

BR 1906
September 1989

Specification for Solid State Interlocking Long Distance Terminal

British Railways Board



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BRITISH RAILWAYS BOARD

SPECIFICATION NO. 1906

FOR

SOLID STATE INTERLOCKING LONG DISTANCE TERMINAL

FOREWORD

This specification supersedes all previous issues and is issued by:-

British Railways Board,
Director of S. & T. Engineering,
Materials Management Group,
Room 1103,
Rail House,
CREWE,
Cheshire. CW2 6EA

from whom further copies may be obtained.

Technical queries shall be referred to the above address.
For telephone enquiries the numbers are:-

BT (STD) 0270-532494
BT (STD) 0270-532345 FAX
BR (ETD) 05-32494
BR (ETD) 05-32345 FAX

REFERENCES

British Railways Drawings

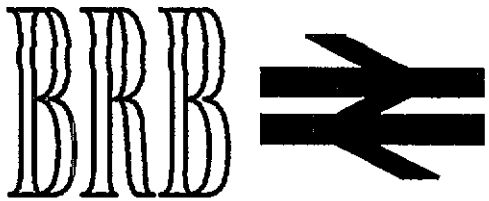
- ELS A1 3654 Issue G - Long Distance Terminal Micro-Processor Circuit Diagram
- ELS A1 3655 Issue F - Long Distance Terminal FIFO/Logic Circuit Diagram
- ELS A2 3695 Issue E - Long Distance Terminal Power Supply Board

British Railways Specifications

- 967 Environmental Conditions for Railway Signalling Apparatus
- 1900 General Specification for Solid State Interlocking Equipment
- 1990 Procedures for Programming and Checking PROM Devices for Vital Systems
- 8665/20 BRB Supplier Quality Assurance Procedures

Other Specifications

- BS 381/C British Standard Plain Colours
- BS 5750 Quality Systems



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<u>Amnd No</u>	<u>Date</u>	<u>Text Affected</u>

British Railways Board

Manufacturers Drawings

GEC - General Signal:-

OC 50500A Issue 4 LDT General Assembly
OW 60554A Issue 5 LDT Dual Processor and Power Supply
OW 60555A Issue 5 LDT FIFO Logic and Interface
OW 60563A Issue 4 LDT Wiring Diagram

The latest issue of all specifications, drawings and British Standards shall apply unless otherwise stated.

1. GENERAL

- 1.1 Long Distance Terminals (LDTs) form part of the serial interface between Multi-Processor Modules (MPMs) or Data Link Modules (DLMs) or Trackside Functional Modules (TFMs) of the solid state interlocking, and a high order pulse code modulation (PCM) Data Transmission System (DTS). On the SSI side of the interface Data transfer is at 20 Kbps. On the DTS side Data transfer is at 64 Kbps. The LDT is required to carry out the conversion between 20 Kbps and 64 Kbps, adding a control centre identity and coding protection to messages transmitted to the DTS and checking and removing the control centre identity and coding from messages received from the DTS.

The LDT shall be capable of connection of up to six SSI modules at 20 Kbps and 1 DTS at 64 Kbps.

- 1.2 This specification states the Engineering requirements for a solid state interlocking module for long line transmission.
- 1.3 The LDT shall meet all the requirements of the BR Specification 1900 unless otherwise stated.

2. CONSTRUCTION

- 2.1 The LDT shall be constructed to meet the requirement of BR Specification 1900 Section 4.
- 2.2 The LDT shall meet the requirements of BR Specification 967 category D.
- 2.3 The LDT shall contain printed circuit boards which will be mounted in a small type module.

Space envelope and fixing dimensions for the module are given on drawing 1906-A4-2.

- 2.4 The LDT shall be internally labelled in accordance with the following:-

- (a) The PCB assembly shall have all the component numbers and positions marked.
- (b) The PCB assembly shall carry the manufacturers name, module type, BR specification number, date of manufacture and modification state.

2.5 A nameplate with Black lettering on a Yellow ground giving the following information shall be attached to the outside of the LDT in a conspicuous position on the front panel as agreed by the Director of Signalling and Telecommunications Engineering. The label shall be generally in accordance with drawing 1906-A4-1.

- (a) Manufacturers Name
- (b) Module Type
- (c) BR Specification Number
- (d) Serial Number
- (e) Date Tested
- (f) Modification State

2.6 The materials used and finish shall comply with BR Specification 1900 Clause 5. The modules shall be painted light aircraft Grey to BR Specifications 381C colour number 627.

3. ELECTRICAL REQUIREMENTS

3.1 The module shall contain all of the circuitry shown in the following drawings.

GEC Drawings No. OC 50500A Issue 4
OW 60554A Issue 5
OW 60555A Issue 5
OW 60563A Issue 4

3.2 The 64 Kbps interface shall comply with CCITT Recommendation G703 - Contradirectional Interface.

3.3 The use of unsoldered plug-in components shall be avoided except for the CPU, EPROM VIA and PIA which shall be mounted using sockets approved by the Director of S & T Engineering.

3.4 The circuitry shall be so arranged that there is only one electrical commonpoint between the power supplies for the logic circuits.

3.5 Special care shall be taken in the design of the printed circuit for protection against electro-magnetic interference.

3.6 The two EPROM's shall have been programmed to the requirements of BR Specification 1990 "Procedures for programming and checking PROM devices for vital systems".

3.7 External indications shall be provided as shown on Drawing No. 1906-A4-1.

3.8 The EPROMS shall be mounted in such a position that they are accessible for changing without dismantling the complete assembly.

4. CONNECTORS

The module shall be connected via a multiway connector. The standard connector shall be a 75-way rectangular form. Further details of this connector and the pin allocation to be used are shown in Appendix one of this Specification.

5. RELIABILITY

The module shall be designed to achieve a predicted nominal M.T.B.F. of 10 years. The contractor shall send details of the method of calculation used.

6. MODULE AND 20 Kbps INTERFACE RATINGS

The maximum current rating of the module measured at the 110V input shall be:-

Each transmitter input shall be capable of sinking up to 23mA without damage.

Each receiver output shall sustain a short circuit current of at least 27mA.

7. TYPE APPROVAL TESTS

The type approval testing shall be carried out as detailed in BR Specification 1900 Section 8. The following type tests shall be applied to an example of the Data Link Module.

- Visual Inspection (1)
- Performance Test (1)
- Dry Heat Test
- Damp Heat Test
- Low Temperature Test
- Drip Test
- Drop Test
- Vibration Test
- Humidity Test
- Insulation Test
- Condensation Test
- Visual Inspection (2)
- Performance Test (2)

8. ACCEPTANCE TESTS

Details of the acceptance tests to be carried out on every module after manufacture are shown in Appendix two of the Specification.

9. QUALITY ASSURANCE

9.1 The contractor shall comply in full with the requirements of this specification and, in addition, shall comply with BR 8665/20 BRB Supplier Quality Assurance Requirements which includes compliance with BS 5750 : 1987.

9.2 Where a BR requirement exists for a certificate of conformity to be provided with the goods, a copy is to be forwarded to the BRB QA representative.

9.3 For the purposes of this specification, the BRB's responsible QA representative is:-

British Railways Board
Director of S & T Engineering
Quality Assurance Engineer
E605 Macmillan House
Paddington Station
London W2 1FT