

Interface Processor and Remote Interlocking Interface SSI-Like Reference

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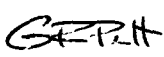
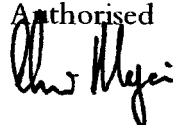
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1 Introduction

1.1 PURPOSE

A Remote Interlocking Interface (formerly known as a Relay Interlocking Interface) subsystem (RII) or an Interface Processor (IFP) is used to allow the incorporation of Route Relay Interlocking (RRI) signalled areas into the control area of an Integrated Electronic Control Centre (IECC). IECC communicates with interlockings using the Solid State Interlocking (SSI) protocol. RII and IFP use the same protocol, but have access to the RRI indications and controls that were previously connected to the signaller's panel.

In most cases, the RRI will have been previously controlled directly by means of an entrance-exit (NX) panel and, hence, the controls and indications connected to RII will directly mirror the switches, lamps and buttons on the panel. Data for RII (or IFP) when used in this configuration is prepared in a similar way to SSI data and is described in this guide.

However in some instances, the RRI may have been previously controlled by an NX panel via Electronic Route Selection Equipment (ERSE) and it may be decided to replace the ERSE with a TDM link to RII (Note. IFP has not been and will not be used as an ERSE replacement). Data for RII when used in this configuration is described in the complementary ERSE guide^[1].

RII and IFP perform the same function. RII supersedes IFP and, unlike IFP, uses the same hardware and software architecture as other IECC subsystems.

1.2 EVOLUTION

This guide supersedes earlier documents for IFP and RII data preparation^[2,3]. This issue of the guide addresses changes in presentation of the data in line with the SSI Applications Manual^[1].

It is derived from the RII guide^[3] which represented a total revision of IFP and RII data preparation practice and allowed for the addition of Train Operated Route Release (TORR). This document amends information in the earlier RII guide^[3], and revises the method of TORR to conform to new Railway Group Standards. Operation with a local emergency panel has now been included, and examples for non-TORR routes and a ground frame have been added. All new IFP and RII data should follow the practice outlined in this document, but retrospective action is not necessary for existing data, unless TORR is required.

2 Terms

2.1 AUTOMATIC ROUTESSETTING SUBSYSTEM (ARS)

The Automatic Routesetting Subsystem (ARS) is part of the IECC. ARS operates main signal running routes plus a limited set of shunting routes automatically in response to the approach of trains. It determines the optimum routeing of trains in the area based on their current position, their importance and their destination, and automatically requests the required routes when the routes are free.

2.2 CONTROL

An item of information which passes along some or all of the information path from the IECC through the RII (or IFP) and RRI towards the trackside.

2.3 ELECTRONIC ROUTE SELECTION EQUIPMENT (ERSE)

ERSE is an electronic non-vital system that is used to reduce the number of relays in an RRI, by carrying out many of the non-vital functions itself. Functions carried out by ERSE include the decoding of button sequences, the calling of the points to the positions required by the route and the calling of the route itself once points are correctly locked.

2.4 ENTRANCE-EXIT (NX) PANEL

A method of controlling signalling systems, where the state of the railway is displayed by lamps on a mimic diagram. A route is set by sequential operation of buttons placed near the entrance and exit signals of the route.

2.5 INDICATION

An item of information which passes over some or all of the information path from the trackside through the RRI and RII (or IFP) towards the IECC.

2.6 INTERFACE PROCESSOR (IFP)

IFP acts as a non-vital interface between the RRI and the IECC. To the IECC, it behaves in the same way as SSI. Instead of communicating with trackside equipment, it is connected to the RRI controls and indications. The data within the IFP is closely related to SSI data.

IFP has been superseded by RII; it is still in use at the Yoker IECC scheme but is scheduled for replacement by an RII at Christmas 2000. The hardware is Motorola 6800-based and is constructed from purpose-built Eurocard processor boards. The hardware and software is not compatible with other IECC subsystems.

2.7 INTEGRATED ELECTRONIC CONTROL CENTRE (IECC)

A computerised railway control centre, intended to communicate mainly with SSIs.

2.8 LOCAL PANEL

A local panel is used to provide local control of an interlocking in case of failure or engineering work. The local panel controls are generally enabled or disabled by a keyswitch facility, and an indication to show that the local panel is not in use is sent back to the RII over the TDM system. When the local panel controls are enabled, the controls from the RII via the TDM are disconnected from the interlocking, however the indications remain connected.

2.9 REMOTE INTERLOCKING INTERFACE SUBSYSTEM (RII)

RII acts as a non-vital interface between the RRI and the IECC. To the IECC, it behaves in the same way as SSI. Instead of communicating with trackside equipment, it is connected to the RRI controls and indications. The data within the RII is closely related to SSI data.

The hardware is Motorola 68000-based and is constructed from commercially available VMEbus printed circuit boards. The hardware and software are compatible with other IECC subsystems.

2.10 ROUTE RELAY INTERLOCKING (RRI)

A relay logic circuit which accepts requests (usually from an operator's panel) and, if the safety conditions are satisfied, changes the state of trackside equipment to satisfy the request. The states of trackside equipment, as well as various RRI internal states, are available for display to the operator.

2.11 SOLID STATE INTERLOCKING (SSI)

SSI performs the same function as RRI, but uses multiple-redundant microprocessors instead of relays. It also has the facility to interface with an Integrated Electronic Control Centre. The function of SSI, and in particular the data used to control its operation, is described in the SSI Applications Manual^[1].

2.12 TIME DIVISION MULTIPLEX (TDM)

A non-vital communications link which is used to connect the RII and the RRI.

2.13 TRAIN OPERATED ROUTE RELEASE

A process by which a route is freed after a train passes its entrance signal, with appropriate precautions to prevent false release while the train is still approaching. The route would otherwise have to be cancelled manually.

2.14 VITAL

A vital operation is part of the safety integrity of the railway and must be processed by a vital system (SSI or RRI).

3 Background

3.1 ROUTE RELAY INTERLOCKING

It is assumed that the RRI is of standard BR free-wired type, with or without Train Operated Route Release (TORR), and that from the RRI viewpoint, the RRI behaves in the same way as an entrance-exit (NX) panel. Any other control, indication or communication arrangements are considered to be scheme-specific requirements and are outside of the scope of this document.

3.2 SSI-LIKE DATA

This guide describes data that is generally similar to SSI data, and can be applied to IFP and RII, except where it is noted that a particular feature applies only to one type of equipment.

RII requires further data to control features such as telegram routing, standby update, and error reporting. These are not covered by this document and are described elsewhere.

[1] IECC Data Preparation, IDPM 1502, Relay Interlocking Interface Reference, SAO-IEC-HD-60
Issue 4, 29 October 1999.