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Module

Chapter E: IPt, PFM, & PRR Files

For endorsement, authorisation and issue record of this document, please refer to the SSI Applications Manual Contents, NR/L2/SIG/17002.

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User information

This Network Rail standard may contain requirements that are colour-coded according to the following Red–Amber–Green classification.

Red – Mandatory requirements

- **Requirements** that **will** be complied with, and achieved under all circumstances.
- Accountability for the efficacy of these requirements lies with the Professional Head/Standard Owner.
- These requirements are monitored for compliance.
- Local non-compliances, discovered through engineering verification visits, will be reported and monitored through the quarterly Engineering Verification Report.
- Corrective actions will be enforced where local non-compliances remain open beyond the agreed mitigation plan dates.
- These are presented in a red box **and with the word “shall” or a direct instruction.**

Amber – Conditional requirements

- **Requirements** that **will** be complied with unless deviation has been approved.
- Accountability for the efficacy of these requirements lies with the Professional Head/ Standard Owner, or their nominated Delegated Authority.
- These requirements are monitored for compliance.
- Derogations **may** be permitted; which are to be approved by Standard Owner in advance.
- Derogations and Temporary Non-Compliances **may** be granted through the existing Delegated Authority arrangements.
- These are presented with an amber sidebar **and with the word “shall” or a direct instruction.**

Green – Guidance

- Guidance based on good practice; representing supporting information, based on good practice, to help achieve **RED** and **AMBER** requirements.
- This guidance is **not mandatory** and is not monitored for compliance.
- Alternative solutions may be used, which do not need to be formally approved.
- Decisions made by a competent person to use alternative solutions should be backed up by appropriate evidence/documentation.
- This is presented with a dotted green sidebar **and with the word “should” (usually in notes).**

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Issue record

Issue	Date	Comments
8	October 2005	8 th Issue
9	03/03/2012	9 th Issue

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 03/03/2012.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 3 (Option Selection) to continue to comply with the issue of any relevant Network Rail standards current when GRIP Stage 3 was completed and not to comply with requirements contained herein, unless stipulated otherwise in the scope of this standard.

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1 Input Telegram Data (IPT File)

For each reply telegram from a Trackside Functional Module, there shall be a block of data which is used by the program to calculate the relationship between the bits in the incoming telegram and the areas of memory which they shall update. Each block of data shall start with a label and end with an "end marker" data type. The label shall be of the form "*Inn", where "nn" is the decimal telegram number in the range 1 to 63. A label and its associated data need only be provided for the Module numbers which have been allocated.

A similar block of data shall be provided for each input telegram which is to be extracted from the message over the Internal Communications System from another Central Interlocking. These data blocks also commence with an input telegram label of the form "*Inn" (in this case the telegram number shall be in the range 64-78), but it is also necessary to specify the other Central Interlocking and which of the fifteen telegrams in its message is to be used. This is achieved by specifying a Central Interlocking Name (as defined in the Scheme Design Database - see Chapter C Section 2) and output telegram number. For instance, if input telegram 68 is to contain the data transmitted by the Central Interlocking called "FENNYCMP" in its output telegram 72, then the full input telegram label will be:

*I68 FENNYCMP 72

Only spaces may separate the input telegram number, the Central Interlocking name and the output telegram number.

1.1 Use of "Input Telegram Specials"

It would almost be possible to write the entire block of data using conditional statements to carry out tests on the input telegram bits and set up the correct areas of memory with standard command data types. There are six data constructs which occur repeatedly, however, and it is more efficient to define the required operations in the program rather than in the data. The six constructs apply when the incoming data refers to track sections (which accesses the data valid bit that isn't accessible long hand), signal lamp proving, points, route/junction indicators and latches. The program to deal with these inputs is invoked by the appearance of the relevant "input telegram special" data type. In order that these data types can be used correctly, it is important to understand the program operations which they invoke.

1.1.1 Input telegram for track section

The format of the "specials" was discussed in Chapter D Section 1.16. The qualifier gives telegram bit numbers. The relevant bit or bits are tested. If they are all in the '1' state, the track section is considered to be clear, otherwise it is considered to be occupied. This information is used to update the relevant bits in the track section memory as described in Chapter B Section 3.4. An alternative form of this data type, the "Input telegram for track section (delayed)" is also available and is processed in a similar manner; it is employed where an additional delay is required in the Interlocking declaring a track section clear (see Section 1.5).

Both data types will set the track section to undefined in the event of the Central Interlocking not receiving replies from the associated Points or Signal Module (see Chapter B Section 3.4 & Chapter H Section 2(iii)).

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1.1.2 Input telegram for signal

The qualifier gives the telegram bit or bits which shall be tested for lamp proving. If all the indicated bits are in the '1' state, the program will set the lamp proving bit in the relevant signal memory to a '1' state, otherwise it will be put to a '0' state. In addition, the status part of the telegram is examined and the "not red retaining" bit of the signal memory is set or cleared as appropriate. If the Signal Module is red retaining and it was not previously in that state, then the aspect code is set to the state meaning "most restrictive".

If the Signal Module is found to be continuing in a red retaining state, then the aspect code is left unaltered. This is done because the part of the program responsible for aspect sequencing will have had the opportunity to calculate what the most restrictive aspect actually is (it may not be red). As there is no status information received over the Internal Data Links, the "not red retained" bit in signal memory will always be set if this data type is used in the data for input telegrams 64-78.

An alternative form of this lamp proving special may have to be used for signals (or slots) without lamp proving, and this is covered in Section 1.2.2.

1.1.3 Input telegram for points

The qualifier gives the telegram bit numbers which correspond to normal and reverse detection of the points. By convention, the more significant bit corresponds to normal detection, while the less significant bit corresponds to reverse detection. The Module allocation should be checked so that this is the case. The states of the detection bits in the telegram are copied into the detection bits in the relevant points memory.

1.1.4 Input telegram for route/junction indicator

In this case there are two qualifiers required. The first is written as "rip" to indicate to the compiler that route/junction indicator proving is required. The second qualifier consists of a mask to indicate which bit or bits in the telegram carry the route/junction indicator proving. If more than one bit is indicated, all shall be in the '1' state for the route/junction indicator to be recorded as proved.

1.1.5 Input telegram for latch

Again the qualifier gives the bit in the telegram to be tested. The program will set the latch memory to the '1' state if (and only if) the bit or bits indicated in the input telegram are in the '1' state. If more than one bit is indicated, all the bits shall be in the '1' state for the latch memory to adopt a '1' state, otherwise it will adopt a '0' state.

1.1.6 Examples

The data for two telegrams at Stopham West are given as examples for the format of complete data blocks using these data types:

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/ Address 6 - Signal Module

*I06

"S11 7

/ Signal 11 lamp proving

"S11 rip 6

/ Signal 11 route indicator proving

"TGH 3 , "TEJ 2 , "TEH 1

/ Track section inputs

"L101DETN 0

/ Release 101 detected normal

. / end of tgm 6

/ Address 8 - Points Module

*I08

"P105 76

/ points 105 on bits 7 and 6

"P103 54

/ points 103 on bits 5 and 4

"TEL 3 , "TEK 2

/ TCs EL and EK on bits 3 and 2

. / end of tgm 8

1.2 More Complex Input Functions

Various inputs do not lend themselves to the unqualified treatment by the five "specials" defined above.

1.2.1 No (or limited) lamp proving

Signals (or slots, see [SSI8003-51](#)) which have no lamp proving inputs form a special case.

There is a requirement that a signal should appear on the Panel as though it were proved, so provision shall be made at this stage in the data. An example is a position light shunting signal having no proving input. In such cases, it is required that the lamp proving function be carried out despite the fact that no lamp proving input exists. This can be achieved by using the standard "Input telegram for signal" data type with the qualifier written as "z". This causes the program to set the lamp proving bit unconditionally. For example:

"S28 z

This will have the effect of setting the lamp proving bit for signal 28 regardless of the state of the input telegram. This shall be done if a red lamp is to be lit on the Panel, using data in the PSD file (see [SSI8003-20C](#), Section 1).

The second reason for employing this form of the "Input Telegram for Signal" special is to check that the "not red retained" bit in signal memory is updated. When the "Output Telegram for Signal" special is employed, this bit is tested during the processing of aspect sequence data (see Chapter G Section 1.2.7) to check whether the Signal Module is in red retaining; if so, the aspect code is changed to the most restrictive aspect in signal memory in order to obtain correct aspect sequencing and to provide correct indications to the Signaller. Also signal stick unsetting is inhibited in this state.

Position light shunting signals for which lamp proving of only the red aspect is required are treated as normal lamp proven signals in the wiring at the trackside and in the input telegram data. The data in the Panel Processor identifies these signals so that a white light can be displayed on the Panel even if the white lamp at the trackside has failed.