam lock.
- 3.8.8 The door shall be provided with rubber gaskets to avoid water and dust entry into the cabinet.
- 3.8.9 Display on all type boards shall be flicker free.
- 3.8.10 The 16 mm pitch model of Outdoor Video Display shall be calibrated for equal color mixture and brightness level from all the pixels of the board. This shall be observed by displaying each primary color and white color on the entire display board.

3.9 Indoor Video Display (IVD) Board:

- 3.9.1 Indoor display boards of pitch 10 mm as per the following specification shall be provided as specified by purchase.

S. No.	Description	Specifications		
		6-Line IVD	12-Line IVD	18-Line IVD
3.9.1.1	Pixel Pitch	10 mm (± 0.5 mm)		
3.9.1.2	Pixel LED	R/G/B - SMD 3-in-1		
3.9.1.3	Pixel Resolution (W x H)	384 x 96	384 x 192	384 x 288
3.9.1.4	Display Area (Width x Height) (+/- 10%)	3840mm x 960mm	3840mm x 1920mm	3840mm x 2880mm
3.9.1.5	Typical Display Viewing Angle(minimum)	110 ° (Horizontal and Vertical)		
3.9.1.6	Color Processing	12-bit per color or more		
3.9.1.7	Surface Luminance (Brightness calibrated) for white balance	2500 cd/m ² or more		
3.9.1.8	Power Consumption @ 2500 cd/m ²	3 K Watts approx.	6 K Watts approx.	9 K Watts approx.
3.9.1.9	IP Rating	IP 54		
3.9.1.10	Line Height	16 pixels		
3.9.1.11	No. of lines (For English Language).	6	12	18

- 3.9.2 Each cabinet shall have water and dust proof gland to accommodate data in and data out and power cables. Water proof connector shall be provided to connect AC input.

- 3.9.3 Display cabinets should be constructed by using LED modules of suitable matrix. The mechanical mounting of these modules should be easy for replacement of LED module in case of repair. Such replacement shall not effect operation of any other modules of the system.
- 3.9.4 Display Board cabinet shall be made up of minimum 1.6 mm thick Aluminum alloy sheet with powder coated.
- 3.9.5 For easy maintenance, rear side door shall be provided with 3-point cam lock.
- 3.9.6 The door shall be provided with rubber gaskets to avoid water and dust entry into the cabinet.
- 3.9.7 Display on all type boards shall be flicker free.
- 3.9.8 The 10 mm pitch model of Indoor Video Display shall be calibrated for equal color mixture and brightness level from all the pixels of the board. This shall be observed by displaying each primary color and white color on the entire display board.

4.0 SPECIFICATION OF LED:

4.1 LED Specifications for Indoor Video Display Boards:

- 4.1.1 Super bright 3-in-1 (RED, GREEN and BLUE) SMD type LEDs of uniform intensity shall be used for true colour with longer visibility in Indoor Video Display boards.
- 4.1.2 The intensity of the illumination of SMD type LEDs should be such that it shall be possible to read the information clearly from a distance of minimum 50 meters for platform display boards, coach guidance display boards. This visibility is to be checked and ensured for that part/ spot of display which has maximum intensity of ambient light.
- 4.1.3. 3-in-1 SMD (Surface Mounting Devices) type LEDs (Light Emitting Diodes) shall have the following parameters:

S. No.	Parameters	Red LED	Green LED	Blue LED
4.1.3.1	Color	3-in-1 (Red + Green + Blue)		
4.1.3.2	LED Size	3 mm x 3 mm Chip LED (Overall max. dimension: 3.6mm x 3.6mm)		
4.1.3.3	Wavelength	626 ± 10nm	530 ± 10nm	470 ± 10nm
4.1.3.4	Directivity (minimum)	90 ⁰		
4.1.3.5	Luminous Intensity(min.) (@ 20mA & @ 25°C)	270 mcd	750 mcd	190 mcd
4.1.3.6	Operating Temperature	-30 °C to +85 °C		
4.1.3.7	Make	Avago / Nichia / Osram / Seoul Semiconductor / CREE		

4.2.(a): LED Specifications for Outdoor Display Boards:

- 4.2.(a).1 Super bright RED, GREEN and BLUE oval type leaded LEDs of uniform intensity shall be used for true colour with longer visibility, in outdoor type video display boards.
- 4.2.(a).2 The intensity of the illumination of LEDs should be such that it shall be possible to read the information clearly from a distance of minimum 50 meters. This visibility is to be checked and ensured for that part/ spot of indicator which has maximum intensity of ambient light.
- 4.2.(a).3 Super bright RED, GREEN and BLUE leaded (lamp type) LEDs shall have the following parameters:

S. No.	Parameters	Red LED	Green LED	Blue LED
4.2.(a).3.1	LED Type	Diffused, Oval, Lamp type		
4.2.(a).3.2	LED Size	3.0 mm x 3.9 mm (± 0.2 mm)		
4.2.(a).3.3	Color	RED	GREEN	BLUE
4.2.(a).3.4	Wavelength (nm)	626 ± 10 nm	530 ± 10 nm	470 ± 10 nm
4.2.(a).3.5	Directivity (minimum)	Horizontal/Vertical: 90 ⁰ /40 ⁰		
4.2.(a).3.6	Luminous Intensity (min.) (@ 20mA & @ 25°C)	680 mcd	1800 mcd	400 mcd
4.2.(a).3.7	Operating Temperature	-30 °C to +85 °C		
4.2.(a).3.8	Make	Avago / Nichia / Osram / Seoul Semiconductor / CREE		

4.2.(b): LED Specifications for Platform Display Boards (PFD):

- 4.2.(b).1 Super bright RED or ORANGE or GREEN color LED/SMD LEDs or WHITE SMD LEDs or 3-in-1 (RGB) SMD LEDs of uniform intensity are to be used for longer visibility in various types of display boards. Color of LED is to be specified by the Railways. The intensity of the illumination should be such that it shall be possible to read the information clearly from a distance of minimum 50 meters. This visibility is to be checked and ensured for that part/ spot of indicator which has maximum intensity of ambient light.

4.2.(b).1.1 Diffused/ Colorless clear Ledged LEDs or Chip Type SMD LEDs should meet following parameters.

S. No	Parameters		Red LED	Orange LED	Green LED	White LED
1	LED Size & Type	Leaded Type LED	5 mm Oval Radial, Diffused/ Colorless clear	5 mm Oval Radial, Diffused/ Colorless clear	5 mm Oval Radial, Diffused/ Colorless Clear	Details as per Clause No. 4.2.(b).1.2
		SMD Type LED	Chip Type SMD LED (overall maximum dimension: 3.6 mm x 3.6 mm)	Chip Type SMD LED (overall maximum dimension: 3.6 mm x 3.6 mm)	Chip Type SMD LED (overall maximum dimension: 3.6 mm x 3.6 mm)	
2	Color		Red	Orange	Green	
3	Wave Length		626±10nm	605± 10nm	530±10nm	
4	Viewing Angle (50% I _v in mcd)		Horizontal: 60° (Minimum)	Horizontal: 60° (Minimum)	Horizontal: 60° (Minimum)	
			Vertical: 25° (Minimum)	Vertical: 25° (Minimum)	Vertical: 25° (Minimum)	
5	Luminous Intensity @ 20mA biased current		500 mcd	500 mcd	1400 mcd	
6	Operating Temperature		- 30°C to +85°C	- 30°C to +85°C	- 30°C to +85°C	
7	Make		Avago / Nichia / Osram / Seoul Semiconductor / CREE	Avago / Nichia / Osram / Seoul Semiconductor / CREE	Avago / Nichia / Osram / Seoul Semiconductor / CREE	

4.2.(b).1.2 SMD type LEDs shall have the following parameters:

S.No	Parameters	White LED
1	Color	White
2	LED Type & Size	Chip Type SMD LED (overall maximum dimension: 3.6 mm x 3.6 mm)
3	Color Temperature	6500°K ± 10 %
4	Viewing Angle (minimum)	90°
5	Luminous intensity @ 20mA (minimum)	1800 mcd

S.No	Parameters	White LED
6	Operating Temperature	-30°C to +85°C
7	Make	Avago / Nichia / Osram / Seoul Semiconductor / CREE

4.2.(c): LED Specifications for Coach Guidance Display Boards (CGD):

Super bright white SMD Type LED or 3-in-1 (RGB) SMD LEDs of the uniform intensity are to be used for Coach Guidance Display Boards (CGD).

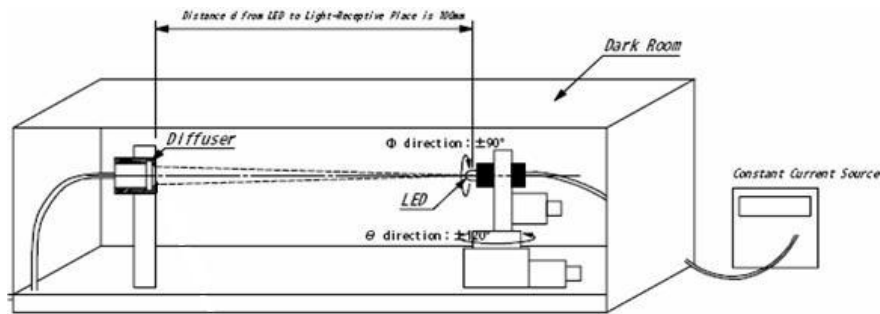
4.2.(c).1 SMD type LEDs shall have the following parameters:

S.No	Parameters	White LED
1	Color	White
2	LED Type & Size	Chip Type SMD LED (overall maximum dimension: 3.6 mm x 3.6 mm)
3	Color Temperature	6500°K ± 10 %
4	Viewing Angle (minimum)	90°
5	Luminous intensity @ 20mA (minimum)	1800 mcd
6	Operating Temperature	-30°C to +85°C
7	Make	Avago / Nichia / Osram / Seoul Semiconductor / CREE

- 4.3 Manufacturer shall maintain proper account of LEDs being used. The record shall include various details like source of supply, procurement invoice number & date, quantity, incoming rejection, lot wise consumption etc. which may be verified by the inspecting officials.
- 4.4 LEDs used in LED display units shall be of high performance quality and from reputed manufacturers as stipulated by RDSO. Epoxy used in the LED shall have UV inhibitors.
- 4.5 Number of LEDs and their part number shall not be changed without prior approval of RDSO.
- 4.6 Data sheets from the LED manufacturer shall be submitted to support the above parameters of the LEDs used.

4.7 **Viewing Angle of LED:**

- 4.7.1 Typical setup diagram is shown below.



- 4.7.2 Place and connect the LED under test in the desired direction (Horizontal or Vertical) based on the LED type (Leaded or SMD) as shown in the above set up in a dark room atmosphere.
- 4.7.3 Bias the LED such that the rated current (as mentioned in the 4.1.3 and 4.2.3) flows in the LED under test.
- 4.7.4 Place the Chromameter or Spectrometer to measure the intensity in Lux in the position indicated in the setup. Adjust the distance between the tip of the LED and Chromameter or Spectrometer diffuser to 10cm exactly.
- 4.7.5 Rotate the LED so that the Chromameter or Spectrometer records maximum Lux. Record this value and treat the angle as 0° (degrees).
- 4.7.6 Rotate the LED in Horizontal (X) direction to a point, at which the Lux reading is half of the value that was observed in the Clause 4.7.5. Record the position of LED in degrees. Calculate the degrees the LED was rotated from the maximum intensity value to half intensity value. Record this value as θ_a (Theta). Similarly rotate the LED in opposite direction from the maximum intensity value and mark the point where the Lux value observed is half the value to the one observed in the center. Calculate the rotation in degrees from maximum Lux value and record this value as θ_b .
- 4.7.7 The viewing angle (or directivity) is the sum of θ_a and θ_b , which shall be greater than or equal to specification given in the respective LED specifications table (4.1.3 and 4.2.3).

Page 27 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

4.8 Intensity of LED in 'mcd':

- 4.8.1 Connect the LED under test as shown in the above set up in a dark room atmosphere.
- 4.8.2 Adjust the distance between the tip of the LED and Chromameter or Spectrometer diffuser to 30cm exactly.
- 4.8.3 Bias the LED such that the rated current (as mentioned in the 4.1.3 and 4.2.3) flows in the LED under test.
- 4.8.4 Record the intensity in 'Lux' shown in the Chromameter or Spectrometer.
- 4.8.5 Intensity of LED (mcd) = 92.9*Lux value observed.

5.0 SOFTWARE REQUIREMENTS:

5.1 General Software Features:

- 5.1.1 The software dealing with operational transactions like train arrival/ departure & platform specific data entry should be preferably of web-based application. This shall allow the access to the applications from any of the standard PCs remotely connected in LAN, having standard browser tool and the same shall also be accessible at the server console.
- 5.1.2 The privileges of the user-accounts shall be configurable in such a way that the respective user can modify only the relevant information. The creation & categorization of user-accounts in terms of administrator, supervisor and operator and provision of defining new category and new user accounts in that category should be possible.
- 5.1.3 Data integrity should be maintained even though the system is being accessed and controlled from different user accounts. Each user shall get the latest information upon refresh of the web-page.
- 5.1.4 Standard Management Information System (MIS) reports shall be provided for all operational & functional transactions done in the system. In addition, if needed by the purchaser, customized reports on available information, shall be provided.
- 5.1.5 As the centralized software is going to interact/interface with multiple display devices, any kind of failure in communicating or delivering the content to remote display device shall be informed to the viewer and details shall be available in a log.
- 5.1.6 All the display devices like PFD, CGD, Indoor Video Display and Outdoor Video Display shall be controlled for making display or no-display.
- 5.1.7 All the history or log related information shall be maintained for 45 calendar days and the data beyond 45 days shall be removed automatically by the application.
- 5.1.8 All the master data entry forms and configuration screens shall be provided for the initial installation of the system, for any station.
- 5.1.9 Different display colors shall be configurable to different train status messages being displayed on OVDs & IVDs.

Page 28 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

- 5.1.10 Software shall support for preparing the “messages”, displayable in PFDs and CGDs in English, Hindi and Regional language.
- 5.1.11 Web-UI shall appropriately update the screen such that the user can easily distinguish which train information is sent at least once and which is not sent, to PFDs, CGDs and multiline displays.
- 5.1.12 It shall be possible to update “Train arrival and departure information”, “platform positioning” and “coach positioning” from three different operators working on three different computers.
- 5.1.13 HELP menu shall be provided for the main web-based software and for all its associated software modules.
- 5.1.14 Software shall provide user with auto and manual mode of operations; for both train arrival/departure data collection and updating all display units (multiline display, PFD and CGDs) with the compiled data.
- 5.1.15 Software shall provide the flexibility to select the services as required by the operator, which as under:
- 5.1.16 Train Arrival/ Departure display on Platform Display Boards and Coach Guidance Boards.
- 5.1.16.1 Train Arrival/ Departure display on Multiline Display Boards.
- 5.1.16.2 Railway & Commercial slogan display on Multiline Display Boards.
- 5.1.16.3 PC based announcements.
- 5.1.17 It shall be possible to adjust intensity of selected display boards through software from CDC in steps of maximum 10% in the range from 10% to 100%.
- 5.2 Video Display Software Feature:**
- 5.2.1 The video display selection between the operations of the display controller between train arrival/ departure information display and scheduled video/ data content display.
- 5.2.2 The CDC shall accept different file formats of video content and images to be played on Video Display Boards. A minimum of the following formats should be supported by the display system: (i). **STILL:** bmp, jpg, jpeg and .tiff (ii). **ANIMATIONS:** .mov, .gif and .swf (iii). **VIDEO:** . avi, mpg, mpeg, wmv, m1v, m2v, dat, mp4, vob and flv.
- 5.2.3 Software shall accept the user/operator configuration about the schedule of items, where each item may be of any still, animated and video format data. Software shall accept to store different play lists, each with different user-configurable name. Software shall play continuously item after item sequentially for the selected play list. If all the items in the play list are completed over a time, the play list shall be repeated.
- 5.2.4 Software shall provide the option to configure the different display & clearing effects/ transition effects in case the item being inserted into the play list is of still image format.
- 5.2.5 The display controller of indoor or outdoor video display board shall accept the schedule configuration and the data for the scheduled items from the CDC. It

Page 29 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

shall be possible to configure the attributes like repeat count, stay time, etc., for each of the items in the play list.

- 5.2.6 The software shall be customized to get the specific train arrival/ departure information or any other passenger service related information as desired by the purchaser, from railway designated server system, through standard & open protocols/interfaces, if specified by purchaser. Software shall be customizable for processing the obtained data and displaying the information in pre-configured formats on the display board. Protocol of such system is to be arranged by purchaser.
- 5.2.7 All operations related to display board scheduling, schedule content changing & pushing the train arrival/departure information to the display board shall be possible from the CDC to all the display controller over LAN/WAN.
- 5.2.8 Preview of files feature shall be available to the user such that user shall be able to view the content of selected item or selected schedule and make alterations if necessary before display on the display board.
- 5.2.9 Feature of adjustable display time for still images shall be available which shall allow the user to adjust the display time or stay time (in seconds) for the still images on display boards. It shall be also possible to set different durations for different images.
- 5.2.10 Feature of display of special messages during live display shall be available which shall facilitate user to display some special messages (flashing or stay for configured time in the bottom of display boards) on display boards. These messages shall be displayed in English / Hindi / Indian regional languages in different font sizes and different colour.
- 5.2.11 Feature of fit to display board shall be available. This feature at CDC shall be helpful when the actual data referred in the scheduled items (still or animated or video) are bigger / smaller than the actual display screen in terms of pixel resolution. This feature is to avoid unnecessary efforts of the operator to reduce / increase the actual data sizes.

5.3 Train Arrival/Departure Information Entry Features:

- 5.3.1 Data entry shall be preferably as per IN-script keyboard layout as defined by Ministry of Information Technology, Government of India or phonetic keyboard for defining master database of train names.
- 5.3.2 It shall be possible to select through menu configuration the display of information with various effects like Scrolling effects, Erasing effects, Curtain effects, etc for PFD and CGD.
- 5.3.3 It can be possible to add, modify and delete timings of existing trains in the master data base. These modification transactions should be logged for security reasons.
- 5.3.4 The entry into Master Data Base should be password protected. It should be also possible to add on new trains. There should be provision to change the password.
- 5.3.5 The operator can be able to make train message by typing only train number and modification to timing and platform nos.

Page 30 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

- 5.3.6 Mouse click should be used for transferring data from workstation to various Display Boards.
- 5.3.7 The information displayed at various boards (PFDs and CGDs) shall be selected automatically related to those boards only based on the platform number.
- 5.3.8 Whenever user modifies details of a train (arrival time, departure time, late, PF number etc.) and sends the data to the board, the application has to take care of automatically updating user database.
- 5.3.9 The modified information can be saved as soon as it is transferred to the board, so that in case of power failure when the workstation is switched "ON" again, the last transferred information appears again.
- 5.3.10 The Train Arrival/Departure information display system software should be developed on Window based operating system using standard package.
- 5.3.11 Software shall be user friendly and developed using standard and sophisticated package with good front-end features.
- 5.3.12 Health status of display and control units should be available on the central data controller.
- 5.3.13 The Software should have the facility to take the data of arrival/departure of trains from train time charting server like NTES, COAS etc, Train Management System or any other system as specified by the purchaser. Necessary data and protocols are to be provided by the purchaser by coordinating with the train charting software developer.
- 5.3.14 The software shall facilitate the service of updating platform number nomination for a selected train and also coach composition information for a selected train, through a LAN/WAN based browser. For this service, remote operator computer should have standard browser application installed in that system namely Internet Explorer, Firefox, Opera and Chrome etc. All these data received should be integrated for making announcement and to be displayed on train arrival/departure display boards and coach guidance system. However, there should be provision to enter coach position and platform number in software.
- 5.3.15 The software should have provision to receive the data, like train coach position from control office computer or any other designated location, platform number nomination from control panel or station master's computer connected to the CDC LAN network.
- 5.3.16 If specified by purchaser, the software may need to obtain the data from SIMRAN (Satellite IMaging for RAil Navigation) server and map the information for the required trains, dynamically and provide the standard tabular information of train arrival/departure and also the details of those trains from SIMRAN server, in scrolling mode. The frames prepared should be shown in English and those frames should stay until the scrolling of details of all the trains is completed. For this feature, access to SIMRAN server over internet or intranet with required privileges shall be provided by the purchaser. (Optional)
- 5.3.17 There should be provision to display the status of train like late, rescheduled, cancelled, diverted, indefinite late etc. In case of reschedule of train, reschedule time and "reschedule" text should be displayed alternatively in arrival/departure

Page 31 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

field of display board. Similar sequence of display shall be given for the states 'Terminated', 'and 'Diverted'.

5.3.18 Different stages of train arrival/departure information shall be displayed based on the following formats or as specified by purchaser.

Main Status	Sub Status	English and Hindi Display		
		Exp. Time	A/D	PF No.
Arrival	Running Right Time	05:30	A	1
	Will Arrive Shortly	05:30	A	1
	Is Arriving on	05:30	A	1
	Has Arrived on	05:30	A	1
	Running Late	05:30	A	1
	Cancelled	Cancelled		रद् की गई है
	Indefinite Late	Indefinite Late		अनिश्चित देरी से
	Terminated	Terminated at		<स्टेशन का नाम>
		<Station Name>		तक जायेगी
Platform Changed	05:30	A	1	
Departure	Running Right Time	05:30	D	1
	Cancelled	Cancelled		रद् की गई है
	Is Ready to Leave	05:30	D	1
	Is on Platform	05:30	D	1
	Has Left	05:30	D	1
	Rescheduled	Rescheduled		परिवर्तित / पुनर्निर्धारित समय पर
		05:30	D	1
	Diverted	Diverted		परिवर्तित मार्ग से
		<diverted route in English>		< मार्ग / स्टेशन का नाम>
Scheduled Departure	05:30	D	1	
Platform Changed	05:30	D	1	

For example, expected time is taken as "05:30 Hrs" & platform number as "01".

- i) For the types "Running Right Time", "Running Late" & "Rescheduled", platform number is optional. For the rest, it is mandatory.
- ii) For the type "Rescheduled", two separate display texts containing "Reschedule" & expected departure time will be displayed alternatively with configurable duration.

Page 32 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

5.3.19 Any other features required by purchaser.

5.4 Coach Guidance Software Features:

5.4.1 The software will have preloaded information of all the trains arriving at station or departing from station with coach composition. When the train is likely to arrive at station or depart from the station, the concerned operator is required to enter the train number and coach position i.e., from ENGINE to GUARD Brake Van will be displayed in editing mode. User shall be able to declare 'coach positioning' by simply having the Train number, parking position and train direction.

5.4.2 On the corresponding platform the train coach positions details are displayed on the individual display boards (double faced), which are installed for each coach respectively across the platform. Information should be displayed at reasonable time interval.

5.4.3 The display cycle should be configurable from the control console with respect to display of coach position & train number.

5.4.4 Software should be developed on standard package.

5.4.5 It should be able to display data on Coach Guidance Display Boards in Hindi & English.

5.4.6 It should be possible to add, modify & delete coach composition of trains in the master database.

5.4.7 The entry into Master Data Base should be password protected. It shall also be possible to add new trains.

5.4.8 The operator should be able to enter details by typing only train number and modification to coach nos.

5.4.9 Mouse click should be used for transferring data from PC to the various Boards.

5.4.10 The information displayed at various boards shall be selected automatically related to those boards only based on the platform number.

5.4.11 Whenever user modifies and sends the data to the boards, the information should be stored into the user database, automatically by the application.

5.4.12 The modified information can be saved as soon as it is transferred to the board, so that in case of power failure when the PC is switched "ON" again, the last transferred information appears again.

5.4.13 The position of the coaches as entered by the operator should be displayed in the coach guidance display board.

5.4.14 Health status of CGD should be available in the CDC.

5.4.15 The display of train number and coach number information on all CGDs in a row of a platform shall be synchronized.

5.4.16 Any other features required by purchaser.

5.5 Features of Announcement System:

5.5.1 The voice announcement message shall be stored in the system in Digital format with minimum 16-bit digitization.

Page 33 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

- 5.5.2 The application shall be GUI (or Web UI) based for the announcement of all types of passenger carrying trains through keyboard.
- 5.5.3 Repeat announcement shall be made by taking the cursor to location and a stroke of key or maintaining the repeat count. However, calling an announcement repeatedly due to repeated pressing of keys shall not be allowed until the called announcement is finished successfully or paused by the operator.
- 5.5.4 The format of the operation for the updating and announcement shall be user friendly.
- 5.5.5 The system shall be user friendly to the maximum extent so that addition and alterations of user generated announcements can be done by the Railway Engineer without the help of suppliers and programmer. For any newly added train, it shall be possible to record a file externally and attached to the train through the web-UI. The application shall take care of placing the recorded file at appropriate internal application folder.
- 5.5.6 The system has to provide selection mechanism for the announcement messages, language of announcement i.e. local, Hindi, English or all three or short announcement in all the three languages. The announcement shall be delivered fluent and professional enough to avoid unnatural pauses in between two pieces of voice are delivered.
- 5.5.7 There shall be one window for each special announcement like courtesy, emergency messages recording & playback of scratch pad messages shall be possible only at the CDC with microphone and speaker provided with CDC using Windows standard sound recording tool.
- 5.5.8 The details of information being announced shall be displayed on the monitor screen.
- 5.5.9 The entire voice recording shall be done in a sound proof professional studio. All the voice recording shall be of professional grade shall have approval of railways before using in the systems.
- 5.5.10 Optimization in the user interface should be done to see that most of the frequently used operations be available in single screen.
- 5.5.11 It should be possible to select and play out courtesy slogans. Provision should be available to play out any of the prerecorded music, which can be started or interrupted by the touch of a single button.
- 5.5.12 Mainly, there shall be three type of announcements; one for train arriving on platform, one for train arrived on platform and one for train departing from platform in all languages. All these types of announcement shall be changed to new platform number in case predetermined platform number is changed. Provision shall be made for the operator to send out announcement related to train number, platform numbers, and arrival/ departure just by keying in the train number, platform number and delays/right time information for any of the following cases.
- a) Late arrival of trains.
 - b) Platform numbers of arriving or arrived trains and changed in platform numbers.

- c) Right time arrival of trains.
- d) Departure of trains at scheduled or unscheduled time. It shall also be possible to announce that trains is expected shortly or terminated or regulated and present status of the train.
- e) Cancellation of train
- f) Route Diversion of train
- g) Any other type of announcement as specified by purchaser.

5.5.13 Format for online data entry screen for announcement & display of train's details shall be preferably as per the Diagram 3.

5.5.14 Any other features required by purchaser.

6.0 DATA COMMUNICATION PROTOCOL:

6.1 The protocol used between CDC & PDC and between CDC & Display Controller shall be TCP/IP based.

6.2 Protocol between PDC & PFD and PDC & CGD shall preferably be as per the following format:

6.1.1	Starting Flags	To indicate the start of the packet/frame (2 bytes) (Preferred values are 0xAA followed by 0x99)
6.1.2.1	Format Identifier (Optional)	1 st Byte: 0x01 to 0x07 2 nd Byte: 'A' to 'Z'
6.1.2.2	Length of Packet	a) 1 Byte, when Format Identifier is not used. b) 2 Bytes, when Format Identifier is used.
6.1.3	Destination Address	Destination unit address (2 bytes)
6.1.4	Source Address	Originating unit address (2 bytes)
6.1.5	Sequence Number	Sequence number of the packets originated (1 byte)
6.1.6	Data bytes	Actual data of the packet - Max. 240 Bytes for 1-Byte LOP - Max. 1024 Bytes for 2-Byte LOP
6.1.7	CRC	CRC8 of all the bytes of the packet for transmission errors detection.

7.0 POWER SUPPLY:

7.1 Power supply units of all types of display boards and control units shall be SMPS (Switch Mode Power Supply) modules of standard make of suitable capacity operated from AC source ranging from 160 to 270 Volts 50Hz AC, single phase supply.

7.2 The load on power supply units shall not exceed 75% of its maximum rated capacity.

7.3 Suitable protection against transient voltages coming in the power supply source or generated by some other source shall be provided by providing Class C protection device. The parameters of Class C protection shall be as per clause no. 5.9 of specification no. RDSO/SPN/TC/98/2011, Rev. 0 or latest. Applicable parameters are given below:

S. No.	Parameters	Limits	
		Between Line & Neutral	Between Neutral & Earth
1	Nominal Voltage (Uo)	230V	230V
2	Maximum continuous operating voltage (Uc)	≥ 300V	≥ 255V
3	Nominal discharge current 8/20µs (In)	≥ 3 kA	≥ 3 kA
4	Maximum discharge current 8/20µs (Imax)	≥ 5 kA	≥ 5 kA
5	Voltage protection level (Up)	≤1.5 KV	≤ 1.5 KV
6	Indication	Mandatory	Optional
7	Degree of protection	IP20	IP20
8	Housing	Fire retardant as per UL 94	Fire retardant as per UL 94

7.4 PVC insulated flexible 3-core x 2.5sq mm multi strand power cables provided for each of the display boards shall conform to specification no. IS: 694:1990 reaffirmed 1995 or latest.

8.0 TEST REQUIREMENTS:

8.1 Conditions of Tests:

8.1.1 Unless otherwise specified all tests shall be carried out at ambient atmospheric conditions.

8.1.2 For inspection of material, relevant clauses of RDSO/SPN/144 shall apply.

8.1.3 Inspection and testing shall be carried out to the effect that all requirements of this specification are complied with.

8.1.4 Inspection shall be carried out for various types of display boards, control units and software. PCs for Central Data Controller, Central Data switch etc. shall be checked during inspection for their functional performance required for proper working of complete system as per specification.

8.1.5 The following are the tests, which shall be carried out during different stages of test.

S. No.	Parameter	Type Test	Accept. Test	Routine Test	Clause No.
I	Visual Inspection	Yes	Yes	Yes	9.1
II	Performance Tests	Yes	Yes	Yes	9.2
III	Insulation Resistance Test	Yes	Yes	Yes	9.3
IV	High Voltage Test	Yes	No	Yes	9.4
V	Environmental / Climatic Tests	Yes	No	No	9.5
	i. Bump Test	Yes	No	No	
	ii. Change of Temperature Test	Yes	No	No	
	iii. Dry Heat Test	Yes	No	No	
	iv. Cold Test	Yes	No	No	
	v. Damp Heat (Cyclic) Test	Yes	No	No	
	vi. Damp Heat Test (Steady State Storage)	Yes	No	No	
	vii. Salt Mist Test	Yes	No	No	
	viii. Dust Test	Yes	No	No	
	ix. Driving Rain Test	Yes	No	No	
	x. Vibration Test	Yes	No	No	
VI	Endurance Test	Yes	Yes	Yes	9.6
VII	System Level functional Tests	Yes	Yes	Yes	As per Test Format
VIII	Card/Module Level Functional Test	Yes	Yes	Yes	
IX	Environmental Stress Screening (ESS) for PCBs and Sub-Systems	Yes	No	Yes	9.5.2 (10)
X	LED Parameter Test	Yes	Yes	Yes	9.7

Insulation Resistance test (before and after Climatic Test)	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes
Applied high voltage test (before and after Climatic Test)	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes
System Level Functional Tests(before and after Climatic Test)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Card/module functional tests(before and after Climatic Test)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Environmenta l/ Climatic test	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes
Endurance test	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes
LED parameter test	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No

8.2.5 Any other tests shall be carried out as considered necessary by the inspecting authority.

8.2.6 Following system should be preserved after type approval.

- a) One Platform Data Controller on which environmental and endurance testing have been conducted.
- b) One number of Platform Display Board (384x16 single sided display board)
- c) One number of Coach Guidance Display Board on which environmental & endurance testing have been conducted.
- d) One number of Outdoor Video Display module (32x32 min.) of 16 mm pitch on which environmental & endurance testing have been conducted.
- e) One number of Indoor Video Display module (32x32 min.) of 10 mm on which environmental & endurance testing have been conducted.
- f) Two sets of complete software in CD.

8.3 Acceptance Tests:

8.3.1 The acceptance tests, as specified in Clause No. 8.1.5, shall be carried out by the inspecting authority for the purpose of acceptance on 20% of the lots (minimum 1 for each type of system) offered for inspection by the supplier.

8.3.2 Any other tests shall be carried out as considered necessary by the inspecting authority.

8.4 Routine Tests

- 8.4.1 The routine tests, as specified in Clause No. 8.1.5, shall be conducted by manufacturer on every device and the test results will be submitted to the inspection authority before inspection. The application software in proper format shall also be submitted to the inspection authority in advance.
- 8.4.2 Any other tests shall be carried out as considered necessary by the inspecting authority.

9.0 TEST PROCEDURE:

The test procedure shall be based on the system design. The methodologies to be adopted for various tests shall be decided taking into account the system design/configuration.

9.1 Visual Inspection:

Each equipment of the system shall be visually inspected to ensure compliance with the requirement of Clause Nos. 3 to 6 of this specification. The visual inspection shall broadly include the following.

S. No.	Type of Visual Check	Description
I	System Level	a) Constructional Details
		b) Dimensional Check
		c) General Workmanship
		d) Configuration
		e) Markings
		f) Mechanical Polarization of Cards
II	Module Level	a) Indications
		b) Mounting and fixing of Connectors
		c) Proper routing of wiring
		d) Proper tightening of fasteners
		e) Proper Housing of Cards
III	Card Level	a) General tack layout
		b) Quality of Soldering and Component Mounting
		c) Conformal Coating
		d) Legend Printing
		e) Green / Black Masking

9.2 Performance Test:

- 9.2.1 The equipment shall comply with the requirements as specified in Clauses 2 to 6.

9.3 Insulation Resistance Test:

This test shall be carried out –

- (a) Before the high voltage test
- (b) After the high voltage test
- (c) After completion of the climatic test

There shall be no appreciable change (value more than 10 Mega ohms and variation within 10%) in the values measured before and after high voltage test.

After the completion of climatic test, the values shall not be less than 10 Mega ohms for the equipment at a temperature of 40° C and relative humidity 60%. The measurement shall be made at a potential of 500V DC.

9.4 High Voltage Test:

The equipment shall withstand for one minute without puncture and arcing, a test voltage applied between line terminal and earth as mentioned below:

- (a) AC line terminals and earth, test voltage of 1500V AC
- (b) DC line terminals and earth, test voltage of 500V AC

The test voltage shall be alternating of approximately sinusoidal waveform of any frequency between 50 Hz and 100 Hz. Printed circuit cards shall be removed.

9.5 Environmental/ Climate Tests:

9.5.1 The various types of display systems shall be capable of working in non-air conditioned environment in the field.

9.5.2 The various types of indoor & outdoor display systems shall meet the following climatic and environmental requirements:

S. No.	TEST	REFERENCE	
1.	Change of temp test	IS 9000 Part XIV Sect. II	
	Low temp		-10°C ± 3°C
	High temp		+55°C ± 2°C
	Rate of change in temperature		1°C / min
	Duration		3 hrs at each temp.-10°C & +55°C
	Cycle		3
	Condition		Fully functional during test
2.	Dry heat test	IEC-571; IS:9000 Part-III Sect 3	
	Temp		+55°C ± 2°C
	Duration		16 hrs
	Condition		Fully functional during test
3.	Cold test	IS 9000 Part II Sect. III	
	Temp		-10°C ±3 °C
	Duration		2 hours
	Condition		Fully functional during test.
4.	Damp heat test (Cyclic)	IS 9000 Part V Sect. 2 Variant 1	
	Upper temp		40°C ±2°C
	Humidity		95% (+1%, -5%)
	Cycles		6

Page 41 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

	Condition	Fully functional during one hour period towards end of each cycle. Stabilization shall be done at 25° ±3°C		
5.	Damp heat test (Steady state storage)			IS9000 Part IV
	Temp	40° ±2°C		
	Humidity	93% (+2%, -3%)		
	Severity	4 days		
	Condition	Fully functional during test.		
6.	Salt mist test			IS9000 Part XI procedure 3
	Mist+Damp heat	Procedure 3: 2 hours +22 hours		
	Temp	35° ±3°C		
	Humidity	93% (+2%, -3%)		
	Hours	22		
	Cycle	3		
	Condition	After this test, electrical parameters shall be monitored in addition to physical checks.		
7.	Dust test			IS 9000 Part XII
	Duration	1hour		
	Condition	After this test, electrical parameters shall be monitored in addition to physical checks.		
8.	Bump test			IS 9000 Part VII, Sec. 2
	PCBs/Modules/units in packed condition shall be subjected to bump test as under:			
	No of bumps	1000		
	Peak acceleration	400m/s ²		
	Pulse duration	6ms		
	No of axes	3		
	Condition	After this test, electrical parameters shall be monitored in addition to physical checks.		
9.	Vibration test			TEC (IPT 1001A-revised)
		Up to & including 75Kgs. weight	Over 75Kgs.	
	Freq. Range	05-350 Hz	5-150 Hz	
	Amplitude	±6 mm constant displacement or 15m/ Sec. ² constant acceleration.	±6 mm constant displacement or 15m/ Sec. ² constant acceleration.	
	No. of axis	3	3	

	No of sweep cycle	20	10	
	Total duration	105min (per axis)	105min (per axis)	
	If resonance is observed	10min at each resonant freq.	10min at each resonant freq.	
	Condition	After this test, electrical parameters shall be monitored in addition to physical checks.		
10.	Production Testing: Environmental Stress Screening tests (ESS) for Printed Circuit Boards (PCB) & sub systems: (The manufacturer shall carry out the following ESS tests on all modules on 100% basis during production / testing in the sequence as follows. Suitable records shall be maintained regarding the compliance of these tests.)			
	10.1 Thermal cycling: The PCBs shall be subjected to thermal cycling as per the procedure given below. The assembled boards are to be subjected to rapid temperature cycling as mentioned below in the power off condition.			
	❖ This temperature cycling from 0°C to 55°C, ½ Hours at each temperature for 9 cycles and 1 hour at each temp. for the 10 th cycle. Dwell time of 1 hour is provided for the last cycle in order to oxidize defective solder joints exposed through thermal stress.			
	<p style="text-align: center;">55°C, ½ Hour 1 Hour</p> <p>Ambient</p> <p style="text-align: center;">0°C, ½ Hour</p> <p>❖ The rate of rise / fall of temp. shall be minimum 10°C per minute.</p> <p>❖ In addition to physical checks, the electrical parameters are also to be monitored after this test.</p>			
	10.2 Power cycling: The power supply modules shall be subjected to 60 ON-OFF cycles for 1 hour. The ON-OFF switch usually provided in the modules may not be used for this purpose.			

9.5.3 Driving Rain Test:

TEST		REFERENCE
Driving Rain test		IS 9000 Part XVI Test condition 'c'
Water spray for 1 hour		
Condition	After this test, electrical parameters shall be monitored in addition to physical checks.	

9.6 Endurance Test:

9.6.1 During type test, endurance test shall be conducted as per clause 8.2.3 for continuous operation which shall be 168 hours at 55°C burning for LED without giving any deterioration in light output and proper functionality of other items.

9.6.2 During acceptance test, endurance test shall be conducted on complete system for continuous operation which shall be 48 hours at room temperature burning for LED without giving any deterioration in light output and proper functionality of other items.

9.7 LED Parameter Test: The manufacturer shall submit the LED data sheets at the time of inspection. The LEDs shall be tested as per Clause No. 4. Samples shall be tested as follows:

- i) For type test, 10 nos. of SMD type LEDs and 10 nos. of leaded oval type LEDs shall be tested from the lots used in manufacturing display boards.
- ii) For acceptance test, 5 nos. of SMD type LEDs and 5 nos. of leaded oval type LEDs shall be tested from the lots used in manufacturing display boards.
- iii) The manufacturer shall submit the test report for minimum 20 nos. of SMD type LEDs and minimum 20 nos. leaded type LEDs of the lots used in manufacturing of display boards.

10.0 QUALITY ASSURANCE:

10.1 All materials & workmanship shall be of good quality.

10.2 Since the quality of the equipment bears a direct relationship to the manufacturing process and the environment under which it is manufactured, the manufacturer shall ensure Quality Assurance Program of adequate standard.

10.3 Separate Bill of Material used in Type Test Sample/ Lot to be submitted by the firm.

10.4 Validation and system of monitoring of QA procedure shall form a part of type approval. The necessary Plant, Machinery and Test instruments as mentioned in Schedule of Technical Requirements (STR) shall be available with the manufacturer.

11.0 MARKING & PACKING:

11.1 The following information shall be clearly marked at a suitable place on all equipment.

- a) Name and Address of the manufacturer.
- b) Year of the manufacturer.

Page 44 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

- c) Serial number of Equipment
- d) Specification number
- e) Wiring diagram of the equipment on the side of the cover for ready reference.

11.2 The equipment and its sub assemblies shall be packed in thermo-Cole boxes and the empty spaces shall be filled with suitable filling material. Before keeping in the thermo-Cole box, the equipment shall be wrapped with bubble sheet. The equipment shall be finally packed in a wooden case of sufficient strength so that it can withstand bumps and jerks encountered in a road/rail journey.

12.0 INFORMATION TO BE SUPPLIED BY THE MANUFACTURER:

The following documents in two sets should be supplied along with the system.

- a) Mechanical drawings of each sub system / rack.
- b) Installation and maintenance manual incorporating trouble shooting exercises, printed cards patterns, software, etc.
- c) User Guide.
- d) Pre-commissioning check list.

Page 45 of 49	Effective from 07/02/2013	RDSO/SPN/TC/67/2013	Revision 3.0
True Colour Video-cum-Train Information Display System			

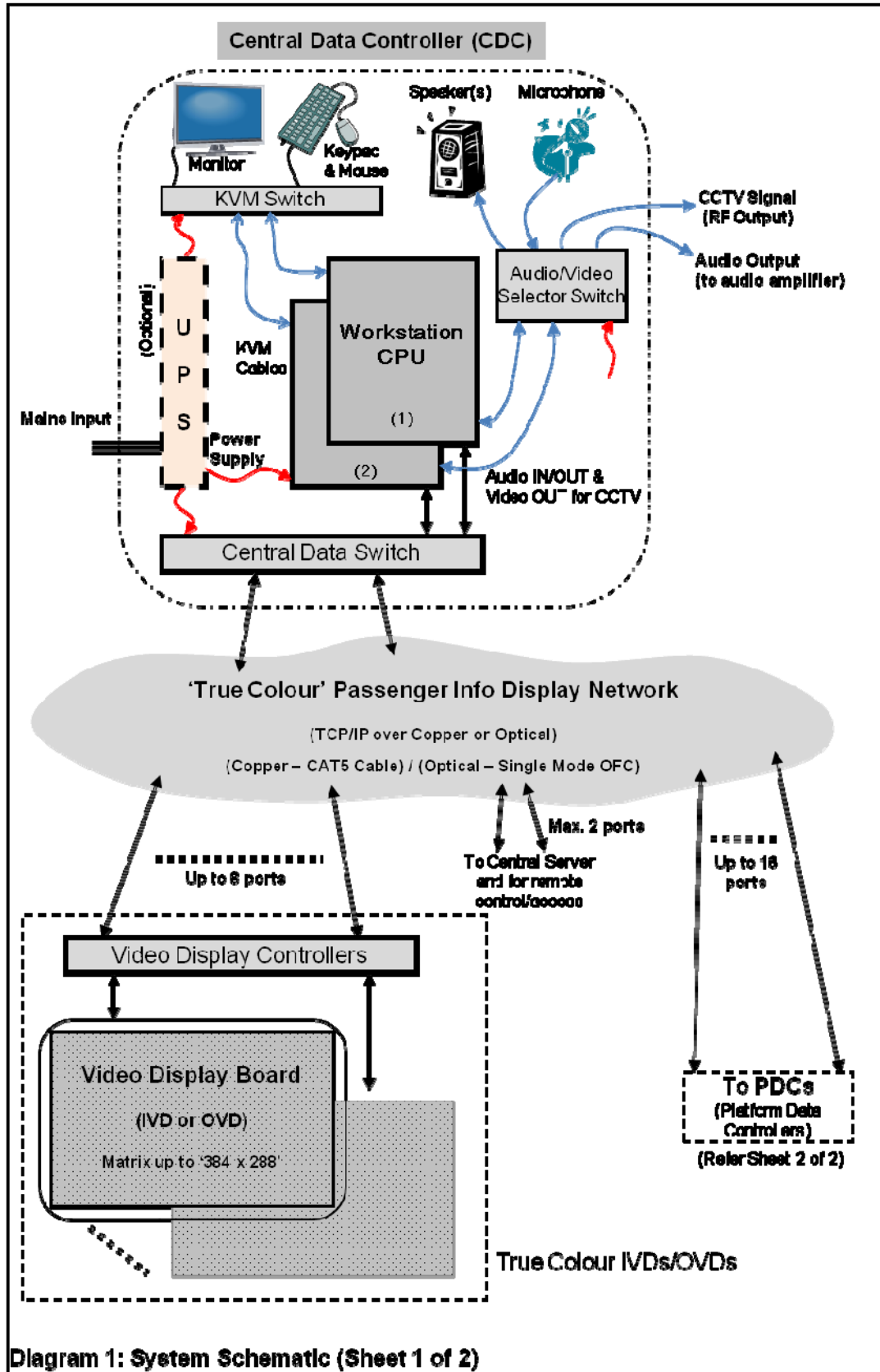
13.0 INFORMATION TO BE SUPPLIED BY THE PURCHASER: The purchaser should clearly indicate details of required items including hardware and software which shall mainly consist of following items as per requirements mentioned in Clauses 3, 4, 5 & 6.

S. No.	Description of the Item	Unit	Quantity
13.1	Central Data Controller (CDC)	Set	Two sets to work in standby mode with suitable cabinet
13.2	Central Data Switch	Nos.	One Unit
13.3	Application Software	Set	One set with soft copy
13.4	Platform Display Controller	Nos.	As specified by purchaser
13.5	Platform Display board- Type 'A' (384x16) single side or double sides	Nos.	As specified by purchaser
13.6	Platform Display board- Type 'B' (192x32) single side or double sides	Nos.	As specified by purchaser
13.7	Coach Guidance Display Board	Nos.	As specified by purchaser
13.8	5-Line Outdoor Video Display Board of 16 mm pitch with Display Controller	Nos.	As specified by purchaser
	10-Line Outdoor Video Display Board of 16 mm pitch with Display Controller	Nos.	As specified by purchaser
	15-Line Outdoor Video Display Board of 16 mm pitch with Display Controller	Nos.	As specified by purchaser
13.9	6-Line Indoor Video Display Board of 10mm pitch with Display Controller	Nos.	As specified by purchaser
	12-Line Indoor Video Display Board of 10mm pitch with Display Controller	Nos.	As specified by purchaser
	18-Line Indoor Video Display Board of 10mm pitch with Display Controller	Nos.	As specified by purchaser
13.10	Stereo Audio Amplifier with Speaker System (as per purchaser specification)	Nos.	As specified by purchaser
13.11	Announcement recordings in digital form as per details given by Railways in English, Hindi and Regional Language	Set	One set with soft copy
13.12	Suitable hardware & software for integration with Automatic Train Information System with server type and interface protocol details	Set	As specified by purchaser
13.13	Data Cable (in meters) (UTP CAT5e or higher grade)	Mtrs.	As specified by purchaser
13.14	Power Cable	Mtrs.	As specified by purchaser
13.15	Any other item required by purchaser		

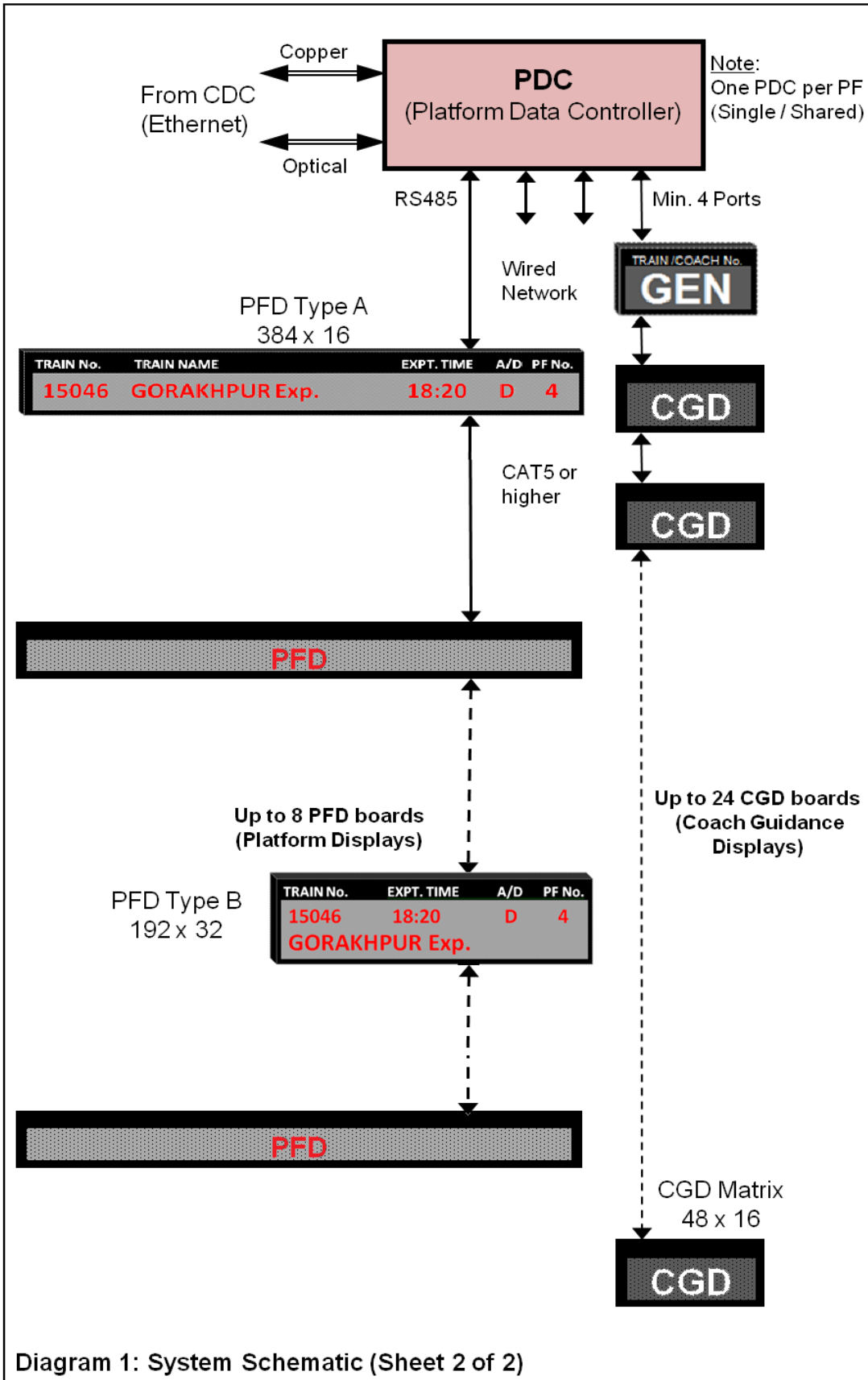
14.0 DIAGRAMS:

Detailed construction diagrams of Cabinet, Single Line Platform Display Board (single sided & double sided), Coach Guidance Display Board, Outdoor Video Display Board, Indoor Video Display Board, Platform Data Controller, Display Controller etc. shall be approved by RDSO before starting manufacturing.

True Colour Video-cum-Train Information Display System



True Colour Video-cum-Train Information Display System



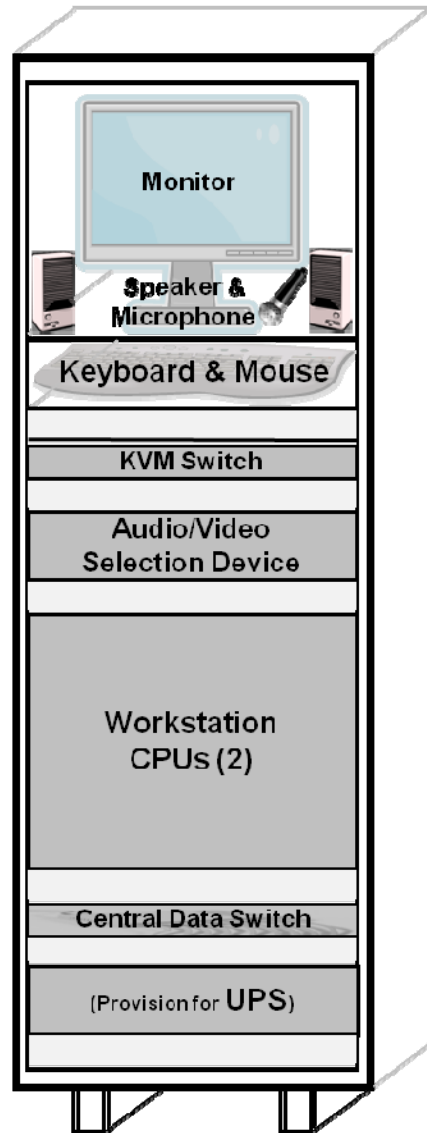


Diagram 2: General Layout of CDC Rack

True Colour Video-cum-Train Information Display System

Train

Train	Train Name	STA	STD	ETA	ETD	A/D	Train Status	Late	PF
<input type="checkbox"/>	1406 Manmad to Visakhapatnam Manmad Express	17:30	17:40	16:30	16:40	A	Running right time	0	1
<input type="checkbox"/>	2728 Hyderabad to Visakhapatnam Godavari Express	17:35	17:40	17:35	17:40	A	Running right time	0	1
<input type="checkbox"/>	2737 Kakinda Secunderabad Gautami Express	17:35	17:45	06:35	06:45	A	Indefinite late	0	1
<input type="checkbox"/>	7255 Narasapur Hyderabad Express	17:55	18:00	04:55	05:00	A	Cancelled	0	1
<input type="checkbox"/>	8645 Howrah to Hyderabad East Coast Express	18:00	18:05	18:00	18:05	D	Running right time	0	1

Other Trains Select

<input type="checkbox"/>	1019 Mumbai to Bhubaneswar Konark Express	07:40	07:50	07:40	07:50	D	Running right time	0	1
<input type="checkbox"/>	1020 Bhubaneswar to Mumbai Konark Express	11:35	11:45	11:35	11:45	A	Running right time	0	--
<input type="checkbox"/>	1405 Visakhapatnam to Manmad Manmad Express	09:20	09:30	09:20	09:30	A	Running late	0	1
<input type="checkbox"/>	2703 Howrah Secunderabad Falaknuma Express	09:35	00:00	09:35	00:00	A	Has arrived on	000	1
<input type="checkbox"/>	2737 Kakinda Secunderabad Gautami Express	17:35	17:45	06:35	06:45	A	Indefinite late	0	1

Control

--Control Type-- Platform-- Device-- Action-- Send

Coach

Train No: 7255 Parking Position: 1 Direction: Right

Schedule Coaches: ENG GEN S1 GEN S2 GEN S3 S4 S4 S3 S3 S2 S2 S1 S1

Actual Coaches: ENG GEN S1 GEN S2 GEN S3 S4 S4 S3 S3 S2 S2 S1 S1

Blank Engine General Sleeper 3T AC 2T AC First CC Guard Luggage Pantry Undo

Ok Send To CGD Rearrange

Diagram 3: Typical User Interface for Data Entry and Control