CICS® Transaction Server for OS/390®

# C++ OO Class Libraries

SC34-5455-30

CICS® Transaction Server for OS/390®

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**Note!**

Before using this information and the product it supports, be sure to read the general information under "Notices" on page iii.

**First edition (November 2000)**

This edition applies to Release 3 of CICS Transaction Server for OS/390, program number 5655-147, and to all subsequent versions, releases, and modifications until otherwise indicated in new editions. Consult the latest edition of the applicable IBM system bibliography for current information on this product.

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# Notices

## Trademarks

# Preface

The CICS® family provides robust transaction processing capabilities across the major hardware platforms that IBM® offers, and also across key non-IBM platforms. It offers a wide range of features for supporting client/server applications, and allows the use of modern graphical interfaces for presenting information to the end-user. The CICS family now supports the emerging technology for object oriented programming and offers CICS users a way of capitalizing on many of the benefits of object technology while making use of their investment in CICS skills, data and applications.

Object oriented programming allows more realistic models to be built in flexible programming languages that allow you to define new types or classes of objects, as well as employing a variety of structures to represent these objects.

Object oriented programming also allows you to create methods (member functions) that define the behavior associated with objects of a certain type, capturing more of the meaning of the underlying data.

The CICS foundation classes software is a set of facilities that IBM has added to CICS to make it easier for application programmers to develop object oriented programs. It is not intended to be a product in its own right.

The CICS C++ foundation classes, as described here, allow an application programmer to access many of the CICS services that are available via the EXEC CICS procedural application programming interface (API). They also provide an object model, making OO application development simpler and more intuitive.

## Who this book is for

This book is for CICS application programmers who want to know how to use the CICS foundation classes.

## What this book is about

This book is divided into three parts and three appendixes:

- "Part 1. Installation and setup" on page 1 describes how to install the product and check that the installation is complete.
- "Part 2. Using the CICS foundation classes" on page 13 describes the classes and how to use them.
- "Part 3. Foundation Classes—reference" on page 61 contains the reference material: the class descriptions and their methods.
- For those of you familiar with the EXEC CICS calls, "Appendix A. Mapping EXEC CICS calls to Foundation Class methods" on page 345 maps EXEC CICS calls to the foundation class methods detailed in this book...
- ... and "Appendix B. Mapping Foundation Class methods to EXEC CICS calls" on page 351 maps them the other way — foundation class methods to EXEC CICS calls.
- "Appendix C. Output from sample programs" on page 357 contains the output from the sample programs.

## What you need to know before reading this book

"Chapter 1. Getting ready for object oriented CICS" on page 3 describes what you need to know to understand this book.

## Notes on terminology

"CICS" is used throughout this book to mean the CICS element of the IBM CICS Transaction Server for OS/390 Release 3.

"RACF®" is used throughout this book to mean the MVS™ Resource Access Control Facility (RACF) or any other external security manager that provides equivalent function.

In the programming examples in this book, the dollar symbol ($) is used as a national currency symbol. In countries where the dollar is not the national currency, the local currency symbol should be used.

## Softcopy links

### Determining if a publication is current

IBM regularly updates its publications with new and changed information. When first published, both hardcopy and BookManager softcopy versions of a publication are usually in step. However, due to the time required to print and distribute hardcopy books, the BookManager version is more likely to have had last-minute changes made to it before publication.

Subsequent updates will probably be available in softcopy before they are available in hardcopy. This means that at any time from the availability of a release, softcopy versions should be regarded as the most up-to-date.

For CICS Transaction Server books, these softcopy updates appear regularly on the *Transaction Processing and Data Collection Kit* CD-ROM, SK2T-0730-xx. Each reissue of the collection kit is indicated by an updated order number suffix (the -xx part). For example, collection kit SK2T-0730-06 is more up-to-date than SK2T-0730-05. The collection kit is also clearly dated on the cover.

Updates to the softcopy are clearly marked by revision codes (usually a "#" character) to the left of the changes.

# Contents

# Bibliography

## CICS Transaction Server for OS/390

| | |
|---|---|
| *CICS Transaction Server for OS/390: Planning for Installation* | GC33-1789 |
| *CICS Transaction Server for OS/390 Release Guide* | GC34-5352 |
| *CICS Transaction Server for OS/390 Migration Guide* | GC34-5353 |
| *CICS Transaction Server for OS/390 Installation Guide* | GC33-1681 |
| *CICS Transaction Server for OS/390 Program Directory* | GI10-2506 |
| *CICS Transaction Server for OS/390 Licensed Program Specification* | GC33-1707 |

## CICS books for CICS Transaction Server for OS/390

| | |
|---|---|
| **General** | |
| *CICS Master Index* | SC33-1704 |
| *CICS User's Handbook* | SX33-6104 |
| *CICS Transaction Server for OS/390 Glossary* (softcopy only) | GC33-1705 |
| **Administration** | |
| *CICS System Definition Guide* | SC33-1682 |
| *CICS Customization Guide* | SC33-1683 |
| *CICS Resource Definition Guide* | SC33-1684 |
| *CICS Operations and Utilities Guide* | SC33-1685 |
| *CICS Supplied Transactions* | SC33-1686 |
| **Programming** | |
| *CICS Application Programming Guide* | SC33-1687 |
| *CICS Application Programming Reference* | SC33-1688 |
| *CICS System Programming Reference* | SC33-1689 |
| *CICS Front End Programming Interface User's Guide* | SC33-1692 |
| *CICS C++ OO Class Libraries* | SC34-5455 |
| *CICS Distributed Transaction Programming Guide* | SC33-1691 |
| *CICS Business Transaction Services* | SC34-5268 |
| **Diagnosis** | |
| *CICS Problem Determination Guide* | GC33-1693 |
| *CICS Messages and Codes* | GC33-1694 |
| *CICS Diagnosis Reference* | LY33-6088 |
| *CICS Data Areas* | LY33-6089 |
| *CICS Trace Entries* | SC34-5446 |
| *CICS Supplementary Data Areas* | LY33-6090 |
| **Communication** | |
| *CICS Intercommunication Guide* | SC33-1695 |
| *CICS Family: Interproduct Communication* | SC33-0824 |
| *CICS Family: Communicating from CICS on System/390* | SC33-1697 |
| *CICS External Interfaces Guide* | SC33-1944 |
| *CICS Internet Guide* | SC34-5445 |
| **Special topics** | |
| *CICS Recovery and Restart Guide* | SC33-1698 |
| *CICS Performance Guide* | SC33-1699 |
| *CICS IMS Database Control Guide* | SC33-1700 |
| *CICS RACF Security Guide* | SC33-1701 |
| *CICS Shared Data Tables Guide* | SC33-1702 |
| *CICS Transaction Affinities Utility Guide* | SC33-1777 |

| | |
|---|---|
| *CICS DB2 Guide* | SC33-1939 |

## CICSPlex SM books for CICS Transaction Server for OS/390

| | |
|---|---|
| **General** | |
| *CICSPlex SM Master Index* | SC33-1812 |
| *CICSPlex SM Concepts and Planning* | GC33-0786 |
| *CICSPlex SM User Interface Guide* | SC33-0788 |
| *CICSPlex SM Web User Interface Guide* | SC34-5403 |
| *CICSPlex SM View Commands Reference Summary* | SX33-6099 |
| **Administration and Management** | |
| *CICSPlex SM Administration* | SC34-5401 |
| *CICSPlex SM Operations Views Reference* | SC33-0789 |
| *CICSPlex SM Monitor Views Reference* | SC34-5402 |
| *CICSPlex SM Managing Workloads* | SC33-1807 |
| *CICSPlex SM Managing Resource Usage* | SC33-1808 |
| *CICSPlex SM Managing Business Applications* | SC33-1809 |
| **Programming** | |
| *CICSPlex SM Application Programming Guide* | SC34-5457 |
| *CICSPlex SM Application Programming Reference* | SC34-5458 |
| **Diagnosis** | |
| *CICSPlex SM Resource Tables Reference* | SC33-1220 |
| *CICSPlex SM Messages and Codes* | GC33-0790 |
| *CICSPlex SM Problem Determination* | GC33-0791 |

## Other CICS books

| | |
|---|---|
| *CICS Application Programming Primer (VS COBOL II)* | SC33-0674 |
| *CICS Application Migration Aid Guide* | SC33-0768 |
| *CICS Family: API Structure* | SC33-1007 |
| *CICS Family: Client/Server Programming* | SC33-1435 |
| *CICS Family: General Information* | GC33-0155 |
| *CICS 4.1 Sample Applications Guide* | SC33-1173 |
| *CICS/ESA 3.3 XRF Guide* | SC33-0661 |

If you have any questions about the CICS Transaction Server for OS/390 library, see *CICS Transaction Server for OS/390: Planning for Installation* which discusses both hardcopy and softcopy books and the ways that the books can be ordered.

## More books

Here are some more books that you may find useful.

### C++ Programming

You should read the books supplied with your C++ compiler.

The following are some non-IBM publications that are generally available. This is not an exhaustive list. IBM does not specifically recommend these books, and other publications may be available in your local library or bookstore.

- Ellis, Margaret A. and Bjarne Stroustrup, *The Annotated C++Reference Manual*, Addison-Wesley Publishing Company.
- Lippman, Stanley B., *C++ Primer*, Addison-Wesley Publishing Company.

- Stroustrup, Bjarne, *The C++ Programming Language*, Addison-Wesley Publishing Company.

## CICS client manuals

| | |
|---|---|
| *CICS Clients: Administration* | SC33-1792 |
| *CICS Clients: Messages* | SC33-1793 |
| *CICS Clients: Gateways* | SC33-1821 |
| *CICS Family: OO Programming in C++ for CICS Clients* | SC33-1923 |
| *CICS Family: OO Programming in BASIC for CICS Clients* | SC33-1924 |

# Part 1. Installation and setup

This part of the book describes the CICS foundation classes installed on your CICS server.

# Chapter 1. Getting ready for object oriented CICS

This book makes several assumptions about you, the reader. It assumes you are familiar with:

- Object oriented concepts and technology
- C++ language
- CICS.

This book is not intended to be an introduction to any of these subjects. If the terms in the "Glossary" on page 365 are not familiar to you, then please consult other sources before going any further. A selection of appropriate books may be found in the bibliography on page "Bibliography" on page xvii, but you may find other books useful too.

# Chapter 2. Installed contents

The CICS foundation classes package consists of several files or datasets. These contain the:

- header files
- executables (DLL’s)
- samples
- other CICS Transaction Server for OS/390 files

This section describes the files that comprise the CICS C++ Foundation Classes and explains where you can find them on your CICS server.

## Header files

The header files are the C++ class definitions needed to compile CICS C++ Foundation Class programs.

| C++ Header File | Classes Defined in this Header |
|---|---|
| ICCABDEH | IccAbendData |
| ICCBASEH | IccBase |
| ICCBUFEH | IccBuf |
| ICCCLKEH | IccClock |
| ICCCNDEH | IccCondition (struct) |
| ICCCONEH | IccConsole |
| ICCCTLEH | IccControl |
| ICCDATEH | IccDataQueue |
| ICCEH | see 1 on page 6 |
| ICCEVTEH | IccEvent |
| ICCEXCEH | IccException |
| ICCFILEH | IccFile |
| ICCFLIEH | IccFileIterator |
| ICCGLBEH | Icc (struct) (global functions) |
| ICCJRNEH | IccJournal |
| ICCMSGEH | IccMessage |
| ICCPRGEH | IccProgram |
| ICCRECEH | IccRecordIndex, IccKey, IccRBA and IccRRN |
| ICCRESEH | IccResource |
| ICCRIDEH | IccResourceId + subclasses (such as IccConvId) |
| ICCSEMEH | IccSemaphore |
| ICCSESEH | IccSession |
| ICCSRQEH | IccStartRequestQ |
| ICCSYSEH | IccSystem |
| ICCTIMEH | IccTime, IccAbsTime, IccTimeInterval, IccTimeOfDay |
| ICCTMDEH | IccTerminalData |
| ICCTMPEH | IccTempStore |
| ICCTRMEH | IccTerminal |
| ICCTSKEH | IccTask |
| ICCUSREH | IccUser |
| ICCVALEH | IccValue (struct) |

**Installed contents**

**Notes:**

1. A single header that #includes all the above header files is supplied as `ICCEH`
2. The file `ICCMAIN` is also supplied with the C++ header files. This contains the **main** function stub that should be used when you build a Foundation Class program.

### Location

PDS: `CICSTS13.CICS.SDFHC370`

## Dynamic link library

The Dynamic Link Library is the runtime that is needed to support a CICS C++ Foundation Class program.

### Location

`ICCFCDLL` module in PDS: `CICSTS13.CICS.SDFHLOAD`

## Sample source code

The samples are provided to help you understand how to use the classes to build object oriented applications.

### Location

PDS: `CICSTS13.CICS.SDFHSAMP`

### Running the sample applications.

If you have installed the resources defined in the member `DFHCURDS`, you should be ready to run some of the sample applications.

The sample programs are supplied as source code in library `CICSTS13.CICS.SDFHSAMP` and before you can run the sample programs, you need to compile, pre-link and link them.To do this, use the procedure `ICCFCCL` in dataset `CICSTS13.CICS.SDFHPROC`.

`ICCFCCL` contains the Job Control Language needed to compile, pre-link and link a CICS user application. Before using `ICCFCCL` you may find it necessary to perform some customization to conform to your installation standards. See also “Compiling Programs” on page 45.

Sample programs such as `ICC$BUF`, `ICC$CLK` and `ICC$HEL` require no additional CICS resource definitions, and should now execute successfully.

Other sample programs, in particular the DTP samples named `ICC$SES1` and `ICC$SES2`, require additional CICS resource definitions. Refer to the prologues in the source of the sample programs for information about these additional requirements.

## Other datasets for CICS Transaction Server for OS/390

`CICSTS13.CICS.SDFHSDCK` contains the member
  `ICCFCIMP` - 'sidedeck' containing import control statements

`CICSTS13.CICS.SDFHPROC` contains the members
  `ICCFCC` - JCL to compile a CFC user program
  `ICCFCCL` - JCL to compile, prelink and link a CFC user program
  `ICCFCL` - JCL to prelink and link a CFC user program

`CICSTS13.CICS.SDFHLOAD` contains the members
  `DFHCURDS` - program definitions required for CICS system definition.
  `DFHCURDI` - program definitions required for CICS system definition.

## Installed contents

# Chapter 3. Hello World

When you start programming in an unaccustomed environment the hardest task is usually getting something—anything—to work and to be seen to be working. The initial difficulty is not in the internals of the program, but in bringing everything together—the CICS server, the programming environment, program inputs and program outputs.

The example shown in this chapter shows how to get started in CICS OO programming. It is intended as an appetizer; "Chapter 5. Overview of the foundation classes" on page 17 is a more formal introduction and you should read it before you attempt serious OO programming.

This example could not be much simpler but when it works it is a visible demonstration that you have got everything together and can go on to greater things. The program writes a simple message to the CICS terminal.

There follows a series of program fragments interspersed with commentary. The source for this program can be found in sample `ICC$HEL` (see "Sample source code" on page 6 for the location).

```
#include "icceh.hpp"
#include "iccmain.hpp"
```

The first line includes the header file, `ICCEH`, which includes the header files for all the CICS Foundation Class definitions. Note that it is coded as `"icceh.hpp"` to preserve cross-platform, C++ language conventions.

The second line includes the supplied program stub. This stub contains the **main** function, which is the point of entry for any program that uses the supplied classes and is responsible for initializing them correctly. (See "Chapter 64. main function" on page 341 for more details). You are strongly advised to use the stub provided but you may in certain cases tailor this stub to your own requirements. The stub initializes the class environment, creates the program control object, then invokes the **run** method, which is where the application program should 'live'.

```
void IccUserControl::run()
{
```

The code that controls the program flow resides not in the **main** function but in the **run** method of a class derived from **IccControl** (see "Chapter 20. IccControl class" on page 119). The user can define their own subclass of **IccControl** or, as here, use the default one – **IccUserControl**, which is defined in ICCMAIN – and just provide a definition for the **run** method.

```
    IccTerminal* pTerm = terminal();
```

The **terminal** method of **IccControl** class is used to obtain a pointer to the terminal object for the application to use.

```
    pTerm->erase();
```

The **erase** method clears the current contents of the terminal.

```
    pTerm->send(10, 35, "Hello World");
```

The **send** method is called on the terminal object. This causes "Hello World" to be written to the terminal screen, starting at row 10, column 35.

```
    pTerm->waitForAID();
```

This waits until the terminal user hits an AID (Action Identifier) key.

```
    return;
}
```

Returning from the **run** method causes program control to return to CICS.

## Compile and link "Hello World"

The "Hello World" sample is provided as sample `ICC$HEL` (see “Sample source code” on page 6). Find this sample and copy it to your own work area.

To compile and link any CICS C++ Foundation program you need access to:

1. The source of the program, here `ICC$HEL`.
2. The Foundation Classes header files (see “Header files” on page 5).
3. The Foundation Classes dynamic link library (see “Dynamic link library” on page 6).

See “Chapter 8. Compiling, executing, and debugging” on page 45 for the JCL required to compile the sample program.

## Running "Hello World" on your CICS server

To run the program you have just compiled on your CICS server, you need to make the executable program available to CICS (that is, make sure it is in a suitable directory or load library). Then, depending on your server, you may need to create a CICS program definition for your executable. Finally, you may logon to a CICS terminal and run the program.

To do this,

1. Logon to a CICS terminal and enter either:
   ```
   IHEL
   ```
   or
   ```
   CECI LINK PROGRAM(ICC$HEL)
   ```
2. If you are not using program autoinstall on your CICS region, define the program ICC$HEL to CICS using the supplied transaction CEDA.
3. Log on to a CICS terminal.
4. On CICS terminal run:
   ```
   CECI LINK PROGRAM(ICC$HEL)
   ```

### Expected Output from "Hello World"

This is what you should see on the CICS terminal if program `ICC$HEL` has been successfuly built and executed.

```
                                  Hello World
```

Hit an Action Identifier, such as the ENTER key, to return.

# Part 2. Using the CICS foundation classes

This part of the book describes the CICS foundation classes and how to use them. There is a formal listing of the user interface in “Part 3. Foundation Classes—reference” on page 61.

# Chapter 4. C++ Objects

This chapter describes how to create, use, and delete objects. In our context an object is an instance of a class. An object cannot be an instance of a base or abstract base class. It is possible to create objects of all the concrete (non-base) classes described in the reference part of this book.

## Creating an object

If a class has a constructor it is executed when an object of that class is created. This constructor typically initializes the state of the object. Foundation Classes' constructors often have mandatory positional parameters that the programmer must provide at object creation time.

C++ objects can be created in one of two ways:

1. Automatically, where the object is created on the C++ stack. For example:

```
{
   ClassX     objX
   ClassY     objY(parameter1);
}     //objects deleted here
```

   Here, objX and objY are automatically created on the stack. Their lifetime is limited by the context in which they were created; when they go out of scope they are automatically deleted (that is, their destructors run and their storage is released).

2. Dynamically, where the object is created on the C++ heap. For example:

```
{
   ClassX*   pObjX = new ClassX;
   ClassY*   pObjY = new ClassY(parameter1);
}     //objects NOT deleted here
```

   Here we deal with pointers to objects instead of the objects themselves. The lifetime of the object outlives the scope in which it was created. In the above sample the pointers (pObjX and pObjY) are 'lost' as they go out of scope but the objects they pointed to still exist! The objects exist until they are explicitly deleted as shown here:

```
{
   ClassX*     pObjX = new ClassX;
   ClassY*     pObjY = new ClassY(parameter1);

⋮
   pObjX->method1();
   pObjY->method2();

⋮
   delete pObjX;
   delete pObjY;
}
```

Most of the samples in this book use automatic storage. You are ***advised*** to use automatic storage, because you do not have remember to explicitly delete objects, but you are free to use either style for CICS C++ Foundation Class programs. For more information on Foundation Classes and storage management see “Storage management” on page 57.

## Using an object

Any of the class public methods can be called on an object of that class. The following example creates object *obj* and then calls method **doSomething** on it:

```
ClassY   obj("TEMP1234");
obj.doSomething();
```

Alternatively, you can do this using dynamic object creation:

```
ClassY*   pObj = new ClassY("parameter1");
pObj->doSomething();
```

## Deleting an object

When an object is destroyed its destructor function, which has the same name as the class preceded with ˜(tilde), is automically called. (You cannot call the destructor explicitly).

If the object was created automatically it is automatically destroyed when it goes out of scope.

If the object was created dynamically it exists until an explicit **delete** operator is used.

# Chapter 5. Overview of the foundation classes

This chapter is a formal introduction to what the Foundation Classes can do for you. See “Chapter 3. Hello World” on page 9 for a simple example to get you started. The chapter takes a brief look at the CICS C++ Foundation Class library by considering the following categories in turn:

- “Base classes”
- “Resource identification classes” on page 18
- “Resource classes” on page 19
- “Support Classes” on page 20.

See “Part 3. Foundation Classes—reference” on page 61 for more detailed information on the Foundation Classes.

Every class that belongs to the CICS Foundation Classes is prefixed by **Icc**.

## Base classes

All classes inherit, directly or indirectly, from **IccBase**.

```
IccBase
    IccRecordIndex
    IccResource
        IccControl
        IccTime
    IccResourceId
```

*Figure 1. Base classes*

All resource identification classes, such as **IccTermId**, and **IccTransId**, inherit from **IccResourceId** class. These are typically CICS table entries.

All CICS resources—in fact any class that needs access to CICS services—inherit from **IccResource** class.

Base classes enable common interfaces to be defined for categories of class. They are used to create the foundation classes, as provided by IBM, and they can be used by application programmers to create their own derived classes.

**IccBase**
: The base for every other foundation class. It enables memory management and allows objects to be interrogated to discover which type they are.

**IccControl**
: The abstract base class that the application program has to subclass and provide with an implementation of the **run** method.

**IccResource**
: The base class for all classes that access CICS resources or services. See “Resource classes” on page 19.

**IccResourceId**
: The base class for all table entry (resource name) classes, such as **IccFileId** and **IccTempStoreId**.

### Base classes

**IccTime**
: The base class for the classes that store time information: **IccAbsTime**, **IccTimeInterval** and **IccTimeOfDay**.

## Resource identification classes

CICS resource identification classes define CICS resource identifiers – typically

- **IccBase**
  - **IccResourceId**
    - **IccConvId**
    - **IccDataQueueId**
    - **IccFileId**
    - **IccGroupId**
    - **IccJournalId**
    - **IccJournalTypeId**
    - **IccLockId**
    - **IccPartnerId**
    - **IccProgramId**
    - **IccRequestId**
      - **IccAlarmRequestId**
    - **IccSysId**
    - **IccTempStoreId**
    - **IccTermId**
    - **IccTPNameId**
    - **IccTransId**
    - **IccUserId**

*Figure 2. Resource identification classes*

entries in one of the CICS tables. For example an **IccFileId** object represents a CICS file name – an FCT (file control table) entry. All concrete resource identification classes have the following properties:

- The name of the class ends in **Id**.
- The class is a subclass of the **IccResourceId** class.
- The constructors check that any supplied table entry meets CICS standards. For example, an **IccFileId** object must contain a 1 to 8 byte character field; providing a 9-byte field is not tolerated.

The resource identification classes improve type checking; methods that expect an **IccFileId** object as a parameter do not accept an **IccProgramId** object instead. If character strings representing the resource names are used instead, the compiler cannot check for validity – it cannot check whether the string is a file name or a program name.

Many of the resource classes, described in “Resource classes” on page 19, contain resource identification classes. For example, an **IccFile** object contains an **IccFileId** object. You must use the resource object, not the resource identification object to operate on a CICS resource. For example, you must use **IccFile**, rather than **IccFileId** to read a record from a file.

| Class | CICS resource | CICS table |
|---|---|---|
| IccAlarmRequestId | alarm request | |
| IccConvId | conversation | |
| IccDataQueueId | data queue | DCT |
| IccFileId | file | FCT |
| IccGroupId | group | |

| Class | CICS resource | CICS table |
|---|---|---|
| IccJournalId | journal | JCT |
| IccJournalTypeId | journal type | |
| IccLockId | (Not applicable) | |
| IccPartnerId | APPC partner definition files | |
| IccProgramId | program | PPT |
| IccRequestId | request | |
| IccSysId | remote system | |
| IccTempStoreId | temporary storage | TST |
| IccTermId | terminal | TCT |
| IccTPNameId | remote APPC TP name | |
| IccTransId | transaction | PCT |
| IccUserId | user | SNT |

## Resource classes

These classes model the behaviour of the major CICS resources, for example:

- **IccBase**
  - **IccResource**
    - **IccAbendData**
    - **IccClock**
    - **IccConsole**
    - **IccControl**
    - **IccDataQueue**
    - **IccFile**
    - **IccFileIterator**
    - **IccJournal**
    - **IccProgram**
    - **IccSemaphore**
    - **IccSession**
    - **IccStartRequestQ**
    - **IccSystem**
    - **IccTask**
    - **IccTempStore**
    - **IccTerminal**
    - **IccTerminalData**
    - **IccUser**

*Figure 3. Resource classes*

- Terminals are modelled by **IccTerminal**.
- Programs are modelled by **IccProgram**.
- Temporary Storage queues are modelled by **IccTempStore**.
- Transient Data queues are modelled by **IccDataQueue**.

All CICS resource classes inherit from the **IccResource** base class. For example, any operation on a CICS resource may raise a CICS condition; the **condition** method of **IccResource** (see page 219) can interrogate it.

(Any class that accesses CICS services *must* be derived from **IccResource**).

| Class | CICS resource |
|---|---|
| IccAbendData | task abend data |
| IccClock | CICS time and date services |

### Resource classes

| Class | CICS resource |
|---|---|
| IccConsole | CICS console |
| IccControl | control of executing program |
| IccDataQueue | transient data queue |
| IccFile | file |
| IccFileIterator | file iterator (browsing files) |
| IccJournal | user or system journal |
| IccProgram | program (outside executing program) |
| IccSemaphore | semaphore (locking services) |
| IccSession | session |
| IccStartRequestQ | start request queue; asynchronous transaction starts |
| IccSystem | CICS system |
| IccTask | current task |
| IccTempStore | temporary storage queue |
| IccTerminal | terminal belonging to current task |
| IccTerminalData | attributes of **IccTerminal** |
| IccTime | time specification |
| IccUser | user (security attributes) |

## Support Classes

These classes are tools that complement the resource classes: they make life easier

- **IccBase**
  - **IccBuf**
  - **IccEvent**
  - **IccException**
  - **IccMessage**
  - **IccRecordIndex**
    - **IccKey**
    - **IccRBA**
    - **IccRRN**
  - **IccResource**
    - **IccTime**
      - **IccAbsTime**
      - **IccTimeInterval**
      - **IccTimeOfDay**

*Figure 4. Support classes*

for the application programmer and thus add value to the object model.

| Resource class | Description |
|---|---|
| IccAbsTime | Absolute time (milliseconds since January 1 1900) |
| IccBuf | Data buffer (makes manipulating data areas easier) |
| IccEvent | Event (the outcome of a CICS command) |
| IccException | Foundation Class exception (supports the C++ exception handling model) |
| IccTimeInterval | Time interval (for example, five minutes) |
| IccTimeOfDay | Time of day (for example, five minutes past six) |

**IccAbsTime, IccTimeInterval** and **IccTimeOfDay** classes make it simpler for the application programmer to specify time measurements as objects within an application program. **IccTime** is a base class: **IccAbsTime**, **IccTimeInterval**, and **IccTimeOfDay** are derived from **IccTime**.

Consider method **delay** in class **IccTask**, whose signature is as follows:

```
void delay(const IccTime& time, const IccRequestId* reqId = 0);
```

To request a delay of 1 minute and 7 seconds (that is, a time interval) the application programmer can do this:

```
IccTimeInterval time(0, 1, 7);
task()->delay(time);
```

**Note:** The task method is provided in class **IccControl** and returns a pointer to the application's task object.

Alternatively, to request a delay until 10 minutes past twelve (lunchtime?) the application programmer can do this:

```
IccTimeOfDay lunchtime(12, 10);
task()->delay(lunchtime);
```

The **IccBuf** class allows easy manipulation of buffers, such as file record buffers, transient data record buffers, and COMMAREAs (for more information on **IccBuf** class see "Chapter 6. Buffer objects" on page 23).

**IccMessage** class is used primarily by **IccException** class to encapsulate a description of why an exception was thrown. The application programmer can also use **IccMessage** to create their own message objects.

**IccException** objects are thrown from many of the methods in the Foundation Classes when an error is encountered.

The **IccEvent** class allows a programmer to gain access to information relating to a particular CICS event (command).

## Using CICS resources

To use a CICS resource, such as a file or program, you must first create an appropriate object and then call methods on the object.

### Creating a resource object

When you create a resource object you create a representation of the actual CICS resource (such as a file or program). You do not create the CICS resource; the object is simply the application's view of the resource. The same is true of destroying objects.

You are recommended to use an accompanying resource identification object when creating a resource object. For example:
This allows the C++ compiler to protect you against doing something wrong such

```
IccFileId  id("XYZ123");
IccFile    file(id);
```

as:

```
IccDataQueueId  id("WXYZ");
IccFile         file(id);      //gives error at compile time
```

The alternative of using the text name of the resource when creating the object is also permitted:

```
IccFile  file("XYZ123");
```

### Singleton classes

Many resource classes, such as **IccFile**, can be used to create multiple resource objects within a single program:

```
IccFileId   id1("File1");
IccFileId   id2("File2");
IccFile     file1(id1);
IccFile     file2(id2);
```

However, some resource classes are designed to allow the programmer to create only ***one*** instance of the class; these are called singleton classes. The following Foundation Classes are singleton:

- **IccAbendData** provides information about task abends.
- **IccConsole**, or a derived class, represents the system console for operator messages.
- **IccControl**, or a derived class, such as **IccUserControl**, controls the executing program.
- **IccStartRequestQ**, or a derived class, allows the application program to start CICS transactions (tasks) asynchronously.
- **IccSystem**, or a derived class, is the application view of the CICS system in which it is running.
- **IccTask**, or a derived class, represents the CICS task under which the executing program is running.
- **IccTerminal**, or a derived class, represents your task's terminal, provided that your principal facility is a 3270 terminal.

Any attempt to create more than one object of a singleton class results in an error – a C++ exception is thrown.

A class method, **instance**, is provided for each of these singleton classes, which returns a pointer to the requested object and creates one if it does not already exist. For example:

```
IccControl* pControl = IccControl::instance();
```

## Calling methods on a resource object

Any of the public methods can be called on an object of that class. For example:

```
IccTempStoreId id("TEMP1234");
IccTempStore   temp(id);
temp.writeItem("Hello TEMP1234");
```

Method **writeItem** writes the contents of the string it is passed ("Hello TEMP1234") to the CICS Temporary Storage queue "TEMP1234".

# Chapter 6. Buffer objects

The Foundation Classes make extensive use of **IccBuf** objects – buffer objects that simplify the task of handling pieces of data or records. Understanding the use of these objects is a necessary precondition for much of the rest of this book.

Each of the CICS Resource classes that involve passing data to CICS (for example by writing data records) and getting data from CICS (for example by reading data records) make use of the **IccBuf** class. Examples of such classes are **IccConsole**, **IccDataQueue**, **IccFile**, **IccFileIterator**, **IccJournal**, **IccProgram**, **IccSession**, **IccStartRequestQ**, **IccTempStore**, and **IccTerminal**.

## IccBuf class

**IccBuf**, which is described in detail in the reference part of this book, provides generalized manipulation of data areas. Because it can be used in a number of ways, there are several **IccBuf** constructors that affect the behavior of the object. Two important attributes of an **IccBuf** object are now described.

### Data area ownership

**IccBuf** has an attribute indicating whether the data area has been allocated inside or outside of the object. The possible values of this attribute are 'internal' and 'external'. It can be interrogated by using the **dataAreaOwner** method.

#### Internal/External ownership of buffers

When **DataAreaOwner** = external, it is the application programmer's responsibility to ensure the validity of the storage on which the **IccBuf** object is based. If the storage is invalid or inappropriate for a particular method applied to the object, unpredictable results will occur.

### Data area extensibility

This attribute defines whether the length of the data area within the **IccBuf** object, once created, can be increased. The possible values of this attribute are 'fixed' and 'extensible'. It can be interrogated by using the **dataAreaType** method.

As an object that is 'fixed' cannot have its data area size increased, the length of the data (for example, a file record) assigned to the **IccBuf** object must not exceed the data area length, otherwise a C++ exception is thrown.

**Note:** By definition, an 'extensible' buffer ***must*** also be 'internal'.

### IccBuf constructors

There are several forms of the **IccBuf** constructor, used when creating **IccBuf** objects. Some examples are shown here.

```
IccBuf buffer;
```

This creates an 'internal' and 'extensible' data area that has an initial length of zero. When data is assigned to the object the data area length is automatically extended to accommodate the data being assigned.

### Buffer objects

```
IccBuf buffer(50);
```

This creates an 'internal' and 'extensible' data area that has an initial length of 50 bytes. The data length is zero until data is assigned to the object. If 50 bytes of data are assigned to the object, both the data length and the data area length return a value of 50. When more than 50 bytes of data are assigned into the object, the data area length is automatically (that is, without further intervention) extended to accommodate the data.

```
IccBuf buffer(50, IccBuf::fixed);
```

This creates an 'internal' and 'fixed' data area that has a length of 50 bytes. If an attempt is made to assign more than 50 bytes of data into the object, the data is truncated and an exception is thrown to notify the application of the error situation.

```
struct MyRecordStruct
{
    short id;
    short code;
    char  dataî30¦;
    char  rating;
};
MyRecordStruct myRecord;
IccBuf buffer(sizeof(MyRecordStruct), &myRecord);
```

This creates an **IccBuf** object that uses an 'external' data area called myRecord. By definition, an 'external' data area is also 'fixed'. Data can be assigned using the methods on the **IccBuf** object or using the `myRecord` structure directly.

```
IccBuf buffer("Hello World");
```

This creates an 'internal' and 'extensible' data area that has a length equal to the length of the string "Hello World". The string is copied into the object's data area. This initial data assignment can then be changed using one of the manipulation methods (such as **insert**, **cut**, or **replace**) provided.

```
IccBuf buffer("Hello World");
buffer << " out there";
IccBuf buffer2(buffer);
```

Here the copy constructor creates the second buffer with almost the same attributes as the first; the exception is the data area ownership attribute – the second object always contains an 'internal' data area that is a copy of the data area in the first. In the above example buffer2 contains "Hello World out there" and has both data area length and data length of 21.

## IccBuf methods

An **IccBuf** object can be manipulated using a number of supplied methods; for example you can append data to the buffer, change the data in the buffer, cut data out of the buffer, or insert data into the middle of the buffer. The operators **const char***, **=**, **+=**, **==**, **!=**, and **<<** have been overloaded in class **IccBuf**. There are also methods that allow the **IccBuf** attributes to be queried. For more details see the reference section.

## Working with IccResource subclasses

To illustrate this, consider writing a queue item to CICS temporary storage using **IccTempstore** class.

```
IccTempStore store("TEMP1234");
IccBuf       buffer(50);
```

The **IccTempStore** object created is the application's view of the CICS temporary storage queue named "TEMP1234". The **IccBuf** object created holds a 50-byte data area (it also happens to be 'extensible').

```
buffer = "Hello Temporary Storage Queue";
store.writeItem(buffer);
```

The character string "Hello Temporary Storage Queue" is copied into the buffer. This is possible because the **operator=** method has been overloaded in the **IccBuf** class.

The **IccTempStore** object calls its **writeItem** method, passing a reference to the **IccBuf** object as the first parameter. The contents of the **IccBuf** object are written out to the CICS temporary storage queue.

Now consider the inverse operation, reading a record from the CICS resource into the application program's **IccBuf** object:

```
buffer = store.readItem(5);
```

The **readItem** method reads the contents of the fifth item in the CICS Temporary Storage queue and returns the data as an **IccBuf** reference.

The C++ compiler actually resolves the above line of code into two method calls, **readItem** defined in class **IccTempStore** and **operator=** which has been overloaded in class **IccBuf**. This second method takes the contents of the returned **IccBuf** reference and copies its data into the buffer.

The above style of reading and writing records using the foundation classes is typical. The final example shows how to write code – using a similar style to the above example – but this time accessing a CICS transient data queue.

```
IccDataQueue queue("DATQ");
IccBuf       buffer(50);
buffer = queue.readItem();
buffer << "Some extra data";
queue.writeItem(buffer);
```

The **readItem** method of the **IccDataQueue** object is called, returning a reference to an **IccBuf** which it then assigns (via **operator=** method, overloaded in class **IccBuf**) to the `buffer` object. The character string – "Some extra data" – is appended to the buffer (via **operator<<** method, overloaded in class **IccBuf**). The **writeItem** method then writes back this modified buffer to the CICS transient data queue.

You can find further examples of this syntax in the samples presented in the following chapters, which describe how to use the foundation classes to access CICS services.

Please refer to the reference section for further information on the **IccBuf** class. You might also find the supplied sample – `ICC$BUF` – helpful.

# Chapter 7. Using CICS Services

This chapter describes how to use CICS services. The following services are considered in turn:

- "File control"
- "Program control" on page 32
- "Starting transactions asynchronously" on page 34
- "Transient Data" on page 37
- "Temporary storage" on page 39
- "Terminal control" on page 41
- "Time and date services" on page 43

## File control

The file control classes – **IccFile**, **IccFileId**, **IccKey**, **IccRBA**, and**IccRRN** – allow you to read, write, update and delete records in files.In addition, **IccFileIterator** class allows you to browse through all the records in a file.

An **IccFile** object is used to represent a file. It is convenient, but not necessary, to use an **IccFileId** object to identify a file by name.

An application program reads and writes its data in the form of individual records. Each read or write request is made by a method call. To access a record, the program must identify both the file and the particular record.

VSAM (or VSAM-like) files are of the following types:

**KSDS**
: Key-sequenced: each record is identified by a key – a field in a predefined position in the record. Each key must be unique in the file.

  The logical order of records within a file is determined by the key. The physical location is held in an index which is maintained by VSAM.

  When browsing, records are found in their logical order.

**ESDS**
: Entry-sequenced: each record is identified by its relative byte address (RBA).

  Records are held in an ESDS in the order in which they were first loaded into the file. New records are always added at the end and records may not be deleted or have their lengths altered.

  When browsing, records are found in the order in which they were originally written.

**RRDS file**
: Relative record: records are written in fixed-length slots. A record is identified by the relative record number (RRN) of the slot which holds it.

### Reading records

A read operation uses two classes – **IccFile** to perform the operation and one of **IccKey**, **IccRBA**, and **IccRRN** to identify the particular record, depending on whether the file access type is KSDS, ESDS, or RRDS.

The **readRecord** method of **IccFile** class actually reads the record.

### Reading KSDS records

Before reading a record you must use the **registerRecordIndex** method of **IccFile** to associate an object of class **IccKey** with the file.

You must use a key, held in the **IccKey** object, to access records. A 'complete' key is a character string of the same length as the physical file’s key. Every record can be separately identified by its complete key.

A key can also be 'generic'. A generic key is shorter than a complete key and is used for searching for a set of records.The **IccKey** class has methods that allow you to set and change the key.

**IccFile** class has methods **isReadable**, **keyLength**, **keyPosition**, **recordIndex**, and **recordLength**, which help you when reading KSDS records.

### Reading ESDS records

You must use a relative byte address (RBA) held in an **IccRBA** object to access the beginning of a record.

Before reading a record you must use the **registerRecordIndex** method of **IccFile** to associate an object of class **IccRBA** with the file.

**IccFile** class has methods **isReadable**, **recordFormat**, **recordIndex**, and **recordLength** that help you when reading ESDS records.

### Reading RRDS records

You must use a relative record number (RRN) held in an **IccRRN** object to access a record.

Before reading a record you must use **registerRecordIndex** method of **IccFile** to associate an object of class **IccRRN** with the file.

**IccFile** class has methods **isReadable**, **recordFormat**, **recordIndex**, and **recordLength** which help you when reading RRDS records.

## Writing records

Writing records is also known as "adding records". This section describes writing records that have not previously been written. Writing records that already exist is not permitted unless they have been previously been put into 'update' mode. See “Updating records” on page 29 for more information.

Before writing a record you must use **registerRecordIndex** method of **IccFile** to associate an object of class **IccKey**, **IccRBA**, or **IccRRN** with the file. The **writeRecord** method of **IccFile** class actually writes the record.

A write operation uses two classes – **IccFile** to perform the operation and one of **IccKey**, **IccRBA**, and **IccRRN** to identify the particular record, depending on whether the file access type is KSDS, ESDS, or RRDS.

If you have more than one record to write, you can improve the speed of writing by using mass insertion of data. You begin and end this mass insertion by calling the **beginInsert** and **endInsert** methods of **IccFile**.

### Writing KSDS records

You must use a key, held in an **IccKey** object to access records. A 'complete' key is a character string that uniquely identifies a record. Every record can be separately identified by its complete key.

The **writeRecord** method of **IccFile** class actually writes the record.

**IccFile** class has methods **isAddable**, **keyLength**, **keyPosition**, **recordIndex**, **recordLength**, and **registerRecordIndex** which help you when writing KSDS records.

### Writing ESDS records

You must use a relative byte address (RBA) held in an **IccRBA** object to access the beginning of a record.

**IccFile** class has methods **isAddable**, **recordFormat**, **recordIndex**, **recordLength**, and **registerRecordIndex** that help you when writing ESDS records.

### Writing RRDS records

Use the **writeRecord** method to add a new ESDS record. After writing the record you can use the **number** method on the **IccRBA** object to discover the assigned relative byte address for the record you have just written.

**IccFile** class has methods **isAddable**, **recordFormat**, **recordIndex**, **recordLength**, and **registerRecordIndex** that help you when writing RRDS records.

## Updating records

Updating a record is also known as "rewriting a record". Before updating a record you must first read it, using **readRecord** method in 'update' mode. This locks the record so that nobody else can change it.

Use **rewriteRecord** method to actually update the record. Note that the **IccFile** object remembers which record is being processed and this information is not passed in again.

For an example, see 31.

The base key in a KSDS file must not be altered when the record is modified. If the file definition allows variable-length records, the length of the record can be changed.

The length of records in an ESDS, RRDS, or fixed-length KSDS file must not be changed on update.

For a file defined to CICS as containing fixed-length records, the length of record being updated must be the same as the original length. The length of an updated record must not be greater than the maximum defined to VSAM.

## Deleting records

Records can never be deleted from an ESDS file.

### Deleting normal records

The **deleteRecord** method of **IccFile** class deletes one or more records, provided they are not locked by virtue of being in 'update' mode. The records to be deleted are defined by the **IccKey** or **IccRRN** object.

### Deleting locked records

The **deleteLockedRecord** method of **IccFile** class deletes a record which has been previously locked by virtue of being put in 'update' mode by the **readRecord** method.

## Browsing records

Browsing, or sequential reading of files uses another class – **IccFileIterator**. An object of this class must be associated with an **IccFile** object and an **IccKey**, **IccRBA**, or **IccRRN** object. After this association has been made the **IccFileIterator** object can be used without further reference to the other objects.

Browsing can be done either forwards, using **readNextRecord** method or backwards, using **readPreviousRecord** method. The **reset** method resets the **IccFileIterator** object to point to the record specified by the **IccKey** or **IccRBA** object.

Examples of browsing files are shown in page 31.

## Example of file control

This sample program demonstrates how to use the **IccFile** and **IccFileIterator** classes. The source for this sample can be found in the samples directory (see "Sample source code" on page 6) in file `ICC$FIL`. Here the code is presented without any of the terminal input and output that can be found in the source file.

```
#include "icceh.hpp"
#include "iccmain.hpp"
```

The first two lines include the header files for the Foundation Classes and the standard **main** function which sets up the operating environment for the application program.

```
const char* fileRecords[] =
{
   //NAME         KEY  PHONE     USERID
   "BACH, J S      003  00-1234   BACH      ",
   "BEETHOVEN, L   007  00-2244   BEET      ",
   "CHOPIN, F      004  00-3355   CHOPIN    ",
   "HANDEL, G F    005  00-4466   HANDEL    ",
   "MOZART, W A    008  00-5577   WOLFGANG  "
};
```

This defines several lines of data that are used by the sample program.

```
void IccUserControl::run()
{
```

The **run** method of **IccUserControl** class contains the user code for this example. As a terminal is to be used, the example starts by creating a terminal object and clearing the associated screen.

```
     short        recordsDeleted = 0;
     IccFileId    id("ICCKFILE");
     IccKey       key(3,IccKey::generic);
     IccFile      file( id );
     file.registerRecordIndex( &key );
     key = "00";
     recordsDeleted = file.deleteRecord();
```

The *key* and *file* objects are first created and then used to delete all the records whose key starts with "00" in the KSDS file "ICCKFILE". *key* is defined as a generic key having 3 bytes, only the first two of which are used in this instance.

```
IccBuf       buffer(40);
key.setKind( IccKey::complete );
for (short j = 0; j < 5; j++)
{
    buffer = fileRecords[j];
    key.assign(3, fileRecords[j]+15);
    file.writeRecord( buffer );
}
```

This next fragment writes all the data provided into records in the file. The data is passed by means of an **IccBuf** object that is created for this purpose. **setKind** method is used to change *key* from 'generic' to 'complete'.

The **for** loop between these calls loops round all the data, passing the data into the buffer, using the **operator=** method of **IccBuf**, and thence into a record in the file, by means of **writeRecord**. On the way the key for each record is set, using **assign**, to be a character string that occurs in the data (3 characters, starting 15 characters in).

```
IccFileIterator fIterator( &file, &key );
key = "000";
buffer = fIterator.readNextRecord();
while (fIterator.condition() == IccCondition::NORMAL)
{
    term->sendLine("- record read: [%s]",(const char*) buffer);
    buffer = fIterator.readNextRecord();
}
```

The loop shown here lists to the terminal, using **sendLine**, all the records in ascending order of key. It uses an **IccFileIterator** object to browse the records. It starts by setting the minimum value for the key which, as it happens, does not actually exist in this example, and relying on CICS to find the first record in key sequence.

The loop continues until any condition other than NORMAL is returned.

```
key = "\xFF\xFF\xFF";
fIterator.reset( &key );
buffer = fIterator.readPreviousRecord();
while (fIterator.condition() == IccCondition::NORMAL)
{
    buffer = fIterator.readPreviousRecord();
}
```

The next loop is nearly identical to the last, but lists the records in reverse order of key.

```
key = "008";
buffer = file.readRecord( IccFile::update );
buffer.replace( 4, "5678", 23);
file.rewriteRecord( buffer );
```

This fragment reads a record for update, locking it so that others cannot change it. It then modifies the record in the buffer and writes the updated record back to the file.

```
    buffer = file.readRecord();
```

The same record is read again and sent to the terminal, to show that it has indeed been updated.

```
    return;
}
```

The end of **run**, which returns control to CICS.

See "Appendix C. Output from sample programs" on page 357 for the expected output from this sample.

## Program control

This section describes how to access and use a program other than the one that is currently executing. Program control uses **IccProgram** class, one of the resource classes.

Programs may be loaded, unloaded and linked to, using an **IccProgram** object. An **IccProgram** object can be interrogated to obtain information about the program. See "Chapter 37. IccProgram class" on page 197 for more details.

The example shown here shows one program calling another two programs in turn, with data passing between them via a COMMAREA. One program is assumed to be local, the second is on a remote CICS system. The programs are in two files, `ICC$PRG1` and `ICC$PRG2`, in the samples directory (see "Sample source code" on page 6).

Most of the terminal IO in these samples has been omitted from the code that follows.

```
#include "icceh.hpp"
#include "iccmain.hpp"
void IccUserControl::run()
{
```

The code for both programs starts by including the header files for the Foundation Classes and the stub for **main** method. The user code is located in the **run** method of the **IccUserControl** class for each program.

```
IccSysId      sysId( "ICC2" );
IccProgram    icc$prg2( "ICC$PRG2" );
IccProgram    remoteProg( "ICC$PRG3" );
IccBuf        commArea( 100, IccBuf::fixed );
```

The first program (ICC$PRG1) creates an **IccSysId** object representing the remote region, and two **IccProgram** objects representing the local and remote programs that will be called from this program. A 100 byte, fixed length buffer object is also created to be used as a communication area between programs.

```
icc$prg2.load();
if (icc$prg2.condition() == IccCondition::NORMAL)
{
  term->sendLine( "Loaded program: %s <%s> Length=%ld Address=%x",
                 icc$prg2.name(),
                 icc$prg2.conditionText(),
                 icc$prg2.length(),
                 icc$prg2.address() );
  icc$prg2.unload();
}
```

The program then attempts to load and interrogate the properties of program ICC$PRG2.

```
 commArea = "DATA SET BY ICC$PRG1";
 icc$prg2.link( &commArea );
```

The communication area buffer is set to contain some data to be passed to the first program that ICC$PRG1 links to (ICC$PRG2). ICC$PRG1 is suspended while ICC$PRG2 is run.

The called program, ICC$PRG2, is a simple program, the gist of which is as follows:

```
IccBuf& commArea = IccControl::commArea();
commArea = "DATA RETURNED BY ICC$PRG2";
return;
```

ICC$PRG2 gains access to the communication area that was passed to it. It then modifies the data in this communication area and passes control back to the program that called it.

The first program (ICC$PRG1) now calls another program, this time on another system, as follows:

```
remoteProg.setRouteOption( sysId );
commArea = "DATA SET BY ICC$PRG1";
remoteProg.link( &commArea );
```

The **setRouteOption** requests that calls on this object are routed to the remote system. The communication area is set again (because it will have been changed by ICC$PRG2) and it then links to the remote program (ICC$PRG3 on system ICC2).

The called program uses CICS temporary storage but the three lines we consider are:

```
IccBuf& commArea = IccControl::commArea();
commArea = "DATA RETURNED BY ICC$PRG3";
return;
```

Again, the remote program (ICC$PRG3) gains access to the communication area that was passed to it. It modifies the data in this communication area and passes control back to the program that called it.

```
  return;
};
```

Finally, the calling program itself ends and returns control to CICS.

See "Appendix C. Output from sample programs" on page 357 for the expected output from these sample programs.

## Starting transactions asynchronously

The **IccStartRequestQ** class enables a program to start another CICS transaction instance asynchronously (and optionally pass data to the started transaction). The same class is used by a started transaction to gain access to the data that the task that issued the start request passed to it. Finally start requests (for some time in the future) can be cancelled.

### Starting transactions

You can use any of the following methods to establish what data will be sent to the started transaction:

- **registerData** or **setData**
- **setQueueName**
- **setReturnTermId**
- **setReturnTransId**

The actual start is requested using the **start** method.

### Accessing start data

A started transaction can access its start data by invoking the **retrieveData** method. This method stores all the start data attributes in the **IccStartRequestQ** object such that the individual attributes can be accessed using the following methods:

- **data**
- **queueName**
- **returnTermId**
- **returnTransId**

### Cancelling unexpired start requests

Unexpired start requests (that is, start requests for some future time that has not yet been reached) can be cancelled using the **cancel** method.

### Example of starting transactions

| CICS system | ICC1 | ICC2 |
|---|---|---|
| Transaction | ISR1/ITMP | ISR2 |
| Program | ICC$SRQ1/ICC$TMP | ICC$SRQ2 |
| Terminal | PEO1 | PEO2 |

The scenario is as follows. We start transaction ISR1 on terminal PEO1 on system ICC1. This issues two start requests; the first is cancelled before it has expired. The second starts transaction ISR2 on terminal PEO2 on system ICC2. This transaction accesses its start data and finishes by starting transaction ITMP on the original terminal (PEO1 on system ICC1).

The programs can be found in the samples directory (see "Sample source code" on page 6) as files `ICC$SRQ1` and `ICC$SRQ2`. Here the code is presented without the terminal IO requests.

Transaction ISR1 runs program ICC$SRQ1 on system ICC1. Let us consider this program first:

```
#include "icceh.hpp"
#include "iccmain.hpp"
void IccUserControl::run()
{
```

These lines include the header files for the Foundation Classes, and the **main** function needed to set up the class library for the application program. The **run** method of **IccUserControl** class contains the user code for this example.

```
   IccRequestId         req1;
   IccRequestId         req2("REQUEST1");
   IccTimeInterval      ti(0,0,5);
   IccTermId            remoteTermId("PE02");
   IccTransId           ISR2("ISR2");
   IccTransId           ITMP("ITMP");
   IccBuf               buffer;
   IccStartRequestQ* startQ = startRequestQ();
```

Here we are creating a number of objects:

**req1** An empty **IccRequestId** object ready to identify a particular start request.

**req2** An **IccRequestId** object containing the user-supplied identifier "REQUEST1".

**ti** An **IccTimeInterval** object representing 0 hours, 0 minutes, and 5 seconds.

**remoteTermId**
An **IccTermId** object; the terminal on the remote system where we start a transaction.

**ISR2** An **IccTransId** object; the transaction we start on the remote system.

**ITMP** An **IccTransId** object; the transaction that the started transaction starts on this program's terminal.

**buffer**
An **IccBuf** object that holds start data.

Finally, the **startRequestQ** method of **IccControl** class returns a pointer to the single instance (singleton) class **IccStartRequestQ**.

```
  startQ->setRouteOption( "ICC2" );
  startQ->registerData( &buffer );
  startQ->setReturnTermId( terminal()->name() );
  startQ->setReturnTransId( ITMP );
  startQ->setQueueName( "startqnm" );
```

This code fragment prepares the start data that is passed when we issue a start request. The **setRouteOption** says we will issue the start request on the remote system, ICC2. The **registerData** method associates an **IccBuf** object that will contain the start data (the contents of the **IccBuf** object are not extracted until we actually issue the start request). The **setReturnTermId** and **setReturnTransId** methods allow the start requester to pass a transaction and terminal name to the started transaction. These fields are typically used to allow the started transaction to start ***another*** transaction (as specified) on another terminal, in this case ours.

The **setQueueName** is another piece of information that can be passed to the started transaction.

```
  buffer = "This is a greeting from program 'icc$srq1'!!";
  req1 = startQ->start( ISR2, &remoteTermId, &ti );
  startQ->cancel( req1 );
```

Here we set the data that we pass on the start requests. We start transaction ISR2 after an interval *ti* (5 seconds). The request identifier is stored in *req1*. Before the five seconds has expired (that is, immediately) we cancel the start request.

```
  req1 = startQ->start( ISR2, &remoteTermID, &ti, &req2 );
  return;
}
```

Again we start transaction ISR2 after an interval *ti* (5 seconds). This time the request is allowed to expire so transaction ISR2 is started on the remote system. Meanwhile, we end by returning control to CICS.

Let us now consider the started program, ICC$SRQ2.

```
  IccBuf              buffer;
  IccRequestId        req("REQUESTX");
  IccTimeInterval     ti(0,0,5);
  IccStartRequestQ* startQ = startRequestQ();
```

Here, as in ICC$SRQ1, we create a number of objects:

**buffer**
: An **IccBuf** object to hold the start data we were passed by our caller (ICC$SRQ1).

**req**
: An **IccRequestId** object to identify the start we will issue on our caller's terminal.

**ti**
: An **IccTimeInterval** object representing 0 hours, 0 minutes, and 5 seconds.

The **startRequestQ** method of **IccControl** class returns a pointer to the singleton class **IccStartRequestQ**.

```
  if ( task()->startType() != IccTask::startRequest )
  {
    term->sendLine(
          "This program should only be started via the StartRequestQ");
    task()->abend( "OOPS" );
  }
```

Here we use the **startType** method of **IccTask** class to check that ICC$SRQ2 was started by the **start** method, and not in any other way (such as typing the transaction name on a terminal). If it was not started as intended, we abend with an "OOPS" abend code.

```
  startQ->retrieveData();
```

We retrieve the start data that we were passed by ICC$SRQ1 and store within the **IccStartRequestQ** object for subsequent access.

```
  buffer = startQ->data();
  term->sendLine( "Start buffer contents = [%s]", buffer.dataArea() );
  term->sendLine( "Start queue= [%s]", startQ->queueName() );
  term->sendLine( "Start rtrn = [%s]", startQ->returnTransId().name());
  term->sendLine( "Start rtrm = [%s]", startQ->returnTermId().name() );
```

The start data buffer is copied into our **IccBuf** object. The other start data items (queue, returnTransId, and returnTermId) are displayed on the terminal.

```
task()->delay( ti );
```

We delay for five seconds (that is, we sleep and do nothing).

```
startQ->setRouteOption( "ICC1" );
```

The **setRouteOption** signals that we will start on our caller's system (ICC1).

```
startQ->start( startQ->returnTransId(),startQ->returnTermId());
return;
```

We start a transaction called ITMP (the name of which was passed by `ICC$SRQ1` in the returnTransId start information) on the originating terminal (where `ICC$SRQ1` completed as it started this transaction). Having issued the start request, `ICC$SRQ1` ends, by returning control to CICS.

Finally, transaction ITMP runs on the first terminal. This is the end of this demonstration of starting transactions asynchronously.

See "Appendix C. Output from sample programs" on page 357 for the expected output from these sample programs.

## Transient Data

The transient data classes, **IccDataQueue** and **IccDataQueueId**, allow you to store data in transient data queues for subsequent processing.

You can:
- Read data from a transient data queue (**readItem** method)
- Write data to a transient data queue (**writeItem** method)
- Delete a transient data queue (**empty** method)

An **IccDataQueue** object is used to represent a temporary storage queue. An **IccDataQueueId** object is used to identify a queue by name. Once the **IccDataQueueId** object is initialized it can be used to identify the queue as an alternative to using its name, with the advantage of additional error detection by the C++ compiler.

The methods available in **IccDataQueue** class are similar to those in the **IccTempStore** class. For more information on these see "Temporary storage" on page 39.

### Reading data

The **readItem** method is used to read items from the queue. It returns a reference to the **IccBuf** object that contains the information.

### Writing data

The **writeItem** method of **IccDataQueue** adds a new item of data to the queue, taking the data from the buffer specified.

### Deleting queues

The **empty** method deletes all items on the queue.

## Example of managing transient data

This sample program demonstrates how to use the **IccDataQueue** and **IccDataQueueId** classes. It can be found in the samples directory (see “Sample source code” on page 6) as file ICC$DAT. Here the code is presented without the terminal IO requests.

```
#include "icceh.hpp"
#include "iccmain.hpp"
```

The first two lines include the header files for the foundation classes and the standard **main** function that sets up the operating environment for the application program.

```
const char* queueItems[] =
{
  "Hello World - item 1",
  "Hello World - item 2",
  "Hello World - item 3"
};
```

This defines some buffer for the sample program.

```
void IccUserControl::run()
{
```

The **run** method of **IccUserControl** class contains the user code for this example.

```
  short itemNum =1;
  IccBuf              buffer( 50 );
  IccDataQueueId      id( "ICCQ" );
  IccDataQueue        queue( id );
  queue.empty();
```

This fragment first creates an identification object, of type IccDataQueueId containing "ICCQ". It then creates an **IccDataQueue** object representing the transient data queue "ICCQ", which it empties of data.

```
  for (short i=0 ; i<3 ; i++)
  {
    buffer = queueItems[i];
    queue.writeItem( buffer );
  }
```

This loop writes the three data items to the transient data object. The data is passed by means of an **IccBuf** object that was created for this purpose.

```
  buffer = queue.readItem();
  while ( queue.condition() == IccCondition::NORMAL )
  {
    buffer = queue.readItem();
  }
```

Having written out three records we now read them back in to show they were successfully written.

```
  return;
}
```

The end of **run**, which returns control to CICS.

See “Appendix C. Output from sample programs” on page 357 for the expected output from this sample program.

## Temporary storage

The temporary storage classes, **IccTempStore** and **IccTempStoreId**, allow you to store data in temporary storage queues.

You can:

- Read an item from the temporary storage queue (**readItem** method)
- Write a new item to the end of the temporary storage queue (**writeItem** method)
- Update an item in the temporary storage queue (**rewriteItem** method)
- Read the next item in the temporary storage queue (**readNextItem** method)
- Delete all the temporary data (**empty** method)

An **IccTempStore** object is used to represent a temporary storage queue. An **IccTempStoreId** object is used to identify a queue by name. Once the **IccTempStoreId** object is initialized it can be used to identify the queue as an alternative to using its name, with the advantage of additional error detection by the C++ compiler.

The methods available in **IccTempStore** class are similar to those in the **IccDataQueue** class. For more information on these see “Transient Data” on page 37.

### Reading items

The **readItem** method of **IccTempStore** reads the specified item from the temporary storage queue. It returns a reference to the **IccBuf** object that contains the information.

### Writing items

Writing items is also known as "adding" items. This section describes writing items that have not previously been written. Writing items that already exist can be done using the **rewriteItem** method. See “Updating items” for more information.

The **writeItem** method of **IccTempStore** adds a new item at the end of the queue, taking the data from the buffer specified. If this is done successfully, the item number of the record added is returned.

### Updating items

Updating an item is also known as "rewriting" an item. The **rewriteItem** method of **IccTempStore** class is used to update the specified item in the temporary storage queue.

### Deleting items

You cannot delete individual items in a temporary storage queue. To delete *all* the temporary data associated with an **IccTempStore** object use the **empty** method of **IccTempStore** class.

### Example of Temporary Storage

This sample program demonstrates how to use the **IccTempStore** and **IccTempStoreId** classes. This program can be found in the samples directory (see

"Sample source code" on page 6) as file `ICC$TMP`. The sample is presented here without the terminal IO requests.

```
#include "icceh.hpp"
#include "iccmain.hpp"
#include <stdlib.h>
```

The first three lines include the header files for the foundation classes, the standard **main** function that sets up the operating environment for the application program, and the standard library.

```
const char* bufferItems[] =
{
  "Hello World - item 1",
  "Hello World - item 2",
  "Hello World - item 3"
};
```

This defines some buffer for the sample program.

```
void IccUserControl::run()
{
```

The **run** method of **IccUserControl** class contains the user code for this example.

```
  short itemNum = 1;
  IccTempStoreId id("ICCSTORE");
  IccTempStore   store( id );
  IccBuf         buffer( 50 );
  store.empty();
```

This fragment first creates an identification object, **IccTempStoreId** containing the field "ICCSTORE". It then creates an **IccTempStore** object representing the temporary storage queue "ICCSTORE", which it empties of records.

```
  for (short j=1 ; j <= 3 ; j++)
  {
    buffer = bufferItems[j-1];
    store.writeItem( buffer );
  }
```

This loop writes the three data items to the Temporary Storage object. The data is passed by means of an **IccBuf** object that was created for this purpose.

```
  buffer = store.readItem( itemNum );
  while ( store.condition() == IccCondition::NORMAL )
  {
    buffer.insert( 9, "Modified " );
    store.rewriteItem( itemNum, buffer );
    itemNum++;
    buffer = store.readItem( itemNum );
  }
```

This next fragment reads the items back in, modifies the item, and rewrites it to the temporary storage queue. First, the **readItem** method is used to read the buffer from the temporary storage object. The data in the buffer object is changed using the **insert** method of **IccBuf** class and then the **rewriteItem** method overwrites the buffer. The loop continues with the next buffer item being read.

```
  itemNum = 1;
  buffer = store.readItem( itemNum );
  while ( store.condition() == IccCondition::NORMAL )
  {
    term->sendLine( " - record #%d = [%s]", itemNum,
                    (const char*)buffer );
    buffer = store.readNextItem();
  }
```

This loop reads the temporary storage queue items again to show they have been updated.

```
  return;
}
```

The end of **run**, which returns control to CICS.

See "Appendix C. Output from sample programs" on page 357 for the expected output from this sample program.

## Terminal control

The terminal control classes, **IccTerminal**, **IccTermId**, and **IccTerminalData**, allow you to send data to, receive data from, and find out information about the terminal belonging to the CICS task.

An **IccTerminal** object is used to represent the terminal that belongs to the CICS task. It can only be created if the transaction has a 3270 terminal as its principal facility. The **IccTermId** class is used to identify the terminal. **IccTerminalData**, which is owned by **IccTerminal**, contains information about the terminal characteristics.

### Sending data to a terminal

The **send** and **sendLine** methods of **IccTerminal** class are used to write data to the screen. Alternatively, you can use the "<<" operators to send data to the terminal.

Before sending data to a terminal, you may want to set, for example, the position of the cursor on the screen or the color of the text. The **set...** methods allow you to do this. You may also want to erase the data currently displayed at the terminal, using the **erase** method, and free the keyboard so that it is ready to receive input, using the **freeKeyboard** method.

### Receiving data from a terminal

The **receive** and **receive3270data** methods of **IccTerminal** class are used to receive data from the terminal.

### Finding out information about a terminal

You can find out information about both the characteristics of the terminal and its current state.

The **data** object points to the **IccTerminalData** object that contains information about the characteristics of the terminal. The methods described in **IccTerminalData** on page 303 allow you to discover, for example, the height of the screen or whether the terminal supports Erase Write Alternative. Some of the methods in **IccTerminal** also give you information about characteristics, such as how many lines a screen holds.

### Terminal control

Other methods give you information about the current state of the terminal. These include **line**, which returns the current line number, and **cursor**, which returns the current cursor position.

## Example of terminal control

This sample program demonstrates how to use the **IccTerminal**, **IccTermId**, and **IccTerminalData** classes. This program can be found in the samples directory (see "Sample source code" on page 6) as file ICC$TRM.

```
#include "icceh.hpp"
#include "iccmain.hpp"
```

The first two lines include the header files for the Foundation Classes and the standard **main** function that sets up the operating environment for the application program.

```
void IccUserControl::run()
{
  IccTerminal& term = *terminal();
  term.erase();
```

The **run** method of **IccUserControl** class contains the user code for this example. As a terminal is to be used, the example starts by creating a terminal object and clearing the associated screen.

```
  term.sendLine( "First part of the line..." );
  term.send( "... a continuation of the line." );
  term.sendLine( "Start this on the next line" );
  term.sendLine( 40, "Send this to column 40 of current line" );
  term.send( 5, 10, "Send this to row 5, column 10" );
  term.send( 6, 40, "Send this to row 6, column 40" );
```

This fragment shows how the **send** and **sendLine** methods are used to send data to the terminal. All of these methods can take **IccBuf** references (const IccBuf&) instead of string literals (const char*).

```
  term.setNewLine();
```

This sends a blank line to the screen.

```
  term.setColor( IccTerminal::red );
  term.sendLine( "A Red line of text.");
  term.setColor( IccTerminal::blue );
  term.setHighlight( IccTerminal::reverse );
  term.sendLine( "A Blue, Reverse video line of text.");
```

The **setColor** method is used to set the colour of the text on the screen and the **setHighlight** method to set the highlighting.

```
  term << "A cout sytle interface... " << endl;
  term << "you can " << "chain input together; "
       << "use different types, eg numbers: " << (short)123 << " "
       << (long)4567890 << " " << (double)123456.7891234 << endl;
  term << "... and everything is buffered till you issue a flush."
       << flush;
```

This fragment shows how to use the iostream–like interface **endl** to start data on the next line. To improve performance, you can buffer data in the terminal until **flush** is issued, which sends the data to the screen.

```
  term.send( 24,1, "Program 'icc$trm' complete: Hit PF12 to End" );
  term.waitForAID( IccTerminal::PF12 );
  term.erase();
```

The **waitForAID** method causes the terminal to wait until the specified key is hit, before calling the **erase** method to clear the display.

```
  return;
}
```

The end of **run**, which returns control to CICS.

See "Appendix C. Output from sample programs" on page 357 for the expected output from this sample program.

## Time and date services

The **IccClock** class controls access to the CICS time and date services. **IccAbsTime** holds information about absolute time (the time in milliseconds that have elapsed since the beginning of 1900), and this can be converted to other forms of date and time. The methods available on **IccClock** objects and on **IccAbsTime** objects are very similar.

### Example of time and date services

This sample program demonstrates how to use **IccClock** class. The source for this program can be found in the samples directory (see "Sample source code" on page 6) as file `ICC$CLK`. The sample is presented here without the terminal IO requests.

```
#include "icceh.hpp"
#include "iccmain.hpp"
void IccUserControl::run()
{
```

The first two lines include the header files for the Foundation Classes and the standard **main** function that sets up the operating environment for the application program.

The **run** method of **IccUserControl** class contains the user code for this example.

```
  IccClock clock;
```

This creates a clock object.

```
  term->sendLine( "date() = [%s]",
                  clock.date() );
  term->sendLine( "date(DDMMYY) = [%s]",
                  clock.date(IccClock::DDMMYY) );
  term->sendLine( "date(DDMMYY,':') = [%s]",
                  clock.date(IccClock::DDMMYY,':'));
  term->sendLine( "date(MMDDYY) = [%s]",
                  clock.date(IccClock::MMDDYY));
  term->sendLine( "date(YYDDD) = [%s]",
                  clock.date(IccClock::YYDDD));
```

Here the **date** method is used to return the date in the format specified by the *format* enumeration. In order the formats are system, DDMMYY, DD:MM:YY, MMDDYY and YYDDD. The character used to separate the fields is specified by the *dateSeparator* character (that defaults to nothing if not specified).

```
  term->sendLine( "daysSince1900() = %ld",
                  clock.daysSince1900());
  term->sendLine( "dayOfWeek() = %d",
                  clock.dayOfWeek());
  if ( clock.dayOfWeek() == IccClock::Friday )
    term->sendLine( 40, "Today IS Friday" );
  else
    term->sendLine( 40, "Today is NOT Friday" );
```

This fragment demonstrates the use of the **daysSince1900** and **dayOfWeek** methods. **dayOfWeek** returns an enumeration that indicates the day of the week. If it is Friday, a message is sent to the screen, 'Today IS Friday'; otherwise the message 'Today is NOT Friday' is sent.

```
  term->sendLine( "dayOfMonth() = %d",
                  clock.dayOfMonth());
  term->sendLine( "monthOfYear() = %d",
                  clock.monthOfYear());
```

This demonstrates the **dayOfMonth** and **monthOfYear** methods of **IccClock** class.

```
  term->sendLine( "time() = [%s]",
                  clock.time() );
  term->sendLine( "time('-') = [%s]",
                  clock.time('-') );
  term->sendLine( "year() = [%ld]",
                  clock.year());
```

The current time is sent to the terminal, first without a separator (that is HHMMSS format), then with '-' separating the digits (that is, HH-MM-SS format). The year is sent, for example 1996.

```
  return;
};
```

The end of **run**, which returns control to CICS.

See “Appendix C. Output from sample programs” on page 357 for the expected output from this sample program.

# Chapter 8. Compiling, executing, and debugging

This chapter describes how to compile, execute, and debug a CICS Foundation Class program. The following are considered in turn:

- "Compiling Programs"
- "Executing Programs"
- "Debugging Programs"

## Compiling Programs

To compile and link a CICS Foundation Class program you need access to the following:

- The source of the program you are compiling

  Your C++ program source code needs `#include` statements for the Foundation Class headers and the Foundation Class `main()` program stub:

  ```
  #include "icceh.hpp"
  #include "iccmain.hpp"
  ```
- The IBM C++ compiler
- The Foundation Classes header files (see "Header files" on page 5)
- The Foundation Classes dynamic link library (DLL) (see "Dynamic link library" on page 6)

Note that, when using the Foundation Classes, you do not need to translate the "EXEC CICS" API so the translator program should not be used.

The following sample job statements show how to compile, prelink and link a program called `ICC$HEL`:

```
//ICC$HEL   JOB 1,user_name,MSGCLASS=A,CLASS=A,NOTIFY=userid
//PROCLIB  JCLLIB ORDER=(CICSTS13.CICS.SDFHPROC)
//ICC$HEL   EXEC ICC$FCCL,INFILE=indatasetname(ICC$HEL),OUTFILE=outdatasetname(ICC$HEL)
//
```

## Executing Programs

To run a compiled and linked (that is, executable) Foundation Classes program you need to do the following:

1. Make the executable program available to CICS. This involves making sure the program is in a suitable directory or load library. Depending on your server, you may also need to create a CICS program definition (using CICS resource definition facilities) before you can execute the program.
2. Logon to a CICS terminal.
3. Run the program.

## Debugging Programs

Having successfully compiled, linked and attempted to execute your Foundation Classes program you may need to debug it.

There are three options available to help debug a CICS Foundation Classes program:

### Compiling, executing, and debugging

1. Use a symbolic debugger
2. Run the Foundation Class Program with tracing active
3. Run the Foundation Class Program with the CICS Execution Diagnostic Facility

## Symbolic Debuggers

A symbolic debugger allows you to step through the source of your CICS Foundation Classes program. **Debug Tool**, a component of CODE/370, is shipped as a feature with IBM C/C++ for OS/390.

To debug a CICS Foundation Classes program with a symbolic debugger, you need to compile the program with a flag that adds debugging information to your executable. For CICS Transaction Server for OS/390, this is TEST(ALL).

For more information see *Debug Tool User's Guide and Reference*, SC09-2137.

## Tracing a Foundation Class Program

The CICS Foundation Classes can be configured to write a trace file for debugging/service purposes.

### Activating the trace output

In CICS Transaction Server for OS/390, exception trace is always active.

The CETR transaction controls the auxilliary and internal traces for all CICS programs including those developed using the C++ classes.

## Execution Diagnostic Facility

For the EXEC CICS API, there is a CICS facility called the Execution Diagnostic Facility (EDF) that allows you to step through your CICS program stopping at each EXEC CICS call. This does not make much sense from the CICS Foundation Classes because the display screen shows the procedural EXEC CICS call interface rather than the CICS Foundation Class type interface. However, this may be of use to programmers familiar with the EXEC CICS interface.

### Enabling EDF

To enable EDF, use the pre-processor macro `ICC_EDF` – this can be done in your source code ***before*** including the file `ICCMAIN` as follows:

```
#define ICC_EDF      //switch EDF on
#include "iccmain.hpp"
```

Alternatively use the appropriate flag on your compiler CPARM to declare ICC_EDF.

For more information about using EDF see ″Execution diagnostic facility (EDF)″ in *CICS Application Programming Guide*.

# Chapter 9. Conditions, errors, and exceptions

This chapter describes how the Foundation Classes have been designed to respond to various error situations they might encounter. These will be discussed under the following headings:

- "Foundation Class Abend codes"
- "C++ Exceptions and the Foundation Classes"
- "CICS conditions" on page 49
- "Platform differences" on page 52

## Foundation Class Abend codes

For serious errors (such as insufficient storage to create an object) the Foundation Classes immediately terminate the CICS task.

All CICS Foundation Class abend codes are of the form ACLx. If your application is terminated with an abend code starting 'ACL' then please refer to *CICS Messages and Codes*, GC33-1694.

## C++ Exceptions and the Foundation Classes

C++ exceptions are managed using the reserved words **try**, **throw**, and **catch**. Please refer to your compiler's documentation or one of the C++ books in the bibliography for more information.

Here is sample ICC$EXC1 (see "Sample source code" on page 6):

```
#include "icceh.hpp"
#include "iccmain.hpp"
class Test {
public:
  void  tryNumber( short num ) {
    IccTerminal* term = IccTerminal::instance();
    *term << "Number passed = " << num << endl << flush;
    if ( num > 10 ) {
      *term << ">>Out of Range - throwing exception" << endl << flush;
      throw "!!Number is out of range!!";
    }
  }
};
```

The first two lines include the header files for the Foundation Classes and the standard **main** function that sets up the operating environment for the application program.

We then declare class **Test**, which has one public method, **tryNumber**. This method is implemented inline so that if an integer greater than ten is passed an exception is thrown. We also write out some information to the CICS terminal.

```
void IccUserControl::run()
{
  IccTerminal* term = IccTerminal::instance();
  term->erase();
  *term << "This is program 'icc$exc1' ..." << endl;
  try  {
    Test test;
    test.tryNumber( 1 );
    test.tryNumber( 7 );
    test.tryNumber( 11 );
    test.tryNumber( 6 );
  }
  catch( const char* exception )   {
    term->setLine( 22 );
    *term << "Exception caught: " << exception << endl << flush;
  }
  term->send( 24,1,"Program 'icc$exc1' complete: Hit PF12 to End" );
  term->waitForAID( IccTerminal::PF12 );
  term->erase();
  return;
}
```

The **run** method of **IccUserControl** class contains the user code for this example.

After erasing the terminal display and writing some text, we begin our **try** block. A **try** block can scope any number of lines of C++ code.

Here we create a **Test** object and invoke our only method, **tryNumber**, with various parameters. The first two invocations (1, 7) succeed, but the third (11) causes **tryNumber** to throw an exception. The fourth **tryNumber** invocation (6) is not executed because an exception causes the program execution flow to leave the current **try** block.

We then leave the **try** block and look for a suitable **catch** block. A suitable **catch** block is one with arguments that are compatible with the type of exception being thrown (here a **char***). The **catch** block writes a message to the CICS terminal and then execution resumes at the line after the **catch** block.

The output from this CICS program is as follows:

```
This is program 'icc$exc1' ...
Number passed = 1
Number passed = 7
Number passed = 11
>>Out of Range - throwing exception
Exception caught: !!Number is out of range!!
Program 'icc$exc1' complete: Hit PF12 to End
```

The CICS C++ Foundation Classes do not throw **char*** exceptions as in the above sample but they do throw **IccException** objects instead.

There are several types of **IccException**. The **type** method returns an enumeration that indicates the type. Here is a description of each type in turn.

**objectCreationError**
: An attempt to create an object was invalid. This happens, for example, if an attempt is made to create a second instance of a singleton class, such as **IccTask**.

**invalidArgument**
: A method was called with an invalid argument. This happens, for example,

if an **IccBuf** object with too much data is passed to the **writeItem** method of the **IccTempStore** class by the application program.

It also happens when attempting to create a subclass of **IccResourceId**, such as **IccTermId**, with a string that is too long.

The following sample can be found in the samples directory (see “Sample source code” on page 6) as file ICC$EXC2. The sample is presented here without many of the terminal IO requests.

```
#include "icceh.hpp"
#include "iccmain.hpp"
void IccUserControl::run()
{
  try
  {
    IccTermId id1( "1234" );
    IccTermId id2( "12345");
  }
  catch( IccException& exception )
  {
    terminal()->send( 21, 1, exception.summary() );
  }
  return;
}
```

In the above example the first **IccTermId** object is successfully created, but the second caused an **IccException** to be thrown, because the string "12345" is 5 bytes where only 4 are allowed. See “Appendix C. Output from sample programs” on page 357 for the expected output from this sample program.

**invalidMethodCall**
: A method cannot be called. A typical reason is that the object cannot honor the call in its current state. For example, a **readRecord** call on an **IccFile** object is only honored if an **IccRecordIndex** object, to specify *which* record is to be read, has already been associated with the file.

**CICSCondition**
: A CICS condition, listed in the **IccCondition** structure, has occurred in the object and the object was configured to throw an exception.

**familyConformanceError**
: Family subset enforcement is on for this program and an operation that is not valid on all supported platforms has been attempted.

**internalError**
: The CICS foundation classes have detected an internal error. Please call service.

## CICS conditions

The CICS foundation classes provide a powerful framework for handling conditions that happen when executing an application. Accessing a CICS resource can raise a number of CICS conditions as documented in “Part 3. Foundation Classes—reference” on page 61.

A condition might represent an error or simply information being returned to the calling application; the deciding factor is often the context in which the condition is raised.

### Conditions, errors, exceptions

The application program can handle the CICS conditions in a number of ways. Each CICS resource object, such as a program, file, or data queue, can handle CICS conditions differently, if required.

A resource object can be configured to take one of the following actions for each condition it can encounter:

**noAction**
Manual condition handling

**callHandleEvent**
Automatic condition handling

**throwException**
Exception handling

**abendTask**
Severe error handling.

## Manual condition handling (noAction)

This is the default action for all CICS conditions (for any resource object). It can be explicitly activated as follows:

```
IccTempStore   temp("TEMP1234");
temp.setActionOnCondition(IccResource::noAction,
                          IccCondition::QIDERR);
```

This setting means that when CICS raises the QIDERR condition as a result of action on the 'temp' object, no action is taken. This means that the condition must be handled manually, using the **condition** method. For example:

```
IccTempStore   temp("TEMP1234");
IccBuf         buf(40);
temp.setActionOnCondition(IccResource::noAction,
                          IccCondition::QIDERR);
buf = temp.readNextItem();
switch (temp.condition())
{
case IccCondition::QIDERR:
    //do whatever here
   ⋮
default:
    //do something else here
}
```

## Automatic condition handling (callHandleEvent)

Activate this for any CICS condition, such as QIDERR, as follows:

```
IccTempStore   temp("TEMP1234");
temp.setActionOnCondition(IccResource::callHandleEvent,
                          IccCondition::QIDERR);
```

When a call to any method on object 'temp' causes CICS to raise the QIDERR condition, **handleEvent** method is automatically called. As the **handleEvent** method is only a virtual method, this call is only useful if the object belongs to a subclass of **IccTempStore** and the **handleEvent** method has been overridden.

Make a subclass of **IccTempStore**, declare a constructor, and override the **handleEvent** method.

```
class MyTempStore : public IccTempStore
{
public:
    MyTempStore(const char* storeName) : IccTempStore(storeName) {}
    HandleEventReturnOpt handleEvent(IccEvent& event);
};
```

Now implement the **handleEvent** method.

```
IccResource::HandleEventReturnOpt MyTempStore::handleEvent(IccEvent& event)
{
    switch (event.condition())
    {
    case ...

   ⋮
    case IccCondition::QIDERR:
        //Handle QIDERR condition here.

   ⋮
        //
    default:
        return rAbendTask;
    }
}
```

This code is called for any **MyTempStore** object which is configured to 'callHandleEvent' for a particular CICS condition.

## Exception handling (throwException)

Activate this for any CICS condition, such as QIDERR, as follows:

```
IccTempStore   temp("TEMP1234");
temp.setActionOnCondition(IccResource::throwException,
                          IccCondition::QIDERR);
```

Exception handling is by means of the C++ exception handling model using **try**, **throw**, and **catch**. For example:

```
try
{
    buf = temp.readNextItem();

   ⋮
}
catch (IccException& exception)
{
    //Exception handling code

   ⋮
}
```

An exception is thrown if any of the methods inside the try block raise the QIDERR condition for object 'temp'. When an exception is thrown, C++ unwinds the stack and resumes execution at an appropriate **catch** block – it is not possible to resume within the **try** block. For a fuller example of the above, see sample `ICC$EXC3`.

**Note:** Exceptions can be thrown from the Foundation Classes for many reasons other than this example – see "C++ Exceptions and the Foundation Classes" on page 47 for more details.

### Severe error handling (abendTask)

This option allows CICS to terminate the task when certain conditions are raised. Activate this for any CICS condition, such as QIDERR, as follows:

```
IccTempStore   temp("TEMP1234");
temp.setActionOnCondition(IccResource::abendTask,
                          IccCondition::QIDERR);
```

If CICS raises the QIDERR condition for object 'temp' the CICS task terminates with an ACL3 abend.

## Platform differences

**Note:** References in this section to other CICS platforms—CICS OS/2 and CICS for AIX—are included for completeness. There have been Technology Releases of the CICS Foundation Classes on those platforms.

The CICS Foundation Classes, as described here, are designed to be independent of the particular CICS platform on which they are running. There are however some differences between platforms; these, and ways of coping with them, are described here.

Applications can be run in one of two modes:

**fsAllowPlatformVariance**
Applications written using the CICS Foundation Classes are able to access all the functions available on the target CICS server.

**fsEnforce**
Applications are restricted to the CICS functions that are available across ***all*** CICS Servers (MVS, UNIX, and OS/2).

The default is to allow platform variance and the alternative is to force the application to only use features which are common to all CICS platforms.

The class headers are the same for all platforms and they "support" (that is, define) all the CICS functions that are available through the Foundation Classes on any of the CICS platforms. The restrictions on each platform are documented in “Part 3. Foundation Classes—reference” on page 61. Platform variations exist at:

- object level
- method level
- parameter level

### Object level

Some objects are not supported on certain platforms. For example **IccJournal** objects cannot be created on CICS OS/2 as CICS OS/2 does not support journalling services. **IccConsole** objects cannot be created on CICS for AIX as CICS for AIX does not support console services.

Any attempt to create **IccJournal** on CICS OS/2, or an **IccConsole** object on CICS for AIX causes an **IccException** object of type 'platformError' to be thrown, but would be acceptable on the other platforms

For example:

```
IccJournal journal7(7);  //No good on CICS OS/2
```

or

```
IccConsole* cons = console();  //No good on CICS for AIX
```

If you initialize your application with 'fsEnforce' selected (see "initializeEnvironment" on page 71) the previous examples both cause an **IccException** object, of type 'familyConformanceError' to be thrown on all platforms.

Unlike objects of the **IccConsole** and **IccJournal** classes, most objects can be created on any CICS server platform. However the use of the methods can be restricted. "Part 3. Foundation Classes—reference" on page 61 fully documents all platform restrictions.

## Method level

Consider, for example method **programId** in the **IccControl** class:

```
void IccUserControl::run()
{
    if (strcmp(programId.name(), "PROG1234") == 0)
        //do something
}
```

Here method **programId** executes correctly on CICS OS/2 and CICS/ESA but throws an **IccException** object of type 'platformError' on CICS for AIX.

Alternatively, if you initialize your application with family subset enforcement on (see **initializeEnvironment** function of **Icc** structure) then method **programId** throws an **IccException** object of type 'familyConformanceError' on *any* CICS server platform.

## Parameter level

At this level a method is supported on all platforms, but a particular positional parameter has some platform restrictions. Consider method **abend** in **IccTask** class.

```
task()->abend();                                         1

task()->abend("WXYZ");                                   2

task()->abend("WXYZ", IccTask::respectAbendHandler);     3

task()->abend("WXYZ", IccTask::ignoreAbendHandler);      4

task()->abend("WXYZ", IccTask::ignoreAbendHandler,       5

              IccTask::suppressDump);
```

Abends 1 to 4 run successfully on all CICS server platforms.

If family subset enforcement is off, abend 5 throws an **IccException** object of type 'platformError' on a CICS for AIX platform, but not on a CICS OS/2 or CICS/ESA platform.

If family subset enforcement is on, abend 5 throws an **IccException** object of type 'familyConformanceError', irrespective of the target CICS platform.

# Chapter 10. Miscellaneous

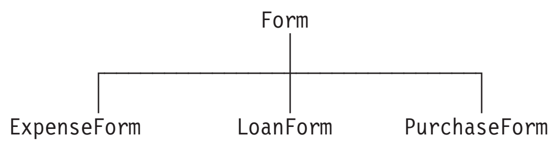
This chapter describes the following:

- "Polymorphic Behavior"
- "Storage management" on page 57
- "Parameter passing conventions" on page 58
- "Scope of data in IccBuf reference returned from 'read' methods" on page 59

## Polymorphic Behavior

Polymorphism (*poly* = many, *morphe* = form) is the ability to treat many different forms of an object as if they were the same.

Polymorphism is achieved in C++ by using inheritance and virtual functions. Consider the scenario where we have three forms (ExpenseForm, LoanForm, PurchaseForm) that are specializations of a general Form:



Each form needs printing at some time. In procedural programming, we would either code a print function to handle the three different forms or we would write three different functions (printExpenseForm, printLoanForm, printPurchaseForm).

In C++ this can be achieved far more elegantly as follows:

```
class   Form   {
public:
   virtual void print();
};
class ExpenseForm : public Form {
public:
   virtual void print();
};
class LoanForm : public Form {
public:
   virtual void print();
};
class PurchaseForm : public Form {
public:
   virtual void print();
};
```

Each of these overridden functions is implemented so that each form prints correctly. Now an application using form objects can do this:

```
Form* pForm[10]
//create Expense/Loan/Purchase Forms...
for (short i=0 ; i < 9 ; i++)
   pForm->print();
```

Here we create ten objects that might be any combination of Expense, Loan, and Purchase Forms. However, because we are dealing with pointers to the base class, **Form**, we do not need to know which sort of form object we have; the correct **print** method is called automatically.

Limited polymorphic behavior is available in the Foundation Classes. Three virtual functions are defined in the base class **IccResource**:

```
   virtual void clear();
   virtual const IccBuf& get();
   virtual void put(const IccBuf& buffer);
```

These methods have been implemented in the subclasses of **IccResource** wherever possible:

| **Class** | **clear** | **get** | **put** |
|---|---|---|---|
| IccConsole | × | × | ✓ |
| IccDataQueue | ✓ | ✓ | ✓ |
| IccJournal | × | × | ✓ |
| IccSession | × | ✓ | ✓ |
| IccTempStore | ✓ | ✓ | ✓ |
| IccTerminal | ✓ | ✓ | ✓ |

These virtual methods are ***not*** supported by any subclasses of **IccResource** except those in the table above.

**Note:** The default implementations of **clear**, **get**, and **put** in the base class **IccResource** throw an exception to prevent the user from calling an unsupported method.

## Example of polymorphic behavior

The following sample can be found in the samples directory (see "Sample source code" on page 6) as file ICC$RES2. It is presented here without the terminal IO requests.

```
#include "icceh.hpp"
#include "iccmain.hpp"
char* dataItems[] =
{
  "Hello World - item 1",
  "Hello World - item 2",
  "Hello World - item 3"
};
void IccUserControl::run()
{
```

Here we include Foundation Class headers and the **main** function. **dataItems** contains some sample data items. We write our application code in the **run** method of **IccUserControl** class.

```
  IccBuf buffer( 50 );
  IccResource* pObj[2];
```

We create an **IccBuf** object (50 bytes initially) to hold our data items. An array of two pointers to **IccResource** objects is declared.

```
pObj[0] = new IccDataQueue("ICCQ");
pObj[1] = new IccTempStore("ICCTEMPS");
```

We create two objects whose classes are derived from **IccResource – IccDataQueue** and **IccTempStore**.

```
for ( short index=0; index <= 1 ; index++ )
{
  pObj[index]->clear();
}
```

For both objects we invoke the **clear** method. This is handled differently by each object in a way that is transparent to the application program; this is polymorphic behavior.

```
for ( index=0; index <= 1 ; index++ )
{
  for (short j=1 ; j <= 3 ; j++)
  {
    buffer = dataItems[j-1];
    pObj[index]->put( buffer );
  }
}
```

Now we **put** three data items in each of our resource objects. Again the **put** method responds to the request in a way that is appropriate to the object type.

```
  for ( index=0; index <= 1 ; index++ )
  {
    buffer = pObj[index]->get();
    while (pObj[index]->condition() == IccCondition::NORMAL)
    {
      buffer = pObj[index]->get();
    }
    delete pObj[index];
  }
  return;
}
```

The data items are read back in from each of our resource objects using the **get** method. We delete the resource objects and return control to CICS.

## Storage management

C++ objects are usually stored on the stack or heap– see “Creating an object” on page 15. Objects on the stack are automatically destroyed when they go out of scope, but objects on the heap are not.

Many of the objects that the CICS Foundation Classes create internally are created on the heap rather than the stack. This can cause a problem in some CICS server environments.

On CICS Transaction Server for OS/390, CICS and Language Environment® manage ***all*** task storage so that it is released at task termination (normal or abnormal).

### Miscellaneous

In a CICS for OS/2® or CICS for AIX environment, as in the earlier Technology Releases for those platforms, storage allocated on the heap is ***not*** automatically released at task termination. This can lead to "memory leaks" if the application programmer forgets to explicitly delete an object on the heap, or, more seriously, if the task abends.

This problem has been overcome in the CICS Foundation Classes by providing operators **new** and **delete** in the base Foundation Class, **IccBase**. These can be configured to map dynamic storage allocation requests to CICS task storage, so that ***all*** storage is automatically released at task termination. The disadvantage of this approach is a performance hit as the Foundation Classes typically issue a large number of small storage allocation requests rather than a single, larger allocation request.

This facility is affected by the **Icc::initializeEnvironment** call that must be issued before using the Foundation Classes. (This function is called from the default **main** function—see “Chapter 64. main function” on page 341.)

The first parameter passed to the **initializeEnvironment** function is an enumeration that takes one of these three values:

**cmmDefault**
The default action is platform dependent:

**MVS/ESA™**
same as 'cmmNonCICS' - see below.

**UNIX** same as 'cmmCICS' - see below.

**OS/2** same as 'cmmCICS' - see below.

**cmmNonCICS**
The **new** and **delete** operators in class **IccBase** ***do not*** map dynamic storage allocation requests to CICS task storage; instead the C++ default **new** and **delete** operators are invoked.

**cmmCICS**
The **new** and **delete** operators in class **IccBase** map dynamic storage allocation requests to CICS task storage (which is automatically released at normal or abnormal task termination).

The default **main** function supplied with the Foundation Classes calls **initializeEnvironment** with an enum of 'cmmDefault'. You can change this in your program without changing the supplied "header file" `ICCMAIN` as follows:

```
#define ICC_CLASS_MEMORY_MGMT Icc::cmmNonCICS
#include "iccmain.hpp"
```

Alternatively, set the option **DEV(ICC_CLASS_MEMORY_MGMT)** when compiling.

## Parameter passing conventions

The convention used for passing objects on Foundation Classes method calls is as follows:

If the object is mandatory, pass by reference; if it is optional pass by pointer.

For example, consider method **start** of class **IccStartRequestQ**, which has the following signature:

```
const IccRequestId& start( const IccTransId& transId,
                           const IccTime* time=0,
                           const IccRequestId* reqId=0 );
```

Using the above convention, we see that an **IccTransId** object is mandatory, while an **IccTime** and an **IccRequestId** object are both optional. This enables an application to use this method in any of the following ways:

```
  IccTransId      trn("ABCD");
  IccTimeInterval int(0,0,5);
  IccRequestId    req("MYREQ");
  IccStartRequestQ* startQ = startRequestQ();
  startQ->start( trn );
  startQ->start( trn, &int );
  startQ->start( trn, &int, &req );
  startQ->start( trn, 0, &req );
```

## Scope of data in IccBuf reference returned from 'read' methods

Many of the subclasses of **IccResource** have 'read' methods that return **const IccBuf** references; for example, **IccFile::readRecord**, **IccTempStore::readItem** and **IccTerminal::receive**.

Care should be taken if you choose to maintain a reference to the **IccBuf** object, rather than copy the data from the **IccBuf** reference into your own **IccBuf** object. For example, consider the following

```
  IccBuf       buf(50);
  IccTempStore store("TEMPSTOR");
  buf = store.readNextItem();
```

Here, the data in the **IccBuf** reference returned from **IccTempStore::readNextItem** is ***immediately*** copied into the application's own **IccBuf** object, so it does not matter if the data is later invalidated. However, the application might look like this

```
  IccTempStore store("TEMPSTOR");
  const IccBuf& buf = store.readNextItem();
```

Here, the **IccBuf** reference returned from **IccTempStore::readNextItem** is ***not*** copied into the application's own storage and care must therefore be taken.

**Note:** You are recommended not to use this style of programming to avoid using a reference to an **IccBuf** object that does not contain valid data.

The returned **IccBuf** reference typically contains valid data until one of the following conditions is met:

- Another 'read' method is invoked on the **IccResource** object (for example, another **readNextItem** or **readItem** method in the above example).
- The resource updates are committed (see method **IccTask::commitUOW**).
- The task ends (normally or abnormally).

## Miscellaneous

# Part 3. Foundation Classes—reference

This part contains the reference information on the Foundation Classes and structures that are provided as part of CICS. The classes and structures are arranged in alphabetic order. All the functionality you require to create object-oriented CICS programs is included within these classes and structures.

All of the classes and structures begin with the unique prefix **Icc**. You are advised not to create your own classes with this prefix.

**Icc** structure contains some functions and enumerations that are widely applicable. **IccValue** structure consists of a large enumeration of all the CVDA values used in traditional CICS programs.

The description of each class starts with a simple diagram that shows how it is derived from **IccBase** class, the basis of all the other classes. This is followed by a short description and an indication of the name of the header file that includes it and, where appropriate, a sample source file that uses it.

Within each class or structure description are, where appropriate, the following sections:

1. Inheritance diagram
2. Brief description of class
3. Header file where class is defined. For the location of the C++ header files on your system see "Header files" on page 5.
4. Sample program demonstrating class. For the location of the supplied C++ sample programs on your system see "Sample source code" on page 6.
5. Icc... constructors
6. Public methods (in alphabetic order)
7. Protected methods (in alphabetic order)
8. Inherited public methods (in tabular form)
9. Inherited protected methods (in tabular form)
10. Enumerations

Methods, including constructors, start with a formal function prototype that shows what a call returns and what the parameters are. There follows a description, in order, of the parameters. To avoid duplication, inherited methods just have an indication of the class from which they are derived (and where they are described).

The convention for names is:

1. Variable names are shown as *variable*.
2. Names of classes, structures, enumerations and methods are shown as **method**
3. Members of enumerations are shown as 'enumMember'.
4. The names of all the supplied classes and structures begin with **Icc**.
5. Compound names have no separators, but have capital letters to demark the beginning of second and subsequent words, as in **IccJournalTypeId**.
6. Class and structure names and enumeration types begin with capital letters. Other names begin with lower case letters.

For further information on how to use these classes, see "Part 2. Using the CICS foundation classes" on page 13.

# Chapter 11. Icc structure

This structure holds global enumerations and functions for the CICS Foundation Classes. These globals are defined within this structure to avoid name conflicts.

**Header file:** `ICCGLBEH`

## Functions

### boolText

**static const char* boolText (Bool** *test*,
**BoolSet** *set* = trueFalse**)**

*test*
: A boolean value, defined in this structure, that has one of two values, chosen from a set of values given by *set*.

*set*
: An enumeration, defined in this structure, that indicates from which pair of values *test* is selected. The default is to use true and false.

Returns the text that represents the boolean value described by the parameters, such as "yes" or "on".

### catchException

**static void catchException(IccException&** *exception***)**

*exception*
: A reference to an **IccException** object that holds information about a particular type of exception.

This is the function of last resort, used to intercept **IccException** objects that the application fails to catch. It can be called from the **main** function in the stub program, listed in `ICCMAIN` header file, and described in "Chapter 64. main function" on page 341. All OO CICS programs should use this stub or a close equivalent.

### conditionText

**static const char* conditionText(IccCondition::Codes** *condition***)**

*condition*
: An enumeration, defined in the **IccCondition** structure, that indicates the condition returned by a call to CICS.

Returns the symbolic name associated with a condition value. For example, if **conditionText** is called with *condition* of IccCondition::NORMAL, it returns "NORMAL", if it is called with *condition* of IccCondition::IOERR, it returns "IOERR", and so on.

### initializeEnvironment

**static void initializeEnvironment (ClassMemoryMgmt** *mem* **=** cmmDefault**,**
**FamilySubset** *fam* **=** fsDefault**,**
**Icc::Bool** *EDF***)**

*mem*
An enumeration, defined in this structure, that indicates the memory management policy for the foundation classes.

*fam*
An enumeration, defined in this structure, that indicates whether the use of CICS features that are not available on all platforms is permitted.

*EDF*
A boolean that indicates whether EDF tracing is initially on.

Initializes the CICS Foundation Classes. The rest of the class library can only be called after this function has been called. It is called from the **main** function in the stub program, listed in `ICCMAIN` header file, and described in "Chapter 64. main function" on page 341. All OO CICS programs should use this stub or a close equivalent.

## isClassMemoryMgmtOn

**static Bool isClassMemoryMgmtOn()**

Returns a boolean value, defined in this structure, that indicates whether class memory management is on.

## isEDFOn

**static Bool isEDFOn()**

Returns a Boolean value, defined in this structure, that indicates whether EDF tracing is on at the global level. (See **setEDF** in this structure, **isEDFOn** and **setEDF** in **IccResource** class on page 217 and **"Execution Diagnostic Facility" on page 46**).

## isFamilySubsetEnforcementOn

**static Bool isFamilySubsetEnforcementOn()**

Returns a boolean value, defined in this structure, that indicates whether it is permitted to use CICS features that are not available on all platforms.

## returnToCICS

**static void returnToCICS()**

This call returns the program flow to CICS. It is called by the **main** function in the stub program, listed in `ICCMAIN` header file, and described in "Chapter 64. main function" on page 341. All OO CICS programs should use this stub or a close equivalent.

## setEDF

**static void setEDF(Icc::Bool** *onOff* **=** off**)**

*onOff*
A boolean, defined in this structure, that indicates whether EDF tracing is enabled. As EDF is more suitable for tracing programs that use EXEC CICS calls than object oriented programs, the default is off.

Sets EDF tracing on or off at the global level.

## unknownException

**static void unknownException()**

This function is called by the **main** function in `ICCMAIN` header file (see “Chapter 64. main function” on page 341) and is used to intercept unknown exceptions. (See also **catchException** in this structure).

## Enumerations

**Note:** References in this section to other CICS platforms—CICS OS/2 and CICS for AIX—are included for completeness. There have been Technology Releases of the CICS Foundation Classes on those platforms.

### Bool

# Two equivalent pairs of boolean values:
# yes, on
# no, off

# yes, and on evaluate to 1, while no, and off evaluate to zero. Thus you can code test functions as follows:

```
if (task()->isStartDataAvailable())
{
    //do something
}
```

# **Note:** The boolean values true and false are now words reserved by the C++
# compilers, so they have been removed from the Icc enumerations. This is a
# change from earlier versions of the Foundation Classes, so you might have
# to change application source code to use yes and no if you have previously
# used true and false.

# ### BoolSet

trueFalse
yesNo
onOff

### ClassMemoryMgmt

**cmmDefault**
The defaults for the different platforms are:

| | |
|---|---|
| **MVS/ESA** | cmmNonCICS |
| **OS/2** | cmmCICS |
| **UNIX** | cmmCICS |

**cmmNonCICS**
The C++ environment performs the memory management required by the program.

In MVS/ESA LE (Language Environment) ensures that the storage for CICS tasks is released at the end of the task, or if the task terminates abnormally.

On CICS for AIX or CICS for OS/2 dynamic storage release does not occur at normal or abnormal task termination. This means that programs are susceptible to memory leaks.

**cmmCICS**
The **new** and **delete** operators defined in **IccBase** class map storage allocations to CICS; storage is automatically released at task termination.

## FamilySubset

**fsDefault**
: The defaults for the different platforms are all the same: fsAllowPlatformVariance

**fsEnforce**
: Enforces Family Subset conformance; that is, it disallows use of any CICS features that are not available on ***all*** CICS servers (OS/2, AIX, and MVS/ESA).

**fsAllowPlatformVariance**
: Allows each platform to access all the CICS features available on that platform.

## GetOpt

This enumeration is used on a number of methods throughout the classes.

It indicates whether the value held internally by the object is to be returned to the caller, or whether it has to be refreshed from CICS first.

**object**
: If the value has been previously retrieved from CICS and stored within the object, return this stored value. Otherwise, get a copy of the value from CICS and store within the object.

**CICS**
: Force the object to retrieve a fresh value from CICS (and store it within the object) even if there is already a value stored within the object from a previous invocation.

## Platforms

Indicates on which operating system the program is being run. Possible values are:

OS2
UNIX
MVS

# Chapter 12. IccAbendData class

**IccBase**
  **IccResource**
    **IccAbendData**

This is a singleton class used to retrieve diagnostic information from CICS about a program abend.

**Header file:** `ICCABDEH`

## IccAbendData constructor (protected)

### Constructor

**IccAbendData()**

## Public methods

**The opt parameter**

Many methods have the same parameter, *opt*, which is described under the **abendCode** method.

### abendCode

**const char* abendCode(Icc::GetOpt** *opt* **=** Icc::object**)**

*opt*
: An enumeration, defined in the **Icc** structure, that indicates whether a value should be refreshed from CICS or whether the existing value should be retained. The possible values are described under the **GetOpt** enumeration in the **Icc** structure on pageGetOpt.

Returns the current 4-character abend code.

#### Conditions

INVREQ

### ASRAInterrupt

**const char* ASRAInterrupt(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns 8 characters of status word (PSW) interrupt information at the point when the latest abend with a code of ASRA, ASRB, ASRD, or AICA occurred.

The field contains binary zeroes if no ASRA or ASRB abend occurred during the execution of the issuing transaction, or if the abend originally occurred in a remote DPL server program.

#### Conditions

INVREQ

### ASRAKeyType

**IccValue::CVDA ASRAKeyType(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns an enumeration, defined in **IccValue**, that indicates the execution key at the time of the last ASRA, ASRB, AICA, or AEYD abend, if any. The possible values are:

**CICSEXECKEY**
: The task was executing in CICS-key at the time of the last ASRA, ASRB, AICA, or AEYD abend. Note that all programs execute in CICS key if CICS subsystem storage protection is not active.

**USEREXECKEY**
: The task was executing in user-key at the time of the last ASRA, ASRB, AICA, or AEYD abend. Note that all programs execute in CICS key if CICS subsystem storage protection is not active.

**NONCICS**
: The execution key at the time of the last abend was not one of the CICS keys; that is, not key 8 or key 9.

**NOTAPPLIC**
There has not been an ASRA, ASRB, AICA, or AEYD abend.

### Conditions

INVREQ

## ASRAPSW

**const char* ASRAPSW(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns an 8-character status word (PSW) at the point when the latest abend with a code of ASRA, ASRB, ASRD, or AICA occurred.

The field contains nulls if no ASRA, ASRB, ASRD, or AICA abend occurred during the execution of the issuing transaction, or if the abend originally occurred in a remote DPL server.

### Conditions

INVREQ

## ASRARegisters

**const char* ASRARegisters(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns the contents of general registers 0–15, as a 64-byte data area, at the point when the latest ASRA, ASRB, ASRD, or AICA abend occurred. The contents of the registers are returned in the order 0, 1, ..., 15.

Note that nulls are returned if no ASRA, ASRB, ASRD, or AICA abend occurred during the execution of the issuing transaction, or if the abend originally occurred in a remote DPL server program.

### Conditions

INVREQ

## ASRASpaceType

**IccValue::CVDA ASRASpaceType(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns an enumeration, defined in **IccValue** structure, that indicates what type of space, if any, was in control at the time of the last ASRA, ASRB, AICA, or AEYD abend. Possible values are:

**SUBSPACE**
The task was executing in either its own subspace or the common subspace at the time of the last ASRA, ASRB, AICA, or AEYD abend.

**BASESPACE**
The task was executing in the base space at the time of the last ASRA, ASRB, AICA, or AEYD abend. Note that all tasks execute in the base space if transaction isolation is not active.

**NOTAPPLIC**
There has not been an ASRA, ASRB, AICA, or AEYD abend.

### Conditions

INVREQ

## ASRAStorageType

**IccValue::CVDA ASRAStorageType(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns an enumeration, defined in **IccValue** structure, that indicates what type of storage, if any, was being addressed at the time of the last ASRA, ASRB, AICA, or AEYD abend. Possible values are:

**CICS**
CICS-key storage is being addressed. This can be in one of the CICS dynamic storage areas (CDSA or ECDSA), or in one of the read-only dynamic storage areas (RDSA or ERDSA) if either of the following apply:

- CICS is running with the NOPROTECT option on the RENTPGM system initialization parameter
- storage protection is not active

**USER**
User-key storage in one of the user dynamic storage areas (RDSA or ERDSA) is being addressed.

**READONLY**
Read-only storage in one of the read-only dynamic storage areas (RDSA or ERDSA) when CICS is running with the PROTECT option on the RENTPGM system initialization parameter.

**NOTAPPLIC**
One of:

- No ASRA or AEYD abend has been found for this task.
- The storage affected by an abend is not managed by CICS.
- The ASRA abend is not caused by a 0C4 abend.
- An ASRB or AICA abend has occurred since the last ASRA or AEYD abend.

### Conditions

INVREQ

## instance

**static IccAbendData* instance()**

Returns a pointer to the single **IccAbendData** object. If the object does not already exist, it is created by this method.

## isDumpAvailable

**Icc::Bool isDumpAvailable(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns a boolean, defined in **Icc** structure, that indicates whether a dump has been produced. If it has, use **programName** method to find the name of the failing program of the latest abend.

### Conditions

INVREQ

## originalAbendCode

**const char* originalAbendCode(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns the original abend code for this task in case of repeated abends.

### Conditions
INVREQ

## programName

**const char* programName(Icc::GetOpt** *opt* **=** Icc::oldValue**)**

Returns the name of the program that caused the abend.

### Conditions
INVREQ

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| classType | IccBase |
| className | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| id | IccResource |
| isEDFOn | IccResource |
| name | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 13. IccAbsTime class

**IccBase**
  **IccResource**
    **IccTime**
      **IccAbsTime**

This class holds information about absolute time, the time in milliseconds that has elapsed since the beginning of the year 1900.

**Header file:** `ICCTIMEH`

## IccAbsTime constructor

### Constructor (1)

**IccAbsTime(const char*** *absTime***)**

*absTime*
  The 8-byte value of time, in packed decimal format.

### Constructor (2)

**IccAbsTime(const IccAbsTime&** *time***)**

The copy constructor.

## Public methods

### date

**const char* date (IccClock::DateFormat** *format* **=** IccClock::defaultFormat**,**
**char** *dateSeparator* **= '\0')**

*format*
: An enumeration, defined in **IccClock** class, that indicates the format of the date. The default is to use the installation default, the value set when the CICS region is initialized.

*dateSeparator*
: The character that separates the different fields of the date The default is no separation character.

Returns the date, as a character string.

#### Conditions

INVREQ

### dayOfMonth

**unsigned long dayOfMonth()**

Returns the day of the month in the range 1 to 31.

#### Conditions

INVREQ

### dayOfWeek

**IccClock::DayOfWeek dayOfWeek()**

Returns an enumeration, defined in **IccClock** class, that indicates the day of the week.

#### Conditions

INVREQ

### daysSince1900

**unsigned long daysSince1900()**

Returns the number of days that have elapsed since the first day of 1900.

#### Conditions

INVREQ

### hours

**virtual unsigned long hours() const**

Returns the hours component of the time.

### milliSeconds

**long double milliSeconds()**

Returns the number of milliseconds that have elapsed since the first day of 1900.

## minutes

**virtual unsigned long minutes() const**

Returns the minutes component of the time.

## monthOfYear

**IccClock::MonthOfYear monthOfYear()**

Returns an enumeration, defined in **IccClock** class, that indicates the month of the year.

### Conditions

INVREQ

## operator=

**IccAbsTime& operator=(const IccAbsTime&** *absTime***)**

Assigns one **IccAbsTime** object to another.

## packedDecimal

**const char* packedDecimal() const**

Returns the time as an 8-byte packed decimal string that expresses the number of milliseconds that have elapsed since the beginning of the year 1900.

## seconds

**virtual unsigned long seconds() const**

Returns the seconds component of the time.

## time

**const char* time(char** *timeSeparator* **= '\0')**

*timeSeparator*
: The character that delimits the time fields. The default is no time separation character.

Returns the time as a text string.

### Conditions

INVREQ

## timeInHours

**unsigned long timeInHours()**

Returns the number of hours that have elapsed since the day began.

## timeInMinutes

**unsigned long timeInMinutes()**

Returns the number of minutes that have elapsed since the day began.

## timeInSeconds

**unsigned long timeInSeconds()**

Returns the number of seconds that have elapsed since the day began.

## year

**unsigned long year()**

Returns the year as a 4-digit integer, e.g. 1996.

### Conditions

INVREQ

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| classType | IccBase |
| className | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| hours | IccTime |
| isEDFOn | IccResource |
| minutes | IccTime |
| operator delete | IccBase |
| operator new | IccBase |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |
| timeInHours | IccTime |
| timeInMinutes | IccTime |
| timeInSeconds | IccTime |
| type | IccTime |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 14. IccAlarmRequestId class

**IccBase**
  **IccResourceId**
    **IccRequestId**
      **IccAlarmRequestId**

An **IccAlarmRequestId** object represents a unique alarm request. It contains the 8-character name of the request identifier and a pointer to a 4-byte timer event control area. **IccAlarmRequestId** is used by the **setAlarm** method of **IccClock** class when setting an alarm, and the **waitOnAlarm** method of **IccTask** when waiting for an alarm.

**Header file:** `ICCRIDEH`

## IccAlarmRequestId constructors

### Constructor (1)

**IccAlarmRequestId()**

Creates a new object with no information present.

### Constructor (2)

**IccAlarmRequestId (const char*** *nam***,**
**const void*** *timerECA***)**

*name*
The 8-character name of the request.

*timerECA*
A pointer to a 4-byte timer event control area.

Creates an object with information already set.

### Constructor (3)

**IccAlarmRequestId(const IccAlarmRequestId&** *id***)**

*id* A reference to an **IccAlarmRequestId** object.

The copy constructor.

## Public methods

### isExpired

**Icc::Bool isExpired()**

Returns a boolean, defined in **Icc** structure, that indicates whether the alarm has expired.

### operator= (1)

**IccAlarmRequestId& operator=(const IccRequestId&** *id***)**

*id* A reference to an **IccRequestId** object.

### operator= (2)

**IccAlarmRequestId& operator=(const IccAlarmRequestId&** *id***)**

*id* A reference to an **IccAlarmRequestId** object.

### operator= (3)

**IccAlarmRequestId& operator=(const char*** *requestName***)**

*requestName*
The 8-character name of the alarm request.

These methods are used to copy information into an **IccAlarmRequestId** object.

### setTimerECA

**void setTimerECA(const void*** *timerECA***)**

*timerECA*
A pointer to a 4-byte timer event control area.

### timerECA

**const void* timerECA() const**

Returns a pointer to the 4-byte timer event control area.

## Inherited public methods

| Method | Class |
|---|---|
| classType | IccBase |
| className | IccBase |
| customClassNum | IccBase |
| name | IccResourceId |
| nameLength | IccResourceId |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| operator= | IccResourceId |
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 15. IccBase class

**IccBase**

**IccBase** class is the base class from which ***all*** CICS Foundation Classes are derived. (The methods associated with **IccBase** are described here although, in practice, they can only be called on objects of the derived classes).

**Header file:** `ICCBASEH`

## IccBase constructor (protected)

### Constructor

**IccBase(ClassType** *type***)**

*type*
: An enumeration that indicates what the subclass type is. For example, for an **IccTempStore** object, the class type is 'cTempStore'.

## Public methods

**The opt parameter**
Many methods have the same parameter, *opt*, which is described under the **abendCode** method in“abendCode” on page 78.

### classType

**ClassType classType() const**

Returns an enumeration that indicates what the subclass type is. For example, for an **IccTempStore** object, the class type is 'cTempStore'. The possible values are listed under **ClassType** on page 96.

### className

**const char* className(NameOpt *opt*=customName)**

*opt*
An enumerator, defined in this class, that indicates whether to return the base name of the class or the name as customized by a derived class.

Returns the name of the class. For example, an **IccTempStore** object returns "IccTempStore".

Suppose a class **MyDataQueue** inherits from **IccDataQueue**. If **MyDataQueue** calls **setClassName(″MyDataQueue″)**, **MyDataQueue::className(IccBase::customName)** returns ″MyDataQueue″ and **MyDataQueue::className(IccBase::baseName)** returns ″IccDataQueue″. An **IccDataQueue** object returns ″IccDataQueue″ for both *opt* values.

### customClassNum

**unsigned short customClassNum() const**

Returns the number that an application designer has associated with a subclass that he or she has designed.

### operator delete

**void operator delete(void* *object*)**

*object*
A pointer to an object that is to be destroyed.

Destroys an object in an orderly manner.

### operator new

**void* operator new(size_t *size*)**

*size*
The size of the object that is to be created, in bytes.

Creates a new object of given size. This operator enables the Foundation Classes to use CICS storage allocation (see “initializeEnvironment” on page 71).

## Protected methods

### setClassName

**void setClassName(const char*** *className***)**

*className*
: The name of the class. For example, if you create a class **MyTempStore** that is a specialization of **IccTempStore**, you might call **setClassName("MyTempStore")**.

Sets the name of the class. It is useful for diagnostic purposes to be able to get a string representation of the name of the class to which an object belongs.

### setCustomClassNum

**void setCustomClassNum(unsigned short** *number***)**

*number*
: The number that an application designer associates with a subclass for identification purposes.

Assigns an identification number to a subclass that is not an original part of the classes, as supplied.

## Enumerations

### ClassType

The names are derived by deleting the first two characters from the name of the class. The possible values are:

| | | |
|---|---|---|
| cAbendData | cGroupId | cSystem |
| cAlarmRequestId | cJournal | cTask |
| cBuf | cJournalId | cTempStore |
| cClock | cJournalTypeId | cTempStoreId |
| cConsole | cLockId | cTermId |
| cControl | cMessage | cTerminal |
| cConvId | cPartnerId | cTerminalData |
| cCUSTOM | cProgram | cTime |
| cDataQueue | cProgramId | cTPNameId |
| cDataQueueId | cRecordIndex | cTransId |
| cEvent | cRequestId | cUser |
| cException | cSemaphore | cUserId |
| cFile | cSession | |
| cFileId | cStartRequestQ | |
| cFileIterator | cSysId | |

**Note:** cCUSTOM allows the class library to be extended by non-IBM developers.

### NameOpt

See“className” on page 94.

**baseName**
Returns the default name assigned to the class as provided by IBM.

**customName**
Returns the name assigned using **setClassName** method from a subclass *or*, if **setClassName** has not been invoked, the same as *baseName*.

# Chapter 16. IccBuf class

**IccBase**
  **IccBuf**

**IccBuf** class is supplied for the general manipulation of buffers. This class is used by other classes that make calls to CICS, but does not itself call CICS services. See "Chapter 6. Buffer objects" on page 23.

**Header file:** `ICCBUFEH`

**Sample:** `ICC$BUF`

## IccBuf constructors

### Constructor (1)

**IccBuf (unsigned long** *length* **= 0,**
  **DataAreaType** *type* = extensible**)**

*length*
  The initial length of the data area, in bytes. The default length is 0.

*type*
  An enumeration that indicates whether the data area can be dynamically extended. Possible values are extensible or fixed. The default is extensible.

Creates an **IccBuf** object, allocating its own data area with the given length and with all the bytes within it set to NULL.

### Constructor (2)

**IccBuf (unsigned long** *length***,**
  **void*** *dataArea***)**

*length*
  The length of the supplied data area, in bytes

*dataArea*
  The address of the first byte of the supplied data area.

Creates an **IccBuf** object that cannot be extended, adopting the given data area as its own.

See warning about "Internal/External ownership of buffers" on page 23.

### Constructor (3)

**IccBuf (const char*** *text***,**
  **DataAreaType** *type* = extensible**)**

*text*
  A null-terminated string to be copied into the new **IccBuf** object.

*type*
An enumeration that indicates whether the data area can be extended. Possible values are **extensible** or **fixed**. The default is **extensible**.

Creates an **IccBuf** object, allocating its own data area with the same length as the *text* string, and copies the string into its data area.

## Constructor (4)

**IccBuf(const IccBuf&** *buffer***)**

*buffer*
A reference to an **IccBuf** object that is to be copied into the new object.

The copy constructor—creates a new **IccBuf** object that is a copy of the given object. The created **IccBuf** object ***always*** has an internal data area.

## Public methods

### append (1)

**IccBuf& append (unsigned long** *length*,
**const void*** *dataArea***)**

*length*
The length of the source data area, in bytes

*dataArea*
The address of the source data area.

Appends data from the given data area to the data area in the object.

### append (2)

**IccBuf& append (const char*** *format*,
**...)**

*format*
The null-terminated format string

**...** The optional parameters.

Append data, in the form of format string and variable argument, to the data area in the object. This is the same as the form used by **printf** in the standard C library. Note that it is the responsibility of the application programmer to ensure that the optional parameters are consistent with the format string.

### assign (1)

**IccBuf& assign (unsigned long** *length*,
**const void*** *dataArea***)**

*length*
The length of the source data area, in bytes

*dataArea*
The address of the source data area.

Assigns data from the given data area to the data area in the object.

### assign (2)

**IccBuf& assign (const char*** *format*,
**...)**

*format*
The format string

**...** The optional parameters.

Assigns data, in the form of format string and variable argument, to the data area in the object. This is the same as the form used by **printf** in the standard C library.

### cut

**IccBuf& cut (unsigned long** *length*,
**unsigned long** *offset* **= 0)**

*length*
The number of bytes to be cut from the data area.

*offset*
The offset into the data area. The default is no offset.

Makes the specified cut to the data in the data area and returns a reference to the **IccBuf** object.

## dataArea

**const void* dataArea(unsigned long** *offset* **= 0) const**

*offset*
The offset into the data area. The default is no offset.

Returns the address of data at the given offset into the data area.

## dataAreaLength

**unsigned long dataAreaLength() const**

Returns the length of the data area in bytes.

## dataAreaOwner

**DataAreaOwner dataAreaOwner() const**

Returns an enumeration that indicates whether the data area has been allocated by the **IccBuf** constructor or has been supplied from elsewhere. The possible values are listed under “DataAreaOwner” on page 105.

## dataAreaType

**DataAreaType dataAreaType() const**

Returns an enumeration that indicates whether the data area can be extended. The possible values are listed under “DataAreaType” on page 105.

## dataLength

**unsigned long dataLength() const**

Returns the length of data in the data area. This cannot be greater than the value returned by **dataAreaLength**.

## insert

**IccBuf& insert (unsigned long** *length*,
**const void*** *dataArea*,
**unsigned long** *offset* **= 0)**

*length*
The length of the data, in bytes, to be inserted into the **IccBuf** object

*dataArea*
The start of the source data to be inserted into the **IccBuf** object

*offset*
The offset in the data area where the data is to be inserted. The default is no offset.

Inserts the given data into the data area at the given offset and returns a reference to the **IccBuf** object.

## isFMHContained

**Icc::Bool isFMHContained() const**

Returns a boolean, defined in **Icc** structure, that indicates whether the data area contains FMHs (function management headers).

## operator const char*

**operator const char*() const**

Casts an **IccBuf** object to a null terminated string.

```
IccBuf data("Hello World");
cout << (const char*) data;
```

## operator= (1)

**IccBuf& operator=(const IccBuf&** *buffer***)**

*buffer*
A reference to an **IccBuf** object.

Assigns data from another buffer object and returns a reference to the **IccBuf** object.

## operator= (2)

**IccBuf& operator=(const char*** *text***)**

*text*
The null-terminated string to be assigned to the **IccBuf** object.

Assigns data from a null-terminated string and returns a reference to the **IccBuf** object.

See also the **assign** method.

## operator+= (1)

**IccBuf& operator+=(const IccBuf&** *buffer***)**

*buffer*
A reference to an **IccBuf** object.

Appends data from another buffer object and returns a reference to the **IccBuf** object.

## operator+= (2)

**IccBuf& operator+=(const char*** *text***)**

*text*
The null-terminated string to be appended to the **IccBuf** object.

Appends data from a null-terminated string and returns a reference to the **IccBuf** object.

See also the **append** method.

## operator==

**Icc::Bool operator==(const IccBuf&** *buffer***) const**

*buffer*
A reference to an **IccBuf** object.

Returns a boolean, defined in **Icc** structure, that indicates whether the data contained in the buffers of the two **IccBuf** objects is the same. It is true if the current lengths of the two data areas are the same and the contents are the same.

## operator!=

**Icc::Bool operator!=(const IccBuf&** *buffer***) const**

*buffer*
A reference to an **IccBuf** object.

Returns a boolean, defined in **Icc** structure, that indicates whether the data contained in the buffers of the two **IccBuf** objects is different. It is true if the current lengths of the two data areas are different or if the contents are different.

## operator<< (1)

Appends another buffer.
**operator<<(const IccBuf&** *buffer***)**

## operator<< (2)

Appends a string.
**operator<<(const char*** *text***)**

## operator<< (3)

Appends a character.
**operator<<(char** *ch***)**

## operator<< (4)

Appends a character.
**operator<<(signed char** *ch***)**

## operator<< (5)

Appends a character.
**operator<<(unsigned char** *ch***)**

## operator<< (6)

Appends a string.
**operator<<(const signed char*** *text***)**

## operator<< (7)

**operator<<(const unsigned char*** *text***)**

Appends a string.

## operator<< (8)

Appends a short.

**operator<<(short** *num***)**

## operator<< (9)

Appends an unsigned short.

**operator<<(unsigned short** *num***)**

## operator<< (10)

Appends a long.

**operator<<(long** *num***)**

## operator<< (11)

Appends an unsigned long.

**operator<<(unsigned long** *num***)**

## operator<< (12)

Appends an integer.

**operator<<(int** *num***)**

## operator<< (13)

Appends a float.

**operator<<(float** *num***)**

## operator<< (14)

Appends a double.

**operator<<(double** *num***)**

## operator<< (15)

Appends a long double.

**operator<<(long double** *num***)**

Appends data of various types to the **IccBuf** object. The types are converted to a 'readable' format, for example from a long to a string representation.

## overlay

```
IccBuf& overlay (unsigned long length,
                 void* dataArea)
```

*length*
: The length of the existing data area.

*dataArea*
: The address of the existing data area.

Makes the data area external and fixed. Any existing internal data area is destroyed.

See warning about “Internal/External ownership of buffers” on page 23.

## replace

**IccBuf& replace (unsigned long** *length***,**
**const void*** *dataArea***,**
**unsigned long** *offset* **= 0)**

*length*
The length of the source data area, in bytes.

*dataArea*
The address of the start of the source data area.

*offset*
The position where the new data is to be written, relative to the start of the **IccBuf** data area. The default is no offset.

Replaces the current contents of the data area at the given offset with the data provided and returns a reference to the **IccBuf** object.

## setDataLength

**unsigned long setDataLength(unsigned long** *length***)**

*length*
The new length of the data area, in bytes

Changes the current length of the data area and returns the new length. If the **IccBuf** object is not extensible, the data area length is set to either the original length of the data area or *length* , whichever is less.

## setFMHContained

**void setFMHContained(Icc::Bool** *yesNo* **=** Icc::yes**)**

*yesNo*
A boolean, defined in **Icc** structure, that indicates whether the data area contains FMHs. The default value is yes.

Allows an application program to indicate that a data area contains function management headers.

## Inherited public methods

| Method | Class |
|---|---|
| className | IccBase |
| classType | IccBase |
| customClassNum | IccBase |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

## Enumerations

### DataAreaOwner

Indicates whether the data area of a **IccBuf** object has been allocated outside the object. Possible values are:

**internal**
: The data area has been allocated by the **IccBuf** constructor.

**external**
: The data area has been allocated externally.

### DataAreaType

Indicates whether the data area of a **IccBuf** object can be made longer than its original length. Possible values are:

**extensible**
: The data area can be automatically extended to accommodate more data.

**fixed**
: The data area cannot grow in size. If you attempt to assign too much data, the data is truncated, and an exception is thrown.

# Chapter 17. IccClock class

**IccBase**
  **IccResource**
    **IccClock**

The **IccClock** class controls access to the CICS time and date services.

**Header file:** `ICCCLKEH`

**Sample:** `ICC$CLK`

## IccClock constructor

### Constructor

**IccClock(UpdateMode** *update* **=** manual**)**

*update*
: An enumeration, defined in this class, that indicates whether the clock is to update its time automatically whenever a time or date service is used, or whether it is to wait until an explicit **update** method call is made. If the time is updated manually, the initial clock time is the time when the **IccClock object** object is created.

## Public methods

### absTime

**IccAbsTime& absTime()**

Returns a reference to an **IccAbsTime** object that contains the absolute time as provided by CICS.

### cancelAlarm

**void cancelAlarm(const IccRequestId*** *reqId* **= 0)**

*reqId*
An optional pointer to the **IccRequestId** object that holds information on an alarm request.

Cancels a previous **setAlarm** request if the alarm time has not yet been reached, that is, the request has not expired.

#### Conditions

ISCINVREQ, NOTAUTH, NOTFND, SYSIDERR

### date

**const char* date (DateFormat** *format* = defaultFormat**,**
**char** *dateSeparator* **= '\0')**

*format*
An enumeration, defined in this class, that indicates in which format you want the date to be returned.

*dateSeparator*
The character that is used to separate different fields in the date. The default is no separation character.

Returns the date as a string.

#### Conditions

INVREQ

### dayOfMonth

**unsigned long dayOfMonth()**

Returns the day component of the date, in the range 1 to 31.

#### Conditions

INVREQ

### dayOfWeek

**DayOfWeek dayOfWeek()**

Returns an enumeration, defined in this class, that indicates the day of the week.

#### Conditions

INVREQ

## daysSince1900

**unsigned long daysSince1900()**

Returns the number of days that have elapsed since 1st January, 1900.

### Conditions
INVREQ

## milliSeconds

**long double milliSeconds()**

Returns the number of milliseconds, rounded to the nearest hundredth of a second, that have elapsed since 00:00 on 1st January, 1900.

## monthOfYear

**MonthOfYear monthOfYear()**

Returns an enumeration, defined in this class, that indicates the month of the year.

### Conditions
INVREQ

## setAlarm

**const IccAlarmRequestId& setAlarm (const IccTime&** *time***,**
**const IccRequestId*** *reqId* **= 0)**

*time*
: A reference to an **IccTime** object that contains time information. As **IccTime** is an abstract class *time* is, in practise, an object of class **IccAbsTime**, **IccTimeOfDay**, or **IccTimeInterval**.

*reqId*
: An optional pointer to an **IccRequestId** object that is used to identify this particular alarm request.

Sets an alarm at the time specified in *time*. It returns a reference to an **IccAlarmRequestId** object that can be used to cancel the alarm—see **cancelAlarm** method. See also the **waitOnAlarm** method on page 270 of class **IccTask**.

### Conditions
EXPIRED, INVREQ

## time

**const char* time(char** *timeSeparator* **= '\0')**

*timeSeparator*
: The character that delimits the time fields. The default is no separation character.

Returns the time as a text string.

### Conditions
INVREQ

## update

**void update()**

Updates the clock time and date from CICS. See the **IccClock** constructor.

## year

**unsigned long year()**

Returns the 4-figure year number, such as 1996.

### Conditions

INVREQ

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| classType | IccBase |
| className | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| id | IccResource |
| isEDFOn | IccResource |
| name | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

## Enumerations

### DateFormat

defaultFormat
DDMMYY
MMDDYY
YYDDD
YYDDMM
YYMMDD
DDMMYYYY
MMDDYYYY
YYYYDDD
YYYYDDMM
YYYYMMDD

### DayOfWeek

Indicates the day of the week.

Sunday
Monday
Tuesday
Wednesday
Thursday
Friday

Saturday

## MonthOfYear

Indicates the month of the year.

January
February
March
April
May
June
July
August
September
October
November
December

## UpdateMode

Indicates whether the clock is automatically updated.

**manual**
: The clock initially holds the time at which it was created. It is subsequently updated only when an **update** method call is made.

**automatic**
: The clock is updated to the current CICS time and date whenever any time or date method is called (for example, **daysSince1900**).

# Chapter 18. IccCondition structure

This structure contains an enumeration of all the CICS condition codes.

**Header file:** `ICCCNDEH`

## Enumerations

### Codes

The possible values are:

| | Value | | Value | | Value |
|---|---|---|---|---|---|
| 0 | NORMAL | 35 | TSIOERR | 70 | NOTAUTH |
| 1 | ERROR | 36 | MAPFAIL | __ | |
| 2 | RDATT | 37 | INVERRTERM | 72 | SUPPRESSED |
| 3 | WRBRK | 38 | INVMPSZ | __ | |
| 4 | ICCEOF | 39 | IGREQID | __ | |
| 5 | EODS | 40 | OVERFLOW | 75 | RESIDERR |
| 6 | EOC | 41 | INVLDC | __ | |
| 7 | INBFMH | 42 | NOSTG | __ | |
| 8 | ENDINPT | 43 | JIDERR | __ | |
| 9 | NONVAL | 44 | QIDERR | __ | |
| 10 | NOSTART | 45 | NOJBUFSP | 80 | NOSPOOL |
| 11 | TERMIDERR | 46 | DSSTAT | 81 | TERMERR |
| 12 | FILENOTFOUND | 47 | SELNERR | 82 | ROLLEDBACK |
| 13 | NOTFND | 48 | FUNCERR | 83 | END |
| 14 | DUPREC | 49 | UNEXPIN | 84 | DISABLED |
| 15 | DUPKEY | 50 | NOPASSBKRD | 85 | ALLOCERR |
| 16 | INVREQ | 51 | NOPASSBKWR | 86 | STRELERR |
| 17 | IOERR | __ | | 87 | OPENERR |
| 18 | NOSPACE | 53 | SYSIDERR | 88 | SPOLBUSY |
| 19 | NOTOPEN | 54 | ISCINVREQ | 89 | SPOLERR |
| 20 | ENDFILE | 55 | ENQBUSY | 90 | NODEIDERR |
| 21 | ILLOGIC | 56 | ENVDEFERR | 91 | TASKIDERR |
| 22 | LENGERR | 57 | IGREQCD | 92 | TCIDERR |
| 23 | QZERO | 58 | SESSIONERR | 93 | DSNNOTFOUND |
| 24 | SIGNAL | 59 | SYSBUSY | 94 | LOADING |
| 25 | QBUSY | 60 | SESSBUSY | 95 | MODELIDERR |
| 26 | ITEMERR | 61 | NOTALLOC | 96 | OUTDESCERR |
| 27 | PGMIDERR | 62 | CBIDERR | 97 | PARTNERIDERR |
| 28 | TRANSIDERR | 63 | INVEXITREQ | 98 | PROFILEIDERR |
| 29 | ENDDATA | 64 | INVPARTNSET | 99 | NETNAMEIDERR |
| 30 | INVTSREQ | 65 | INVPARTN | 100 | LOCKED |
| 31 | EXPIRED | 66 | PARTNFAIL | 101 | RECORDBUSY |
| 32 | RETPAGE | __ | | 102 | UOWNOTFOUND |
| 33 | RTEFAIL | __ | | 103 | UOWLNOTFOUND |
| 34 | RTESOME | 69 | USERIDERR | | |

## Range

**maxValue**
The highest CICS condition, currently 103.

# Chapter 19. IccConsole class

**IccBase**
  **IccResource**
    **IccConsole**

This is a singleton class that represents the CICS console.

**Header file:** `ICCCONEH`

**Sample:** `ICC$CON`

## IccConsole constructor (protected)

### Constructor

**IccConsole()**

No more than one of these objects is permitted in a task. An attempt to create more objects causes an exception to be thrown.

## Public methods

**The opt parameter**
Many methods have the same parameter, *opt*, which is described under the **abendCode** method in"abendCode" on page 78.

### instance

**static IccConsole* instance()**

Returns a pointer to the single **IccConsole** object that represents the CICS console. If the object does not already exist, it is created by this method.

### put

**virtual void put(const IccBuf&** *send***)**

*send*
: A reference to an **IccBuf** object that contains the data that is to be written to the console.

Writes the data in *send* to the CICS console. **put** is a synonym for **write**. See "Polymorphic Behavior" on page 55.

### replyTimeout

**unsigned long replyTimeout() const**

Returns the length of the reply timeout in milliseconds.

### resetRouteCodes

**void resetRouteCodes()**

Removes all route codes held in the **IccConsole** object.

### setAllRouteCodes

**void setAllRouteCodes()**

Sets all possible route codes in the **IccConsole** object, that is, 1 through 28.

### setReplyTimeout (1)

**void setReplyTimeout(IccTimeInterval&** *interval***)**

*interval*
: A reference to a **IccTimeInterval** object that describes the length of the time interval required.

## setReplyTimeout (2)

**void setReplyTimeout(unsigned long** *seconds***)**

*seconds*
The length of the time interval required, in seconds.

The two different forms of this method are used to set the length of the reply timeout.

## setRouteCodes

**void setRouteCodes (unsigned short** *numRoutes***,**
**...)**

*numRoutes*
The number of route codes provided in this call—the number of arguments that follow this one.

**...** One or more arguments, the number of which is given by *numRoutes*. Each argument is a route code, of type **unsigned short**, in the range 1 to 28.

Saves route codes in the object for use on subsequent **write** and **writeAndGetReply** calls. Up to 28 codes can be held in this way.

## write

**void write (const IccBuf&** *send***,**
**SeverityOpt** *opt* **=** none**)**

*send*
A reference to an **IccBuf** object that contains the data that is to be written to the console.

*opt*
An enumeration, defined below, that indicates the severity of the console message.

Writes the data in *send* to the CICS console.

### Conditions

INVREQ, LENGERR, EXPIRED

## writeAndGetReply

**const IccBuf& writeAndGetReply (const IccBuf&** *send***,**
**SeverityOpt** *opt***=** none**)**

*send*
A reference to an **IccBuf** object that contains the data that is to be written to the console.

*opt*
An enumeration, defined below, that indicates the severity of the console message.

Writes the data in *send* to the CICS console and returns a reference to an **IccBuf** object that contains the reply from the CICS operator.

### Conditions

INVREQ, LENGERR, EXPIRED

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| classType | IccBase |
| className | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| id | IccResource |
| isEDFOn | IccResource |
| name | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

## Enumerations

### SeverityOpt

Possible values are:
- none
- warning
- error
- severe

# Chapter 20. IccControl class

**IccBase**
  **IccResource**
    **IccControl**

**IccControl** class controls an application program that uses the supplied Foundation Classes. This class is a singleton class in the application program; each program running under a CICS task has a single **IccControl** object.

**IccControl** has a pure virtual **run** method, where application code is written, and is therefore an abstract base class. The application programmer must subclass **IccControl**, and implement the **run** method.

**Header file:** `ICCCTLEH`

## IccControl constructor (protected)

### Constructor

**IccControl()**

## Public methods

### callingProgramId

**const IccProgramId& callingProgramId()**

Returns a reference to an **IccProgramId** object that represents the program that called this program. The returned **IccProgramId** reference contains a null name if the executing program was not called by another program.

**Conditions**
INVREQ

### cancelAbendHandler

**void cancelAbendHandler()**

Cancels a previously established exit at this logical program level.

**Conditions**
NOTAUTH, PGMIDERR

### commArea

**IccBuf& commArea()**

Returns a reference to an **IccBuf** object that encapsulates the COMMAREA—the communications area of CICS memory that is used for passing data between CICS programs and transactions.

**Conditions**
INVREQ

### console

**IccConsole* console()**

Returns a pointer to the single **IccConsole** object. If this object has not yet been created, this method creates the object before returning a pointer to it.

### initData

**const IccBuf& initData()**

Returns a reference to an **IccBuf** object that contains the initialization parameters specified for the program in the INITPARM system initialization parameter.

**Conditions**
INVREQ

### instance

**static IccControl* instance()**

Returns a pointer to the single **IccControl** object. The object is created if it does not already exist.

## isCreated

**static Icc::Bool isCreated()**

Returns a boolean value that indicates whether the **IccControl** object already exists. Possible values are true or false.

## programId

**const IccProgramId& programId()**

Returns a reference to an **IccProgramId** object that refers to this executing program.

### Conditions

INVREQ

## resetAbendHandler

**void resetAbendHandler()**

Reactivates a previously cancelled abend handler for this logical program level. (See **cancelAbendHandler on page** 120).

### Conditions

NOTAUTH, PGMIDERR

## returnProgramId

**const IccProgramId& returnProgramId()**

Returns a reference to an **IccProgramId** object that refers to the program that resumes control when this logical program level issues a return.

## run

**virtual void run() = 0**

This method should be implemented in a subclass of **IccControl** by the application programmer.

## session

**IccSession* session()**

Returns a pointer to the **IccSession** object that represents the principal facility for this program. An exception is thrown if this program does not have a session as its principal facility.

## setAbendHandler (1)

**void setAbendHandler(const IccProgramId&** *programId***)**

*programId*
A reference to the **IccProgramId** object that indicates which program is affected.

## setAbendHandler (2)

**void setAbendHandler(const char*** *programName***)**

*programName*
The name of the program affected.

These methods set the abend handler to the named program for this logical program level.

### Conditions

NOTAUTH, PGMIDERR

## startRequestQ

**IccStartRequestQ* startRequestQ()**

Returns a pointer to the **IccStartRequestQ** object. If this object has not yet been created, this method creates the object before returning a pointer to it.

## system

**IccSystem* system()**

Returns a pointer to the **IccSystem** object. If this object has not yet been created, this method creates the object before returning a pointer to it.

## task

**IccTask* task()**

Returns a pointer to the **IccTask** object. If this object has not yet been created, this method creates the object before returning a pointer to it.

## terminal

**IccTerminal* terminal()**

Returns a pointer to the **IccTerminal** object. If this object has not yet been created, this method creates the object before returning a pointer to it.

This method has a condition, that the transaction must have a terminal as its principle facility. That is, there must be a physical terminal involved.

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| classType | IccBase |
| className | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| id | IccResource |
| isEDFOn | IccResource |
| name | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 21. IccConvId class

**IccBase**
  **IccResourceId**
    **IccConvId**

**IccConvId** class is used to identify an APPC conversation.

**Header file:** `ICCRIDEH`

## IccConvId constructors

### Constructor (1)

**IccConvId(const char*** *convName***)**

*convName*
  The 4-character name of the conversation.

### Constructor (2)

**IccConvId(const IccConvId&** *convId***)**

*convId*
  A reference to an **IccConvId** object.
The copy constructor.

## Public methods

### operator= (1)

**IccConvId& operator=(const char*** *convName***)**

### operator= (2)

**IccConvId& operator=(const IccConvId** *id***)**

Assigns new value.

## Inherited public methods

| Method | Class |
|---|---|
| classType | IccBase |
| className | IccBase |
| customClassNum | IccBase |
| name | IccResourceId |
| nameLength | IccResourceId |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| operator= | IccResourceId |
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 22. IccDataQueue class

**IccBase**
  **IccResource**
    **IccDataQueue**

This class represents a CICS transient data queue.

**Header file:** `ICCDATEH`

**Sample:** `ICC$DAT`

## IccDataQueue constructors

### Constructor (1)

**IccDataQueue(const IccDataQueueId&** *id***)**

*id* A reference to an **IccDataQueueId** object that contains the name of the CICS transient data queue.

### Constructor (2)

**IccDataQueue(const char*** *queueName***)**

*queueName*
The 4-byte name of the queue that is to be created. An exception is thrown if *queueName* is not valid.

## Public methods

### clear

**virtual void clear()**

A synonym for **empty**. See “Polymorphic Behavior” on page 55.

### empty

**void empty()**

Empties the queue, that is, deletes all items on the queue.

#### Conditions

ISCINVREQ, NOTAUTH, QIDERR, SYSIDERR, DISABLED, INVREQ

### get

**virtual const IccBuf& get()**

A synonym for **readItem**. See “Polymorphic Behavior” on page 55.

### put

**virtual void put(const IccBuf&** *buffer***)**

*buffer*
: A reference to an **IccBuf** object that contains data to be put into the queue.

A synonym for **writeItem**. See “Polymorphic Behavior” on page 55.

### readItem

**const IccBuf& readItem()**

Returns a reference to an **IccBuf** object that contains one item read from the data queue.

#### Conditions

IOERR, ISCINVREQ, LENGERR, NOTAUTH, NOTOPEN, QBUSY, QIDERR, QZERO, SYSIDERR, DISABLED, INVREQ

### writeItem (1)

**void writeItem(const IccBuf&** *item***)**

*item*
: A reference to an **IccBuf** object that contains data to be written to the queue.

### writeItem (2)

**void writeItem(const char*** *text***)**

*text*
: Text that is to be written to the queue.

Writes an item of data to the queue.

### Conditions

IOERR, ISCINVREQ, LENGERR, NOSPACE, NOTAUTH, NOTOPEN, QIDERR, SYSIDERR, DISABLED, INVREQ

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| className | IccBase |
| classType | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| id | IccResource |
| isEDFOn | IccResource |
| isRouteOptionOn | IccResource |
| name | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| routeOption | IccResource |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |
| setRouteOption | IccResource |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 23. IccDataQueueId class

**IccBase**
  **IccResourceId**
    **IccDataQueueId**

**IccDataQueueId** is used to identify a CICS Transient Data Queue name.

**Header file:** `ICCRIDEH`

## IccDataQueueId constructors

### Constructor (1)

**IccDataQueueId(const char*** *queueName***)**

*queueName*
The 4-character name of the queue

### Constructor (2)

**IccDataQueueId(const IccDataQueueId&** *id***)**

*id* A reference to an **IccDataQueueId** object.

## Public methods

### operator= (1)

**IccDataQueueId& operator=(const char*** *queueName***)**

*queueName*
The 4-character name of the queue

### operator= (2)

**IccDataQueueId& operator=(const IccDataQueueId&** *id***)**

*id* A reference to an **IccDataQueueId** object.
Assigns new value.

## Inherited public methods

| Method | Class |
|---|---|
| classType | IccBase |
| className | IccBase |
| customClassNum | IccBase |
| name | IccResourceId |
| nameLength | IccResourceId |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| operator= | IccResourceId |
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 24. IccEvent class

**IccBase**
  **IccEvent**

The **IccEvent** class contains information on a particular CICS call, which we call a CICS event.

**Header file:** `ICCEVTEH`

**Sample:** `ICC$RES1`

## IccEvent constructor

### Constructor

**IccEvent (const IccResource*** *object*,
  **const char*** *methodName***)**

*object*
  A pointer to the **IccResource** object that is responsible for this event.

*methodName*
  The name of the method that caused the event to be created.

## Public methods

### className

**const char* className() const**

Returns the name of the class responsible for this event.

### classType

**IccBase::ClassType classType() const**

Returns an enumeration, described under **classType** on page 94 in **IccBase** class, that indicates the type of class that is responsible for this event.

### condition

**IccCondition::Codes condition(IccResource::ConditionType** *type* **=**
IccResource::majorCode**) const**

*type*
An enumeration that indicates whether a major code or minor code is being requested. Possible values are 'majorCode' or 'minorCode'. 'majorCode' is the default value.

Returns an enumerated type that indicates the condition returned from this CICS event. The possible values are described under the **Codes** type in the **IccCondition** structure.

### conditionText

**const char* conditionText() const**

Returns the text of the CICS condition code, such as "NORMAL" or "LENGERR".

### methodName

**const char* methodName() const**

Returns the name of the method responsible for this event.

### summary

**const char* summary()**

Returns a summary of the CICS event in the form:

```
CICS event summary: IccDataQueue::readItem condition=23 (QZERO) minor=0
```

## Inherited public methods

| Method | Class |
|---|---|
| className | IccBase |
| classType | IccBase |
| customClassNum | IccBase |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 25. IccException class

**IccBase**
  **IccException**

**IccException** class contains information about CICS Foundation Class exceptions. It is used to create objects that are ’thrown’ to application programs. They are generally used for error conditions such as invalid method calls, but the application programmer can also request an exception is thrown when CICS raises a particular condition.

**Header file:** `ICCEXCEH`

**Samples:** `ICC$EXC1`, `ICC$EXC2`, `ICC$EXC3`

## IccException constructor

### Constructor

**IccException (Type** *exceptionType***,**
  **IccBase::ClassType** *classType***,**
  **const char*** *className***,**
  **const char*** *methodName***,**
  **IccMessage*** *message***,**
  **IccBase*** *object* **= 0,**
  **unsigned short** *exceptionNum* **= 0)**

*exceptionType*
  An enumeration, defined in this class, that indicates the type of the exception

*classType*
  An enumeration, defined in this class, that indicates from which type of class the exception was thrown

*className*
  The name of the class from which the exception was thrown

*methodName*
  The name of the method from which the exception was thrown

*message*
  A pointer to the **IccMessage** object that contains information about why the exception was created.

*object*
  A pointer to the object that threw the exception

*exceptionNum*
  The unique exception number.

**Note:** When the **IccException** object is created it takes ownership of the **IccMessage** given on the constructor. When the **IccException** is deleted, the **IccMessage** object is deleted automatically by the **IccException** destructor. Therefore, do not delete the **IccMessage** object before deleting the **IccException** object.

## Public methods

### className

**const char* className() const**

Returns the name of the class responsible for throwing this exception.

### classType

**IccBase::ClassType classType() const**

Returns an enumeration, described under **ClassType** in **IccBase** class, that indicates the type of class which threw this exception.

### message

**IccMessage* message() const**

Returns a pointer to an **IccMessage** object that contains information on any message associated with this exception.

### methodName

**const char* methodName() const**

Returns the name of the method responsible for throwing this exception.

### number

**unsigned short number() const**

Returns the unique exception number.

This is a useful diagnostic for IBM service. The number uniquely identifies from where in the source code the exception was thrown.

### summary

**const char* summary()**

Returns a string containing a summary of the exception. This combines the **className**, **methodName**, **number**, **Type**, and **IccMessage::summary** methods into the following form:

```
CICS exception summary: 094 IccTempStore::readNextItem type=CICSCondition
```

### type

**Type type() const**

Returns an enumeration, defined in this class, that indicates the type of exception.

## typeText

**const char* typeText() const**

Returns a string representation of the exception type, for example, "objectCreationError", "invalidArgument".

## Inherited public methods

| Method | Class |
|---|---|
| className | IccBase |
| classType | IccBase |
| customClassNum | IccBase |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

## Enumerations

### Type

**objectCreationError**
An attempt to create an object was invalid. This happens, for example, if an attempt is made to create a second instance of a singleton class, such as **IccTask**.

**invalidArgument**
A method was called with an invalid argument. This happens, for example, if an **IccBuf** object with too much data is passed to the **writeItem** method of the **IccTempStore** class by the application program. An attempt to create an **IccFileId** object with a 9-character filename also generates an exception of this type.

**invalidMethodCall**
A method call cannot proceed. A typical reason is that the object cannot honor the call in its current state. For example, a **readRecord** call on an **IccFile** object is only honored if an **IccRecordIndex** object, to specify ***which*** record is to be read, has already been associated with the file.

**CICSCondition**
A CICS condition, listed in the **IccCondition** structure, has occurred in the object and the object was configured to throw an exception.

**platformError**
An operation is invalid because of limitations of this particular platform. For example, an attempt to create an **IccJournal** object would fail under CICS for OS/2 because there are no CICS journal services on this server.

A platformError exception can occur at 3 levels:
1. An object is not supported on this platform.
2. An object is supported on this platform, but a particular method is not.
3. A method is supported on this platform, but a particular positional parameter is not.

See “Platform differences” on page 52 for more details.

**familyConformanceError**
Family subset enforcement is on for this program and an operation that is not valid on all supported platforms has been attempted.

**internalError**
The CICS Foundation Classes have detected an internal error. Please call your support organization.

# Chapter 26. IccFile class

**IccBase**
　**IccResource**
　　**IccFile**

**IccFile** class enables the application program to access CICS files.

**Header file:** `ICCFILEH`

**Sample:** `ICC$FIL`

## IccFile constructors

### Constructor (1)

**IccFile (const IccFileId&** *id***,**
　　**IccRecordIndex*** *index* **= 0)**

*id* A reference to the **IccFileId** object that identifies which file is being operated on

*index*
An optional pointer to the **IccRecordIndex** object that identifies which record in the file is being operated on.

### Constructor (2)

**IccFile (const char*** *fileName***,**
　　**IccRecordIndex*** *index* **= 0)**

*fileName*
The 8-character name of the file

*index*
An optional pointer to the **IccRecordIndex** object that identifies which record in the file is being operated on.

To access files using an **IccFile** object, it must have an **IccRecordIndex** object associated with it. If this association is not made when the object is created, use the **registerRecordIndex** method.

## Public methods

**The opt parameter**
Many methods have the same parameter, *opt*, which is described under the **abendCode** method in“abendCode” on page 78.

### access

**unsigned long access(Icc::GetOpt** *opt* **=Icc::object)**

*opt*
An enumeration, defined in **Icc** structure, that indicates whether you can use a value previously retrieved from CICS (object), or whether the object should retrieve a fresh value from CICS.

Returns a composite number indicating the access properties of the file. See also **isReadable**, **isBrowsable**, **isAddable**, **isDeletable**, and **isUpdatable** methods.

### accessMethod

**IccValue::CVDA accessMethod(Icc::GetOpt** *opt* **=** Icc::object**)**

*opt*
See **access** method.

Returns an enumeration, defined in **IccValue**, that represents the access method for this file. Possible values are:
VSAM
BDAM
SFS

#### Conditions
END, FILENOTFOUND, ILLOGIC, NOTAUTH

### beginInsert(VSAM only)

**void beginInsert()**

Signals the start of a mass insertion of data into the file.

### deleteLockedRecord

**void deleteLockedRecord(unsigned long** *updateToken* **= 0)**

*updateToken*
A token that indicates which previously read record is to be deleted. This is the token that is returned from **readRecord** method when in update mode.

Deletes a record that has been previously locked by **readRecord** method in update mode. (See also **readRecord** method.)

#### Conditions
DISABLED, DUPKEY, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, NOTAUTH, NOTFIND, NOTOPEN, SYSIDERR, LOADING

## deleteRecord

**unsigned short deleteRecord()**

Deletes one or more records, as specified by the associated **IccRecordIndex** object, and returns the number of deleted records.

### Conditions

DISABLED, DUPKEY, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, NOTAUTH, NOTFIND, NOTOPEN, SYSIDERR, LOADING

## enableStatus

**IccValue::CVDA enableStatus(Icc::GetOpt** *opt* = Icc::object**)**

*opt*
: See **access** method.

Returns an enumeration, defined in **IccValue**, that indicates whether the file is enabled to be used by programs. Possible values are:

DISABLED
DISABLING
ENABLED
UNENABLED

### Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

## endInsert(VSAM only)

**void endInsert()**

Marks the end of a mass insertion operation. See **beginInsert**.

## isAddable

**Icc::Bool isAddable(Icc::GetOpt** *opt* = Icc::object**)**

*opt*
: See **access** method.

Indicates whether more records can be added to the file.

### Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

## isBrowsable

**Icc::Bool isBrowsable(Icc::GetOpt** *opt* = Icc::object**)**

*opt*
: See **access** method.

Indicates whether the file can be browsed.

### Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

## isDeletable

**Icc::Bool isDeletable(Icc::GetOpt** *opt* **=** Icc::object**)**

*opt*
: See **access** method.

Indicates whether the records in the file can be deleted.

### Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

## isEmptyOnOpen

**Icc::Bool isEmptyOnOpen(Icc::GetOpt** *opt* **=** Icc::object**)**

*opt*
: See **access** method.

Returns a Boolean that indicates whether the EMPTYREQ option is specified. EMPTYREQ causes the object associated with this file to be set to empty when opened, if it is a VSAM data set defined as reusable.

### Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

## isReadable

**Icc::Bool isReadable(Icc::GetOpt** *opt* **=** Icc::object**)**

*opt*
: See **access** method.

Indicates whether the file records can be read.

### Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

## isRecoverable

**Icc::Bool isRecoverable(Icc::GetOpt** *opt* **=** Icc::object**)**

*opt*
: See **access** method.

**Conditions:** END, FILENOTFOUND, ILLOGIC, NOTAUTH

## isUpdatable

**Icc::Bool isUpdatable(Icc::GetOpt** *opt* **=** Icc::object**)**

*opt*
: See **access** method.

Indicates whether the file can be updated.

### Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

## keyLength

**unsigned long keyLength(Icc::GetOpt** *opt* **=** Icc::object**)**

*opt*
: See **access** method.

Returns the length of the search key.

### Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

## keyPosition

**long keyPosition(Icc::GetOpt** *opt* **=** Icc::object**)**

*opt*
: See **access** method.

Returns the position of the key field in each record relative to the beginning of the record. If there is no key, zero is returned.

### Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

## openStatus

**IccValue::CVDA openStatus(Icc::GetOpt** *opt* **=** Icc::object**)**

*opt*
: See **access** method.

Returns a CVDA that indicates the open status of the file. Possible values are:

**CLOSED**
: The file is closed.

**CLOSING**
: The file is in the process of being closed. Closing a file may require dynamic deallocation of data sets and deletion of shared resources, so the process may last a significant length of time.

**CLOSEREQUEST**
: The file is open and one or more application tasks are using it. A request has been received to close it.

**OPEN**
: The file is open.

**OPENING**
: The file is in the process of being opened.

**Conditions:** END, FILENOTFOUND, ILLOGIC, NOTAUTH

## readRecord

**const IccBuf& readRecord (ReadMode** *mode* **=** normal**,**
**unsigned long*** *updateToken* **= 0)**

*mode*
An enumeration, defined in this class, that indicates in which mode the record is to be read.

*updateToken*
A pointer to an **unsigned long** token that will be updated by the method when *mode* is update and you wish to make multiple read updates. The token uniquely identifies the update request and is passed to the **deleteLockedRecord**, **rewriteRecord**, or **unlockRecord** methods

Reads a record and returns a reference to an **IccBuf** object that contains the data from the record.

### Conditions

DISABLED, DUPKEY, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, LENGERR, NOTAUTH, NOTFND, NOTOPEN, SYSIDERR, LOADING

## recordFormat

**IccValue::CVDA recordFormat(Icc::GetOpt** *opt* **=** Icc::object**)**

*opt*
See **access** method.

Returns a CVDA that indicates the format of the data. Possible values are:

**FIXED**
The records are of fixed length.

**UNDEFINED (BDAM data sets only)**
The format of records on the file is undefined.

**VARIABLE**
The records are of variable length. If the file is associated with a data table, the record format is always variable length, even if the source data set contains fixed-length records.

**Conditions:** END, FILENOTFOUND, ILLOGIC, NOTAUTH

## recordIndex

**IccRecordIndex* recordIndex() const**

Returns a pointer to an **IccRecordIndex** object that indicates which records are to be accessed when using methods such as **readRecord**, **writeRecord**, and **deleteRecord**.

## recordLength

**unsigned long recordLength(Icc::GetOpt** *opt* **=** Icc::object**)**

*opt*
See **access** method.

Returns the length of the current record.

### Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

## registerRecordIndex

**void registerRecordIndex(IccRecordIndex*** *index***)**

*index*
: A pointer to an **IccKey**, **IccRBA**, or **IccRRN** object that will be used by methods such as **readRecord**, **writeRecord**, etc..

## rewriteRecord

```
void rewriteRecord (const IccBuf& buffer,
                    unsigned long updateToken = 0)
```

*buffer*
: A reference to the **IccBuf** object that holds the new record data to be written to the file.

*updateToken*
: The token that identifies which previously read record is to be rewritten. See **readRecord**.

Updates a record with the contents of *buffer*.

### Conditions

DISABLED, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, NOTAUTH, NOTFND, NOTOPEN, SYSIDERR, LOADING

## setAccess

**void setAccess(unsigned long** *access***)**

*access*
: A positive integer value created by ORing (or adding) one or more of the values of the Access enumeration, defined in this class.

Sets the permitted access to the file. For example:

```
file.setAccess(IccFile::readable + IccFile::notUpdatable);
```

### Conditions

FILENOTFOUND, INVREQ, IOERR, NOTAUTH

## setEmptyOnOpen

**void setEmptyOnOpen(Icc::Bool** *trueFalse***)**

Specifies whether or not to make the file empty when it is next opened.

### Conditions

FILENOTFOUND, INVREQ, IOERR, NOTAUTH

## setStatus

**void setStatus(Status** *status***)**

*status*
: An enumeration, defined in this class, that indicates the required status of the file after this method is called.

Sets the status of the file.

### Conditions

FILENOTFOUND, INVREQ, IOERR, NOTAUTH

## type

**IccValue::CVDA type(Icc::GetOpt** *opt* **=** Icc::object**)**

*opt*
See **access** method.

Returns a CVDA that identifies the type of data set that corresponds to this file. Possible values are:

| | |
|---|---|
| **ESDS** | The data set is an entry-sequenced data set. |
| **KEYED** | The data set is addressed by physical keys. |
| **KSDS** | The data set is a key-sequenced data-set. |
| **NOTKEYED** | The data set is not addressed by physical keys. |
| **RRDS** | The data set is a relative record data set. |
| **VRRDS** | The data set is a variable relative record data set. |

**Conditions:** END, FILENOTFOUND, ILLOGIC, NOTAUTH

## unlockRecord

**void unlockRecord(unsigned long** *updateToken* **= 0)**

*updateToken*
A token that indicates which previous **readRecord** update request is to be unlocked.

Unlock a record, previously locked by reading it in update mode. See **readRecord**.

### Conditions

DISABLED, FILENOTFOUND, ILLOGIC, IOERR, ISCINVREQ, NOTAUTH, NOTOPEN, SYSIDERR, INVREQ

## writeRecord

**void writeRecord(const IccBuf&** *buffer***)**

*buffer*
A reference to the **IccBuf** object that holds the data that is to be written into the record.

Write either a single record or a sequence of records, if used with the **beginInsert** and **endInsert** methods.

### Conditions

DISABLED, DUPREC, FILENOTFOUND, ILLOGIC, INVREEQ, IOERR, ISCINVREQ, LENGERR, NOSPACE, NOTAUTH, NOTOPEN, SYSIDERR, LOADING, SUPPRESSED

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| className | IccBase |
| classType | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| id | IccResource |
| isEDFOn | IccResource |
| isRouteOptionOn | IccResource |
| name | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| routeOption | IccResource |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |
| setRouteOption | IccResource |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

## Enumerations

### Access

| | |
|---|---|
| **readable** | File records can be read by CICS tasks. |
| **notReadable** | File records cannot be read by CICS tasks. |
| **browsable** | File records can be browsed by CICS tasks. |
| **notBrowsable** | File records cannot be browsed by CICS tasks. |
| **addable** | Records can be added to the file by CICS tasks. |
| **notAddable** | Records cannot be added to the file by CICS tasks. |
| **updatable** | Records in the file can be updated by CICS tasks. |
| **notUpdatable** | Records in the file cannot be updated by CICS tasks. |
| **deletable** | Records in the file can be deleted by CICS tasks. |
| **notDeletable** | Records in the file cannot be deleted by CICS tasks. |
| **fullAccess** | Equivalent to readable AND browsable AND addable AND updatable AND deletable. |
| **noAccess** | Equivalent to notReadable AND notBrowsable AND notAddable AND notUpdatable AND notDeletable. |

## ReadMode

The mode in which a file is read.

| | |
|---|---|
| **normal** | No update is to be performed (that is, read-only mode) |
| **update** | The record is to be updated. The record is locked by CICS until: • it is rewritten using the **rewriteRecord** method *or* • it is deleted using the **deleteLockedRecord** method *or* • it is unlocked using the **unlockRecord** method *or* • the task commits or rolls back its resource updates *or* • the task is abended. |

## SearchCriterion

| | |
|---|---|
| **equalToKey** | The search only finds an exact match. |
| **gteqToKey** | The search finds either an exact match or the next record in search order. |

## Status

| | |
|---|---|
| **open** | File is open, ready for read/write requests by CICS tasks. |
| **closed** | File is closed, and is therefore not currently being used by CICS tasks. |
| **enabled** | File is enabled for access by CICS tasks. |
| **disabled** | File is disabled from access by CICS tasks. |

# Chapter 27. IccFileId class

**IccBase**
  **IccResourceId**
    **IccFileId**

**IccFileId** is used to identify a file name in the CICS system. On MVS/ESA this is an entry in the FCT (file control table).

**Header file:** `ICCRIDEH`

## IccFileId constructors

### Constructor (1)

**IccFileId(const char*** *fileName***)**

*fileName*
  The name of the file.

### Constructor (2)

**IccFileId(const IccFileId&** *id***)**

*id* A reference to an **IccFileId** object.

## Public methods

### operator= (1)

**IccFileId& operator=(const char*** *fileName***)**

*fileName*
The 8-byte name of the file.

### operator= (2)

**IccFileId& operator=(const IccFileId&** *id***)**

*id* A reference to an **IccFileId** object.
Assigns new value.

## Inherited public methods

| Method | Class |
|---|---|
| classType | IccBase |
| className | IccBase |
| customClassNum | IccBase |
| name | IccResourceId |
| nameLength | IccResourceId |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| operator= | IccResourceId |
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 28. IccFileIterator class

**IccBase**
  **IccResource**
    **IccFileIterator**

This class is used to create **IccFileIterator** objects that can be used to browse through the records of a CICS file, represented by an **IccFile** object.

**Header file:** `ICCFLIEH`

**Sample:** `ICC$FIL`

## IccFileIterator constructor

### Constructor

**IccFileIterator (IccFile*** *file***,**
**IccRecordIndex*** *index***,**
**IccFile::SearchCriterion** *search* **=** IccFile::gteqToKey**)**

*file*
: A pointer to the **IccFile** object that is to be browsed

*index*
: A pointer to the **IccRecordIndex** object that is being used to select a record in the file

*search*
: An enumeration, defined in **IccFile**, that indicates the criterion being used to find a search match. The default is gteqToKey.

The **IccFile** and **IccRecordIndex** object must exist before the **IccFileIterator** is created.

#### Conditions

DISABLED, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, NOTAUTH, NOTFND, NOTOPEN, SYSIDERR, LOADING

## Public methods

### readNextRecord

**const IccBuf& readNextRecord (IccFile::ReadMode** *mode* **=** IccFile::normal**,**
**unsigned long*** *updateToken* **=** 0**)**

*mode*
An enumeration, defined in **IccFile** class, that indicates the type of read request

*updateToken*
A returned token that is used to identify this unique update request on a subsequent **rewriteRecord**, **deleteLockedRecord**, or **unlockRecord** method on the file object.

Read the record that follows the current record.

#### Conditions

DUPKEY, ENDFILE, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, LENGERR, NOTAUTH, NOTFIND, SYSIDERR

### readPreviousRecord

**const IccBuf& readPreviousRecord (IccFile::ReadMode** *mode* **=** IccFile::normal**,**
**unsigned long*** *updateToken* **=** 0**)**

*mode*
An enumeration, defined in **IccFile** class, that indicates the type of read request.

*updateToken*
See **readNextRecord**.

Read the record that precedes the current record.

#### Conditions

DUPKEY, ENDFILE, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, LENGERR, NOTAUTH, NOTFIND, SYSIDERR

### reset

**void reset (IccRecordIndex*** *index***,**
**IccFile::SearchCriterion** *search* **=** IccFile::gteqToKey**)**

*index*
A pointer to the **IccRecordIndex** object that is being used to select a record in the file.

*search*
An enumeration, defined in **IccFile**, that indicates the criterion being used to find a search match. The default is gteqToKey.

Resets the **IccFileIterator** object to point to the record identified by the **IccRecordIndex** object and the specified search criterion.

#### Conditions

FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, NOTAUTH, NOTFND, SYSIDERR

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| className | IccBase |
| classType | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| id | IccResource |
| isEDFOn | IccResource |
| isRouteOptionOn | IccResource |
| name | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| routeOption | IccResource |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |
| setRouteOption | IccResource |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 29. IccGroupId class

**IccBase**
  **IccResourceId**
    **IccGroupId**

**IccGroupId** class is used to identify a CICS group.

**Header file:** `ICCRIDEH`

## IccGroupId constructors

### Constructor (1)

**IccGroupId(const char*** *groupName***)**

*groupName*
The 8-character name of the group.

### Constructor (2)

**IccGroupId(const IccGroupId&** *id***)**

*id* A reference to an **IccGroupId** object.
The copy constructor.

## Public methods

### operator= (1)

**IccGroupId& operator=(const char*** *groupName***)**

*groupName*
: The 8-character name of the group.

### operator= (2)

**IccGroupId& operator=(const IccGroupId&** *id***)**

*id* A reference to an **IccGroupId** object.

Assigns new value.

## Inherited public methods

| Method | Class |
|---|---|
| classType | IccBase |
| className | IccBase |
| customClassNum | IccBase |
| name | IccResourceId |
| nameLength | IccResourceId |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| operator= | IccResourceId |
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 30. IccJournal class

**IccBase**
  **IccResource**
    **IccJournal**

**IccJournal** class represents a user or system CICS journal.

**Header file:** `ICCJRNEH`

**Sample:** `ICC$JRN`

## IccJournal constructors

### Constructor (1)

**IccJournal (const IccJournalId&** *id***,**
  **unsigned long** *options* **= 0)**

*id* A reference to an **IccJournalId** object that identifies which journal is being used.

*options*
An integer, constructed from the **Options** enumeration defined in this class, that affects the behavior of **writeRecord** calls on the **IccJournal** object. The values may be combined by addition or bitwise ORing, for example:

```
IccJournal::startIO | IccJournal::synchronous
```

The default is to use the system default.

### Constructor (2)

**IccJournal (unsigned short** *journalNum***,**
  **unsigned long** *options* **= 0)**

*journalNum*
The journal number (in the range 1-99)

*options*
See above.

## Public methods

### clearPrefix

**void clearPrefix()**

Clears the current prefix as set by **registerPrefix** or **setPrefix**.

If the current prefix was set using **registerPrefix**, then the **IccJournal** class only removes its own reference to the prefix. The buffer itself is left unchanged.

If the current prefix was set by **setPrefix**, then the **IccJournal**'s copy of the buffer is deleted.

### journalTypeId

**const IccJournalTypeId& journalTypeId() const**

Returns a reference to an **IccJournalTypeId** object that contains a 2-byte field used to identify the origin of journal records.

### put

**virtual void put(const IccBuf&** *buffer***)**

*buffer*
A reference to an **IccBuf** object that holds data to be put into the journal.

A synonym for **writeRecord**—puts data into the journal. See "Polymorphic Behavior" on page 55 for information on polymorphism.

### registerPrefix

**void registerPrefix(const IccBuf*** *prefix***)**

Stores pointer to prefix object for use when the **writeRecord** method is called on this **IccJournal** object.

### setJournalTypeId (1)

**void setJournalTypeId(const IccJournalTypeId&** *id***)**

### setJournalTypeId (2)

Sets the journal type—a 2 byte identifier—included in the journal record created
**void setJournalTypeId(const char*** *jtypeid***)**

when using the **writeRecord** method.

### setPrefix (1)

**void setPrefix(const IccBuf&** *prefix***)**

## setPrefix (2)

Stores the *current* contents of *prefix* for inclusion in the journal record created when
**void setPrefix(const char*** *prefix***)**

the **writeRecord** method is called.

## wait

**void wait (unsigned long** *requestNum***=0,**
**unsigned long** *option* **= 0)**

*requestNum*
The write request. Zero indicates the last write on this journal.

*option*
An integer that affects the behaviour of **writeRecord** calls on the **IccJournal** object. Values other than 0 should be made from the **Options** enumeration, defined in this class. The values may be combined by addition or bitwise ORing, for example `IccJournal::startIO + IccJournal::synchronous`. The default is to use the system default.

Waits until a previous journal write has completed.

**Condition:** IOERR, JIDERR, NOTOPEN

## writeRecord (1)

**unsigned long writeRecord (const IccBuf&** *record***,**
**unsigned long** *option* **= 0)**

*record*
A reference to an **IccBuf** object that holds the record

*option*
See above.

## writeRecord (2)

**unsigned long writeRecord (const char*** *record***,**
**unsigned long** *option* **= 0)**

*record*
The name of the record

*option*
See above.

Writes the data in the record to the journal.

The returned number represents the particular write request and can be passed to the **wait** method in this class.

### Conditions

IOERR, JIDERR, LENGERR, NOJBUFSP, NOTAUTH, NOTOPEN

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| classType | IccBase |
| className | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| id | IccResource |
| isEDFOn | IccResource |
| name | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

## Enumerations

### Options

The behaviour of **writeRecord** calls on the **IccJournal** object. The values can be combined in an integer by addition or bitwise ORing.

**startIO**
: Specifies that the output of the journal record is to be initiated immediately. If 'synchronous' is specified for a journal that is not frequently used, you should also specify 'startIO' to prevent the requesting task waiting for the journal buffer to be filled. If the journal is used frequently, startIO is unnecessary.

**noSuspend**
: Specifies that the NOJBUFSP condition does not suspend an application program.

**synchronous**
: Specifies that synchronous journal output is required. The requesting task waits until the record has been written.

# Chapter 31. IccJournalId class

**IccBase**
  **IccResourceId**
    **IccJournalId**

**IccJournalId** is used to identify a journal number in the CICS sytem. On MVS/ESA this is an entry in the JCT (Journal Control Table).

**Header file:** `ICCRIDEH`

## IccJournalId constructors

### Constructor (1)

**IccJournalId(unsigned short** *journalNum***)**

*journalNum*
  The number of the journal, in the range 1 to 99

### Constructor (2)

**IccJournalId(const IccJournalId&** *id***)**

*id* A reference to an **IccJournalId** object.
The copy constructor.

## Public methods

### number

**unsigned short number() const**

Returns the journal number, in the range 1 to 99.

### operator= (1)

**IccJournalId& operator=(unsigned short** *journalNum***)**

*journalNum*
The number of the journal, in the range 1 to 99

### operator= (2)

**IccJournalId& operator=(const IccJournalId&** *id***)**

*id* A reference to an **IccJournalId** object.
Assigns new value.

## Inherited public methods

| Method | Class |
|---|---|
| classType | IccBase |
| className | IccBase |
| customClassNum | IccBase |
| name | IccResourceId |
| nameLength | IccResourceId |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| operator= | IccResourceId |
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 32. IccJournalTypeId class

**IccBase**
  **IccResourceId**
    **IccJournalTypeId**

An **IccJournalTypeId** class object is used to help identify the origin of a journal record—it contains a 2-byte field that is included in the journal record.

**Header file:** `ICCRIDEH`

## IccJournalTypeId constructors

### Constructor (1)

**IccJournalTypeId(const char*** *journalTypeName***)**

*journalTypeName*
A 2-byte identifier used in journal records.

### Constructor (2)

**IccJournalTypeId(const IccJournalId&** *id***)**

*id* A reference to an **IccJournalTypeId** object.

## Public methods

### operator= (1)

**void operator=(const IccJournalTypeId&** *id***)**

*id* A reference to an **IccJournalTypeId** object.

### operator= (2)

**void operator=(const char*** *journalTypeName***)**

*journalTypeName*
A 2-byte identifier used in journal records.

Sets the 2-byte field that is included in the journal record.

## Inherited public methods

| Method | Class |
|---|---|
| classType | IccBase |
| className | IccBase |
| customClassNum | IccBase |
| name | IccResourceId |
| nameLength | IccResourceId |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| operator= | IccResourceId |
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 33. IccKey class

**IccBase**
  **IccRecordIndex**
    **IccKey**

**IccKey** class is used to hold a search key for an indexed (KSDS) file.

**Header file:** `ICCRECEH`

**Sample:** `ICC$FIL`

## IccKey constructors

### Constructor (1)

**IccKey (const char*** *initValue***,**
    **Kind** *kind* **=** complete**)**

### Constructor (2)

**IccKey (unsigned short** *completeLength***,**
    **Kind** *kind***=** complete**)**

### Constructor (3)

**IccKey(const IccKey&** *key***)**

## Public methods

### assign

**void assign (unsigned short** *length***,**
**const void*** *dataArea***)**

*length*
The length of the data area

*dataArea*
A pointer to the start of the data area that holds the search key.

Copies the search key into the **IccKey** object.

### completeLength

**unsigned short completeLength() const**

Returns the length of the key when it is complete.

### kind

**Kind kind() const**

Returns an enumeration, defined in this class, that indicates whether the key is generic or complete.

### operator= (1)

**IccKey& operator=(const IccKey&** *key***)**

### operator= (2)

**IccKey& operator=(const IccBuf& buffer)**

### operator= (3)

Assigns new value to key.
**IccKey& operator=(const char*** *value***)**

### operator== (1)

**Icc::Bool operator==(const IccKey&** *key***) const**

### operator== (2)

**Icc::Bool operator==(const IccBuf&** *text***) const**

### operator== (3)

Tests equality.
**Icc::Bool operator==(const char*** *text***) const**

## operator!= (1)

**Icc::Bool operator !=(const IccKey&** *key***) const**

## operator!= (2)

**Icc::Bool operator!=(const IccBuf&** *text***) const**

## operator!= (3)

Tests inequality.
**Icc::Bool operator!=(const char*** *text***) const**

## setKind

**void setKind(Kind** *kind***)**

*kind*
An enumeration, defined in this class, that indicates whether the key is generic or complete.

Changes the type of key from generic to complete or vice versa.

## value

**const char* value()**

Returns the start of the data area containing the search key.

## Inherited public methods

| Method | Class |
|---|---|
| className | IccBase |
| classType | IccBase |
| customClassNum | IccBase |
| length | IccRecordIndex |
| operator delete | IccBase |
| operator new | IccBase |
| type | IccRecordIndex |
| value | IccRecordIndex |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

## Enumerations

### Kind

**complete**
Specifies that the supplied key is not generic.

**generic**
Specifies that the search key is generic. A search is satisfied when a record is found with a key whose prefix matches the supplied key.

# Chapter 34. IccLockId class

**IccBase**
  **IccResourceId**
    **IccLockId**

**IccLockId** class is used to identify a lock request.

**Header file:** `ICCRIDEH`

## IccLockId constructors

### Constructor (1)

**IccLockId(const char*** *name***)**

*name*
  The 8-character name of the lock request.

### Constructor (2)

**IccLockId(const IccLockId&** *id***)**

*id* A reference to an **IccLockId** object.
The copy constructor.

## Public methods

### operator= (1)

**IccLockId& operator=(const char*** *name***)**

*name*
The 8-character name of the lock request.

### operator= (2)

**IccLockId& operator=(const IccLockId&** *id***)**

*id* A reference to an **IccLockId** object.
Assigns new value.

## Inherited public methods

| Method | Class |
|---|---|
| classType | IccBase |
| className | IccBase |
| customClassNum | IccBase |
| name | IccResourceId |
| nameLength | IccResourceId |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| operator= | IccResourceId |
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 35. IccMessage class

**IccBase**
  **IccMessage**

**IccMessage** can be used to hold a message description. It is used primarily by the **IccException** class to describe why the **IccException** object was created.

**Header file:** `ICCMSGEH`

## IccMessage constructor

### Constructor

**IccMessage (unsigned short** *number***,**
  **const char*** *text***,**
  **const char*** *className* **= 0,**
  **const char*** *methodName* **= 0)**

*number*
  The number associated with the message

*text*
  The text associated with the message

*className*
  The optional name of the class associated with the message

*methodName*
  The optional name of the method associated with the message.

## Public methods

### className

**const char* className() const**

Returns the name of the class with which the message is associated, if any. If there is no name to return, a null pointer is returned.

### methodName

**const char* methodName() const**

Returns the name of the method with which the message is associated, if any. If there is no name to return, a null pointer is returned.

### number

**unsigned short number() const**

Returns the number of the message.

### summary

Returns a summary of the message in the form:
**const char* summary()**

```
IccMessage: 008 IccTempStore::readNextItem <CICS returned the
'QIDERR'
condition.>
```

### text

**const char* text() const**

Returns the text of the message.

## Inherited public methods

| **Method** | **Class** |
|---|---|
| className | IccBase |
| classType | IccBase |
| customClassNum | IccBase |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| **Method** | **Class** |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 36. IccPartnerId class

**IccBase**
  **IccResourceId**
    **IccPartnerId**

**IccPartnerId** class represents CICS remote (APPC) partner transaction definitions.

**Header file:** `ICCRIDEH`

## IccPartnerId constructors

### Constructor (1)

**IccPartnerId(const char*** *partnerName***)**

*partnerName*
  The 8-character name of an APPC partner.

### Constructor (2)

**IccPartnerId(const IccPartnerId&** *id***)**

*id* A reference to an **IccPartnerId** object.
The copy constructor.

## Public methods

### operator= (1)

**IccPartnerId& operator=(const char*** *partnerName***)**

*partnerName*
The 8-character name of an APPC partner.

### operator= (2)

**IccPartnerId& operator=(const IccPartnerId&** *id***)**

*id* A reference to an **IccPartnerId** object.
Assigns new value.

## Inherited public methods

| Method | Class |
|---|---|
| classType | IccBase |
| className | IccBase |
| customClassNum | IccBase |
| name | IccResourceId |
| nameLength | IccResourceId |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| operator= | IccResourceId |
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 37. IccProgram class

**IccBase**
  **IccResource**
    **IccProgram**

The **IccProgram** class represents any CICS program outside of your currently executing one, which the **IccControl** object represents.

**Header file:** `ICCPRGEH`

**Sample:** `ICC$PRG1`, `ICC$PRG2`, `ICC$PRG3`

## IccProgram constructors

### Constructor (1)

**IccProgram(const IccProgramId&** *id***)**

*id* A reference to an **IccProgramId** object.

### Constructor (2)

**IccProgram(const char*** *progName***)**

*progName*
The 8-character name of the program.

## Public methods

**The opt parameter**

Many methods have the same parameter, *opt*, which is described under the **abendCode** method in“abendCode” on page 78.

### address

**const void* address() const**

Returns the address of a program module in memory. This is only valid after a successful **load** call.

### clearInputMessage

**void clearInputMessage()**

Clears the current input message which was set by **setInputMessage** or **registerInputMessage**.

If the current input message was set using **registerInputMessage** then only the pointer is deleted: the buffer is left unchanged.

If the current input message was set using **setInputMessage** then **clearInputMessage** releases the memory used by that buffer.

### entryPoint

**const void* entryPoint() const**

Returns a pointer to the entry point of a loaded program module. This is only valid after a successful **load** call.

### length

**unsigned long length() const**

Returns the length of a program module. This is only valid after a successful **load** call.

### link

**void link (const IccBuf*** *commArea* **= 0,**
**const IccTransId*** *transId* **= 0,**
**CommitOpt** *opt* **=** noCommitOnReturn**)**

*commArea*
An optional pointer to the **IccBuf** object that contains the COMMAREA—the buffer used to pass information between the calling program and the program that is being called

*transId*
An optional pointer to the **IccTransId** object that indicates the name of the mirror transaction under which the program is to run if it is a remote (DPL) program link

*opt*
An enumeration, defined in this class, that affects the behavior of the link when the program is remote (DPL). The default (noCommitOnReturn) is not to commit resource changes on the remote CICS region until the current task commits its resources. The alternative (commitOnReturn) means that the resources of the remote program are committed whether or not this task subsequently abends or encounters a problem.

**Conditions:** INVREQ, NOTAUTH, PGMIDERR, SYSIDERR, LENGERR, ROLLEDBACK, TERMERR

### Restrictions

Links may be nested, that is, a linked program may **link** to another program. However, due to implementation restrictions, you may only nest such programs 15 times. If this is exceeded, an exception is thrown.

## load

**void load(LoadOpt** *opt* **=** releaseAtTaskEnd**)**

*opt*
An enumeration, defined in this class, that indicates whether CICS should automatically allow the program to be unloaded at task termination (releaseAtTaskEnd), or not (hold).

**Conditions:** NOTAUTH, PGMIDERR, INVREQ, LENGERR

## registerInputMessage

**void registerInputMessage(const IccBuf&** *msg***)**

Store pointer to InputMessage for when the **link** method is called.

## setInputMessage

Specifies data to be made available, by the **IccSession::receive()** method, to the
**void setInputMessage(const IccBuf&** *msg***)**

called program, when using the **link** method in this class.

## unload

**void unload()**

Allow a program to be unloaded. It can be reloaded by a call to **load**.

### Conditions

NOTAUTH, PGMIDERR, INVREQ

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| className | IccBase |
| classType | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| id | IccResource |
| isEDFOn | IccResource |
| isRouteOptionOn | IccResource |
| name | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| routeOption | IccResource |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |
| setRouteOption | IccResource |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

## Enumerations

### CommitOpt

**noCommitOnReturn**
Changes to resources on the remote CICS region are not committed until the current task commits its resources. This is the default setting.

**commitOnReturn**
Changes to resources on the remote CICS region are committed whether or not the current task subsequently abends or encounters a problem.

### LoadOpt

**releaseAtTaskEnd**
Indicates that CICS should automatically allow the program to be unloaded at task termination.

**hold** Indicates that CICS should not automatically allow the program to be unloaded at task termination. (In this case, this or another task must explicitly use the **unload** method).

# Chapter 38. IccProgramId class

**IccBase**
  **IccResourceId**
    **IccProgramId**

**IccProgramId** objects represent program names in the CICS system. On MVS/ESA this is an entry in the PPT (program processing table).

**Header file:** `ICCRIDEH`

## IccProgramId constructors

### Constructor (1)

**IccProgramId(const char*** *progName***)**

*progName*
The 8-character name of the program.

### Constructor (2)

The copy constructor.

**IccProgramId(const IccProgramId&** *id***)**

*id* A reference to an **IccProgramId** object.

## Public methods

### operator= (1)

**IccProgramId& operator=(const char*** *progName***)**

*progName*
The 8-character name of the program.

### operator= (2)

**IccProgramId& operator=(const IccProgramId&** *id***)**

*id* A reference to an **IccProgramId** object.
Assigns new value.

## Inherited public methods

| Method | Class |
|---|---|
| classType | IccBase |
| className | IccBase |
| customClassNum | IccBase |
| name | IccResourceId |
| nameLength | IccResourceId |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| operator= | IccResourceId |
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 39. IccRBA class

**IccBase**
  **IccRecordIndex**
    **IccRBA**

An **IccRBA** object holds a relative byte address which is used for accessing VSAM ESDS files.

**Header file:** `ICCRECEH`

## IccRBA constructor

### Constructor

**IccRBA(unsigned long** *initRBA* **= 0)**

*initRBA*
An initial value for the relative byte address.

## Public methods

### operator= (1)

**IccRBA& operator=(const IccRBA&** *rba***)**

### operator= (2)

**IccRBA& operator=(unsigned long** *num***)**

*num*
A valid relative byte address.
Assigns a new value for the relative byte address.

### operator== (1)

**Icc::Bool operator== (const IccRBA&** *rba***) const**

### operator== (2)

Tests equality
**Icc::Bool operator== (unsigned long** *num***) const**

### operator!= (1)

**Icc!:Bool operator== (const IccRBA&** *rba***) const**

### operator!= (2)

Tests inequality
**Icc::Bool operator!=(unsigned long** *num***) const**

### number

**unsigned long number() const**

Returns the relative byte address.

## Inherited public methods

| Method | Class |
|---|---|
| className | IccBase |
| classType | IccBase |
| customClassNum | IccBase |
| length | IccRecordIndex |
| operator delete | IccBase |
| operator new | IccBase |
| type | IccRecordIndex |
| value | IccRecordIndex |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 40. IccRecordIndex class

**IccBase**
 **IccRecordIndex**
  **IccKey**
  **IccRBA**
  **IccRRN**

CICS File Control Record Identifier. Used to tell CICS which particular record the program wants to retrieve, delete, or update. **IccRecordIndex** is a base class from which **IccKey**, **IccRBA**, and **IccRRN** are derived.

**Header file:** `ICCRECEH`

## IccRecordIndex constructor (protected)

### Constructor

**IccRecordIndex(Type** *type***)**

*type*
An enumeration, defined in this class, that indicates whether the index type is key, RBA, or RRN.

**Note:** This is protected because you should not create **IccRecordIndex** objects; see subclasses **IccKey**, **IccRBA**, and **IccRRN**.

## Public methods

### length

**unsigned short length() const**

Returns the length of the record identifier.

### type

**Type type() const**

Returns an enumeration, defined in this class, that indicates whether the index type is key, RBA, or RRN.

## Inherited public methods

| Method | Class |
|---|---|
| className | IccBase |
| classType | IccBase |
| customClassNum | IccBase |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

## Enumerations

### Type

Indicates the access method. Possible values are:
- key
- RBA
- RRN

# Chapter 41. IccRequestId class

**IccBase**
  **IccResourceId**
    **IccRequestId**

An **IccRequestId** is used to hold the name of a request. This request identifier can subsequently be used to cancel a request—see, for example, **start** and **cancel** methods in **IccStartRequestQ** class.

**Header file:** `ICCRIDEH`

## IccRequestId constructors

### Constructor (1)

**IccRequestId()**

An empty **IccRequestId** object.

### Constructor (2)

**IccRequestId(const char*** *requestName***)**

*requestName*
  The 8-character name of the request.

### Constructor (3)

The copy constructor.

**IccRequestId(const IccRequestId&** *id***)**

*id* A reference to an **IccRequestId**.

## Public methods

### operator= (1)

**IccRequestId& operator=(const IccRequestId&** *id***)**

*id* A reference to an **IccRequestId** object whose properties are copied into this object.

### operator= (2)

**IccRequestId& operator=(const char*** *reqestName***)**

*requestName*
An 8-character string which is copied into this object.

Assigns new value.

## Inherited public methods

| **Method** | **Class** |
|---|---|
| classType | IccBase |
| className | IccBase |
| customClassNum | IccBase |
| name | IccResourceId |
| nameLength | IccResourceId |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| **Method** | **Class** |
|---|---|
| operator= | IccResourceId |
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 42. IccResource class

**IccBase**
    **IccResource**

**IccResource** class is a base class that is used to derive other classes. The methods associated with **IccResource** are described here although, in practise, they are only called on objects of derived classes.

**IccResource** is the parent class for all CICS resources—tasks, files, programs, etc. Every class inherits from **IccBase**, but only those that use CICS services inherit from **IccResource**.

**Header file:** `ICCRESEH`

**Sample:** `ICC$RES1`, `ICC$RES2`

## IccResource constructor (protected)

### Constructor

**IccResource(IccBase::ClassType** *classType***)**

*classType*
: An enumeration that indicates what the subclass type is. For example, for an **IccTempStore** object, the class type is cTempStore. The possible values are listed under **ClassType** in the description of the **IccBase** class.

## Public methods

### actionOnCondition

**ActionOnCondition actionOnCondition(IccCondition::Codes** *condition***)**

*condition*
: The name of the condition as an enumeration. See **IccCondition** structure for a list of the possible values.

Returns an enumeration that indicates what action the class will take in response to the specified condition being raised by CICS. The possible values are described in this class.

### actionOnConditionAsChar

**char actionOnConditionAsChar(IccCondition::Codes** *condition***)**

This method is the same as **actionOnCondition** but returns a character, rather than an enumeration, as follows:

**0 (zero)**
: No action is taken for this CICS condition.

**H**
: The virtual method **handleEvent** is called for this CICS condition.

**X**
: An exception is generated for this CICS condition.

**A**
: This program is abended for this CICS condition.

### actionsOnConditionsText

**const char* actionsOnConditionsText()**

Returns a string of characters, one character for each possible condition. Each character indicates the actions to be performed for that corresponding condition. The characters used in the string are described above in "actionOnConditionAsChar". For example, the string: `0X00H0A ...` shows the actions for the first seven conditions are as follows:

**condition 0 (NORMAL)**
: action=0 (noAction)

**condition 1 (ERROR)**
: action=X (throwException)

**condition 2 (RDATT)**
: action=0 (noAction)

**condition 3 (WRBRK)**
: action=0 (noAction)

**condition 4 (ICCEOF)**
: action=H (callHandleEvent)

**condition 5 (EODS)**
: action=0 (noAction)

**condition 6 (EOC)**
: action=A (abendTask)

### clear

**virtual void clear()**

Clears the contents of the object. This method is virtual and is implemented, wherever appropriate, in the derived classes. See "Polymorphic Behavior" on page 55 page 55 for a description of polymorphism. The default implementation in this class throws an exception to indicate that it has not been overridden in a subclass.

## condition

**unsigned long condition(ConditionType** *type* **=** majorCode**) const**

*type*
: An enumeration, defined in this class, that indicates the type of condition requested. Possible values are majorCode (the default) and minorCode.

Returns a number that indicates the condition code for the most recent CICS call made by this object.

## conditionText

**const char* conditionText() const**

Returns the symbolic name of the last CICS condition for this object.

## get

**virtual const IccBuf& get()**

Gets data from the **IccResource** object and returns it as an **IccBuf** reference. This method is virtual and is implemented, wherever appropriate, in the derived classes. See "Polymorphic Behavior" on page 55 for a description of polymorphism. The default implementation in this class throws an exception to indicate that it has not been overridden in a subclass.

## handleEvent

**virtual HandleEventReturnOpt handleEvent(IccEvent&** *event***)**

*event*
: A reference to an **IccEvent** object that describes the reason why this method is being called.

This virtual function may be re-implemented in a subclass (by the application programmer) to handle CICS events (see **IccEvent** class on page 137).

## id

**const IccResourceId* id() const**

Returns a pointer to the **IccResourceId** object associated with this **IccResource** object.

## isEDFOn

**Icc::Bool isEDFOn() const**

Returns a boolean value that indicates whether EDF trace is active. Possible values are yes or no.

## isRouteOptionOn

**Icc::Bool isRouteOptionOn() const**

Returns a boolean value that indicates whether the route option is active. Possible values are yes or no.

## name

**const char* name() const**

Returns a character string that gives the name of the resource that is being used. For an **IccTempStore** object, the 8-character name of the temporary storage queue is returned. For an **IccTerminal** object, the 4-character terminal name is returned. This is equivalent to calling **id()→name**.

## put

**virtual void put(const IccBuf&** *buffer***)**

*buffer*
: A reference to an **IccBuf** object that contains data that is to be put into the object.

Puts information from the buffer into the **IccResource** object. This method is virtual and is implemented, wherever appropriate, in the derived classes. See "Polymorphic Behavior" on page 55 for more information on polymorphism. The default implementation in this class throws an exception to indicate that it has not been overridden in a subclass.

## routeOption

**const IccSysId& routeOption() const**

Returns a reference to an **IccSysId** object that represents the system to which all CICS requests are routed—explicit function shipping.

## setActionOnAnyCondition

**void setActionOnAnyCondition(ActionOnCondition** *action***)**

*action*
: The name of the action as an enumeration. The possible values are listed under the description of this class.

Specifies the default action to be taken by the CICS foundation classes when a CICS condition occurs.

## setActionOnCondition

**void setActionOnCondition (ActionOnCondition** *action***,**
**IccCondition::Codes** *condition***)**

*action*
: The name of the action as an enumeration. The possible values are listed under the description of this class.

*condition*
: See **IccCondition** structure.

Specifies what action is automatically taken by the CICS foundation classes when a given CICS condition occurs.

## setActionsOnConditions

**void setActionsOnConditions(const char*** *actions* **= 0)**

*actions*
A string that indicates what action is to be taken for each condition. The default is not to indicate any actions, in which case each condition is given a default **ActionOnCondition** of noAction. The string should have the same format as the one returned by the **actionsOnConditionsText** method.

## setEDF

**void setEDF(Icc::Bool** *onOff***)**

*onOff*
A boolean value that selects whether EDF trace is switched on or off.

Switches EDF on or off for this resource object. See "Execution Diagnostic Facility" on page 46.

These methods force the object to route CICS requests to the named remote system. This is called explicit function shipping.

## setRouteOption (1)

The parameters are:
**void setRouteOption(const IccSysId&** *sysId***)**

*sysId*
The **IccSysId** object that represents the remote system to which commands are routed.

## setRouteOption (2)

**void setRouteOption(const char*** *sysName* **= 0)**

*sysName*
The 4-character name of the system to which commands are routed.

This option is only valid for the following classes:
- **IccDataQueue**
- **IccFile**
- **IccFileIterator**
- **IccProgram**
- **IccStartRequestQ**
- **IccTempStore**

Attempting to use this method on other subclasses of **IccResource** causes an exception to be thrown.

To turn off the route option specify no parameter, for example:

```
obj.setRouteOption()
```

## Inherited public methods

| Method | Class |
|---|---|
| className | IccBase |
| classType | IccBase |
| customClassNum | IccBase |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

## Enumerations

### ActionOnCondition

Possible values are:

**noAction**
: Carry on as normal; it is the application program's responsibility to test CICS conditions using the **condition** method, after executing a method that calls CICS services.

**callHandleEvent**
: Call the virtual **handleEvent** method.

**throwException**
: An **IccException** object is created and thrown. This is typically used for more serious conditions or errors.

**abendTask**
: Abend the CICS task.

### HandleEventReturnOpt

Possible values are:

**rContinue**
: The CICS event proceeded satisfactorily and normal processing is to resume.

**rThrowException**
: The application program could not handle the CICS event and an exception is to be thrown.

**rAbendTask**
: The application program could not handle the CICS event and the CICS task is to be abended.

### ConditionType

Possible values are:

**majorCode**
: The returned value is the CICS RESP value. This is one of the values in IccCondition::codes.

**minorCode**
: The returned value is the CICS RESP2 value.

# Chapter 43. IccResourceId class

**IccBase**
  **IccResourceId**

This is a base class from which **IccTransId** and other classes, whose names all end in "Id", are derived. Many of these derived classes represent CICS resource names, such as a file control table (FCT) entry.

**Header file:** `ICCRIDEH`

## IccResourceId constructors (protected)

### Constructor (1)

**IccResourceId (IccBase::ClassType** *typ***,**
**const IccResourceId&** *id***)**

*type*
An enumeration, defined in **IccBase** class, that indicates the type of class.

*id* A reference to an **IccResourceId** object that is used to create this object.

### Constructor (2)

**IccResourceId (IccBase::ClassType** *type***,**
**const char*** *resName***)**

*type*
An enumeration, defined in **IccBase** class, that indicates the type of class.

*resName*
The name of a resource that is used to create this object.

## Public methods

### name

**const char* name() const**

Returns the name of the resource identifier as a string. Most **...Id** objects have 4- or 8-character names.

### nameLength

**unsigned short nameLength() const**

Returns the length of the name returned by the **name** method.

## Protected methods

### operator=

**IccResourceId& operator=(const IccResourceId&** *id***)**

*id* A reference to an **IccResourceId** object.
Set an **IccResourceId** object to be identical to *id*.

## Inherited public methods

| Method | Class |
|---|---|
| className | IccBase |
| classType | IccBase |
| customClassNum | IccBase |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 44. IccRRN class

**IccBase**
  **IccRecordIndex**
    **IccRRN**

An **IccRRN** object holds a relative record number and is used to identify records in VSAM RRDS files.

**Header file:** `ICCRECEH`

## IccRRN constructors

### Constructor

**IccRRN(unsigned long** *initRRN* **= 1)**

*initRRN*
: The initial relative record number—an integer greater than 0. The default is 1.

## Public methods

### operator= (1)

**IccRRN& operator=(const IccRRN&** ***rrn*****)**

### operator= (2)

**IccRRN& operator=(unsigned long** ***num*****)**

*num*
A relative record number—an integer greater than 0.

Assigns a new value for the relative record number.

### operator== (1)

**Icc::Bool operator== (const IccRRN&** ***rrn*****) const**

### operator== (2)

**Icc::Bool operator== (unsigned long num) const**

Tests equality

### operator!= (1)

**Icc::Bool operator!= (const IccRRN&** ***rrn*****) const**

### operator!= (2)

**Icc::Bool operator!=(unsigned long num) const**

Tests inequality

### number

**unsigned long number() const**

Returns the relative record number.

## Inherited public methods

| Method | Class |
|---|---|
| className | IccBase |
| classType | IccBase |
| customClassNum | IccBase |
| length | IccRecordIndex |
| operator delete | IccBase |
| operator new | IccBase |
| type | IccRecordIndex |
| value | IccRecordIndex |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 45. IccSemaphore class

**IccBase**
  **IccResource**
    **IccSemaphore**

This class enables synchronization of resource updates.

**Header file:** `ICCSEMEH`

**Sample:** `ICC$SEM`

## IccSemaphore constructor

### Constructor (1)

**IccSemaphore (const char*** *resource***,**
  **LockType** *type* **= byValue,**
  **LifeTime** *life* **= UOW)**

*resource*
: A text string, if *type* is byValue, otherwise an address in storage.

*type*
: An enumeration, defined in this class, that indicates whether locking is by value or by address. The default is by value.

*life*
: An enumeration, defined in this class, that indicates how long the semaphore lasts. The default is to last for the length of the UOW.

### Constructor (2)

**IccSemaphore (const IccLockId&** *id***,**
  **LifeTime** *life* **= UOW)**

*id* A reference to an **IccLockId** object

*life*
: An enumeration, defined in this class, that indicates how long the semaphore lasts. The default is to last for the length of the UOW.

## Public methods

### lifeTime

**LifeTime lifeTime() const**

Returns an enumeration, defined in this class, that indicates whether the lock lasts for the length of the current unit-of-work ('UOW') or until the task terminates('task').

### lock

**void lock()**

Attempts to get a lock. This method blocks if another task already owns the lock.

#### Conditions
ENQBUSY, LENGERR, INVREQ

### tryLock

**Icc::Bool tryLock()**

Attempts to get a lock. This method does not block if another task already owns the lock. It returns a boolean that indicates whether it succeeded.

#### Conditions
ENQBUSY, LENGERR, INVREQ

### type

**LockType type() const**

Returns an enumeration, defined in this class, that indicates what type of semaphore this is.

### unlock

**void unlock()**

Release a lock.

#### Conditions
LENGERR, INVREQ

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| classType | IccBase |
| className | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| id | IccResource |
| isEDFOn | IccResource |
| name | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

## Enumerations

### LockType

**byValue**
The lock is on the contents (for example, name).

**byAddress**
The lock is on the memory address.

### LifeTime

| | |
|---|---|
| **UOW** | The semaphore lasts for the length of the current unit of work. |
| **task** | The semaphore lasts for the length of the task. |

# Chapter 46. IccSession class

**IccBase**
  **IccResource**
    **IccSession**

This class enables APPC and DTP programming.

**Header file:** `ICCSESEH`

**Sample:** `ICC$SES1`, `ICC$SES2`

## IccSession constructors (public)

### Constructor (1)

**IccSession(const IccPartnerId&** *id***)**

*id* A reference to an **IccPartnerId** object

### Constructor (2)

**IccSession (const IccSysId&** *sysId***,**
**const char*** *profile* **= 0)**

*sysId*
A reference to an **IccSysId** object that represents a remote CICS system

*profile*
The 8-character name of the profile.

### Constructor (3)

**IccSession (const char*** *sysName***,**
**const char*** *profile* **= 0)**

*sysName*
The 4-character name of the remote CICS system with which this session is associated

*profile*
The 8-character name of the profile.

## IccSession constructor (protected)

### Constructor

**IccSession()**

This constructor is for back end DTP CICS tasks that have a session as their principal facility. In this case the application program uses the **session** method on the **IccControl** object to gain access to their **IccSession** object.

## Public methods

### allocate

**void allocate(AllocateOpt** *option* **= queue)**

*option*
: An enumeration, defined in this class, that indicates what action CICS is to take if a communication channel is unavailable when this method is called.

Establishes a session (communication channel) to the remote system.

#### Conditions

INVREQ, SYSIDERR, CBIDERR, NETNAMEIDERR, PARTNERIDERR, SYSBUSY

### connectProcess (1)

```
void connectProcess (SyncLevel level,
                     const IccBuf* PIP = 0)
```

*level*
: An enumeration, defined in this class, that indicates what sync level is to be used for this conversation

*PIP*
: An optional pointer to an **IccBuf** object that contains the PIP data to be sent to the remote system

This method can only be used if an **IccPartnerId** object was used to construct this session object.

### connectProcess (2)

```
void connectProcess (SyncLevel level,
                     const IccTransId& transId,
                     const IccBuf* PIP = 0)
```

*level*
: An enumeration, defined in this class, that indicates what sync level is to be used for this conversation

*transId*
: A reference to an **IccTransId** object that holds the name of the transaction to be started on the remote system

*PIP*
: An optional pointer to an **IccBuf** object that contains the PIP data to be sent to the remote system

### connectProcess (3)

```
void connectProcess (SyncLevel level,
                     const IccTPNameId& TPName,
                     const IccBuf* PIP = 0)
```

*level*
: An enumeration, defined in this class, that indicates what sync level is to be used for this conversation

*TPName*
A reference to an **IccTPNameId** object that contains the 1–64 character TP name.

*PIP*
An optional pointer to an **IccBuf** object that contains the PIP data to be sent to the remote system

Starts a partner process on the remote system in preparation for sending and receiving information.

### Conditions

INVREQ, LENGERR, NOTALLOC, PARTNERIDERR, NOTAUTH, TERMERR, SYSBUSY

## converse

**const IccBuf& converse(const IccBuf&** *send***)**

*send*
A reference to an **IccBuf** object that contains the data that is to be sent.

**converse** sends the contents of *send* and returns a reference to an **IccBuf** object that holds the reply from the remote APPC partner.

### Conditions

EOC, INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

## convId

**const IccConvId& convId()**

Returns a reference to an **IccConvId** object that contains the 4-byte conversation identifier.

## errorCode

**const char* errorCode() const**

Returns the 4-byte error code received when **isErrorSet** returns true. See the relevant DTP Guide for more information.

## extractProcess

**void extractProcess()**

Retrieves information from an APPC conversation attach header and holds it inside the object. See **PIPList**, **process**, and **syncLevel** methods to retrieve the information from the object. This method should be used by the back end task if it wants access to the PIP data, the process name, or the synclevel under which it is running.

### Conditions

INVREQ, NOTALLOC, LENGERR

## flush

**void flush()**

Ensure that accumulated data and control information are transmitted on an APPC mapped conversation.

### Conditions
INVREQ, NOTALLOC

## free

**void free()**

Return the APPC session to CICS so that it may be used by other tasks.

### Conditions
INVREQ, NOTALLOC

## get

**virtual const IccBuf& get()**

A synonym for **receive**. See "Polymorphic Behavior" on page 55 for information on polymorphism.

## isErrorSet

**Icc::Bool isErrorSet() const**

Returns a boolean variable, defined in **Icc** structure, that indicates whether an error has been set.

## isNoDataSet

**Icc::Bool isNoDataSet() const**

Returns a boolean variable, defined in **Icc** structure, that indicates if no data was returned on a **send**—just control information.

## isSignalSet

**Icc::Bool isSignalSet() const**

Returns a boolean variable, defined in **Icc** structure, that indicates whether a signal has been received from the remote process.

## issueAbend

**void issueAbend()**

Abnormally ends the conversation. The partner transaction sees the TERMERR condition.

### Conditions
INVREQ, NOTALLOC, TERMERR

## issueConfirmation

**void issueConfirmation()**

Sends positive response to a partner's **send** request that specified the confirmation option.

### Conditions

INVREQ, NOTALLOC, TERMERR, SIGNAL

## issueError

**void issueError()**

Signals an error to the partner process.

### Conditions

INVREQ, NOTALLOC, TERMERR, SIGNAL

## issuePrepare

**void issuePrepare()**

This only applies to DTP over APPC links. It enables a syncpoint initiator to prepare a syncpoint slave for syncpointing by sending only the first flow ('prepare to commit') of the syncpoint exchange.

### Conditions

INVREQ, NOTALLOC, TERMERR

## issueSignal

**void issueSignal()**

Signals that a mode change is needed.

### Conditions

INVREQ, NOTALLOC, TERMERR

## PIPList

**IccBuf& PIPList()**

Returns a reference to an **IccBuf** object that contains the PIP data sent from the front end process. A call to this method should be preceded by a call to **extractProcess** on back end DTP processes.

## process

**const IccBuf& process() const**

Returns a reference to an **IccBuf** object that contains the process data sent from the front end process. A call to this method should be preceded by a call to **extractProcess** on back end DTP processes.

## put

**virtual void put(const IccBuf&** *data***)**

*data*
A reference to an **IccBuf** object that holds the data to be sent to the remote process.

A synonym for **send**. See "Polymorphic Behavior" on page 55 for information on polymorphism.

## receive

**const IccBuf& receive()**

Returns a reference to an **IccBuf** object that contains the data received from the remote system.

### Conditions

EOC, INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

## send (1)

**void send (const IccBuf&** *send***,**
**SendOpt** *option* **=** normal**)**

*send*
A reference to an **IccBuf** object that contains the data that is to be sent.

*option*
An enumeration, defined in this class, that affects the behavior of the **send** method. The default is normal.

## send (2)

**void send(SendOpt** *option* **=** normal**)**

*option*
An enumeration, defined in this class, that affects the behavior of the **send** method. The default is normal.

Sends data to the remote partner.

### Conditions

INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

## sendInvite (1)

**void sendInvite (const IccBuf&** *send***,**
**SendOpt** *option* **=** normal**)**

*send*
A reference to an **IccBuf** object that contains the data that is to be sent.

*option*
An enumeration, defined in this class, that affects the behavior of the **sendInvite** method. The default is normal.

## sendInvite (2)

**void sendInvite(SendOpt** *option* = normal**)**

*option*
: An enumeration, defined in this class, that afffects the behavior of the **sendInvite** method. The default is normal.

Sends data to the remote partner and indicates a change of direction, that is, the next method on this object will be **receive**.

### Conditions

INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

## sendLast (1)

**void sendLast (const IccBuf&** *send***,**
**SendOpt** *option* = normal**)**

*send*
: A reference to an **IccBuf** object that contains the data that is to be sent.

*option*
: An enumeration, defined in this class, that affects the behavior of the **sendLast** method. The default is normal.

## sendLast (2)

**void sendLast(SendOpt** *option* = normal**)**

*option*
: An enumeration, defined in this class, that affects the behavior of the **sendLast** method. The default is normal.

Sends data to the remote partner and indicates that this is the final transmission. The **free** method must be invoked next, unless the sync level is 2, when you must commit resource updates before the **free**. (See **commitUOW** on page 264 in **IccTaskClass**).

### Conditions

INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

## state

**IccValue::CVDA state(StateOpt** *option* = lastCommand**)**

*option*
: An enumeration, defined in this class, that indicates how to report the state of the conversation

Returns a CVDA, defined in **IccValue** structure, that indicates the current state of the APPC conversation. Possible values are:

- ALLOCATED
- CONFFREE
- CONFSEND
- FREE
- PENDFREE
- PENDRECEIVE
- RECEIVE

ROLLBACK
SEND
SYNCFREE
SYNCRECEIVE
SYNCSEND
NOTAPPLIC

IccValue::NOTAPPLIC is returned if there is no APPC conversation state.

### Conditions

INVREQ, NOTALLOC

## stateText

**const char* stateText(StateOpt** *option* **=** lastCommand**)**

*option*
: An enumeration, defined in this class, that indicates how to report the state of the conversation

Returns the symbolic name of the state that **state** method would return. For example, if **state** returns IccValue::ALLOCATED, **stateText** would return "ALLOCATED".

## syncLevel

**SyncLevel syncLevel() const**

Returns an enumeration, defined in this class, that indicates the synchronization level that is being used in this session. A call to this method should be preceded by a call to **extractProcess** on back end DTP processes.

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| classType | IccBase |
| className | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| id | IccResource |
| isEDFOn | IccResource |
| name | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

## Enumerations

### AllocateOpt

**queue**
If all available sessions are in use, CICS is to queue this request (and block the method) until it can allocate a session.

**noQueue**
Control is returned to the application if it cannot allocate a session. CICS raises the SYSBUSY condition.

Indicates whether queuing is required on an **allocate** method.

### SendOpt

**normal**
The default.

**confirmation**
Indicates that a program using SyncLevel level1 or level2 requires a response from the remote partner program. The remote partner can respond positively, using the **issueConfirmation** method, or negatively, using the **issueError** method. The sending program does not receive control back from CICS until the response is received.

**wait**
Requests that the data is sent and not buffered internally. CICS is free to buffer requests to improve performance if this option is not specified.

## StateOpt

Used to indicate how the state of a conversation is to be reported.

**lastCommand**
: Return the state at the time of the completion of the last operation on the session.

**extractState**
: Return the explicitly extracted current state.

## SyncLevel

**level0**
: Sync level 0

**level1**
: Sync level 1

**level2**
: Sync level 2

# Chapter 47. IccStartRequestQ class

**IccBase**
  **IccResource**
    **IccStartRequestQ**

This is a singleton class that enables the application programmer to request an asynchronous start of another CICS transaction (see the **start** method on page 251).

An asynchronously started transaction uses the **IccStartRequestQ** class method **retrieveData** to gain the information passed to it by the transaction that issued the **start** request.

An unexpired start request can be cancelled by using the **cancel** method.

**Header file:** `ICCSRQEH`

**Sample:** `ICC$SRQ1`, `ICC$SRQ2`

## IccStartRequestQ constructor (protected)

### Constructor

**IccStartRequestQ()**

## Public methods

### cancel

**void cancel (const IccRequestId&** *reqId***,**
**const IccTransId*** *transId* **= 0)**

*reqId*
A reference to an **IccRequestId** object that represents the request to be cancelled

*transId*
An optional pointer to an **IccTransId** object that represents the transaction that is to be cancelled.

Cancels a previously issued **start** request that has not yet expired.

#### Conditions

ISCINVREQ, NOTAUTH, NOTFND, SYSIDERR

### clearData

**void clearData()**

**clearData** clears the current data that is to be passed to the started transaction. The data was set using **setData** or **registerData**.

If the data was set using **registerData**, only the pointer to the data is removed, the data in the buffer is left unchanged.

If the data was set using **setData**, then **clearData** releases the memory used by the buffer.

### data

**const IccBuf& data() const**

Returns a reference to an **IccBuf** object that contains data passed on a start request. A call to this method should be preceded by a call to **retrieveData** method.

### instance

**static IccStartRequestQ* instance()**

Returns a pointer to the single **IccStartRequestQ** object. If the object does not exist it is created. See also **startRequestQ** method on page 122 of **IccControl**.

### queueName

**const char* queueName() const**

Returns the name of the queue that was passed by the start requester. A call to this method should be preceded by a call to **retrieveData** method.

### registerData

**void registerData(const IccBuf*** *buffer***)**

*buffer*
A pointer to the **IccBuf** object that holds data to be passed on a **start** request.

Registers an **IccBuf** object to be interrogated for start data on each subsequent **start** method invocation.

This just stores the address of the **IccBuf** object within the **IccStartRequestQ** so that the **IccBuf** object can be found when using the **start** method. This differs from the **setData** method, which takes a copy of the data held in the **IccBuf** object during the time that it is invoked.

## reset

**void reset()**

Clears any associations previously made by **set...** methods in this class.

## retrieveData

**void retrieveData(RetrieveOpt** *option* **=** noWait**)**

*option*
An enumeration, defined in this class, that indicates what happens if there is no start data available.

Used by a task that was started, via an async start request, to gain access to the information passed by the start requester. The information is returned by the **data**, **queueName**, **returnTermId**, and **returnTransId** methods.

### Conditions

ENDDATA, ENVDEFERR, IOERR, LENGERR, NOTFND, INVREQ

**Note:** The ENVDEFERR condition will be raised if all the possible options (**setData**, **setQueueName**, **setReturnTermId**, and **setReturnTransId**) are not used before issuing the **start** method. This condition is therefore not necessarily an error condition and your program should handle it accordingly.

## returnTermId

**const IccTermId& returnTermId() const**

Returns a reference to an **IccTermId** object that identifies which terminal is involved in the session. A call to this method should be preceded by a call to **retrieveData** method.

## returnTransId

**const IccTransId& returnTransId() const**

Returns a reference to an **IccTransId** object passed on a start request. A call to this method should be preceded by a call to **retrieveData** method.

## setData

**void setData(const IccBuf&** *buf***)**

Copies the data in *buf* into the **IccStartRequestQ**, which passes it to the started transaction when the **start** method is called. See also **registerData** on page 248 for an alternative way to pass data to started transactions.

## setQueueName

**void setQueueName(const char*** *queueName***)**

*queueName*
An 8-character queue name.

Requests that this queue name be passed to the started transaction when the **start** method is called.

## setReturnTermId (1)

**void setReturnTermId(const IccTermId&** *termId***)**

*termId*
A reference to an **IccTermId** object that identifies which terminal is involved in the session.

## setReturnTermId (2)

**void setReturnTermId(const char*** *termName***)**

*termName*
The 4-character name of the terminal that is involved in the session.

Requests that this return terminal ID be passed to the started transaction when the **start** method is called.

## setReturnTransId (1)

**void setReturnTransId(const IccTransId&** *transId***)**

*transId*
A reference to an **IccTransId** object.

## setReturnTransId (2)

**void setReturnTransId(const char*** *transName***)**

*transName*
The 4-character name of the return transaction.

Requests that this return transaction ID be passed to the started transaction when the **start** method is called.

## setStartOpts

**void setStartOpts (ProtectOpt** *popt* **=** none**,**
**CheckOpt** *copt* **=** check**)**

*popt*
: An enumeration, defined in this class, that indicates whether start requests are to be protected

*copt*
: An enumeration, defined in this class, that indicates whether start requests are to be checked.

Sets whether the started transaction is to have protection and whether it is to be checked.

## start

```
const IccRequestId& start (const IccTransId& transId,
                           const IccTermId* termId,
                           const IccTime* time = 0,
                           const IccRequestId* reqId = 0)
```

or

```
const IccRequestId& start (const IccTransId& transId,
                           const IccUserId* userId,
                           const IccTime* time = 0,
                           const IccRequestId* reqId = 0)
```

or

```
const IccRequestId& start (const IccTransId& transId,
                           const IccTime* time = 0,
                           const IccRequestId* reqId = 0)
```

*transId*
: A reference to an **IccTransId** object that represents the transaction to be started

*termId*
: A reference to an **IccTermId** object that identifies which terminal is involved in the session.

*userId*
: A reference to an **IccUserId** object that represents the user ID.

*time*
: An (optional) pointer to an **IccTime** object that specifies when the task is to be started. The default is for the task to be started immediately.

*reqId*
: An (optional) pointer to an **IccRequestId** object that is used to identify this start request so that the **cancel** can cancel the request.

Asynchronously starts the named CICS transaction. The returned reference to an **IccRequestId** object identifies the **start** request and can be used subsequently to **cancel** the **start** request.

### Conditions

INVREQ, IOERR, ISCINVREQ, LENGERR, NOTAUTH, SYSIDERR, TERMIDERR, TRANSIDERR, USERIDERR

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| className | IccBase |
| classType | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| id | IccResource |
| isEDFOn | IccResource |
| isRouteOptionOn | IccResource |
| name | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| routeOption | IccResource |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |
| setRouteOption | IccResource |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

## Enumerations

### RetrieveOpt

noWait
wait

### ProtectOpt

none
protect

### CheckOpt

check
noCheck

# Chapter 48. IccSysId class

**IccBase**
  **IccResourceId**
    **IccSysId**

**IccSysId** class is used to identify a remote CICS system.

**Header file:** `ICCRIDEH`

## IccSysId constructors

### Constructor (1)

**IccSysId(const char*** *name***)**

*name*
  The 4-character name of the CICS system.

### Constructor (2)

**IccSysId(const IccSysId&** *id***)**

*id* A reference to an **IccSysId** object.
The copy constructor.

## Public methods

### operator= (1)

**IccSysId& operator=(const IccSysId&** *id***)**

*id* A reference to an existing **IccSysId** object.

### operator= (2)

**IccSysId& operator=(const char*** *name***)**

*name*
The 4-character name of the CICS system.

Sets the name of the CICS system held in the object.

## Inherited public methods

| Method | Class |
|---|---|
| classType | IccBase |
| className | IccBase |
| customClassNum | IccBase |
| name | IccResourceId |
| nameLength | IccResourceId |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| operator= | IccResourceId |
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 49. IccSystem class

**IccBase**
  **IccResource**
    **IccSystem**

This is a singleton class that represents the CICS system. It is used by an application program to discover information about the CICS system on which it is running.

**Header file:** `ICCSYSEH`

**Sample:** `ICC$SYS`

## IccSystem constructor (protected)

### Constructor

**IccSystem()**

## Public methods

### applName

**const char* applName()**

Returns the 8-character name of the CICS region.

#### Conditions

INVREQ

### beginBrowse (1)

**void beginBrowse (ResourceType** *resource***,**
**const IccResourceId*** *resId* **= 0)**

*resource*
: An enumeration, defined in this class, that indicates the type of resource to be browsed within the CICS system.

*resId*
: An optional pointer to an **IccResourceId** object that indicates the starting point for browsing through the resources.

### beginBrowse (2)

**void beginBrowse (ResourceType** *resource***,**
**const char*** *resName***)**

*resource*
: An enumeration, defined in this class, that indicates the type of resource to be browsed within the CICS system.

*resName*
: The name of the resource that is to be the starting point for browsing the resources.

Signals the start of a browse through a set of CICS resources.

#### Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

### dateFormat

**const char* dateFormat()**

Returns the default dateFormat for the CICS region.

#### Conditions

INVREQ

### endBrowse

**void endBrowse(ResourceType** *resource***)**

Signals the end of a browse through a set of CICS resources.

### Conditions
END, FILENOTFOUND, ILLOGIC, NOTAUTH

## freeStorage

**void freeStorage(void*** *pStorage***)**

Releases the storage obtained by the **IccSystem getStorage** method.

### Conditions
INVREQ

## getFile (1)

**IccFile* getFile(const IccFileId&** *id***)**

*id* A reference to an **IccFileId** object that identifies a CICS file.

## getFile (2)

**IccFile* getFile(const char*** *fileName***)**

*fileName*
The name of a CICS file.

Returns a pointer to the **IccFile** object identified by the argument.

### Conditions
END, FILENOTFOUND, ILLOGIC, NOTAUTH

## getNextFile

**IccFile* getNextFile()**

This method is only valid after a successful **beginBrowse(IccSystem::file)** call. It returns the next file object in the browse sequence in the CICS system.

### Conditions
END, FILENOTFOUND, ILLOGIC, NOTAUTH

## getStorage

```
void* getStorage (unsigned long size,
                  char initByte = -1,
                  unsigned long storageOpts = 0)
```

*size*
The amount of storage being requested, in bytes

*initByte*
The initial setting of all bytes in the allocated storage

*storageOpts*
An enumeration, defined in **IccTask** class, that affects the way that CICS allocates storage.

Obtains a block of storage of the requested size and returns a pointer to it. The storage is not released automatically at the end of task; it is only released when a **freeStorage** operation is performed.

#### Conditions
LENGERR, NOSTG

## instance

**static IccSystem* instance()**

Returns a pointer to the singleton **IccSystem** object. The object is created if it does not already exist.

## operatingSystem

**char operatingSystem()**

Returns a 1-character value that identifies the operating system under which CICS is running:

| | |
|---|---|
| **A** | AIX |
| **N** | Windows NT |
| **P** | OS/2 |
| **X** | MVS/ESA |

#### Conditions
NOTAUTH

## operatingSystemLevel

**unsigned short operatingSystemLevel()**

Returns a halfword binary field giving the release number of the operating system under which CICS is running. The value returned is ten times the formal release number (the version number is not represented). For example, MVS/ESA Version 3 Release 2.1 would produce a value of 21.

#### Conditions
NOTAUTH

## release

**unsigned long release()**

Returns the level of the CICS system as an integer set to 100 multiplied by the version number plus 10 multiplied by the release level. For example, CICS Transaction Server for OS/390 [Version 1] Release 3 would return 130.

#### Conditions
NOTAUTH

## releaseText

**const char* releaseText()**

Returns the same as **release**, except as a 4-character string. For example, CICS Transaction Server for OS/390 [Version 1] Release 3 would return "0130".

#### Conditions
NOTAUTH

## sysId

**IccSysId& sysId()**

Returns a reference to the **IccSysId** object that identifies this CICS system.

### Conditions

INVREQ

## workArea

**const IccBuf& workArea()**

Returns a reference to the **IccBuf** object that holds the work area for the CICS system.

### Conditions

INVREQ

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| classType | IccBase |
| className | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| id | IccResource |
| isEDFOn | IccResource |
| name | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

## Enumerations

### ResourceType

autoInstallModel
connection
dataQueue
exitProgram
externalDataSet
file
journal
modename
partner
profile
program
requestId
systemDumpCode
tempStore
terminal
transactionDumpCode
transaction
transactionClass

# Chapter 50. IccTask class

**IccBase**
  **IccResource**
    **IccTask**

**IccTask** is a singleton class used to invoke task related CICS services.

**Header file:** `ICCTSKEH`

**Sample:** `ICC$TSK`

## IccTask Constructor (protected)

### Constructor

**IccTask()**

## Public methods

**The opt parameter**
Many methods have the same parameter, *opt*, which is described under the **abendCode** method in"abendCode" on page 78.

### abend

**void abend (const char*** *abendCode* **= 0,**
**AbendHandlerOpt** *opt1* **=** respectAbendHandler**,**
**AbendDumpOpt** *opt2* **=** createDump**)**

*abendCode*
The 4-character abend code

*opt1*
An enumeration, defined in this class, that indicates whether to respect or ignore any abend handling program specified by **setAbendHandler** method in **IccControl** class

*opt2*
An enumeration, defined in this class, that indicates whether a dump is to be created.

Requests CICS to abend this task.

### abendData

**IccAbendData* abendData()**

Returns a pointer to an **IccAbendData** object that contains information about the program abends, if any, that relate to this task.

### commitUOW

**void commitUOW()**

Commit the resource updates within the current UOW for this task. This also causes a new UOW to start for subsequent resource update activity.

#### Conditions

INVREQ, ROLLEDBACK

### delay

**void delay (const IccTime&** *time***,**
**const IccRequestId*** *reqId* **= 0)**

*time*
A reference to an object that contains information about the delay time. The object can be one of these types:

**IccAbsTime**
Expresses time as the number of milliseconds since the beginning of the year 1900.

**IccTimeInterval**
Expresses an interval of time, such as 3 hours, 2 minutes, and 1 second.

**IccTimeOfDay**
Expresses a time of day, such as 13 hours, 30 minutes (1-30 pm).

*reqId*
An optional pointer to an **IccRequestId** object that can be used to cancel an unexpired delay request.

Requests that this task be delayed for an interval of time, or until a specific time.

### Conditions

EXPIRED, INVREQ

## dump

```
const char* dump (const char* dumpCode,
                  const IccBuf* buf = 0)
```

*dumpCode*
A 4-character label that identifies this dump

*buf*
A pointer to the **IccBuf** object that contains additional data to be included in the dump.

Requests CICS to take a dump for this task. (See also **setDumpOpts**.) Returns the character identifier of the dump.

### Conditions

INVREQ, IOERR, NOSPACE, NOSTG, NOTOPEN, OPENERR, SUPPRESSED

## enterTrace

```
void enterTrace (unsigned short traceNum,
                 const char* resource = 0,
                 IccBuf* data = 0,
                 TraceOpt opt = normal)
```

*traceNum*
The trace identifier for a user trace table entry; a value in the range 0 through 199.

*resource*
An 8-character name to be entered in the resource field of the trace table entry.

*data*
A pointer to the **IccBuf** object containing data to be included in the trace record.

*opt*
An enumeration, defined in this class, that indicates whether tracing should be normal or whether only exceptions should be traced.

Writes a user trace entry in the CICS trace table.

### Conditions

INVREQ, LENGERR

## facilityType

**FacilityType facilityType()**

Returns an enumeration, defined in this class, that indicates what type of principal facility this task has. This is usually a terminal, such as when the task was started by someone keying a transaction name on a CICS terminal. It is a session if the task is the back end of a mapped APPC conversation.

### Conditions

INVREQ

## freeStorage

**void freeStorage(void* pStorage)**

Releases the storage obtained by the **IccTask getStorage** method.

### Conditions

INVREQ

## getStorage

```
void* getStorage (unsigned long size,
                  char initByte = -1,
                  unsigned short storageOpts = 0)
```

*size*
: The amount of storage being requested, in bytes

*initByte*
: The initial setting of all bytes in the allocated storage

*storageOpts*
: An enumeration, defined in this class, that affects the way that CICS allocates storage.

Obtains a block of storage of the requested size. The storage is released automatically at the end of task, or when the **freeStorage** operation is performed. See also **getStorage** on page 259 in **IccSystem**class.

### Conditions

LENGERR, NOSTG

## instance

**static IccTask* instance();**

Returns a pointer to the singleton **IccTask** object. The object is created if it does not already exist.

## isCommandSecurityOn

**Icc::Bool isCommandSecurityOn()**

Returns a boolean, defined in **Icc** structure, that indicates whether this task is subject to command security checking.

#### Conditions
INVREQ

## isCommitSupported

**Icc::Bool isCommitSupported()**

Returns a boolean, defined in **Icc** structure that indicates whether this task can support the **commit** method. This method returns true in most environments; the exception to this is in a DPL environment (see **link** on page 198 in **IccProgram**).

#### Conditions
INVREQ

## isResourceSecurityOn

**Icc::Bool isResourceSecurityOn()**

Returns a boolean, defined in **Icc** structure, that indicates whether this task is subject to resource security checking.

#### Conditions
INVREQ

## isRestarted

**Icc::Bool isRestarted()**

Returns a boolean, defined in **Icc** structure, that indicates whether this task has been automatically restarted by CICS.

#### Conditions
INVREQ

## isStartDataAvailable

**Icc::Bool isStartDataAvailable()**

Returns a boolean, defined in **Icc** structure, that indicates whether start data is available for this task. See the **retrieveData** method in **IccStartRequestQ** class if start data is available.

#### Conditions
INVREQ

## number

**unsigned long number() const**

Returns the number of this task, unique within the CICS system.

## principalSysId

**IccSysId& principalSysId(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns a reference to an **IccSysId** object that identifies the principal system identifier for this task.

### Conditions
INVREQ

## priority

**unsigned short priority(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns the priority for this task.

### Conditions
INVREQ

## rollBackUOW

**void rollBackUOW()**

Roll back (backout) the resource updates associated with the current UOW within this task.

### Conditions
INVREQ, ROLLEDBACK

## setDumpOpts

**void setDumpOpts(unsigned long** *opts* **= dDefault)**

*opts*
: An integer, made by adding or logically ORing values from the **DumpOpts** enumeration, defined in this class.

Set the dump options for this task. This method affects the behavior of the **dump** method defined in this class.

## setPriority

**void setPriority(unsigned short** *pri***)**

*pri*
: The new priority.

Changes the dispatch priority of this task.

### Conditions
INVREQ

## setWaitText

**void setWaitText(const char*** *name***)**

*name*
: The 8-character string label that indicates why this task is waiting.

Sets the text that will appear when someone inquires on this task while it is suspended as a result of a **waitExternal** or **waitOnAlarm** method call.

## startType

**StartType startType()**

Returns an enumeration, defined in this class, that indicates how this task was started.

### Conditions
INVREQ

## suspend

**void suspend()**

Suspend this task, allowing other tasks to be dispatched.

## transId

**const IccTransId& transId()**

Returns the **IccTransId** object representing the transaction name of this CICS task.

## triggerDataQueueId

**const IccDataQueueId& triggerDataQueueId()**

Returns a reference to the **IccDataQueueId** representing the trigger queue, if this task was started as a result of data arriving on an **IccDataQueue**. See **startType** method.

### Conditions
INVREQ

## userId

**const IccUserId& userId(Icc::GetOpt** *opt* **= Icc::object)**

*opt*
An enumeration, defined in **Icc** structure, that indicates whether the information already existing in the object is to be used or whether it is to be refreshed from CICS.

Returns the ID of the user associated with this task.

### Conditions
INVREQ

## waitExternal

**void waitExternal (long**** *ECBList***,**
**unsigned long** *numEvents***,**
**WaitPurgeability** *opt* = purgeable**,**
**WaitPostType** *type* = MVSPost**)**

*ECBList*
A pointer to a list of ECBs that represent events.

*numEvents*
: The number of events in *ECBList*.

*opt*
: An enumeration, defined in this class, that indicates whether the wait is purgeable.

*type*
: An enumeration, defined in this class, that indicates whether the post type is a standard MVS POST.

Waits for events that post ECBs - Event Control Blocks. The call causes the issuing task to be suspended until one of the ECBs has been posted—that is, one of the events has occurred. The task can wait on more than one ECB and can be dispatched as soon as any of them are posted.

See **waitExternal** in the *CICS Application Programming Reference* for more information about ECBs.

### Conditions

INVREQ

## waitOnAlarm

**void waitOnAlarm(const IccAlarmRequestId&** *id***)**

*id* A reference to the **IccAlarmRequestId** object that identifies a particular alarm request.

Suspends the task until the alarm goes off (expires). See also **setAlarm** on page 109 in **IccClock**.

### Conditions

INVREQ

## workArea

**IccBuf& workArea()**

Returns a reference to the **IccBuf** object that holds the work area for this task.

### Conditions

INVREQ

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| classType | IccBase |
| className | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| id | IccResource |
| isEDFOn | IccResource |
| name | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

## Enumerations

### AbendHandlerOpt

**respectAbendHandler**
Allows control to be passed to an abend handling program if one is in effect.

**ignoreAbendHandler**
Does not allow control to be passed to any abend handling program that may be in effect.

### AbendDumpOpt

**createDump**
Take a transaction dump when servicing an abend request.

**suppressDump**
Do not take a transaction dump when servicing an abend request.

### DumpOpts

The values may be added, or bitwise ORed, together to get the desired combination. For example `IccTask::dProgram + IccTask::dDCT + IccTask::dSIT`.

**dDefault**
**dComplete**
**dTask**
**dStorage**

**dProgram**
**dTerminal**
**dTables**
**dDCT**
**dFCT**
**dPCT**
**dPPT**
**dSIT**
**dTCT**
**dTRT**

## FacilityType

**none** The task has no principal facility, that is, it is a background task.

**terminal**
This task has a terminal as its principal facility.

**session**
This task has a session as its principal facility, that is, it was probably started as a backend DTP program.

**dataqueue**
This task has a transient data queue as its principal facility.

## StartType

**DPL** Distributed program link request

**dataQueueTrigger**
Trigger by data arriving on a data queue

**startRequest**
Started as a result of an asynchronous start request. See **IccStartRequestQ** class.

**FEPIRequest**
Front end programming interface. See *CICS/ESA: Front End Programming Interface User's Guide*, SC33-1175.

**terminalInput**
Started via a terminal input

**CICSInternalTask**
Started by CICS.

## StorageOpts

**ifSOSReturnCondition**
If insufficient space is available, return NOSTG condition instead of blocking the task.

**below**
Allocate storage below the 16Mb line.

**userDataKey**
Allocate storage in the USER data key.

**CICSDataKey**
Allocate storage in the CICS data key.

## TraceOpt

**normal**
The trace entry is a standard entry.

**exception**
The trace entry is an exception entry.

## WaitPostType

**MVSPost**
: ECB is posted using the MVS POST service.

**handPost**
: ECB is hand posted (that is, using some method other than the MVS POST service).

## WaitPurgeability

**purgeable**
: Task can be purged via a system call.

**notPurgeable**
: Task cannot be purged via a system call.

# Chapter 51. IccTempStore class

**IccBase**
  **IccResource**
    **IccTempStore**

**IccTempStore** objects are used to manage the temporary storage of data. (**IccTempStore** data can exist between transaction calls.)

**Header file:** `ICCTMPEH`

**Sample:** `ICC$TMP`

## IccTempStore constructors

### Constructor (1)

**IccTempStore (const IccTempStoreId&** *id***,**
  **Location** *loc* **= auxStorage)**

*id* Reference to an **IccTempStoreId** object

*loc*
An enumeration, defined in this class, that indicates where the storage is to be located when it is first created. The default is to use auxiliary storage (disk).

### Constructor (2)

**IccTempStore (const char*** *storeName***,**
  **Location** *loc* **= auxStorage)**

**storeName**
Specifies the 8-character name of the queue to be used. The name must be unique within the CICS system.

*loc*
An enumeration, defined in this class, that indicates where the storage is to be located when it is first created. The default is to use auxiliary storage (disk).

## Public methods

**The opt parameter**
Many methods have the same parameter, *opt*, which is described under the **abendCode** method in"abendCode" on page 78.

### clear

**virtual void clear()**

A synonym for **empty**. See "Polymorphic Behavior" on page 55 for information on polymorphism.

### empty

**void empty()**

Deletes all the temporary data associated with the **IccTempStore** object and deletes the associated TD queue.

#### Conditions
INVREQ, ISCINVREQ, NOTAUTH, QIDERR, SYSIDERR

### get

**virtual const IccBuf& get()**

A synonym for **readNextItem**. See "Polymorphic Behavior" on page 55 for information on polymorphism.

### numberOfItems

**unsigned short numberOfItems() const**

Returns the number of items in temporary storage. This is only valid after a successful **writeItem** call.

### put

**virtual void put(const IccBuf&** *buffer***)**

*buffer*
A reference to an **IccBuf** object that contains the data that is to be added to the end of the temporary storage queue.

A synonym for **writeItem**. See "Polymorphic Behavior" on page 55 for information on polymorphism.

### readItem

**const IccBuf& readItem(unsigned short** *itemNum***)**

*itemNum*
Specifies the item number of the logical record to be retrieved from the queue.

Reads the specified item from the temporary storage queue and returns a reference to the **IccBuf** object that contains the information.

### Conditions

INVREQ, IOERR, ISCINVREQ, ITEMERR, LENGERR, NOTAUTH, QIDERR, SYSIDERR

## readNextItem

**const IccBuf& readNextItem()**

Reads the next item from a temporary storage queue and returns a reference to the **IccBuf** object that contains the information.

### Conditions

INVREQ, IOERR, ISCINVREQ, ITEMERR, LENGERR, NOTAUTH, QIDERR, SYSIDERR

## rewriteItem

**void rewriteItem (unsigned short** *itemNum*,
**const IccBuf&** *item*,
**NoSpaceOpt** *opt* = suspend**)**

The parameters are:

*itemNum*
: Specifies the item number of the logical record that is to be modified

*item*
: The name of the **IccBuf** object that contains the update data.

*opt*
: An enumeration, defined in this class, that indicates whether the application program is to be suspended if a shortage of space in the queue prevents the record being added. suspend is the default.

This method updates the specified item in the temporary storage queue.

### Conditions

INVREQ, IOERR, ISCINVREQ, ITEMERR, LENGERR, NOSPACE, NOTAUTH, QIDERR, SYSIDERR

## writeItem (1)

**unsigned short writeItem (const IccBuf&** *item*,
**NoSpaceOpt** *opt* = suspend**)**

*item*
: The name of the **IccBuf** object that contains the data that is to added to the end of the temporary storage queue.

*opt*
: An enumeration, defined in this class, that indicates whether the application program is to be suspended if a shortage of space in the queue prevents the record being added. suspend is the default.

## writeItem (2)

**unsigned short writeItem (const char*** *text***,**
**NoSpaceOpt** *opt* **=** suspend**)**

*text*
The text string that is to added to the end of the temporary storage queue.

*opt*
An enumeration, defined in this class, that indicates whether the application program is to be suspended if a shortage of space in the queue prevents the record being added. suspend is the default.

This method adds a new record at the end of the temporary storage queue. The returned value is the item number that was created (if this was done successfully).

### Conditions

INVREQ, IOERR, ISCINVREQ, ITEMERR, LENGERR, NOSPACE, NOTAUTH, QIDERR, SYSIDERR

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| className | IccBase |
| classType | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| id | IccResource |
| isEDFOn | IccResource |
| isRouteOptionOn | IccResource |
| name | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| routeOption | IccResource |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |
| setRouteOption | IccResource |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

## Enumerations

### Location

**auxStorage**
Temporary store data is to reside in auxiliary storage (disk).

**memory**
Temporary store data is to reside in memory.

### NoSpaceOpt

What action to take if a shortage of space in the queue prevents the record being added immediately.

**suspend**
Suspend the application program.

**returnCondition**
Do not suspend the application program, but raise the NOSPACE condition instead.

# Chapter 52. IccTempStoreId class

**IccBase**
  **IccResourceId**
    **IccTempStoreId**

**IccTempStoreId** class is used to identify a temporary storage name in the CICS system. This is an entry in the TST (temporary storage table).

**Header file:** `ICCRIDEH`

## IccTempStoreId constructors

### Constructor (1)

**IccTempStoreId(const char*** *name***)**

*name*
The 8-character name of the temporary storage entry.

### Constructor (2)

**IccTempStoreId(const IccTempStoreId&** *id***)**

*id* A reference to an **IccTempStoreId** object.
The copy constructor.

## Public methods

### operator= (1)

**IccTempStoreId& operator=(const char*** *name***)**

*name*
The 8-character name of the temporary storage entry.

### operator= (2)

**IccTempStoreId& operator=(const IccTempStoreId&** *id***)**

*id* A reference to an **IccTempStoreId** object.
Assigns a new value.

## Inherited public methods

| Method | Class |
|---|---|
| classType | IccBase |
| className | IccBase |
| customClassNum | IccBase |
| name | IccResourceId |
| nameLength | IccResourceId |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| operator= | IccResourceId |
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 53. IccTermId class

**IccBase**
  **IccResourceId**
    **IccTermId**

**IccTermId** class is used to identify a terminal name in the CICS system. This is an entry in the TCT (terminal control table).

**Header file:** `ICCRIDEH`

## IccTermId constructors

### Constructor (1)

**IccTermId(const char*** *name***)**

*name*
  The 4-character name of the terminal

### Constructor (2)

**IccTermId(const IccTermId&** *id***)**

*id* A reference to an **IccTermId** object.
The copy constructor.

## Public methods

### operator= (1)

**IccTermId& operator=(const char*** *name***)**

*name*
The 4-character name of the terminal

### operator= (2)

**IccTermId& operator=(const IccTermId&** *id***)**

*id* A reference to an **IccTermId** object.
Assigns a new value.

## Inherited public methods

| Method | Class |
|---|---|
| classType | IccBase |
| className | IccBase |
| customClassNum | IccBase |
| name | IccResourceId |
| nameLength | IccResourceId |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| operator= | IccResourceId |
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 54. IccTerminal class

**IccBase**
  **IccResource**
    **IccTerminal**

This is a singleton class that represents the terminal that belongs to the CICS task. It can only be created if the transaction has a 3270 terminal as its principal facility, otherwise an exception is thrown.

**Header file:** `ICCTRMEH`

**Sample:** `ICC$TRM`

## IccTerminal constructor (protected)

### Constructor

**IccTerminal()**

## Public methods

**The opt parameter**
Many methods have the same parameter, *opt*, which is described under the **abendCode** method in"abendCode" on page 78.

### AID

**AIDVal AID()**

Returns an enumeration, defined in this class, that indicates which AID (action identifier) key was last pressed at this terminal.

### clear

**virtual void clear()**

A synonym for **erase**. See "Polymorphic Behavior" on page 55 for information on polymorphism.

### cursor

**unsigned short cursor()**

Returns the current cursor position as an offset from the top left corner of the screen.

### data

**IccTerminalData* data()**

Returns a pointer to an **IccTerminalData** object that contains information about the characteristics of the terminal. The object is created if it does not already exist.

### erase

**void erase()**

Erase all the data displayed at the terminal.

#### Conditions
INVREQ, INVPARTN

### freeKeyboard

**void freeKeyboard()**

Frees the keyboard so that the terminal can accept input.

#### Conditions
INVREQ, INVPARTN

## get

**virtual const IccBuf& get()**

A synonym for **receive**. See "Polymorphic Behavior" on page 55 for information on polymorphism.

## height

**unsigned short height(Icc::getopt** *opt* **= Icc::object)**

Returns how many lines the screen holds.

### Conditions

INVREQ

## inputCursor

**unsigned short inputCursor()**

Returns the position of the cursor on the screen.

## instance

**static IccTerminal* instance()**

Returns a pointer to the single **IccTerminal** object. The object is created if it does not already exist.

## line

**unsigned short line()**

Returns the current line number of the cursor from the top of the screen.

## netName

**const char* netName()**

Returns the 8-byte string representing the network logical unit name of the principal facility.

## operator<< (1)

Sets the foreground color for data subsequently sent to the terminal.
**IccTerminal& operator << (Color** *color***)**

## operator<< (2)

Sets the highlighting used for data subsequently sent to the terminal.
**IccTerminal& operator << (Highlight** *highlight***)**

## operator<< (3)

Writes another buffer.
**IccTerminal& operator << (const IccBuf&** *buffer***)**

### operator<< (4)

Writes a character.

**IccTerminal& operator << (char** *ch***)**

### operator<< (5)

Writes a character.

**IccTerminal& operator << (signed char** *ch***)**

### operator<< (6)

Writes a character.

**IccTerminal& operator << (unsigned char** *ch***)**

### operator<< (7)

Writes a string.

**IccTerminal& operator << (const char*** *text***)**

### operator<< (8)

Writes a string.

**IccTerminal& operator << (const signed char*** *text***)**

### operator<< (9)

Writes a string.

**IccTerminal& operator << (const unsigned char*** *text***)**

### operator<< (10)

Writes a short.

**IccTerminal& operator << (short** *num***)**

### operator<< (11)

Writes an unsigned short.

**IccTerminal& operator << (unsigned short** *num***)**

### operator<< (12)

Writes a long.

**IccTerminal& operator << (long** *num***)**

### operator<< (13)

Writes an unsigned long.

**IccTerminal& operator << (unsigned long** *num***)**

### operator<< (14)

Writes an integer.

**IccTerminal& operator << (int** *num***)**

### operator<< (15)

Writes a float.

**IccTerminal& operator << (float** *num***)**

### operator<< (16)

Writes a double.

**IccTerminal& operator << (double** *num***)**

## operator<< (17)

Writes a long double.
**IccTerminal& operator << (long double** *num***)**

## operator<< (18)

**IccTerminal& operator << (IccTerminal& (*f)(IccTerminal&))**

Enables the following syntax:

```
Term << "Hello World" << endl;
Term << "Hello again" << flush;
```

## put

**virtual void put(const IccBuf&** *buf***)**

A synonym for **sendLine**. See “Polymorphic Behavior” on page 55 for information on polymorphism.

## receive

**const IccBuf& receive(Case** *caseOpt* **=** upper**)**

*caseOpt*
: An enumeration, defined in this class, that indicates whether text is to be converted to upper case or left as it is.

Receives data from the terminal

### Conditions

EOC, INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

## receive3270Data

**const IccBuf& receive3270Data(Case** *caseOpt* **=** upper**)**

*caseOpt*
: An enumeration, defined in this class, that indicates whether text is to be converted to upper case or left as it is.

Receives the 3270 data buffer from the terminal

### Conditions

INVREQ, LENGERR, TERMERR

## send (1)

**void send(const IccBuf&** *buffer***)**

*buffer*
: A reference to an **IccBuf** object that holds the data that is to be sent.

## send (2)

**void send (const char*** *format***,**
**...)**

*format*
A format string, as in the **printf** standard library function.

**...** The optional arguments that accompany *format*.

## send (3)

**void send (unsigned short** *row***,**
**unsigned short** *col***,**
**const IccBuf&** *buffer***)**

*row*
The row where the writing of the data is started.

*col*
The column where the writing of the data is started.

*buffer*
A reference to an **IccBuf** object that holds the data that is to be sent.

## send (4)

**void send (unsigned short** *row***,**
**unsigned short** *col***,**
**const char*** *format***,**
**...)**

*row*
The row where the writing of the data is started.

*col*
The column where the writing of the data is started.

*format*
A format string, as in the **printf** standard library function.

**...** The optional arguments that accompany *format*.
Writes the specified data to either the current cursor position or to the cursor position specified by the arguments.

### Conditions
INVREQ, LENGERR, TERMERR

## send3270 (1)

**void send3270(const IccBuf&** *buffer***)**

*buffer*
A reference to an **IccBuf** object that holds the data that is to be sent.

## send3270 (2)

**void send3270 (const char*** *format***,**
**...)**

*format*
A format string, as in the **printf** standard library function

**...** The optional arguments that accompany *format*.

## send3270 (3)

**void send3270 (unsigned short** *col***,**
**const IccBuf&** *buf***)**

*col*
The column where the writing of the data is started

*buffer*
A reference to an **IccBuf** object that holds the data that is to be sent.

## send3270 (4)

**void send3270 (unsigned short** *col***,**
**const char*** *format***,**
**...)**

*col*
The column where the writing of the data is started

*format*
A format string, as in the **printf** standard library function

*...* The optional arguments that accompany *format*.

Writes the specified data to either the next line of the terminal or to the specified column of the current line.

### Conditions

INVREQ, LENGERR, TERMERR

## sendLine (1)

**void sendLine(const IccBuf&** *buffer***)**

*buffer*
A reference to an **IccBuf** object that holds the data that is to be sent.

## sendLine (2)

**void sendLine (const char*** *format***,**
**...)**

*format*
A format string, as in the **printf** standard library function

*...* The optional arguments that accompany *format*.

## sendLine (3)

**void sendLine (unsigned short** *col***,**
**const IccBuf&** *buf***)**

*col*
The column where the writing of the data is started

*buffer*
A reference to an **IccBuf** object that holds the data that is to be sent.

## sendLine (4)

**void sendLine (unsigned short** *col***,**
**const char*** *format***,**
**...)**

*col*
The column where the writing of the data is started

*format*
A format string, as in the **printf** standard library function

*...* The optional arguments that accompany *format*.

Writes the specified data to either the next line of the terminal or to the specified column of the current line.

### Conditions

INVREQ, LENGERR, TERMERR

## setColor

**void setColor(Color** *color***=defaultColor)**

*color*
An enumeration, defined in this class, that indicates the color of the text that is written to the screen.

Changes the color of the text subsequently sent to the terminal.

## setCursor (1)

**void setCursor(unsigned short** *offset***)**

*offset*
The position of the cursor where the top left corner is 0.

## setCursor (2)

**void setCursor (unsigned short** *row***,**
**unsigned short** *col***)**

*row*
The row number of the cursor where the top row is 1

*col*
The column number of the cursor where the left column is 1

Two different ways of setting the position of the cursor on the screen.

### Conditions

INVREQ, INVPARTN

## setHighlight

**void setHighlight(Highlight** *highlight* **= normal)**

*highlight*
An enumeration, defined in this class, that indicates the highlighting of the text that is written to the screen.

Changes the higlighting of the data subsequently sent to the terminal.

## setLine

**void setLine(unsigned short** *lineNum* **= 1)**

*lineNum*
: The line number, counting from the top.

Moves the cursor to the start of line *lineNum*, where 1 is the top line of the terminal. The default is to move the cursor to the start of line 1.

### Conditions

INVREQ, INVPARTN

## setNewLine

**void setNewLine(unsigned short** *numLines* **= 1)**

*numLines*
: The number of blank lines.

Requests that *numLines* blank lines be sent to the terminal.

### Conditions

INVREQ, INVPARTN

## setNextCommArea

**void setNextCommArea(const IccBuf&** *commArea***)**

*commArea*
: A reference to the buffer that is to be used as a COMMAREA.

Specifies the COMMAREA that is to be passed to the next transaction started on this terminal.

## setNextInputMessage

**void setNextInputMessage(const IccBuf&** *message***)**

*message*
: A reference to the buffer that holds the input message.

Specifies data that is to be made available, by the **receive** method, to the next transaction started at this terminal.

## setNextTransId

**void setNextTransId (const IccTransId&** *transid***,**
**NextTransIdOpt** *opt* **=** queue**)**

*transid*
: A reference to the **IccTransId** object that holds the name of a transaction

*opt*
: An enumeration, defined in this class, that indicates whether *transId* should be queued or started immediately (that is, it should be the very next transaction) at this terminal.

Specifies the next transaction that is to be started on this terminal.

## signoff

**void signoff()**

Signs off the user who is currently signed on. Authority reverts to the default user.

### Conditions

INVREQ

## signon (1)

```
void signon (const IccUserId& id,
             const char* password = 0,
             const char* newPassword = 0)
```

*id* A reference to an **IccUserId** object

*password*
The 8-character existing password.

*newPassword*
An optional 8-character new password.

## signon (2)

```
void signon (IccUser& user,
             const char* password = 0,
             const char* newPassword = 0)
```

*user*
A reference to an **IccUser** object

*password*
The 8-character existing password.

*newPassword*
An optional 8-character new password. This method differs from the first **signon** method in that the **IccUser** object is interrogated to discover **IccGroupId** and language information. The object is also updated with language and ESM return and response codes.

Signs the user on to the terminal.

### Conditions

INVREQ, NOTAUTH, USERIDERR

## waitForAID (1)

**AIDVal waitForAID()**

Waits for any input and returns an enumeration, defined in this class, that indicates which AID key is expected.

## waitForAID (2)

**void waitForAID(AIDVal** *aid***)**

*aid*

An enumeration, defined in this class, that indicates which AID key was last pressed.

Waits for the specified AID key to be pressed, before returning control. This method loops, receiving input from the terminal, until the correct AID key is pressed by the operator.

### Conditions

EOC, INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

## width

**unsigned short width(Icc::getopt** *opt* **=** Icc::object**)**

Returns the width of the screen in characters.

### Conditions

INVREQ

## workArea

**IccBuf& workArea()**

Returns a reference to the **IccBuf** object that holds the terminal work area.

## Inherited public methods

| **Method** | **Class** |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| classType | IccBase |
| className | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| id | IccResource |
| isEDFOn | IccResource |
| name | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |

## Inherited protected methods

| **Method** | **Class** |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

## Enumerations

### AIDVal

**ENTER**
**CLEAR**
**PA1 to PA3**
**PF1 to PF24**

### Case

**upper**
**mixed**

### Color

**defaultColor**
**blue**
**red**
**pink**
**green**
**cyan**
**yellow**
**neutral**

## Highlight

**defaultHighlight**
**blink**
**reverse**
**underscore**

## NextTransIdOpt

**queue**
Queue the transaction with any other outstanding starts queued on the terminal.

**immediate**
Start the transaction immediately, that is, before any other outstanding starts queued on the terminal.

# Chapter 55. IccTerminalData class

**IccBase**
  **IccResource**
    **IccTerminalData**

**IccTerminalData** is a singleton class owned by **IccTerminal** (see **data** on page 290 in **IccTerminal** class). **IccTerminalData** contains information about the terminal characteristics.

**Header file:** `ICCTMDEH`

**Sample:** `ICC$TRM`

## IccTerminalData constructor (protected)

### Constructor

**IccTerminalData()**

## Public methods

**The opt parameter**
Many methods have the same parameter, *opt*, which is described under the **abendCode** method in"abendCode" on page 78.

### alternateHeight

**unsigned short alternateHeight(Icc::GetOpt** *opt* **=** Icc::object**)**

*opt*
An enumeration that indicates whether the information in the object should be refreshed from CICS before being extracted. The default is not to refresh.

Returns the alternate height of the screen, in lines.

#### Conditions
INVREQ

### alternateWidth

**unsigned short alternateWidth(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns the alternate width of the screen, in characters.

#### Conditions
INVREQ

### defaultHeight

**unsigned short defaultHeight(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns the default height of the screen, in lines.

#### Conditions
INVREQ

### defaultWidth

**unsigned short defaultWidth(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns the default width of the screen, in characters.

#### Conditions
INVREQ

### graphicCharCodeSet

**unsigned short graphicCharCodeSet(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns the binary code page global identifier as a value in the range 1 to 65534, or 0 for a non-graphics terminal.

#### Conditions
INVREQ

## graphicCharSetId

**unsigned short graphicCharSetId(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns the graphic character set global identifier as a number in the range 1 to 65534, or 0 for a non-graphics terminal.

### Conditions
INVREQ

## isAPLKeyboard

**Icc::Bool isAPLKeyboard(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns a boolean that indicates whether the terminal has the APL keyboard feature.

### Conditions
INVREQ

## isAPLText

**Icc::Bool isAPLText(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns a boolean that indicates whether the terminal has the APL text feature.

### Conditions
INVREQ

## isBTrans

**Icc::Bool isBTrans(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns a boolean that indicates whether the terminal has the background transparency capability.

### Conditions
INVREQ

## isColor

**Icc::Bool isColor(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns a boolean that indicates whether the terminal has the extended color capability.

### Conditions
INVREQ

## isEWA

**Icc::Bool isEWA(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns a Boolean that indicates whether the terminal supports Erase Write Alternative.

#### Conditions
INVREQ

## isExtended3270

**Icc::Bool isExtended3270(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns a Boolean that indicates whether the terminal supports the 3270 extended data stream.

#### Conditions
INVREQ

## isFieldOutline

**Icc::Bool isFieldOutline(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns a boolean that indicates whether the terminal supports field outlining.

#### Conditions
INVREQ

## isGoodMorning

**Icc::Bool isGoodMorning(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns a boolean that indicates whether the terminal has a 'good morning' message.

#### Conditions
INVREQ

## isHighlight

**Icc::Bool isHighlight(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns a boolean that indicates whether the terminal has extended highlight capability.

#### Conditions
INVREQ

## isKatakana

**Icc::Bool isKatakana(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns a boolean that indicates whether the terminal supports Katakana.

#### Conditions
INVREQ

## isMSRControl

**Icc::Bool isMSRControl(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns a boolean that indicates whether the terminal supports magnetic slot reader control.

### Conditions
INVREQ

## isPS

**Icc::Bool isPS(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns a boolean that indicates whether the terminal supports programmed symbols.

### Conditions
INVREQ

## isSOSI

**Icc::Bool isSOSI(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns a boolean that indicates whether the terminal supports mixed EBCDIC/DBCS fields.

### Conditions
INVREQ

## isTextKeyboard

**Icc::Bool isTextKeyboard(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns a boolean that indicates whether the terminal supports TEXTKYBD.

### Conditions
INVREQ

## isTextPrint

**Icc::Bool isTextPrint(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns a boolean that indicates whether the terminal supports TEXTPRINT.

### Conditions
INVREQ

## isValidation

**Icc::Bool isValidation(Icc::GetOpt** *opt* **=** Icc::object**)**

Returns a boolean that indicates whether the terminal supports validation.

### Conditions
INVREQ

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| classType | IccBase |
| className | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| id | IccResource |
| isEDFOn | IccResource |
| name | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 56. IccTime class

**IccBase**
  **IccResource**
    **IccTime**

**IccTime** is used to contain time information and is the base class from which **IccAbsTime**, **IccTimeInterval**, and **IccTimeOfDay** classes are derived.

**Header file:** `ICCTIMEH`

## IccTime constructor (protected)

### Constructor

**IccTime (unsigned long** *hours* **= 0,**
    **unsigned long** *minutes* **= 0,**
    **unsigned long** *seconds* **= 0)**

*hours*
  The number of hours

*minutes*
  The number of minutes

*seconds*
  The number of seconds

## Public methods

### hours

**virtual unsigned long hours() const**

Returns the hours component of time—the value specified in the constructor.

### minutes

**virtual unsigned long minutes() const**

Returns the minutes component of time—the value specified in the constructor.

### seconds

**virtual unsigned long seconds() const**

Returns the seconds component of time—the value specified in the constructor.

### timeInHours

**virtual unsigned long timeInHours()**

Returns the time in hours.

### timeInMinutes

**virtual unsigned long timeInMinutes()**

Returns the time in minutes.

### timeInSeconds

**virtual unsigned long timeInSeconds()**

Returns the time in seconds.

### type

**Type type() const**

Returns an enumeration, defined in this class, that indicates what type of subclass of **IccTime** this is.

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| className | IccBase |
| classType | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| isEDFOn | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

## Enumerations

### Type

**absTime**
The object is of **IccAbsTime** class. It is used to represent a current date and time as the number of milliseconds that have elapsed since the beginning of the year 1900.

**timeInterval**
The object is of **IccTimeInterval** class. It is used to represent a length of time, such as 5 minutes.

**timeOfDay**
The object is of **IccTimeOfDay** class. It is used to represent a particular time of day, such as midnight.

# Chapter 57. IccTimeInterval class

**IccBase**
    **IccResource**
        **IccTime**
            **IccTimeInterval**

This class holds information about a time interval.

**Header file:** `ICCTIMEH`

## IccTimeInterval constructors

### Constructor (1)

**IccTimeInterval (unsigned long** *hours* **= 0,**
**unsigned long** *minutes* **= 0,**
**unsigned long** *seconds* **= 0)**

*hours*
The initial hours setting. The default is 0.

*minutes*
The initial minutes setting. The default is 0.

*seconds*
The initial seconds setting. The default is 0.

### Constructor (2)

**IccTimeInterval(const IccTimeInterval&** *time***)**

The copy constructor.

## Public methods

### operator=

**IccTimeInterval& operator=(const IccTimeInterval&** *timeInterval***)**

Assigns one **IccTimeInterval** object to another.

### set

```
void set (unsigned long hours,
          unsigned long minutes,
          unsigned long seconds)
```

*hours*
The new hours setting

*minutes*
The new minutes setting

*seconds*
The new seconds setting

Changes the time held in the **IccTimeInterval** object.

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| classType | IccBase |
| className | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| hours | IccTime |
| isEDFOn | IccResource |
| minutes | IccTime |
| operator delete | IccBase |
| operator new | IccBase |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |
| timeInHours | IccTime |
| timeInMinutes | IccTime |
| timeInSeconds | IccTime |
| type | IccTime |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 58. IccTimeOfDay class

**IccBase**
  **IccResource**
    **IccTime**
      **IccTimeOfDay**

This class holds information about the time of day.

**Header file:** `ICCTIMEH`

## IccTimeOfDay constructors

### Constructor (1)

**IccTimeOfDay (unsigned long** *hours* **= 0,**
**unsigned long** *minutes* **= 0,**
**unsigned long** *seconds* **= 0)**

*hours*
  The initial hours setting. The default is 0.

*minutes*
  The initial minutes setting. The default is 0.

*seconds*
  The initial seconds setting. The default is 0.

### Constructor (2)

**IccTimeOfDay(const IccTimeOfDay&** *time***)**

The copy constructor

## Public methods

### operator=

**IccTimeOfDay& operator=(const IccTimeOfDay&** *timeOfDay***)**

Assigns one **IccTimeOfDay** object to another.

### set

**void set (unsigned long** *hours***,**
**unsigned long** *minutes***,**
**unsigned long** *seconds***)**

*hours*
The new hours setting

*minutes*
The new minutes setting

*seconds*
The new seconds setting

Changes the time held in the **IccTimeOfDay** object.

## Inherited public methods

| **Method** | **Class** |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| classType | IccBase |
| className | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| hours | IccTime |
| isEDFOn | IccResource |
| minutes | IccTime |
| operator delete | IccBase |
| operator new | IccBase |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |
| timeInHours | IccTime |
| timeInMinutes | IccTime |
| timeInSeconds | IccTime |
| type | IccTime |

## Inherited protected methods

| **Method** | **Class** |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 59. IccTPNameId class

**IccBase**
  **IccResourceId**
    **IccTPNameId**

**IccTPNameId** class holds a 1-64 byte TP partner name.

**Header file:** `ICCRIDEH`

## IccTPNameId constructors

### Constructor (1)

**IccTPNameId(const char*** *name***)**

*name*
  The 1- to 64-character TP name.

### Constructor (2)

**IccTPNameId(const IccTPNameId&** *id***)**

*id* A reference to an **IccTPNameId** object.
The copy constructor.

## Public methods

### operator= (1)

**IccTPNameId& operator=(const char*** *name***)**

*name*
The 1- to 64-character TP name.

### operator= (2)

**IccTPNameId& operator=(const IccTPNameId&** *id***)**

*id* A reference to an **IccTPNameId** object.
Assigns a new value.

## Inherited public methods

| Method | Class |
|---|---|
| classType | IccBase |
| className | IccBase |
| customClassNum | IccBase |
| name | IccResourceId |
| nameLength | IccResourceId |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| operator= | IccResourceId |
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 60. IccTransId class

**IccBase**
    **IccResourceId**
        **IccTransId**

**IccTransId** class identifies a transaction name in the CICS system. This is an entry in the PCT (Program Control Table).

**Header file:** `ICCRIDEH`

## IccTransId constructors

### Constructor (1)

**IccTransId(const char*** *name***)**

*name*
    The 4-character transaction name.

### Constructor (2)

**IccTransId(const IccTransId&** *id***)**

*id* A reference to an **IccTransId** object.
The copy constructor.

## Public methods

### operator= (1)

**IccTransId& operator=(const char*** *name***)**

*name*
The 4-character transaction name.

### operator= (2)

**IccTransId& operator=(const IccTransId&** *id***)**

*id* A reference to an **IccTransId** object.
Assigns a new value.

## Inherited public methods

| Method | Class |
|---|---|
| classType | IccBase |
| className | IccBase |
| customClassNum | IccBase |
| name | IccResourceId |
| nameLength | IccResourceId |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| Method | Class |
|---|---|
| operator= | IccResourceId |
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 61. IccUser class

**IccBase**
 **IccResource**
  **IccUser**

This class represents a CICS user.

**Header file:** `ICCUSREH`

**Sample:** `ICC$USR`

## IccUser constructors

### Constructor (1)

**IccUser (const IccUserId&** *id***,**
  **const IccGroupId*** *gid* **= 0)**

*id* A reference to an **IccUserId** object that contains the user ID name

*gid*
An optional pointer to an **IccGroupId** object that contains information about the user's group ID.

### Constructor (2)

**IccUser (const char*** *userName***,**
  **const char*** *groupName* **= 0)**

*userName*
The 8-character user ID

*gid*
The optional 8-character group ID.

## Public methods

### changePassword

**void changePassword (const char*** *password***,**
**const char*** *newPassword***)**

*password*
The user's existing password—a string of up to 8 characters

*newPassword*
The user's new password—a string of up to 8 characters.

Attempts to change the user’s password.

#### Conditions

INVREQ, NOTAUTH, USERIDERR

### daysUntilPasswordExpires

**unsigned short daysUntilPasswordExpires() const**

Returns the number of days before the password expires. This method is valid after a successful **verifyPassword** method call in this class.

### ESMReason

**unsigned long ESMReason() const**

Returns the external security reason code of interest if a **changePassword** or **verifyPassword** method call is unsuccessful.

### ESMResponse

**unsigned long ESMResponse() const**

Returns the external security response code of interest if a **changePassword** or **verifyPassword** method call is unsuccessful.

### groupId

**const IccGroupId& groupId() const**

Returns a reference to the **IccGroupId** object that holds information on the user's group ID.

### invalidPasswordAttempts

**unsigned long invalidPasswordAttempts() const**

Returns the number of times the wrong password has been entered for this user since the last successful signon. This method should only be used after a successful **verifyPassword** method.

### language

**const char* language() const**

Returns the user’s language after a successful call to **signon** in **IccTerminal**.

## lastPasswordChange

**const IccAbsTime& lastPasswordChange() const**

Returns a reference to an **IccAbsTime** object that holds the time when the password was last changed. This method should only be used after a successful **verifyPassword** method.

## lastUseTime

**const IccAbsTime& lastUseTime() const**

Returns a reference to an **IccAbsTime** object that holds the time when the user ID was last used. This method should only be used after a successful **verifyPassword** method.

## passwordExpiration

**const IccAbsTime& passwordExpiration() const**

Returns a reference to an **IccAbsTime** object that holds the time when the password will expire. This method should only be used after a successful **verifyPassword** method.

## setLanguage

**void setLanguage(const char*** *language***)**

Sets the IBM-defined national language code that is to be associated with this user. This should be a three character value.

## verifyPassword

**void verifyPassword(const char*** *password***)**

Checks that the supplied password matches the password recorded by the external security manager for this **IccUser**.

### Conditions

INVREQ, NOTAUTH, USERIDERR

## Inherited public methods

| Method | Class |
|---|---|
| actionOnCondition | IccResource |
| actionOnConditionAsChar | IccResource |
| actionsOnConditionsText | IccResource |
| classType | IccBase |
| className | IccBase |
| condition | IccResource |
| conditionText | IccResource |
| customClassNum | IccBase |
| handleEvent | IccResource |
| id | IccResource |
| isEDFOn | IccResource |
| name | IccResource |
| operator delete | IccBase |
| operator new | IccBase |
| setActionOnAnyCondition | IccResource |
| setActionOnCondition | IccResource |
| setActionsOnConditions | IccResource |
| setEDF | IccResource |

## Inherited protected methods

| Method | Class |
|---|---|
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 62. IccUserId class

**IccBase**
  **IccResourceId**
    **IccUserId**

**IccUserId** class represents an 8-character user name.

**Header file:** `ICCRIDEH`

## IccUserId constructors

### Constructor (1)

**IccUserId(const char*** *name***)**

*name*
  The 8-character name of the user ID.

### Constructor (2)

**IccUserId(const IccUserId&** *id***)**

*id* A reference to an **IccUserId** object.
The copy constructor.

## Public methods

### operator= (1)

**IccUserId& operator=(const char*** *name***)**

*name*
The 8-character name of the user ID.

### operator= (2)

**IccUserId& operator=(const IccUserId&** *id***)**

*id* A reference to an **IccUserId** object.
Assigns a new value.

## Inherited public methods

| **Method** | **Class** |
|---|---|
| classType | IccBase |
| className | IccBase |
| customClassNum | IccBase |
| name | IccResourceId |
| nameLength | IccResourceId |
| operator delete | IccBase |
| operator new | IccBase |

## Inherited protected methods

| **Method** | **Class** |
|---|---|
| operator= | IccResourceId |
| setClassName | IccBase |
| setCustomClassNum | IccBase |

# Chapter 63. IccValue structure

This structure contains CICS-value data areas (CVDAs) as an enumeration.

**Header file:** `ICCVALEH`

## Enumeration

### CVDA

Valid CVDAs are:

| | | | |
|---|---|---|---|
| ACQFAIL | ACQUIRED | ACQUIRING | ACTIVE |
| ADD | ADDABLE | ADDFAIL | ADVANCE |
| ALARM | ALLCONN | ALLOCATED | ALLQUERY |
| ALTERABLE | ALTERNATE | ALTPRTCOPY | ANY |
| APLKYBD | APLTEXT | APPC | APPCPARALLEL |
| APPCSINGLE | APPLICATION | ASACTL | ASCII7 |
| ASCII8 | ASSEMBLER | ATI | ATTENTION |
| AUDALARM | AUTOACTIVE | AUTOARCH | AUTOCONN |
| AUTOINACTIVE | AUTOPAGEABLE | AUTOSTART | AUXILIARY |
| AUXPAUSE | AUXSTART | AUXSTOP | AVAILABLE |
| BACKOUT | BACKTRANS | BACKUPNONBWO | BASE |
| BASESPACE | BATCHLU | BDAM | BEGINSESSION |
| BELOW | BGAM | BIPROG | BISYNCH |
| BLK | BLOCKED | BROWSABLE | BSAM |
| BTAM | BUSY | C | CACHE |
| CANCEL | CANCELLED | CD | CDRDLPRT |
| CEDF | CICS | CICSDATAKEY | CICSEXECKEY |
| CICSSECURITY | CICSTABLE | CLEAR | CLOSED |
| CLOSEFAILED | CLOSELEAVE | CLOSEREQUEST | CLOSING |
| CMDPROT | CMDSECEXT | CMDSECNO | CMDSECYES |
| COBOL | COBOLII | COLDACQ | COLDQUERY |
| COLDSTART | COLOR | COMMIT | COMMITFAIL |
| CONFFREE | CONFRECEIVE | CONFSEND | CONNECTED |
| CONNECTION | CONSISTENT | CONSOLE | CONTNLU |
| CONTROLSHUT | CONVERSE | CONVIDLE | COORDINATOR |
| COPY | CREATE | CRITICAL | CTLGALL |
| CTLGMODIFY | CTLGNONE | CTRLABLE | CURRENT |
| DAE | DATA | DATASET | DATASETFULL |
| DATASTREAM | DB2® | DEADLOCK | DEC |
| DEFAULT | DEFRESP1 | DEFRESP1OR2 | DEFRESP2 |
| DEFRESP3 | DELAY | DELETABLE | DELETEFAIL |
| DELEXITERROR | DEREGERROR | DEREGISTERED | DEST |
| DISABLED | DISABLING | DISCARDFAIL | DISCREQ |
| DISK1 | DISK2 | DISK2PAUSE | DISPATCHABLE |
| DPLSUBSET | DS3270 | DUALCASE | DUMMY |
| DYNAMIC | EB | EMERGENCY | EMPTY |
| EMPTYREQ | ENABLED | ENDAFFINITY | ESDS |
| EVENT | EVENTUAL | EXCEPT | EXCEPTRESP |
| EXCI | EXCTL | EXECENQ | EXECENQADDR |
| EXITTRACE | EXTENDEDDS | EXTRA | EXTSECURITY |
| FAILED | FAILEDBKOUT | FAILINGBKOUT | FCLOSE |

| | | | |
|---|---|---|---|
| FILE | FINALQUIESCE | FINPUT | FIRSTINIT |
| FIRSTQUIESCE | FIXED | FLUSH | FMH |
| FMHPARM | FOPEN | FORCE | FORCECANCEL |
| FORCECLOSE | FORCECLOSING | FORCEPURGE | FORCEUOW |
| FORMATEDF | FORMATTED | FORMFEED | FOUTPUT |
| FREE | FREEING | FULL | FULLAPI |
| FWDRECOVABLE | GENERIC | GMT | GOINGOUT |
| GTFSTART | GTFSTOP | HARDCOPY | HEURBACKOUT |
| HEURCOMMIT | HEX | HFORM | HILIGHT |
| HOLD | IGNORE | IGNORERR | IMMCLOSE |
| IMMCLOSING | IMMEDIATE | IMMQUIESCED | INACTIVE |
| INBOUND | INDEXRECFULL | INDIRECT | INDOUBT |
| INFLIGHT | INITCOMPLETE | INOUT | INPUT |
| INSERVICE | INSTALLED | INSTALLFAIL | INTACTLU |
| INTRA | INTSTART | INTSTOP | INVALID |
| IOERROR | IRC | ISCMMCONV | ISOLATE |
| KATAKANA | KEYED | KSDS | LE370 |
| LEAVE | LIC | LIGHTPEN | LOCAL |
| LOG | LOGICAL | LOGTERM | LOSE |
| LPA | LU61 | LUCMODGRP | LUCSESS |
| LUP | LUSTAT | LUTYPE4 | LUTYPE6 |
| LUW | MAGTAPE | MAIN | MAP |
| MAPSET | MCHCTL | MDT | MOD |
| MODE24 | MODE31 | MODEANY | MODEL |
| MORE | MSRCONTROL | MVS | NEGATIVE |
| NEW | NEWCOPY | NEWSESSION | NOALARM |
| NOALTPRTCOPY | NOAPLKYBD | NOAPLTEXT | NOATI |
| NOAUDALARM | NOAUTOARCH | NOBACKOUT | NOBACKTRANS |
| NOCEDF | NOCLEAR | NOCMDPROT | NOCOLOR |
| NOCONV | NOCONVERSE | NOCOPY | NOCREATE |
| NOCTL | NODAE | NODISCREQ | NODUALCASE |
| NOEMPTYREQ | NOEVENT | NOEXCEPT | NOEXCTL |
| NOEXITTRACE | NOEXTENDEDDS | NOFMH | NOFMHPARM |
| NOFORMATEDF | NOFORMFEED | NOHFORM | NOHILIGHT |
| NOHOLD | NOISOLATE | NOKATAKANA | NOLIGHTPEN |
| NOLOG | NOLOSTLOCKS | NOMDT | NOMSGJRNL |
| NOMSRCONTROL | NONAUTOCONN | NONCICS | NONE |
| NOOBFORMAT | NOOBOPERID | NOOUTLINE | NOPARTITIONS |
| NOPERF | NOPRESETSEC | NOPRINTADAPT | NOPROGSYMBOL |
| NOPRTCOPY | NOQUERY | NORECOVDATA | NOREENTPROT |
| NORELREQ | NORETAINED | NORMALBKOUT | NORMALRESP |
| NOSECURITY | NOSHUTDOWN | NOSOSI | NOSPI |
| NOSTSN | NOSWITCH | NOSYNCPOINT | NOSYSDUMP |
| NOSYSLOG | NOTADDABLE | NOTALTERABLE | NOTAPPLIC |
| NOTASKSTART | NOTBROWSABLE | NOTBUSY | NOTCDEB |
| NOTCONNECTED | NOTCTRLABLE | NOTDEFINED | NOTDELETABLE |
| NOTEMPTY | NOTERMINAL | NOTEXTKYBD | NOTEXTPRINT |
| NOTFWDRCVBLE | NOTINBOUND | NOTINIT | NOTINSTALLED |
| NOTKEYED | NOTLPA | NOTPENDING | NOTPURGEABLE |
| NOTRANDUMP | NOTREADABLE | NOTREADY | NOTRECOVABLE |
| NOTREQUIRED | NOTRLS | NOTSOS | NOTSUPPORTED |
| NOTTABLE | NOTTI | NOTUPDATABLE | NOUCTRAN |
| NOVALIDATION | NOVFORM | NOWAIT | NOWRITE |
| NOZCPTRACE | OBFORMAT | OBOPERID | OBTAINING |
| OFF | OK | OLD | OLDCOPY |

| | | | |
|---|---|---|---|
| OLDSESSION | ON | OPEN | OPENERROR |
| OPENING | OPENINPUT | OPENOUTPUT | OUTLINE |
| OUTPUT | OUTSERVICE | OWNER | PAGEABLE |
| PARTITIONS | PARTITIONSET | PATH | PENDBEGIN |
| PENDDATA | PENDFREE | PENDING | PENDPASS |
| PENDRECEIVE | PENDRELEASE | PENDSTART | PENDSTSN |
| PENDUNSOL | PERF | PHASEIN | PHYSICAL |
| PL1 | PLI | POSITIVE | POST |
| PRESETSEC | PRIMARY | PRINTADAPT | PRIVATE |
| PROFILE | PROGRAM | PROGSYMBOL | PROTECTED |
| PRTCOPY | PURGE | PURGEABLE | QUEUE |
| QUIESCED | QUIESCING | READABLE | READBACK |
| READONLY | READY | RECEIVE | RECOVDATA |
| RECOVERABLE | RECOVERED | RECOVERLOCKS | REENTPROT |
| REGERROR | REGISTERED | REJECT | RELATED |
| RELEASE | RELEASED | RELEASING | RELREQ |
| REMLOSTLOCKS | REMOTE | REMOVE | REMSESSION |
| REPEATABLE | REQUIRED | REREAD | RESET |
| RESETLOCKS | RESSECEXT | RESSECNO | RESSECYES |
| RESSYS | RESYNC | RETAINED | RETRY |
| REVERTED | RLS | RLSACTIVE | RLSGONE |
| RLSINACTIVE | RLSSERVER | RMI | ROLLBACK |
| ROUTE | RPG | RRDS | RTR |
| RU | RUNNING | SCS | SDLC |
| SECONDINIT | SEND | SEQDISK | SESSION |
| SESSIONFAIL | SESSIONLOST | SETFAIL | SFS |
| SHARE | SHARED | SHUNTED | SHUTDISABLED |
| SHUTDOWN | SHUTENABLED | SIGNEDOFF | SIGNEDON |
| SINGLEOFF | SINGLEON | SKIP | SMF |
| SNA | SOS | SOSABOVE | SOSBELOW |
| SOSI | SPECIFIC | SPECTRACE | SPI |
| SPRSTRACE | STANDBY | STANTRACE | START |
| STARTED | STARTING | STARTUP | STATIC |
| STOPPED | STSN | STSNSET | STSNTEST |
| SUBORDINATE | SUBSPACE | SURROGATE | SUSPENDED |
| SWITCH | SWITCHALL | SWITCHING | SWITCHNEXT |
| SYNCFREE | SYNCPOINT | SYNCRECEIVE | SYNCSEND |
| SYS370 | SYS7BSCA | SYSDUMP | SYSLOG |
| SYSTEM3 | SYSTEM | SYSTEM7 | SYSTEMOFF |
| SYSTEMON | T1050 | T1053 | T2260L |
| T2260R | T2265 | T2740 | T2741BCD |
| T2741COR | T2770 | T2780 | T2980 |
| T3275R | T3277L | T3277R | T3278M2 |
| T3278M3 | T3278M4 | T3278M5 | T3279M2 |
| T3279M3 | T3279M4 | T3279M5 | T3284L |
| T3284R | T3286L | T3286R | T3600BI |
| T3601 | T3614 | T3650ATT | T3650PIPE |
| T3650USER | T3653HOST | T3735 | T3740 |
| T3780 | T3790 | T3790SCSP | T3790UP |
| T7770 | TAKEOVER | TAPE1 | TAPE2 |
| TASK | TASKSTART | TCAM | TCAMSNA |
| TCEXITALL | TCEXITALLOFF | TCEXITNONE | TCEXITSYSTEM |
| TCLASS | TCONSOLE | TDQ | TELETYPE |
| TERM | TERMINAL | TEXTKYBD | TEXTPRINT |
| THIRDINIT | TIME | TIMEOUT | TPS55M2 |

| | | | |
|---|---|---|---|
| TPS55M3 | TPS55M4 | TPS55M5 | TRANDUMP |
| TRANIDONLY | TSQ | TTCAM | TTI |
| TWX3335 | UCTRAN | UNAVAILABLE | UNBLOCKED |
| UNCOMMITTED | UNCONNECTED | UNDEFINED | UNDETERMINED |
| UNENABLED | UNENABLING | UNKNOWN | UNPROTECTED |
| UNQUIESCED | UNREGISTERED | UNSOLDATA | UOW |
| UPDATABLE | USER | USERDATAKEY | USEREXECKEY |
| USEROFF | USERON | USERTABLE | VALID |
| VALIDATION | VARIABLE | VFORM | VIDEOTERM |
| VRRDS | VSAM | VTAM® | WAIT |
| WAITCOMMIT | WAITER | WAITFORGET | WAITING |
| WAITRMI | WARMSTART | WIN | XCF |
| XM | XNOTDONE | XOK | ZCPTRACE |

# Chapter 64. main function

You are recommended to include this code in your application. It initializes the CICS Foundation Classes correctly, provides default exception handling, and releases allocated memory after it is finished. You may substitute your own variation of this **main** function, provided you know what you are doing, but this should rarely be necessary.

**Source file:** `ICCMAIN`

The stub has three functions:

1. It initializes the Foundation Classes environment. You can customize the way it does this by using `#defines` that control:
   - memory management (see page 57)
   - Family Subset enforcement (see page 75)
   - EDF enablement (see page 46)
2. It provides a default definition of a class **IccUserControl**, derived from **IccControl**, that includes a default constructor and **run** method.
3. It invokes the **run** method of the user's control object using a try-catch construct.

The functional part of the **main** code is shown below.

```
void main(void)                                                 1

{
    Icc::initializeEnvironment(ICC_CLASS_MEMORY_MGMT,           2

                               ICC_FAMILY_SUBSET,
                               ICC_EDF_BOOL);
    try                                                         3

    {
        ICC_USER_CONTROL control;                               4

        control.run();                                          5

    }
    catch(IccException& exc)                                    6

    {
        Icc::catchException(exc);                               7

    }
    catch(...)                                                  8

    {
        Icc::unknownException();                                9

    }
    Icc::returnToCICS();                                        10

}
```

**1** This is the main C++ entry point.

2 This call initializes the environment and is essential. The three parameters have previously been defined to the defaults for the platform.
3 Run the user's application code, using **try** and **catch**, in case the application code does not catch exceptions.
4 Create control object.
5 Invoke **run** method of control object (defined as pure virtual in **IccControl**.
6 Catch any **IccException** objects not caught by the application.
7 Call this function to abend task.
8 Catch any other exceptions not caught by application.
9 Call this function to abend task.
10 Return control to CICS.

# Part 4. Appendixes

# Appendix A. Mapping EXEC CICS calls to Foundation Class methods

The following table shows the correspondence between CICS calls made using the EXEC CICS API and the equivalent calls from the Foundation Classes.

| EXEC CICS | Class | Method |
|---|---|---|
| ABEND | IccTask | abend |
| ADDRESS COMMAREA | IccControl | commArea |
| ADDRESS CWA | IccSystem | workArea |
| ADDRESS EIB | No direct access to EIB: please use appropriate method on appropriate class. | |
| ADDRESS TCTUA | IccTerminal | workArea |
| ADDRESS TWA | IccTask | workArea |
| ALLOCATE | IccSession | allocate |
| ASKTIME | IccClock | update |
| ASSIGN ABCODE | IccAbendData | abendCode |
| ASSIGN ABDUMP | IccAbendData | isDumpAvaliable |
| ASSIGN ABPROGRAM | IccAbendData | programName |
| ASSIGN ALTSCRNHT | IccTerminalData | alternateHeight |
| ASSIGN ALTSCRNWD | IccTerminalData | alternateWidth |
| ASSIGN APLKYBD | IccTerminalData | isAPLKeyboard |
| ASSIGN APLTEXT | IccTerminalData | isAPLText |
| ASSIGN ASRAINTRPT | IccAbendData | ASRAInterrupt |
| ASSIGN ASRAKEY | IccAbendData | ASRAKeyType |
| ASSIGN ASRAPSW | IccAbendData | ASRAPSW |
| ASSIGN ASRAREGS | IccAbendData | ASRARegisters |
| ASSIGN ASRASPC | IccAbendData | ASRASpaceType |
| ASSIGN ASRASTG | IccAbendData | ASRAStorageType |
| ASSIGN APPLID | IccSystem | applName |
| ASSIGN BTRANS | IccTerminalData | isBTrans |
| ASSIGN CMDSEC | IccTask | isCommandSecurityOn |
| ASSIGN COLOR | IccTerminalData | isColor |
| ASSIGN CWALENG | IccSystem | workArea |
| ASSIGN DEFSCRNHT | IccTerminalData | defaultHeight |
| ASSIGN DEFSCRNWD | IccTerminalData | defaultWidth |
| ASSIGN EWASUPP | IccTerminalData | isEWA |
| ASSIGN EXTDS | IccTerminalData | isExtended3270 |
| ASSIGN FACILITY | IccTerminal | name |
| ASSIGN FCI | IccTask | facilityType |
| ASSIGN GCHARS | IccTerminalData | graphicCharSetId |

## EXEC CICS to Foundation Class methods

| EXEC CICS | Class | Method |
|---|---|---|
| ASSIGN GCODES | IccTerminalData | graphicCharCodeSet |
| ASSIGN GMMI | IccTerminalData | isGoodMorning |
| ASSIGN HILIGHT | IccTerminalData | isHighlight |
| ASSIGN INITPARM | IccControl | initData |
| ASSIGN INITPARMLEN | IccControl | initData |
| ASSIGN INVOKINGPROG | IccControl | callingProgramId |
| ASSIGN KATAKANA | IccTerminalData | isKatakana |
| ASSIGN NETNAME | IccTerminal | netName |
| ASSIGN OUTLINE | IccTerminalData | isFieldOutline |
| ASSIGN ORGABCODE | IccAbendData | originalAbendCode |
| ASSIGN PRINSYSID | IccTask | principalSysId |
| ASSIGN PROGRAM | IccControl | programId |
| ASSIGN PS | IccTerminalData | isPS |
| ASSIGN QNAME | IccTask | triggerDataQueueId |
| ASSIGN RESSEC | IccTask | isResourceSecurityOn |
| ASSIGN RESTART | IccTask | isRestarted |
| ASSIGN SCRNHT | IccTerminal | height |
| ASSIGN SCRNWD | IccTerminal | width |
| ASSIGN SOSI | IccTerminalData | isSOSI |
| ASSIGN STARTCODE | IccTask | startType, isCommitSupported, isStartDataAvailable |
| ASSIGN SYSID | IccSystem | sysId |
| ASSIGN TASKPRIORITY | IccTask | priority |
| ASSIGN TCTUALENG | IccTerminal | workArea |
| ASSIGN TEXTKYBD | IccTerminalData | isTextKeyboard |
| ASSIGN TEXTPRINT | IccTerminalData | isTextPrint |
| ASSIGN TWALENG | IccTask | workArea |
| ASSIGN USERID | IccTask | userId |
| ASSIGN VALIDATION | IccTerminalData | isValidation |
| CANCEL | IccClock | cancelAlarm |
| CANCEL | IccStartRequestQ | cancel |
| CHANGE PASSWORD | IccUser | changePassword |
| CHANGE TASK | IccTask | setPriority |
| CONNECT PROCESS | IccSession | connectProcess |
| CONVERSE | IccSession | converse |
| DELAY | IccTask | delay |
| DELETE | IccFile | deleteRecord |
| DELETE | IccFile | deleteLockedRecord |
| DELETEQ TD | IccDataQueue | empty |
| DELETEQ TS | IccTempStore | empty |

| EXEC CICS | Class | Method |
|---|---|---|
| DEQ | IccSemaphore | unlock |
| DUMP TRANSACTION | IccTask | dump |
| DUMP TRANSACTION | IccTask | setDumpOpts |
| ENDBR | IccFileIterator | IccFileIterator (destructor) |
| ENQ | IccSemaphore | lock |
| ENQ | IccSemaphore | tryLock |
| ENTER TRACENUM | IccTask | enterTrace |
| EXTRACT ATTRIBUTES | IccSession | state, stateText |
| EXTRACT PROCESS | IccSession | extractProcess |
| FORMATTIME YYDDD, YYMMDD, etc | IccClock | date |
| FORMATTIME DATE | IccClock | date |
| FORMATTIME DATEFORM | IccSystem | dateFormat |
| FORMATTIME DAYCOUNT | IccClock | daysSince1900 |
| FORMATTIME DAYOFWEEK | IccClock | dayOfWeek |
| FORMATTIME DAYOFMONTH | IccClock | dayOfMonth |
| FORMATTIME MONTHOFYEAR | IccClock | monthOfYear |
| FORMATTIME TIME | IccClock | time |
| FORMATTIME YEAR | IccClock | year |
| FREE | IccSession | free |
| FREEMAIN | IccTask | freeStorage |
| GETMAIN | IccTask | getStorage |
| HANDLE ABEND | IccControl | setAbendHandler, cancelAbendHandler, resetAbendHandler |
| INQUIRE FILE ACCESSMETHOD | IccFile | accessMethod |
| INQUIRE FILE ADD | IccFile | isAddable |
| INQUIRE FILE BROWSE | IccFile | isBrowsable |
| INQUIRE FILE DELETE | IccFileControl | isDeletable |
| INQUIRE FILE EMPTYSTATUS | IccFile | isEmptyOn |
| INQUIRE FILE ENABLESTATUS | IccFile | enableStatus |
| INQUIRE FILE KEYPOSITION | IccFile | keyPosition |
| INQUIRE FILE OPENSTATUS | IccFile | openStatus |
| INQUIRE FILE READ | IccFile | isReadable |
| INQUIRE FILE RECORDFORMAT | IccFile | recordFormat |
| INQUIRE FILE RECORDSIZE | IccFile | recordLength |

## EXEC CICS to Foundation Class methods

| **EXEC CICS** | **Class** | **Method** |
|---|---|---|
| INQUIRE FILE RECOVSTATUS | IccFile | isRecoverable |
| INQUIRE FILE TYPE | IccFile | type |
| INQUIRE FILE UPDATE | IccFile | isUpdatable |
| ISSUE ABEND | IccSession | issueAbend |
| ISSUE CONFIRMATION | IccSession | issueConfirmation |
| ISSUE ERROR | IccSession | issueError |
| ISSUE PREPARE | IccSession | issuePrepare |
| ISSUE SIGNAL | IccSession | issueSignal |
| LINK | IccProgram | link |
| LINK INPUTMSG INPUTMSGLEN | IccProgram | setInputMessage |
| LOAD | IccProgram | load |
| POST | IccClock | setAlarm |
| READ | IccFile | readRecord |
| READNEXT | IccFileIterator | readNextRecord |
| READPREV | IccFileIterator | readPreviousRecord |
| READQ TD | IccDataQueue | readItem |
| READQ TS | IccTempStore | readItem |
| RECEIVE (APPC) | IccSession | receive |
| RECEIVE (3270) | IccTerminal | receive, receive3270Data |
| RELEASE | IccProgram | unload |
| RESETBR | IccFileIterator | reset |
| RETRIEVE | IccStartRequestQ | retrieveData [1] |
| **Note:** The **retrieveData** method gets the start information from CICS and stores it in the IccStartRequestQ object: the information can then be accessed using **data, queueName, returnTermId and returnTransId** methods. | | |
| RETRIEVE INTO, LENGTH | IccStartRequestQ | data |
| RETRIEVE QUEUE | IccStartRequestQ | queueName |
| RETRIEVE RTRANSID | IccStartRequestQ | returnTransId |
| RETRIEVE RTERMID | IccStartRequestQ | returnTermId |
| RETURN | IccControl | main [2] |
| **Note:** Returning (using C++ reserved word **return**) from method **run** in class **IccControl** results in an EXEC CICS RETURN. | | |
| RETURN TRANSID | IccTerminal | setNextTransId [3] |
| RETURN IMMEDIATE | IccTerminal | setNextTransId [3] |
| RETURN COMMAREA LENGTH | IccTerminal | setNextCommArea [3] |
| RETURN INPUTMSG, INPUTMSGLEN | IccTerminal | setNextInputMessage [3] |
| **Note:** Issue this call before returning from **IccControl::run**. | | |
| REWRITE | IccFile | rewriteRecord |
| SEND (APPC) | IccSession | send, sendInvite, sendLast |

| EXEC CICS | Class | Method |
|---|---|---|
| SEND (3270) | IccTerminal | send, sendLine |
| SEND CONTROL CURSOR | IccTerminal | setCursor setLine, setNewLine |
| SEND CONTROL ERASE | IccTerminal | erase |
| SEND CONTROL FREEKB | IccTerminal | freeKeyboard |
| SET FILE ADD \| BROWSE \| DELETE \| ... | IccFile | setAccess |
| SET FILE EMPTYSTATUS | IccFile | setEmptyOnOpen |
| SET FILE OPEN STATUS \| ENABLESTATUS | IccFile | setStatus |
| SIGNOFF | IccTerminal | signoff |
| SIGNON | IccTerminal | signon |
| START TRANSID AT/AFTER | IccStartRequestQ | start [4] |
| START TRANSID FROM LENGTH | IccStartRequestQ | setData, registerDataBuffer [4] |
| START TRANSID NOCHECK | IccStartRequestQ | setStartOpts [4] |
| START TRANSID PROTECT | IccStartRequestQ | setStartOpts [4] |
| START TRANSID QUEUE | IccStartRequestQ | setQueueName [4] |
| START TRANSID REQID | IccStartRequestQ | start [4] |
| START TRANSID TERMID | IccStartRequestQ | start [4] |
| START TRANSID USERID | IccStartRequestQ | start [4] |
| START TRANSID RTERMID | IccStartRequestQ | setReturnTermId [4] |
| START TRANSID RTRANSID | IccStartRequestQ | setReturnTransId [4] |

**Note:** Use methods **setData, setQueueName, setReturnTermId, setReturnTransId, setStartOpts** to set the state of the **IccStartRequestQ** object before issuing start requests with the **start** method.

| EXEC CICS | Class | Method |
|---|---|---|
| STARTBR | IccFileIterator | IccFileIterator (constructor) |
| SUSPEND | IccTask | suspend |
| SYNCPOINT | IccTask | commitUOW |
| SYNCPOINT ROLLBACK | IccTask | rollBackUOW |
| UNLOCK | IccFile | unlockRecord |
| VERIFY PASSWORD | IccUser | verifyPassword |
| WAIT CONVID | IccSession | flush |
| WAIT EVENT | IccTask | waitOnAlarm |
| WAIT EXTERNAL | IccTask | waitExternal |
| WAIT JOURNALNUM | IccJournal | wait |
| WRITE | IccFile | writeRecord |
| WRITE OPERATOR | IccConsole | write, writeAndGetReply |
| WRITEQ TD | IccDataQueue | writeItem |
| WRITEQ TS | IccTempStore | writeItem, rewriteItem |

# Appendix B. Mapping Foundation Class methods to EXEC CICS calls

The following table shows the correspondence between CICS calls made using the Foundation Classes and the equivalent EXEC CICS API calls.

| IccAbendData Class | |
|---|---|
| Method | EXEC CICS |
| abendCode | ASSIGN ABCODE |
| ASRAInterrupt | ASSIGN ASRAINTRPT |
| ASRAKeyType | ASSIGN ASRAKEY |
| ASRAPSW | ASSIGN ASRAPSW |
| ASRARegisters | ASSIGN ASRAREGS |
| ASRASpaceType | ASSIGN ASRASPC |
| ASRAStorageType | ASSIGN ASRASTG |
| isDumpAvailable | ASSIGN ABDUMP |
| originalAbendCode | ASSIGN ORGABCODE |
| programName | ASSIGN ABPROGRAM |
| IccAbsTime Class | |
| Method | EXEC CICS |
| date | FORMATTIME YYDDD/YYMMDD/etc. |
| dayOfMonth | FORMATTIME DAYOFMONTH |
| dayOfWeek | FORMATTIME DAYOFWEEK |
| daysSince1900 | FORMATTIME DAYCOUNT |
| monthOfYear | FORMATTIME MONTHOFYEAR |
| time | FORMATTIME TIME |
| year | FORMATTIME YEAR |
| IccClock Class | |
| Method | EXEC CICS |
| cancelAlarm | CANCEL |
| date | FORMATTIME YYDDD/YYMMDD/etc. |
| dayOfMonth | FORMATTIME DAYOFMONTH |
| dayOfWeek | FORMATTIME DAYOFWEEK |
| daysSince1900 | FORMATTIME DAYCOUNT |
| monthOfYear | FORMATTIME MONTHOFYEAR |
| setAlarm | POST |
| time | FORMATTIME TIME |
| update | ASKTIME |
| year | FORMATTIME YEAR |
| IccConsole Class | |
| Method | EXEC CICS |

| | |
|---|---|
| write | WRITE OPERATOR |
| writeAndGetReply | WRITE OPERATOR |
| IccControl Class | |
| Method | EXEC CICS |
| callingProgramId | ASSIGN INVOKINGPROG |
| cancelAbendHandler | HANDLE ABEND CANCEL |
| commArea | ADDRESS COMMAREA |
| initData | ASSIGN INITPARM & INITPARMLEN |
| programId | ASSIGN PROGRAM |
| resetAbendHandler | HANDLE ABEND RESET |
| setAbendHandler | HANDLE ABEND PROGRAM |
| IccDataQueue Class | |
| Method | EXEC CICS |
| empty | DELETEQ TD |
| readItem | READQ TD |
| writeItem | WRITEQ TD |
| IccFile Class | |
| Method | EXEC CICS |
| access | INQUIRE FILE ADD \| BROWSE \| DELETE \| READ \| UPDATE |
| accessMethod | INQUIRE FILE ACCESSMETHOD |
| deleteRecord | DELETE FILE RIDFLD |
| deleteLockedRecord | DELETE FILE |
| enableStatus | INQUIRE FILE ENABLESTATUS |
| isAddable | INQUIRE FILE ADD |
| isBrowsable | INQUIRE FILE BROWSE |
| isDeletable | INQUIRE FILE DELETE |
| isEmptyOnOpen | INQUIRE FILE EMPTYSTATUS |
| isReadable | INQUIRE FILE READ |
| isRecoverable | INQUIRE FILE RECOVSTATUS |
| isUpdatable | INQUIRE FILE UPDATE |
| keyPosition | INQUIRE FILE KEYPOSITION |
| openStatus | INQUIRE FILE OPENSTATUS |
| readRecord | READ FILE |
| recordFormat | INQUIRE FILE RECORDFORMAT |
| recordLength | INQUIRE FILE RECORDSIZE |
| rewriteRecord | REWRITE FILE |
| setAccess | SET FILE ADD BROWSE DELETE etc. |
| setEmptyOnOpen | SET FILE EMPTYSTATUS |
| setStatus | SET FILE OPENSTATUS ENABLESTATUS |
| type | INQUIRE FILE TYPE |
| unlockRecord | UNLOCK FILE |

| | |
|---|---|
| writeRecord | WRITE FILE |
| IccFileIterator Class | |
| Method | EXEC CICS |
| IccFileIterator (constructor) | STARTBR FILE |
| ~IccFileIterator (destructor) | ENDBR FILE |
| readNextRecord | READNEXT FILE |
| readPreviousRecord | READPREV FILE |
| reset | RESETBR FILE |
| IccJournal Class | |
| Method | EXEC CICS |
| wait | WAIT JOURNALNUM |
| writeRecord | WRITE JOURNALNUM |
| IccProgram Class | |
| Method | EXEC CICS |
| link | LINK PROGRAM |
| load | LOAD PROGRAM |
| unload | RELEASE PROGRAM |
| IccResource Class | |
| Method | EXEC CICS |
| condition | (RESP & RESP2) |
| setRouteOption | (SYSID) |
| IccSemaphore Class | |
| Method | EXEC CICS |
| lock | ENQ RESOURCE |
| tryLock | ENQ RESOURCE NOSUSPEND |
| unlock | DEQ RESOURCE |
| IccSession Class | |
| Method | EXEC CICS |
| allocate | ALLOCATE |
| connectProcess | CONNECT PROCESS CONVID |
| converse | CONVERSE CONVID |
| extractProcess | EXTRACT PROCESS CONVID |
| flush | WAIT CONVID |
| free | FREE CONVID |
| issueAbend | ISSUE ABEND CONVID |
| issueConfirmation | ISSUE CONFIRMATION CONVID |
| issueError | ISSUE ERROR CONVID |
| issuePrepare | ISSUE PREPARE CONVID |
| issueSignal | ISSUE SIGNAL CONVID |
| receive | RECEIVE CONVID |
| send | SEND CONVID |
| sendInvite | SEND CONVID INVITE |

| | |
|---|---|
| sendLast | SEND CONVID LAST |
| state | EXTRACT ATTRIBUTES |
| IccStartRequestQ Class | |
| Method | EXEC CICS |
| cancel | CANCEL |
| retrieveData | RETRIEVE |
| start | START TRANSID |
| IccSystem Class | |
| Method | EXEC CICS |
| applName | ASSIGN APPLID |
| beginBrowse | INQUIRE (FILE, TDQUEUE, etc) START |
| dateFormat | FORMATTIME DATEFORM |
| endBrowse | INQUIRE (FILE, TDQUEUE, etc) END |
| freeStorage | FREEMAIN |
| getFile | INQUIRE FILE |
| getNextFile | INQUIRE FILE NEXT |
| getStorage | GETMAIN SHARED |
| operatingSystem | INQUIRE SYSTEM OPSYS |
| operatingSystemLevel | INQUIRE SYSTEM OPREL |
| release | INQUIRE SYSTEM RELEASE |
| releaseText | INQUIRE SYSTEM RELEASE |
| sysId | ASSIGN SYSID |
| workArea | ADDRESS CWA |
| IccTask Class | |
| Method | EXEC CICS |
| abend | ABEND |
| commitUOW | SYNCPOINT |
| delay | DELAY |
| dump | DUMP TRANSACTION |
| enterTrace | ENTER TRACENUM |
| facilityType | ASSIGN STARTCODE, TERMCODE, PRINSYSID, FCI |
| freeStorage | FREEMAIN |
| isCommandSecurityOn | ASSIGN CMDSEC |
| isCommitSupported | ASSIGN STARTCODE |
| isResourceSecurityOn | ASSIGN RESSEC |
| isRestarted | ASSIGN RESTART |
| isStartDataAvailable | ASSIGN STARTCODE |
| principalSysId | ASSIGN PRINSYSID |
| priority | ASSIGN TASKPRIORITY |
| rollBackUOW | SYNCPOINT ROLLBACK |
| setPrioity | CHANGE TASK PRIORITY |
| startType | ASSIGN STARTCODE |

| | |
|---|---|
| suspend | SUSPEND |
| triggerDataQueueId | ASSIGN QNAME |
| userId | ASSIGN USERID |
| waitExternal | WAIT EXTERNAL / WAITCICS |
| waitOnAlarm | WAIT EVENT |
| workArea | ADDRESS TWA |
| IccTempStore Class | |
| Method | EXEC CICS |
| empty | DELETEQ TS |
| readItem | READQ TS ITEM |
| readNextItem | READQ TS NEXT |
| rewriteItem | WRITEQ TS ITEM REWRITE |
| writeItem | WRITEQ TS ITEM |
| IccTerminal Class | |
| Method | EXEC CICS |
| erase | SEND CONTROL ERASE |
| freeKeyboard | SEND CONTROL FREEKB |
| height | ASSIGN SCRNHT |
| netName | ASSIGN NETNAME |
| receive | RECEIVE |
| receive3270Data | RECEIVE BUFFER |
| send | SEND |
| sendLine | SEND |
| setCursor | SEND CONTROL CURSOR |
| setLine | SEND CONTROL CURSOR |
| setNewLine | SEND CONTROL CURSOR |
| signoff | SIGNOFF |
| signon | SIGNON |
| waitForAID | RECEIVE |
| width | ASSIGN SCRNWD |
| workArea | ADDRESS TCTUA |
| IccTerminalData Class | |
| Method | EXEC CICS |
| alternateHeight | ASSIGN ALTSCRNHT |
| alternateWidth | ASSIGN ALTSCRNWD |
| defaultHeight | ASSIGN DEFSCRNHT |
| defaultWidth | ASSIGN DEFSCRNWD |
| graphicCharSetId | ASSIGN GCHARS |
| graphicCharCodeSet | ASSIGN GCODES |
| isAPLKeyboard | ASSIGN APLKYBD |
| isAPLText | ASSIGN APLTEXT |
| isBTrans | ASSIGN BTRANS |

## Foundation Class methods to EXEC CICS

| | |
|---|---|
| isColor | ASSIGN COLOR |
| isEWA | ASSIGN ESASUPP |
| isExtended3270 | ASSIGN EXTDS |
| isGoodMorning | ASSIGN GMMI |
| isHighlight | ASSIGN HILIGHT |
| isKatakana | ASSIGN KATAKANA |
| isMSRControl | ASSIGN MSRCONTROL |
| isFieldOutline | ASSIGN OUTLINE |
| isPS | ASSIGN PS |
| isSOSI | ASSIGN SOSI |
| isTextKeyboard | ASSIGN TEXTKYBD |
| isTextPrint | ASSIGN TEXTPRINT |
| isValidation | ASSIGN VALIDATION |
| IccUser Class | |
| Method | EXEC CICS |
| changePassword | CHANGE PASSWORD |
| verifyPassword | VERIFY PASSWORD |

# Appendix C. Output from sample programs

This section shows the typical screen output from the supplied sample programs (see “Sample source code” on page 6).

## ICC$BUF (IBUF)

```
This is program 'icc$buf'...
IccBuf buf1                          dal= 0 dl= 0 E+I []
IccBuf buf2(50)                      dal=50 dl= 0 E+I []
IccBuf buf3(30,fixed)                dal=30 dl= 0 F+I []
IccBuf buf4(sizeof(AStruct),&aStruc) dal=24 dl=24 F+E [!Some text for aStruc]
IccBuf buf5("A String Literal")      dal=19 dl=19 E+I [Some data somewhere]
IccBuf buf6(buf5)                    dal=19 dl=19 E+I [Some data somewhere]
buf1 = "Some XXX data for buf1"      dal=22 dl=22 E+I [Some XXX data for buf1]
buf2.assign(strlen(data),data)       dal=50 dl=19 E+I [Some data somewhere]
buf1.cut(4,5)                        dal=22 dl=18 E+I [Some data for buf1]
buf5.insert(5,more,5)                dal=24 dl=24 E+I [Some more data somewhere]
buf5.replace(4,xtra,5)               dal=24 dl=24 E+I [Some xtra data somewhere]
buf2 << ".ext"                       dal=50 dl=23 E+I [Some data somewhere.ext]
buf3 = buf4                          dal=30 dl=24 F+I [!Some text for aStruc]
(buf3 == buf4) returns true (OK).
buf3 = "garbage"                     dal=30 dl= 7 F+I [garbage]
(buf3 != buf4) returns true (OK).
Program 'icc$buf' complete: Hit PF12 to End
```

## ICC$CLK (ICLK)

```
This is program 'icc$clk' ...
date() = [220296  ]
date(DDMMYY) = [220296  ]
date(DDMMYY,':') = [22:02:96]
date(MMDDYY) = [022296  ]
date(YYDDD) = [96053   ]
daysSince1900() = 35116
dayOfWeek() = 4                        Today is NOT Friday
dayOfMonth() = 22
monthOfYear() = 2
time() = [143832  ]
time('-') = [14-38-32]
year() = [1996]
Program 'icc$clk' complete: Hit PF12 to End
```

## ICC$DAT (IDAT)

```
This is program 'icc$dat'...
Writing records to 'ICCQ'...
 - writing record #1: 'Hello World - item 1' <NORMAL>
 - writing record #2: 'Hello World - item 2' <NORMAL>
 - writing record #3: 'Hello World - item 3' <NORMAL>
Reading records back in...
 - reading record #1: 'Hello World - item 1' <NORMAL>
 - reading record #2: 'Hello World - item 2' <NORMAL>
 - reading record #3: 'Hello World - item 3' <NORMAL>
Program 'icc$dat' complete: Hit PF12 to End
```

## ICC$EXC1 (IEX1)

```
This is program 'icc$exc1' ...
Number passed = 1
Number passed = 7
Number passed = 11
>>Out of Range - throwing exception
Exception caught: !!Number is out of range!!
Program 'icc$exc1' complete: Hit PF12 to End
```

## ICC$EXC2 (IEX2)

```
This is program 'icc$exc2'...
Creating IccTermId id1...
Creating IccTermId id2...
IccException: 112 IccTermId::IccTermId type=invalidArgument (IccMessage: 030 Ic
cTermId::IccTermId <Invalid string length passed to 'IccTermId' constructor.
Spec ified: 5, Maximum allowed: 4>)
Program 'icc$exc2' complete: Hit PF12 to End
```

## ICC$EXC3 (IEX3)

```
This is program 'icc$exc3'...
About to read Temporary Storage 'UNKNOWN!'...
IccException: 094 IccTempStore::readNextItem type=CICSCondition (IccMessage: 008
 IccTempStore::readNextItem <CICS returned the 'QIDERR' condition.>)
Program 'icc$exc3' complete: Hit PF12 to End
```

## ICC$FIL (IFIL)

```
This is program 'icc$fil'...
Deleting records in file 'ICCKFILE...
5 records were deleted.
Writing records to file 'ICCKFILE'...
- writing record number 1.    <NORMAL>
- writing record number 2.    <NORMAL>
- writing record number 3.    <NORMAL>
- writing record number 4.    <NORMAL>
- writing record number 5.    <NORMAL>
Browsing records...
 - record read: [BACH, J S      003  00-1234   BACH      ]
 - record read: [CHOPIN, F      004  00-3355   CHOPIN    ]
 - record read: [HANDEL, G F    005  00-4466   HANDEL    ]
 - record read: [BEETHOVEN, L   007  00-2244   BEET      ]
 - record read: [MOZART, W A    008  00-5577   WOLFGANG  ]
 - record read: [MOZART, W A    008  00-5577   WOLFGANG  ]
 - record read: [BEETHOVEN, L   007  00-2244   BEET      ]
 - record read: [HANDEL, G F    005  00-4466   HANDEL    ]
 - record read: [CHOPIN, F      004  00-3355   CHOPIN    ]
 - record read: [BACH, J S      003  00-1234   BACH      ]
Updating record 1...
readRecord(update)<NORMAL>    rewriteRecord()<NORMAL>
 - record read: [MOZART, W A    008  00-5678   WOLFGANG  ]
Program 'icc$fil' complete: Hit PF12 to End
```

## ICC$HEL (IHEL)

```
                                  Hello World
```

## ICC$JRN (IJRN)

```
This is program 'icc$jrn'...
Writing  3 records to  journal number 77...
 - writing record 1: [Hello World - item 1]      <NORMAL>
 - writing record 2: [Hello World - item 2]      <NORMAL>
 - writing record 3: [Hello World - item 3]      <NORMAL>
Program 'icc$jrn' complete: Hit PF12 to End
```

## ICC$PRG1 (IPR1)

### First Screen

```
This is program 'icc$prg1'...
Loaded program: ICC$PRG2  <NORMAL> Length=0 Address=ff000000
Unloading program: ICC$PRG2        <NORMAL>
 - Hit ENTER to continue...
```

### Second Screen

```
About to link to program 'ICC$PRG2 '
 - commArea before link is [DATA SET BY ICC$PRG1]
 - Hit ENTER to continue...
   This is program 'icc$prg2'...
   commArea received from caller =[DATA SET BY ICC$PRG1]
   Changed commArea to [DATA RETURNED BY ICC$PRG2]
   - Hit ENTER to return to caller...
 - link call returned <NORMAL>
 - commArea after link is [DATA RETURNED BY ICC$PRG2]
About to link to program 'ICC$PRG3 ' on system 'ICC2'
 - commArea before link is [DATA SET BY ICC$PRG1]
 - Hit ENTER to continue...
 - link call returned <NORMAL>
 - commArea after link is [DATA RETURNED BY ICC$PRG3]
Program 'icc$prg1' complete: Hit PF12 to End
```

## ICC$RES1 (IRE1)

```
This is program 'icc$res1'...
Writing items to CustomDataQueue 'ICCQ' ...
 - writing item #1: 'Hello World - item 1'  <NORMAL>
 - writing item #2: 'Hello World - item 2'  <NORMAL>
 - writing item #3: 'Hello World - item 3'  <NORMAL>
Reading items from CustomDataQueue 'ICCQ' ...
 - item = 'Hello World - item 1'
 - item = 'Hello World - item 2'
 - item = 'Hello World - item 3'
Reading loop complete.
> In handleEvent().
Summary=IccEvent: CustomDataQueue::readItem condition=23 (QZ ERO) minor=0
Program 'icc$res1' complete: Hit PF12 to End
```

## ICC$RES2 (IRE2)

```
This is program 'icc$res2'...
invoking clear() method for IccDataQueue object            <NORMAL>
invoking clear() method for IccTempStore object            <NORMAL>
put() item #1 in IccDataQueue object
put() item #2 in IccDataQueue object
put() item #3 in IccDataQueue object
put() item #1 in IccTempStore object
put() item #2 in IccTempStore object
put() item #3 in IccTempStore object
Now get items from IccDataQueue object
get() from IccDataQueue object returned 'Hello World - item 1'
get() from IccDataQueue object returned 'Hello World - item 2'
get() from IccDataQueue object returned 'Hello World - item 3'
Now get items from IccTempStore object
get() from IccTempStore object returned 'Hello World - item 1'
get() from IccTempStore object returned 'Hello World - item 2'
get() from IccTempStore object returned 'Hello World - item 3'
Program 'icc$res2' complete: Hit PF12 to End
```

## ICC$SEM (ISEM)

```
This is program 'icc$sem'...
Constructing IccSemaphore object (lock by value)...
Issuing lock request...     <NORMAL>
Issuing unlock request...   <NORMAL>
Constructing Semaphore object (lock by address)...
Issuing tryLock request...  <NORMAL>
Issuing unlock request...   <NORMAL>


Program 'icc$sem' complete: Hit PF12 to End
```

## ICC$SES1 (ISE1)

```
This is program 'icc$ses1'...
allocate session...                      <NORMAL>
STATE=81 ALLOCATED ERR=0 connectProcess...<NORMAL>
STATE=90 SEND ERR=0 sendInvite ...       <NORMAL>
STATE=87 PENDRECEIVE ERR=0 receive ...   <NORMAL>
STATE=85 FREE ERR=0  - data from back end=[Hi there this is from backEnd
TIME=14:49:18 on 22/02/96]
free...                                  <NORMAL>
STATE=1 NOTAPPLIC ERR=0

Program 'icc$ses1' complete: Hit PF12 to End
```

## ICC$SES2 (ISE2)

This screen is typical output after running ″CEBR DTPBKEND″ on the back-end CICS system:

```
 CEBR  TSQ DTPBKEND       SYSID ABCD REC     1 OF    11    COL     1 OF    78
 ENTER COMMAND ===>
     *************************  TOP OF QUEUE  *****************************
00001 Transaction 'ISE2' starting.
00002 extractProcess...
00003 <NORMAL> STATE=88 RECEIVE ERR=0
00004 process=[ISE2] syncLevel=1 PIP=[Hello World]
00005 receive...
00006 <NORMAL> STATE=90 SEND ERR=0 NoData=0
00007 data from front end=[Hi there this is from frontEnd TIME=16:03:18 on 04/0
00008 sendLast ...
00009 <NORMAL>        STATE=86 PENDFREE ERR=0
00010 free...
00011 <NORMAL>        STATE=1 NOTAPPLIC ERR=0
     ************************  BOTTOM OF QUEUE  ***************************
PF1 : HELP               PF2 : SWITCH HEX/CHAR     PF3 : TERMINATE BROWSE
PF4 : VIEW TOP           PF5 : VIEW BOTTOM         PF6 : REPEAT LAST FIND
PF7 : SCROLL BACK HALF   PF8 : SCROLL FORWARD HALF PF9 : VIEW RIGHT
PF10: SCROLL BACK FULL   PF11: SCROLL FORWARD FULL PF12: UNDEFINED
```

## ICC$SRQ1 (ISR1)

```
This is program 'icc$srq1'...
Starting Tran 'ISR2' on terminal 'PE12' after 5 seconds... - <NORMAL>
request='DF!U0000'
Issuing cancel for start request='DF!U0000'...             - <NORMAL>
request='DF!U0000'
Starting Tran 'ISR2' on terminal 'PE12' after 5 seconds... - <NORMAL>
request='REQUEST1'
Program 'icc$srq1' complete.
```

## ICC$SRQ2 (ISR2)

```
This is program 'icc$srq2'...
retrieveData()...                                        <NORMAL>
Start buffer contents = [This is a greeting from program 'icc$srq1'!!]
Start queue= [startqnm]
Start rtrn = [ITMP]
Start rtrm = [PE11]
Sleeping for 5 seconds...
Starting tran 'ITMP' on terminal 'PE11' on system ICC1...<NORMAL>

Program 'icc$srq2' complete: Hit PF12 to end
```

## ICC$SYS (ISYS)

```
This is program 'icc$sys'...
applName=ICC$REG01 operatingSystem=A operatingSystemLevel=41
releaseText=[0210] sysidnt=ICC1
getStorage( 5678, 'Y')...                                  <NORMAL>
freeStorage( p )...                                        <NORMAL>
Checking attributes of a named file (ICCKFILE)...
>ICCKFILE< Add=true Brw=true Del=true Read=true Upd=true op=18 en=23
accessMethod=3 isRecoverable=true keyLength=3 keyPosition=16
setStatus( closed ) ...                                    <NORMAL>
setStatus( disabled ) ...                                  <NORMAL>
setAccess( notUpdatable ) ...                              <NORMAL>
>ICCKFILE< Add=true Brw=true Del=true Read=true Upd=false op=19 en=24
setAccess( updateable ) & setStatus( enabled, open ) ...
>ICCKFILE< Add=true Brw=true Del=true Read=true Upd=true op=18 en=23
Beginning browse of all file objects in CICS system...     <NORMAL>
 - >ICCEFILE< type=1                                       <NORMAL>
 - >ICCKFILE< type=6                                       <NORMAL>
 - >ICCRFILE< type=1                                       <NORMAL>
Program 'icc$sys' complete: Hit PF12 to End
```

## ICC$TMP (ITMP)

```
This is program 'icc$tmp'...
Writing 3 records to IccTempStore object 'ICCSTORE'...
 - writing record #1: 'Hello World - item 1'     <NORMAL>
 - writing record #2: 'Hello World - item 2'     <NORMAL>
 - writing record #3: 'Hello World - item 3'     <NORMAL>
Reading records back in & rewriting new buffer contents...
 - record #1 = [Hello World - item 1]       - rewriteItem #1   <NORMAL>
 - record #2 = [Hello World - item 2]       - rewriteItem #2   <NORMAL>
 - record #3 = [Hello World - item 3]       - rewriteItem #3   <NORMAL>
Reading records back in one last time...
 - record #1 = [Modified Hello World - item 1]
 - record #1 = [Modified Hello World - item 2]
 - record #1 = [Modified Hello World - item 3]
Program 'icc$tmp' complete: Hit PF12 to end
```

## ICC$TRM (ITRM)

```
This is program 'icc$trm'...
First part of the line...... a continuation of the line.
Start this on the next line            Send this to col 40 of current line

         Send this to row 5, column 10
                                       Send this to row 6, column 40

A Red line!
A Blue, reverse video line!

A cout style interface...
you can chain input together; use different types, eg numbers: 123 4567890 12345
6.789123
... and everything is buffered till you issue a flush.



Program 'icc$trm' complete: Hit PF12 to End
```

## ICC$TSK (ITSK)

```
This is program 'icc$tsk'...
startType() = terminalInput
number() = 0598
isStartDataSupplied() = true
isCommitSupported() = true
userId() = [rabcics ]
enterTrace( 77, "ICCENTRY", buffer )        <NORMAL>
suspend()...                                <NORMAL>
delay( ti ) (for 2 seconds)...              <NORMAL>
getStorage( 1234, 'X')...                   <NORMAL>
freeStorage( p )...                         <NORMAL>
commitUOW()...                              <NORMAL>
rollBackUOW()...                            <NORMAL>


Program 'icc$tsk' complete: Hit PF12 to End OR PF24 to ABEND
```

# Glossary

**abstract class.** A class that is used as a base class for other classes and has at least one pure virtual function. It is not possible to create an instance of this class.

**base class.** A class from which other classes are derived.

**CICS program.** A program that runs in the CICS environment as part of a transaction.

**class.** A group of objects that share a common definition and common properties, operations and behavior.

**class definition.** How a class is defined in C++.

**class implementation.** How a class is implemented in C++.

**const.** In C++, the **const** attribute explicitly declares a data object as a data item that cannot be changed. Its value is set at initialization.

**constructor.** In C++, a special class member function (method) that has the same name as the class and is used to initialize class objects.

**default argument.** In C++, a default is used when an argument in a method call is not explicitly provided.

**delete.** A C++ operator that deallocates dynamic storage to destroy an object.

**destructor.** In C++, a special class member function (method) that has the same name as the class, preceded by (tilde), and is executed when an object is destroyed.

**distributed program link.** A technique where a program running on one CICS system links to a program running on another system.

**encapsulation.** The means whereby the inner workings of an object are hidden. An application programmer only has direct access to the external features.

**function shipping.** A technique whereby a transaction running on one CICS system accesses resources held on another system.

**inheritance.** The passing of class resources or attributes from a base class to a subclass.

**method.** An operator or function that is declared as a member of a class.

**new.** A C++ operator that allocates dynamic storage to create an object.

**object.** An abstraction consisting of data and the operations associated with that data.

**overloading.** The redefinition of functions and most standard C++ operators. This typically extends the operations that the function or operator performs to different data types.

**polymorphism.** The application of a method or function to objects of more than one data type.

**subclass.** A class that is derived from another class. The subclass inherits the data and methods of the base class and can define new methods or over-ride existing methods to define new behavior not inherited from the parent class.

**task.** One instance of the execution of a particular CICS transaction.

**transaction.** One or more programs on a CICS server that can be initiated on request by a CICS user.

**transaction routing.** A technique whereby a transaction initiated on one CICS system is actually run on another system.

**UOW.** A CICS unit of work is a set of resource updates.

**virtual function.** In C++, a class member function that is defined with the keyword **virtual**. The code that is executed when you make a call to a virtual function depends on the type of object for which it is called.

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