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Ref	NR/SP/SIG/I 7504
Issue	3
Date	December 2003

IECC Operating Specification for Signalling Control and Indications Purposes (formerly RT/E/S/I7504)

This temporary front sheet facilitates change to the new Network Rail Standards referencing nomenclature.

The Ref above will be formally allocated to this standard when it is next changed in the meantime the contents, date and issue number of this Network Rail Standard are UNCHANGED and with immediate effect it should be referred to as “(new ref) formerly (old ref)”.

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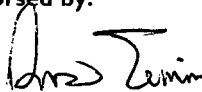
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Company Specification

IECC Operating Specification for Signalling Control and Indications Purposes

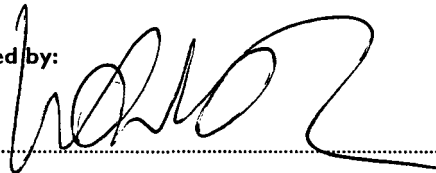
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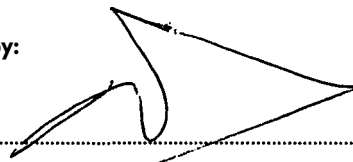
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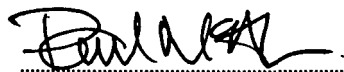
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Issue record

This Specification will be updated when necessary by distribution of a complete document. Amendments will be marked by a vertical black line in the adjacent right hand margin.

Issue	Date	Comments
1	August 2001	Replaces BR1878C
2	December 2001	Modifications to Signal Group Replacement control
3	December 2003	Amendments for IECC Upgrade 003, removal of reference to SGRC key, amendments and additions to description of symbols, reformatting to Network Rail standard.

Implementation

The requirements specified in this document shall be enforced from February 2004.

Compliance

The requirements of this specification are mandatory and apply to all new IECC schemes when design is started after 1st February 2004 and the upgrading of existing IECC schemes.

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Contents

1	Purpose	6
2	Scope	6
3	Reference documentation	6
4	Definitions	6
5	General Information	6
6	Introduction to Part 1	8
7	Arrangement of the System	9
8	General Presentation of Display	11
9	Overview Display	12
10	Detail View	14
11	General Purpose Display	15
12	Track Diagram	17
13	Route Setting and Route Set	19
14	Track Circuits	20
15	Signals	22
16	Points	25
17	Train Descriptions	26
18	Block Indications	27
19	Remote Control Systems	29
20	Train Protection Warning System	30
21	Reminder Appliances, SPAD ALARM INHIBIT and Associated Indications	32
22	Miscellaneous Indications	35
23	Alarms	41
	PART 2 - CONTROLS	44
24	Introduction TO PART 2	45
25	Arrangement of the System	46
26	Principles of Control	47
27	Cursor Control Facilities	48
28	Keyboard Control Facilities	61
29	Signalling Commands ENTERED BY KEYBOARD	64

Ref:	RT/E/S/17504
Issue:	3
Date:	December 2003

30	Train Describer Commands	76
31	Automatic Routesetting Commands	79
32	Alarms	84
Appendix A	Symbols Used on IECC VDU Display for Signalling Purposes	87
Appendix B	Summary of Colours Required	116
Appendix C	Typical General Purpose VDU Display	118
Appendix D	Signaller's Keyboard	119
Appendix E	Signaller's Display Character Set (Version 3.1)	120

1 Purpose

This operating specification defines the mandatory requirements for signalling control and indications equipment based on the use of colour visual display units (VDUs), and which forms a subsystem of the Integrated Electronic Control Centre (IECC). It does not define the requirements for the PC SPAD Monitor (PSM), which are defined elsewhere.

2 Scope

The control and indications requirements defined herein are applicable where the IECC is used in relation to the signalling and operation of Network Rail infrastructure.

3 Reference documentation

None.

4 Definitions

Within this specification, one signaller's operating position is defined as a "Workstation" and a Signalling Control Centre with more than one workstation shall be physically designed so that it is possible for one person to operate an adjacent workstation during periods of lower traffic density.

References to "switches" or "buttons" in this specification shall be taken as meaning their equivalent as displayed on a VDU to those on a conventional panel.

5 General Information

This is a general specification and details related to specific schemes shall be given in an appropriate Appendix.

System requirements and interface details shall be given in separate documents.

Ref:	RT/E/S/17504
Issue:	3
Date:	December 2003

PART 1 - INDICATIONS

Ref:	RT/E/S/17504
Issue:	3
Date:	December 2003

6 Introduction to Part 1

6.1

This part of the specification defines the requirements of the user of a signalling indications system based on colour visual display units (VDUs).

6.2

The VDU-based system shall, as far as is practicable, follow present practice for signalling indications. Details of the symbols to be used appear in Appendix 'A'.

6.3

Details of input control are given in Part 2 of this specification.

7 Arrangement of the System

One signaller's workstation shall be equipped with a number of colour VDUs, not exceeding five (excluding the VDU for the General Purpose display defined in Section 7.3), depending upon the size of the control area. To cater for extremely simple cases, one VDU may be used, this shall take the form of a fixed detail display operating as per Sections 7.2 and 10. The General Purpose display VDU shall be required additionally. The VDUs shall show the following types of display:

7.1 Overview Display

The Overview shall be a simplified display of that workstation's complete control area, shall show the whereabouts and identification of all trains and contain sufficient information to permit the setting of routes from main running signals only. The Overview may continue onto a second or third VDU should this be necessary. The workstation shall be arranged so that its Overview display(s) may normally be displayed continuously.

Details of the Overview Display appear in Section 9.

7.2 Detail Display

The complete control area shall be divided into sections - typically depicting remote interlocking areas and auto sections - and each of these sections shall be capable of being shown individually on a Detail Display. One or two VDUs shall be provided for this purpose.

A Detail Display shall be capable of being used for all control functions, and shall be capable of showing all the information currently displayed on a conventional panel. However, it will not be necessary to show all the available information all of the time and information not normally displayed shall be capable of being written onto the display on demand.

The Detail Displays shall be called up instantly on command by minimal control operations and shall not normally cause the loss of any display or facility except on the screen to which the display is called.

Further information regarding the Detail Display is contained in Section 12.

7.3 General Purpose Display

The General Purpose Display shall be shown on a dedicated colour VDU. This shall display Alarms for Signalling, Train Descriptor, Automatic Route Setting and System Functions. It shall also echo entries made through the workstation keyboard.

Other display features shall be supplied and further information regarding the General Purpose Display is contained in Section 11.

7.4 Interchangeability

The system shall be designed so that each signalling VDU at a workstation shall be capable of displaying any signalling display available to that workstation.

The General Purpose Display shall be non interchangeable.

7.5 Operating Supervisor's Facilities

Where an Operating Supervisor is located in the Signalling Control Centre, provision shall be made for a Supervisor's workstation which shall consist of colour VDUs capable of displaying the first two Overviews from each workstation available in the Signalling Control Centre. The supervisor's workstation may include separate displays from other systems which are not part of this specification.

7.6 Visual Display Units

The VDUs used for the displays shall be high resolution colour monitors, either of the CRT type when enclosed within metal type workstation or of the TFT (flat screen) type when free-standing on an ergonomically constructed desk type workstation. Brightness, Contrast and Degaussing controls and the ON-OFF switch shall be available to the operator.

7.7 Environment

Careful account should be taken of the Signalling Control Centre operating room environment with a view to eliminating reflected light from the VDU screens.

8 General Presentation of Display

8.1 Symbols

The symbols to be used in the Overview, Detail and General Purpose Displays are shown in Appendix 'A'. In order to convey an idea of the required size and proportions of the symbols, a typical character size of 8 x 8 pixels is defined in Appendix 'E' and shown used in Appendix 'A' as a typical example, using the space occupied by a letter to represent one character. This size is not mandatory; other sizes may be used where this is deemed appropriate.

The colours used are summarised in Appendix 'B'.

8.2 Background

Either a black or grey background to the displays shall be used. Where grey is used, the shade of grey used shall be easily distinguishable from any grey foreground colour and a full assessment of the colour scheme and symbols shall be undertaken. Note the colour definitions are given in Appendix B.

8.3 Split Screen Presentation

Where split screen presentation is used the layout diagram shall usually read from top left to bottom right for each screen.

8.4 Screen Areas

Signalling elements may be displayed in various ways dependent on their context. Overlapping screen areas e.g. windows and scratchpad areas, shall be allowed on the understanding that vital signalling indications shall not be obscured.

Flashing symbols or text shall flash at no more than a rate of one half second i.e. one quarter second on, one quarter second off. All symbols and text shall ideally flash simultaneously. If symbols and text flash asynchronously, then all in the field of view shall effectively flash at a rate of no greater than 2 Hz.

9 Overview Display

The minimum information required on the Overview Display shall consist of:

9.1

The track diagram, inclusive of features shown in the Overview column of Appendix 'A'.

9.2

The position and on-off aspect of all main controlled signals. Where the information is available, the actual signal aspect shall be indicated providing the entire control area can be presented consistently.

9.3

Indications of all routes set, including ground frame releases. The latter shall be shown on the Overview by white route set indications through the connection(s) concerned. Exit symbols for the selection of main class routes to buffer stops and for warning class routes shall be shown.

9.4

Indications of the positions of all trains i.e. track circuit occupied. The extent of unoccupied track circuits will not be required to be shown.

9.5

The lie of points shall not be shown on the Overview except when a route is set through them, but out of correspondence or loss of detection shall be indicated. The points locked/free condition shall not be displayed on the Overview.

9.6

Train descriptions shall be shown and shall be designed such that they move from the berth associated with one signal section to the next berth when the head of the train to which the description refers passes beyond that signal section.

9.7

Provision shall be made for soft key functions (visual targets representing function keys) to be displayed on the second from bottom line of the screen.

9.8

Indications of SPADs shall be shown and the soft key function corresponding to the detail view on which the SPAD is shown (see Section 10) shall be highlighted.

Ref:	RT/E/S/17504
Issue:	3
Date:	December 2003

9.9

Upper case script shall be used throughout.

10 Detail View

The Detail Display shall contain all the information from the appropriate section of the Overview, together with additional information as detailed in Appendix 'A'. The following items should be noted specially:

10.1

Position and aspect of all position light signals.

10.2

Separate route exit symbols for shunt routes.

10.3

The extent of all track circuits and individual track circuit occupation.

10.4

The disposition of the individual point requests.

10.5

Signalling alarm facilities as detailed in Section 0.

10.6

The following information shall be available for display on demand:

10.6.1

Signal numbers.

10.6.2

Point and ground frame release numbers.

10.6.3

The direction defined as Normal for each set of points.

10.6.4

Track circuit designations.

10.6.5

Interlocking boundaries.

11 General Purpose Display

11.1

The General Purpose Display shall comprise windows allocated to the following functions:

11.1.1

Train describer map displays.

11.1.2

Automatic Route Setting output responses to the operator's requests.

11.1.3

Signalling output information as confirmation or otherwise of operator's requests.

11.1.4

Train describer output information as confirmation of operator's requests as well as description received warnings.

11.1.5

General information where this is appropriate.

11.1.6

Train describer (non described) alarms.

11.1.7

Automatic Route Setting alarms.

11.1.8

System alarms.

11.1.9

Signalling alarms.

11.1.10

SPAD alarms.

11.1.11

Operator's input.

11.2

Only alarms pertinent to the signaller shall be displayed within appropriate alarm windows.

11.3

All output information (except SPAD alarms) shall be scrolled automatically.

11.4

All alarms (except SPAD alarms) shall be scrolled once acknowledged. Failure to acknowledge shall prevent scrolling and an indicator shall be provided should further alarms occur which cannot yet be displayed.

11.5

SPAD alarms shall be scrolled up or down only by requests entered by the operator. SPAD alarms shall be acknowledged and cleared by the operator.

11.6

Appendix 'C' shows the presentation of the General Purpose Display, giving examples of typical entries.

12 Track Diagram

The track diagram shall show the lines of railway relevant to the signaller's area of control.

12.1 Lines of Railway

12.1.1

Lines of railway shall normally be shown. Where necessary, diagonal lines may be used and shall appear to have a similar width to the horizontal line. Vertical lines having a similar width shall not normally be used. However, for some orientations e.g. triangular trackwork, this may be necessary but shall be kept to the absolute minimum.

12.1.2

A line of railway on which a track circuit is not occupied nor a route set shall be coloured grey. (Appendix 'A' - 1)

12.1.3

Lines of railway which are not yet commissioned shall be in grey with the limits of the non-commissioned area designated by yellow lines crossing the track at the appropriate positions.

12.1.4

Non track circuited lines and those controlled by an adjacent Signalling Control Centre or signal box shall be shown as a grey outline with central band in the screen background colour. (Appendix 'A' - 2)

12.1.5

Adjacent lines shall be shown with sufficient space between them to ensure clarity.

12.1.6

Points and crossings where no route is set or in use shall be represented as shown in Appendix 'A' - 3 to 9.

12.1.7

Points and crossings that are out of correspondence, including loss of detection, shall flash the character in which they are depicted. The track shall alternate in colour between grey and screen background colour. Appendix 'A' - 3, 5 to 9 show the character that shall flash. This presentation shall apply to both overview and detail displays.

12.2 Overview Display

In addition to the requirements of 12.1 above, the following features shall be incorporated in the Overview Display.

12.2.1

The extent of individual track circuits shall not be shown.

12.2.2

The detected position of points shall not be shown unless a route is set or in use through the points.

12.3 Detail Display

In addition to the requirements of 12.1 above, the following features shall be incorporated in the Detail Display.

12.3.1

The extent of track circuits shall be shown by a break in line of sufficient width to ensure clarity. (Appendix 'A' - 10)

12.3.2

The termination of an overlap track circuit shall be as shown in Appendix 'A' - 11.

12.3.3

A restricted overlap shall be depicted by the letters ROL, coloured grey and displayed continuously at the overlap joint.

12.3.4

The detected positions of points and crossings shall be shown at all times, except when out of correspondence as provided for in 12.1.7.

13 Route Setting and Route Set

13.1

The indication through which an entrance to a route will be selected shall be the entrance signal symbol.

13.2

The indication through which an exit to a route will be selected shall be the exit signal symbol with the following exceptions:

13.2.1

Where the exit to the route is not associated with a signal.

13.2.2

Where, in addition to a main class route between signals, there also exists a warning or shunt class move.

In cases described in 13.2.1 and 13.2.2 an exit symbol as shown in Appendix 'A' - 12 and 13 shall be used respectively.

13.3

When route setting has been initiated the initial part of the first track circuit past the entrance signal shall flash white/grey. Once the route is called, this shall become steady white.

13.4

Where manual selection from alternative routes between two signals is required, the alternatives shall be depicted by flashing a sufficient amount of track for clarity at an intermediate point along each of the routes when route setting is initiated. This would typically be in the middle of a crossover. This shall cease flashing once the required route has been selected.

13.5

As each section of the route and overlap (where necessary) becomes established the section of track within the bounds of the track circuit concerned shall become white as shown in Appendix 'A' - 14.

13.6

Sections of track through points and crossings are defined as being established once the points are detected in the correct position for the route required. Route set indications shall include the detected position of the points using the symbols shown in Appendix 'A' - 15 to 21.

13.7

Where self restoring points are set reverse, the reverse route indications shall flash white/grey if a delay of more than 10 seconds occurs after the train clears the track circuit until the points have been restored to normal. If appropriate, a separate miscellaneous indication, normally a white circle/roundel combination, shall be used to indicate "reverse and free".

14 Track Circuits

14.1 General

14.1.1

Track circuits occupied shall be shown by changing the relevant section of track to red. When a route or suboverlap is set, only the track in the line of route or the suboverlap shall change to red, otherwise the full extent of the track circuit shall change colour.

14.1.2

Individual track circuits shall be of sufficient length to ensure clarity, and when required to display a train description, shall be arranged so that red track is easily distinguishable on either side of the description.

14.1.3

So that clearance points at point and crossing work can be resolved, track circuits shall extend for a sufficient length either side of the points themselves to ensure clarity.

14.1.4

For designated track circuits in an automatically signalled section, an alarm shall be given if any track circuit remains occupied for longer than a common specified time (e.g. 4 minutes).

14.2 Overview

In addition to the requirements specified in section 14.1 above, the following features shall be incorporated in the Overview:

14.2.1

No symbol to mark the extent of a track circuit whether occupied or unoccupied, shall be shown.

14.2.2

It will be permissible to combine the indications of occupied track circuits within a signal section for ease of presentation and to assist in the accommodation of train descriptions subject to the following:

14.2.2.1

The occupation of overlaps to controlled signals shall be shown separately.

14.2.2.2

Track circuit occupied indications shall not be combined through points and crossings.

14.2.3

Track circuit nomenclature shall not be shown on the Overview.

14.3 Detail View

In addition to the requirements specified in section 14.1 above, the following features shall be incorporated in the Detail Display:

14.3.1

The extent of all track circuits shall be shown, as in Appendix 'A' - 10.

14.3.2

All track circuits shall be shown individually.

14.3.3

Track circuit nomenclature shall be coloured grey and shall be displayed only when requested as in Appendix 'A' - 10.

15 Signals

15.1 General

15.1.1

Signals shall be shown as illustrated in Appendix 'A' - 22 to 26.

15.1.2

Signal posts shall normally be coloured grey and the aspect part of the symbol shall be a roundel and display the aspect of controlled signals. This shall take the form of "on-off" aspects or, where the information is available for the whole control area, all aspects shall be shown at the request of Network Rail.

When a controlled route is set, the post of the entry signal shall be displayed in white. When the route releases, the signal post shall revert to grey.

15.1.3

The "light out" indication for controlled signals shall be shown as a grey circle.

15.1.4

Automatic signals without emergency replacement facilities shall be shown as a grey roundel, unless signal aspect information is available when the full aspect sequence shall be shown (as with controlled signals, refer to 15.1.2 and 15.1.3).

15.1.5

Colourlight distant signals shall be shown as controlled signals with the letter R in grey permanently shown adjacent to the signal.

15.1.6

Banner repeater signals shall be shown as automatic signals (refer to 15.1.4) with the letter B in grey permanently shown adjacent to the signal.

15.1.7

Signals supervised by an adjacent box or workstation shall be shown as a grey roundel with the appropriate box prefix permanently displayed adjacent to the signal.

15.1.8

Emergency replacement facilities shall be shown as a dark red circle and the letter "E" where no signal lamp proving indication is available or the letter "R"

where a signal lamp proving indication is available; this letter shall also be shown in dark red as shown in Appendix 'A' - 27.

Operation of the facility shall be indicated by the appropriate automatic signal symbol showing red and the dark red circle shall become a dark red roundel.

15.1.9

Automatic working facilities for controlled signals shall be as shown in Appendix 'A' - 28. The dark blue circle and letter "A" shall be shown when the facility is not in use and the dark blue circle shall become a dark blue roundel when the facility is in use.

Where this facility applies to a group of signals the indication shall be positioned adjacent to the first signal of the group.

15.1.10

Signal Group Replacement shall be as shown in Appendix 'A' - 58. The red circle shall be shown when the signal group is not replaced to danger and the red circle shall become a red roundel when the signal group is replaced to danger.

A fixed indication shall be shown in cyan identifying the signals within an individual group.

15.1.11

The aspects of signals shown in Appendix 'A' – 22 and 23 shall flash when the signal aspect is flashing or when the route is timing off.

Details of the display of signal reminder appliances and SPAD alarm inhibit indications appear in Section 21 of this Specification.

A white diamond shall be shown next to any signal which has limited clearance for a driver using the Signal Post Telephone at that signal, as per Appendix 'A' - 22.

15.2 Overview

In addition to the requirements specified in Section 15.1 above, the following features shall be incorporated in the Overview.

15.2.1

Automatic, semi-automatic and intermediate block signal post plate symbols shall not be shown.

15.2.2

Position light signals shall not be shown.

15.3 Detail View

In addition to the requirements specified in Section 15.1 above, the following features shall be incorporated in the Detail Display.

15.3.1

Automatic, semi-automatic and intermediate block signal post symbols shall be shown.

15.3.2

All position light signals shall be shown.

15.3.3

The “light out” indication for position light signals shall be shown as in Appendix ‘A’ - 26.

15.3.4

Signal numbers shall be coloured grey or blue (see Section 20 of this Specification). Those shown in grey shall only be displaced when requested.

16 Points

16.1 Individual Point Setting

Individual point request indications (“N” and “R”) shall be provided on the Detail Display as follows:

16.1.1

When the points are individually requested to the normal or reverse position and the request is maintained an “N” or “R” will be displayed adjacent to the points as shown in Appendix ‘A’ - 29. Otherwise neither an “N” nor “R” will be displayed.

16.1.2

When an individual point request contradicts the interlocking controls, the “N” or “R” will flash to represent the requested position as shown in Appendix ‘A’ - 30.

16.1.3

A facility shall be provided to display reminder appliances for the individual point setting function and this is described in Section 21.5.

16.2 Definition of ‘Normal’ and ‘Reverse’

On request, it shall be possible to display a symbol and text at the bottom of the relevant Detail Display defining the normal setting for each end of points. The symbol shall take the form illustrated in Appendix ‘A’ - 31. Additionally, the points number shall be displayed adjacent to the points on the Track Diagram.

16.3 Point Numbers

Point numbers shall be coloured grey and shall be displayed only when requested.

17 Train Descriptions

17.1

Where they are required, train descriptions shall appear on both the Overview and the Detail Displays.

17.2

Train descriptions shall move from berth to berth and shall function generally in accordance with RT/E/PS/00012.

17.3

Train describer berths shall normally be shown within the running lines. Berths that are not within the running lines shall be shown as a grey block.

17.4

Train descriptions shall be cyan on the screen background when the train is controlled by Automatic Route Setting.

17.5

Train descriptions shall be pink on the screen background when the train is not controlled by Automatic Route Setting.

17.6

Train descriptions shall be stone on the screen background when the train is running to a contingency plan or a special timing pattern.

17.7

Train descriptions shall be of sufficient size on both the Overview and Detail Display to ensure clarity. The size may vary between the Overview and Detail view as shown in Appendix 'A' - 32.

18 Block Indications

18.1 Absolute Block

18.1.1

Where absolute block is the normal means of working trains to an adjacent Signalling Control Centre or signal box, the transmission operation shall be performed through three circular symbols set in the line to which the block applies.

18.1.2

The following colours shall be used for the symbols:

White - Normal

Green - Line Clear

Dark Red - Train on Line

18.1.3

The state of the block shall be indicated by the relevant circle being displayed as a roundel.

18.1.4

The receiving indication shall be given through the colour of the non track circuited line as follows:-

White - Normal

Green - Line Clear

Red - Train on Line

18.1.5

When the block is subject to a 'Timed Release', the text "TIME RELEASE" shall be displayed in red.

18.1.6

Where required, a 'Train Arrived Complete' indication shall be displayed as "TRAIN COMPLETE" in white.

18.1.7

Similar indications, but offset from the line, shall be used for block transmission where absolute block is only occasionally used. Receiving indications shall be as

18.1.8

The presentation shall be as shown in Appendix 'A' - 33.

18.2 Tokenless Block

18.2.1

The display associated with Tokenless Block working shall be as shown in Appendix 'A' - 34.

18.2.2

The Normal/Accept function shall be controlled through a white target, circular when in Normal state and becoming a roundel when in Accept state. The text "ACCEPT" shall be permanently displayed adjacent to the target.

18.2.3

The 'Offer' and 'Train Arrived' functions shall be displayed as white circular targets with the appropriate text adjacent to the target.

18.2.4

The state of the block shall be displayed in the colour of the non track circuited section of line as follows:

White - Normal (Blocked)

Green - Train Accepted

Red - Train in Section

18.3 One Train Working Without Train Staff

18.3.1

The state of the One Train Working section shall be shown by the colour of the non track circuited section of line as follows:

Green - Line Clear

Red - Train in Section

18.3.2

The presentation shall be as shown in Appendix 'A' - 35.

18.4 Radio Electronic Token Block

18.4.1

Radio Electronic Token Block controls shall not be displayed on a signalling display system. A separate screen shall be used.

18.4.2

The interface between the two systems shall be displayed in the form of a slot.

19 Remote Control Systems

19.1 General

The displays described within this specification provide for the most common permutation of Remote Control Systems. It should be amended as necessary where the systems are otherwise structured. Solid State Interlocking (SSI) failures shall also be treated in the same way as described below in 19.2.1, 19.2.3 and 19.2.4.

19.2 Duplicated TDM Remote Control

19.2.1

The failure indication (shown in Appendix 'A' - 36) shall comprise a red roundel target and text. The target shall flash until the fault is acknowledged and then become steady. It shall flash again on clearance of the failure and, on acknowledgement, the target and text shall be removed.

19.2.2

The text "CRITICAL" or "SEMI CRITICAL" shall suffix the alarm. Switching between systems shall be either automatic or technician initiated.

19.2.3

If the remote control system failure adversely affects the indications, acknowledgement of the alarm shall cause the area concerned to be shown as track diagram and static symbols, in both Overview and Detail Displays. Controlled signals shall be displayed as "light out" and points shown as in Appendix 'A' - 3 to 9 on both Overview and Detail Displays.

19.2.4

The limits of the area involved in the failure shall be designated by red lines crossing the track at the appropriate positions.

20 Train Protection Warning System

20.1 General

The Train Protection Warning System (TPWS) shall be shown in two different ways:

20.1.1

Any signal, permanent speed restriction or buffer stop shall be identified.

20.1.2

TPWS failure shall be separately indicated.

20.2 TPWS Fitment

20.2.1

Signal fitment shall be as shown in Appendix 'A' - 59. The signal number shall be shown in blue on the Detail view only. The signal number shall be permanently shown.

20.2.2

Permanent Speed Restriction fitment shall be as shown in Appendix 'A' - 60. The letter 'P' shall be shown in blue on the Detail view only, adjacent to the track to which the (or group of) permanent speed restriction(s) refer.

20.2.3

Buffer stop fitment shall be as shown in Appendix 'A' - 61. The final symbol at the end of the track shall be shown in blue on the Detail view only.

20.3 TPWS State

20.3.1

For signal fitment, display of the correct signal aspect shall indicate that TPWS is in operation, whether energised or not. A failure of TPWS shall not prevent display of the correct aspect.

TPWS failure shall be as shown in Appendix 'A' - 62. A flashing rectangular symbol shall be shown in blue adjacent to the signal number on Detail views. On

Overviews, a flashing rectangular symbol shall be shown in blue indicating on which Detail view the particular signal is displayed.

In addition, a text message including the signal number shall be shown in the signalling alarm window on the General Purpose VDU. This shall be accompanied by an audible alarm.

20.3.2

For Permanent Speed Restriction fitment, display of a steady letter 'P' in blue shall indicate that TPWS is fitted.

TPWS failure shall be as shown in Appendix 'A' - 63. A flashing letter 'P' shall be shown in blue adjacent to the track associated with the (or group of) permanent speed restriction(s) on Detail views. On Overviews, a flashing letter 'P' shall be shown in blue indicating on which Detail view the particular permanent speed restriction is displayed.

In addition, a text message indicating the permanent speed restriction shall be shown in the signalling alarm window on the General Purpose VDU. This shall be accompanied by an audible alarm.

20.3.3

For buffer fitment, display of a steady buffer stop symbol, final track symbol or exist symbol in blue shall indicate that TPWS is fitted.

TPWS failure shall be as shown in Appendix 'A' – 64. A flashing buffer stop symbol, final track symbol or exit symbol shall be shown in blue on Detail views. On Overviews, a flashing letter 'B' shall be shown in blue indicating on which Detail view the particular buffer stop is displayed.

In addition, a text message indicating the buffer stop shall be shown in the signalling alarm window on the General Purpose VDU. This shall be accompanied by an audible alarm.

21 Reminder Appliances, SPAD ALARM INHIBIT and Associated Indications

21.1 Signal Reminders

21.1.1

Signal reminder appliances shall be displayed as shown in Appendix 'A' - 37, 38.

21.1.2

The colours of the signal reminder appliances shall be as follows:

Pink - meaning route(s) ahead isolated and blocked to electric traction.

Cyan - meaning route(s) ahead blocked and signal to be maintained at danger.

21.1.3

Where a traction current isolation coincides with any other reason for maintaining a signal at danger the signal reminder appliance will be in two colours as shown in Appendix 'A' - 41.

21.2 Automatic Working Reminders

The screen background colour of the dark blue circle used for the automatic working indication shall be changed to cyan when a reminder is applied as shown in Appendix 'A' - 65.

21.3 Emergency Replacement Reminders

The screen background colour of the dark red circle used for the emergency replacement indication shall be changed to cyan when a reminder is applied as shown in Appendix 'A' - 39.

21.4 Block Instrument Reminders

The screen background colour of the appropriate block instrument circle used shall be changed to cyan when a reminder is applied as shown in Appendix 'A' - 66.

21.5 Signal Group Replacements, Axle Counters, Points, Ground Frames, Automatic Route Setting Sub Area and CCTV Control Indication Reminders

21.5.1

Reminder appliances for signal group replacements, axle counters, points, ground frames, Automatic Route Setting sub areas and CCTV control indications shall consist of yellow characters placed either side of the appropriate indication as shown in Appendix 'A' - 40 and 'A' - 71.

21.5.2

Uncommitted point indications shall be shown similarly, but in cyan. The point setting "N" or "R" shall not be displayed.

21.6 Automatic Working Isolations

The screen background colour of the non-used area directly adjacent (left or right) to the dark blue circle used for the automatic working indication shall be changed to pink when an isolation is applied as shown in Appendix 'A' - 65.

21.7 Emergency Replacement Isolations

The screen background colour of the non-used area directly adjacent (left or right) to the dark red circle used for the emergency replacement indication shall be changed to pink when an isolation is applied as shown in Appendix 'A' - 39.

21.8 Section Reminders

21.8.1 AC Traction Isolation

The affected section of track shall be displayed on a pink background as shown in Appendix 'A' - 41.

21.8.2 DC Traction Isolation

The affected section of track shall be displayed on a stone background as shown in Appendix 'A' - 41.

21.8.3 AC and DC Traction Isolation

The affected section of track shall be displayed on a background of alternating pink and stone as shown in Appendix 'A' - 41.

21.8.4 Blocked To AC Electric Traction

The affected section of track shall be displayed on a background of alternating pink and black as shown in Appendix 'A' - 42.

21.8.5 Blocked To DC Electric Traction

The affected section of track shall be displayed on a background of alternating stone and black as shown in Appendix 'A' - 42.

21.8.6 Blocked To AC and DC Electric Traction

The affected section of track shall be displayed on a background of alternating pink/black and stone/black as shown in Appendix 'A' - 42.

21.8.7 Engineer's Possession

The affected section of track shall be displayed on a cyan background as shown in Appendix 'A' - 43.

21.8.8 AC Traction Isolation Simultaneous with Engineer's Possession

The affected section of track shall be displayed on a background of alternating pink and cyan as shown in Appendix 'A' - 43.

21.8.9 DC Traction Isolation Simultaneous with Engineer's Possession

The affected section of track shall be displayed on a background of alternating stone and cyan as shown in Appendix 'A' - 43.

21.8.10 AC and DC Traction Isolation Simultaneous with Engineer's Possession

The affected section of track shall be displayed on a background of alternating pink, stone and cyan as shown in Appendix 'A' - 43.

21.8.11 Blocked To AC Electric Traction Simultaneous with Engineer's Possession

The affected section of track shall be displayed on a background of alternating cyan, pink and black as shown in Appendix 'A' - 43.

21.8.12 Blocked To DC Electric Traction Simultaneous with Engineer's Possession

The affected section of track shall be displayed on a background of alternating cyan, stone and black as shown in Appendix 'A' - 43.

21.8.13 Blocked To AC and DC Electric Traction Simultaneous with Engineer's Possession

The affected section of track shall be displayed on a background of alternating cyan, pink, stone and black as shown in Appendix 'A' - 43.

21.9 SPAD Alarm Inhibit

The screen background colour of the signal post base shall be changed to yellow when a SPAD Inhibit Long (SIL) or SPAD Inhibit Short (SIS) is applied (i.e. SPAD detection is inhibited) as shown in Appendix 'A' – 70.

22 Miscellaneous Indications

22.1 Ground Frames

Indications of the status of Ground Frames shall be as shown in Appendix 'A' - 44. Ground frame release indications shall not be shown on the Overview, white route set indications being shown in the relevant track circuit when the release is given.

The Detail Display shall show both route set indications and release indications. The circles shall be dark green and the text grey, the "N" indication being a white roundel when no release is given. The "F" indication shall be flashing dark green when the release is given until accepted when a steady dark green roundel shall be displayed.

22.2 Slots Control

Slot releases shall be shown as a dark green circle. The circle shall change to a white roundel to indicate a slot release given or to a white circle to indicate a slot release received - see Appendix 'A' - 45. Only slots on main signals shall be shown on the Overview.

22.3 Axle Counters

Axle counters shall be shown on detail views only as a dark green circle. The circle shall change to a flashing red roundel to indicate an axle counter fault, steady when acknowledged. When the axle counter is resetting, the indication shall change to a flashing white roundel, steady when complete. Adjacent to the axle counter indication, a 2-digit reset count shall be displayed. This count shall increase by one each time the axle counter is reset - see Appendix 'A' - 67. When the reset count has reached 99, on the next reset, the count shall revert to 00.

The symbol specified in Appendix 'A' – 67 is intended for isolated axle counters within track circuit schemes and any scheme with a high density of axle counters shall review and justify the adequacy of the proposed symbols/operation.

22.4 Hot Axle Box Detectors (HABD)

Hot axle box detectors shall be shown as a red circle with an adjacent letter 'H' in red - see Appendix 'A' - 68. The red circle shall change to a flashing red roundel to indicate that a hot axle box has been detected. When the hot axle box has been acknowledged, the red roundel shall become steady. When the hot axle box detector has been cancelled, the red roundel shall revert to a red circle.

22.5 Train Ready To Start (TRTS)

This shall take the form of a white roundel situated on the relevant platform symbol which shall flash when the function is operated until a route is set (see Appendix 'A' - 46) or until an appropriate acknowledgement is given.

22.6 Notice Boards

The symbol shall be as shown in Appendix 'A' - 47 and coloured grey. Notice board symbols shall appear on the Detail Display only.

22.7 Limit of Shunt Indicators

The symbol shall be coloured red to indicate that the LOS is alight and shown in grey outline with black interior to indicate light out - see Appendix 'A' - 47. The letters "LOS" shall be grey. LOS symbols shall appear on the Detail Display only.

22.8 Bi-Directional Signalling

Direction arrows shall be shown on the overview and detail display as illustrated in Appendix 'A' - 48. The inhibition and releasing of wrong direction routes in co-operation with a patrolman shall take the same form as a groundframe release. The inhibited direction shall be indicated by a red direction arrow.

22.9 Signalboxes

Signalboxes, as well as other structures such as relay rooms etc., shall not be shown.

22.10 Stations

Stations shall be shown using stone coloured rectangles, identified normally by the first and last letters of the name as shown in Appendix 'A' - 46.

22.11 Tunnels and Viaducts

Tunnels will be shown if they are 200 yards or longer or have special operational conditions. They shall be denoted by the tunnel liner shown dotted, as illustrated in Appendix 'A' - 49.

Viaducts shall be shown if they have special operational conditions, as illustrated in Appendix 'A' - 50.

22.12 Automatic Route Setting Sub Area

Automatic Route Setting Sub Area control shall be displayed as shown in Appendix 'A' - 53.

22.13 Level Crossings

22.13.1 Position of Level Crossing

Level Crossings shall be shown as in Appendix 'A' - 51 by a band in stone colour. The name and type of crossing shall be shown in grey. The following shall be indicated.

22.13.1.1

Automatic crossings.

22.13.1.2

Open crossings.

22.13.1.3

Crossings with white light indications.

22.13.1.4

Crossings with a telephone.

22.13.1.5

Crossings manned locally by crossing keeper.

22.13.1.6

Manually Controlled Barriers (MCB).

22.13.1.7

Remote Controlled Barriers (RCB).

22.13.1.8

Close Circuit Television (CCTV).