IECC Data Preparation

IDPM 1302

Issue 4.1

Date1 November 1999

External Communications Reference

For approval and authorisation of this document, please refer to the IECC Applications Manual Contents, RT/E/S/10040.

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Author	Approved	Date	Authorised	Date
R.G. Watson.	GRH	21/12/1999		12/10/00

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1 Introduction

This document is the reference manual for the ECS data compiler and contains information concerning the following subjects :-

- input file preparation and syntax description;
- error messages and their interpretation;
- worked examples of ECS data compiler source files.

Users of Automated Data Preparation (ADP) tools may use this document to check and modify ADP prepared data.

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2 Assumptions And Restrictions

1. The Central Parameter File may be referred to within this document by its abbreviation, CPF.
2. The reader of this documentis assumed to be familiar with the content of the CPF.
3. The reader of this document is assumed to be familiar with the role of the ECS within the IECC.
4. The following files are not specific to the ECS Data Compiler but must be present and correctly set up for it to operate successfully:
   - the CPF;
   - the GWS input file;
   - the TD map (.SA) files;
   - the IECC Identities files.
5. The term “signal item” is equivalent to the term “identity”.
6. For the IECC to operate successfully, there must be no more than 4096 berths and/or 4096 signal items.
7. In this document, an ET berth is a berth which is on the edge of the IECC area and whose content is transmitted to either the IECC or to a remote system as state change messages.

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3 Overview Of Components

The ECS data compiler consists of three components:

- **ecs** - the top level shell executable. This controls level 1 and C compilation;
- **ecs2** - performs the level 2 compilation phase;
- **ecs1** - performs the level 1 compilation phase.

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4 File Preparation

Before the ECS data compiler can be used, the following files require preparation. This is normally achieved through use of ADP but they can be produced or amended manually.

(1) Central Parameter File;
(2) ECS Overview File;
(3) Remote System File(s);
(4) Gateway Subsystem Input File
(5) TD Map SA File(s);
(6) IECC Identity Files.

All these files contain data which is specific to each IECC site. They will normally be different between sites. Some are optional dependent on the configuration of a particular site.

This section describes the input file format and the effect of the various data fields on subsystem operation. The syntax is described in English. For a more rigorous description of the input file syntax, refer to section 9.

Preparation of the CPF, Gateway Subsystem Input File and TD Map SA Files are described elsewhere within this manual. All other files are described within this document.

4.1 ECS OVERVIEW FILE STRUCTURE

The ECS Overview file consists of a set of statements and sections containing information about ECS characteristics for a particular site. Each statement consists of a keyword and some formatted data and each section consists of a set of keywords and formatted data.

Each statement in this ECS Overview file is described below. The statements are expected in the order in which they are described

4.1.1 SUBSYSTEM Statement

SUBSYSTEM { ECS1 }

The SUBSYSTEM statement gives the subsystem name of the ECS for which the data is being prepared.

4.1.2 CPF Statement

CPF { FILE '../SERVICE/cpf1' }

The CPF statement gives the search path which the ECS Data Compiler uses to load the CPF.

4.1.3 GWS Statement

GWS { FILE '../GWS/gws' }

The GWS statement gives the search path which the ECS Data Compiler uses to load the Gateway Subsystem Input File.

4.1.4 IECC Statement

IECC { ZR11 } / TD area name is ZR11

The IECC statement gives the TD area name for IECC berths and signalling items. This keyword is optional and if not specified then the statement within the CPF is used.

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4.1.5 BERTHS Section

The format of this section is as follows :-

```
BERTHS {
        TDAREAS {
                Area  {
                        BerthList
                }
        }
        INITTDN {
                { Berth Description }
        }
        QUEUE {
                { BerthList }
        }
        STACK {
                StackBerth {
                        BerthList
              }
        }
        GROUP {
                STACK {
                        StackBerth {
                                BerthList
                        }
                }
        }
        PERM {
                { Berth Berth }
        }
        POSITION REPORT Subsystem {
                BerthList
      }
        ARSSI DisplaySubsystem  {
              BerthList
      }
        ETBFOR DisplaySubsystem {
              BerthList
        }
}
```

Where :-

Area	A four character TD area name
Berth	A four character TD berth name
BerthList	A list of TD berth names separated by white space
Description	A four character train description
DisplaySubsystem	The logical name of a display subsystem, as entered in the CPF
StackBerth	A four character TD berth name used to report the contents of the stack
Subsystem	The logical name of a subsystem, as entered in the CPF

The BERTHS section of the ECS Overview file is used to declare the attributes of all berths, both IECC and remote, which are not specific to any one remote system. Attributes are declared by means of keywords and

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formatted data. All keywords are optional and need not be included unless site requirements demand it. The berth definition keywords are described in detail below:

- **TDAREAS (mandatory)**- the only mandatory berth definition keyword. Within this section there are a number of lists, one for each TD area. The lists contain all remote berths which are known to the ECS.

- **INITTDN (optional)**- Display subsystems do not have the facility to initialise a berth with a train description. If necessary, this is performed by ECS on start-up. Each berth which requires initialisation is listed along with its initial train description.

- **QUEUE (optional)**- lists all berth queues at the site. A queue is a set of berths used to monitor the order of trains on a section of track outside the IECC control area.

  An example of a queue implementation is where a train passes through a section of track within the IECC boundaries, but outside IECC control.

  The ECS provides stepping between the berths in the queue. These berths are displayed by the display subsystem so that the signaller is aware of the order of trains in on that section of track.

  When the train re-enters the IECC area of control, the IECC steps the train out of the queue.

- **STACK (optional)**- this is used to list of stacks at the site.

  A stack consists of a stack berth and an associated queue. A stack is used in situations where regular updates on the position of approaching trains is not available, but the signaller needs to be aware of the order of the trains.

  An initial interpose from the Remote System is used to load the train description into the queue. The ECS steps the train description towards the front of the queue. The queue contains an ordered list of approaching trains. This information may be displayed by the display subsystem.

  When the train reaches a point where regular updates are available from the Remote System, an interpose is received from the Remote System for the stack berth. The ECS uses this to remove the train description from the queue. The Remote System then continues to forward updates each time the position of the train changes.

- **GROUP (optional)**- lists berth groups at the site.

  This construct provides a way of associating a stack berth with more than one queue. This is used in situations where the train that is interposed into the stack berth may have come from one or more queues.

- **PERM (optional)**- lists the IECC implementations of ‘permissive’ berths, i.e. those remote berths which can have up to two train descriptions in them at any one time. The IECC does not permit more than one train description per berth and so each permissive berth is modelled within the IECC by a berth pair.

- **POSITION REPORT (optional)**- the subsystem name along with the berths that report train position messages to it are listed.

- **ARSSI (optional)**- the ARS needs to know about berths on routes entering the IECC control area to facilitate route-planning. Such berths are known as ARS strike-in berths. Within this section there are a number of lists, one for each display subsystem. The lists contain all remote berths on routes into the IECC area.

  All remote berths on routes into the IECC area up to but not including the first IECC berth on the routes should be included.

- **ETBFOR (optional)**- specifies the display subsystem to which changes in the contents of the early transmission berths (ETBs) listed in this section should be sent. Within this section there are a number of lists, one for each display subsystem.

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4.1.6 IDENTITIES section

The format of this section is as follows :-

```
IDENTITIES {
        TDAREAS {
                Area { ItemList }
        }
        INHIBIT {
                Item State { BerthList }
        }
        PSEUDO ITEMS {
                { Item = Conditional }
    }
}
```

Where :-

Area A four character TD area name

BerthList A list of TD berth names separated by white space

Conditional An expression built up from Items, the logical expressions AND, OR, XOR and NOT and brackets to force evaluation order

Item A signalling item identity

ItemList A list of signalling item identities separated by white space

The IDENTITIES section is used to specify remote system attributes for both IECC and REMOTE signalling items, and to declare Pseudo signalling items.

- **TDAREAS (optional)**- lists all the remote signalling item known to the ECS. Within this section there are a number of lists, one for each TD area.

- **INHIBIT (optional)**- lists the signal items which will stop the transmission of berth contents whilst the signal item is in a defined state. This is normally used to stop the transmission of certain berth contents to a remote system when a route is set which does not enter that remote system's control. The name of the signalling item is listed together with the signal state which will cause inhibition and a list of the berths whose contents will not be transmitted.

  There can be a maximum of eight inhibited berths for each signal item defined in this section.

  IECC signal items and their states are:

▪	signal	red (0) or not red (1);
▪	route	route set (1) or route clear (0);
▪	track circuit	track circuit clear (1) or track circuit occupied (0);
▪	TRTS flag	TRTS clear (0) or TRTS not clear(1);
▪	Suboverlap flag	1;
▪	Subroute flag	1.

- **PSEUDO ITEMS (optional)**- used to specify the calculations required for each pseudo signalling item.

  Pseudo signalling items are **not** listed in the TDAREAS sub-section. Also a pseudo item **can not** form a part of the logical expression for another pseudo item.

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4.1.7 IECC LINK STATUS Section

The format of this section is as follows :-

```
IECC LINK STATUS {
        Subsystem {
                BerthOrItem Identity
        }
}
```

Where :-

BerthOrItem The keyword BERTH or SIGNAL to specify the type of link status display

Identity A berth or signalling item identity

Subsystem The logical name of a subsystem, as entered in the CPF

The status of each link between the ECS and an IECC subsystem is indicated to remote systems by representing each link as a dummy berth and/or signal item. The status of a link can then be indicated by changing the contents of the relevant dummy berth or the state of the relevant dummy signal item to a value which the remote system understands as meaning “failure of the link between the ECS and that IECC subsystem”.

Each link may have up to 1 dummy berth and up to 1 dummy signal item to represent it. The status of a link can be indicated to any number of the remote systems associated with the ECS. Whether to use a dummy berth or signal item to indicate the link status to a particular remote system depends on the remote system, so:

- if the remote system to which the link status is to be indicated is designed only to accept berth contents updates, then the link status must be indicated to that remote system by using the dummy berth. The name of the dummy berth must be included in the BERTHS section of the Remote System file;
- if the remote system to which the link status is to be indicated is designed only to accept signalling status messages, then the link status must be indicated to that remote system by the dummy signal item. The name of the dummy signal item must be included in the IDENTITIES section of the Remote System file;
- if the remote system accepts both type of message the link status must be indicated to that remote system by either method.

4.1.8 REMOTE SYSTEMS Section

```
REMOTE SYSTEMS {
        FILE ‘../ECS/ECS1/rem1’
        FILE ‘../ECS/ECS1/rem2’
}
```

There must be one Remote System file for every remote system with which the ECS communicates. There is also a Remote System file for the ECS Inter-Unit link. The file path of each Remote System file must be listed and enclosed in single quotes.

The first Remote System file listed in this section will be treated as “Remote System 1” by the ECS Data Compiler, the second as “Remote System 2”, etc. Therefore, the **order** in which the Remote System files are listed in this section should reflect the numerical order of remote systems and their order of priority.

4.2 ECS OVERVIEW FILE PREPARATION

This section describes the preparation of the ECS Overview file, including suggestions on where to find source details for inclusion in the file.

Input data will vary depending on the requirements of the site. Details may be obtained from stepping tables, block schematics and other source documents.

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- **SUBSYSTEM** statement: The subsystem name of the ECS subsystem must be specified.
- **CPF** statement: Enter the path to the CPF, remembering to enclose it in single quotes.
- **GWS** statement: Enter the path to the Gateway Input File, remembering to enclose it in single quotes.
- **IECC** statement: If IECC berths are to have a different TD area name than that specified in the CPF, the TD area name must be specified in this statement. If the TD area name specified in the CPF is to be used, this statement may be omitted.
- **BERTHS** section: For each site, a set of documents will be supplied which specify details for all berths within the IECC control area, and those berths on routes into the IECC area whose changes need to be monitored for route-planning and screen display purposes. These will include block schematics, stepping and control tables, and TD map layouts. Entries for the berths statement should be based on these specifications.

  i) TDAREAS: List all remote berths known to the ECS together with their TD area name in this section.

  ii) INITTDN: Any berths to be initialised to a specific train description on ECS start-up must be listed in this section.

  iii) QUEUE: Any berths in queues at the site must be listed in this section.

  iv) STACK: Any berths in stacks at the site must be listed in this section.

  v) GROUP: Any stack berths that are in groups must be listed in this section.

  vi) PERM: Any remote permissive berths must have their IECC berth pairs listed in this section.

  vii) POSITION REPORT: Any berth for which a Train Position Report is generated is listed in this section.

  viii) ARSSI: Determine the first berth the ARS needs to know about on each route coming into the IECC area. The ARS strike-in point, i.e. the point at which ARS monitoring starts, can be obtained from the ARS team. List all berths on each route, up to but not including the first IECC berth, in this section.

  ix) ETBFOR: Determine which berths lie on an approach path into the IECC and whose movements need to be reported to an SDS and list them in this section.

- IDENTITIES section:

  x) TDAREAS section: List all remote signalling items known to the ECS together with their TD area name in this section.

  xi) INHIBIT section: Any signalling items which will cause the inhibition of transmission of certain berths' contents must be listed in this section. The signal item name, the state which will trigger inhibition and the affected berths should be listed for each such signal item.

  xii) PSEUDO ITEMS section: Any pseudo signalling item whose state is calculated is listed along with the logical expression that generates the state.

- **IECC LINK STATUS** section: The status of a link between the ECS and another IECC subsystem is forwarded to remote systems by means of a dummy berth and/or dummy signal item. Each IECC subsystem whose link is to be monitored is listed together with the dummy item(s) being used for link status indication.
- **REMOTE SYSTEMS** statement: There must be one Remote System file for each remote system with which the ECS communicates. The file path of each Remote System file must be listed in this section.

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