iWay

iWay Adapter for IMS/TM
Version 5 Release 5

DN3501281.0104

Preface

This documentation describes how to configure and use the iWay Adapter for IMS/TM.

How This Manual Is Organized

This manual includes the following chapters:

Chapter/Appendix		Contents
1	Introduction to the iWay Adapter for IMS/TM	Introduces the adapter environment.
2	*Configuring the iWay Adapter for IMS/TM*	Describes how to configure the adapter.
3	Designing the iWay Adapter for IMS/TM	Describes how to create transactions for the adapter.
A	Sample Requests, Schemas, and Cobol File Descriptions	Provides request and response documents for the sample transaction PART.

Documentation Conventions

The following conventions apply throughout this manual:

Convention	Description
`THIS TYPEFACE` or `this typeface`	Denotes syntax that you must enter exactly as shown.
`this typeface`	Represents a placeholder (or variable) in syntax for a value that you or the system must supply.
underscore	Indicates a default setting.
this typeface	Represents a placeholder (or variable), a cross-reference, or an important term. It may also indicate a button, menu item, or dialog box option you can click or select.
this typeface	Highlights a file name or command.
Key + Key	Indicates keys that you must press simultaneously.
`{ }`	Indicates two or three choices; type one of them, not the braces.
`[ ]`	Indicates a group of optional parameters. None are required, but you may select one of them. Type only the parameter in the brackets, not the brackets.
|	Separates mutually exclusive choices in syntax. Type one of them, not the symbol.
`...`	Indicates that you can enter a parameter multiple times. Type only the parameter, not the ellipsis points (…).
. . .	Indicates that there are (or could be) intervening or additional commands.

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Information You Should Have

To help our consultants answer your questions most effectively, be ready to provide the following information when you call:

- Your six-digit site code (*xxxx.xx*).
- Your iWay Software configuration:
  - The iWay Software version and release. You can find your server version and release using the *Version* option in the Web Console. (**Note:** the MVS and VM servers do not use the Web Console.)
  - The communications protocol (for example, TCP/IP or LU6.2), including vendor and release.
- The stored procedure (preferably with line numbers) or SQL statements being used in server access.
- The database server release level.
- The database name and release level.
- The Master File and Access File.

- The exact nature of the problem:
  - Are the results or the format incorrect? Are the text or calculations missing or misplaced?
  - Is there an error message and return code (if applicable)?
  - Is this related to any other problem?
- Has the procedure or query ever worked in its present form? Has it been changed recently? How often does the problem occur?
- What release of the operating system are you using? Has it, your security system, communications protocol, or front-end software changed?
- Is this problem reproducible? If so, how?
- Have you tried to reproduce your problem in the simplest form possible? For example, if you are having problems joining two data sources, have you tried executing a query containing just the code to access the data source?
- Do you have a trace file?
- How is the problem affecting your business? Is it halting development or production? Do you just have questions about functionality or documentation?

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Contents

CHAPTER 1

Introduction to the iWay Adapter for IMS/TM

Topics:

- Overview of the Adapter
- IMS/TM Adapter

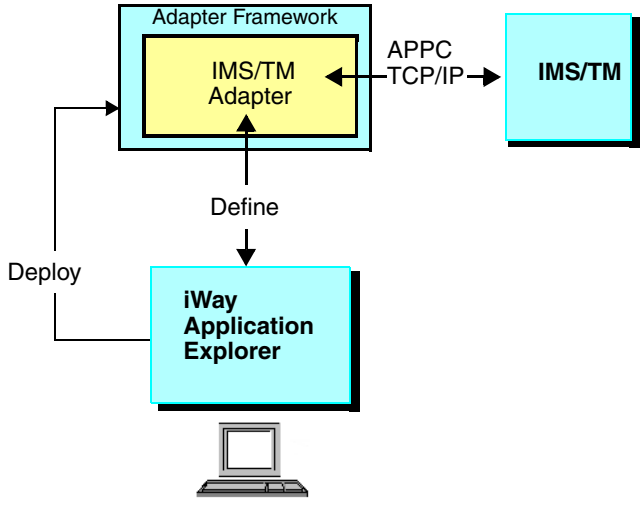
This section describes the iWay Adapter for IMS/TM. The adapter supports automatic transaction invocation, message transformation, and error recovery. The adapter enables applications to call IMS/TM transactions and work with the native features and syntax of IMS/TM.

Overview of the Adapter

The advantages of the adapter include the following:

- No modification required to existing IMS/TM transactions.
- No installation of new code on IMS/TM.
- All adapter processing performed off of the mainframe.
- Configuration by metadata—no coding required.
- Support for older versions of IMS/TM.
- Support for IMS/TM transactions.

The adapter enables you to execute IMS/TM transactions.

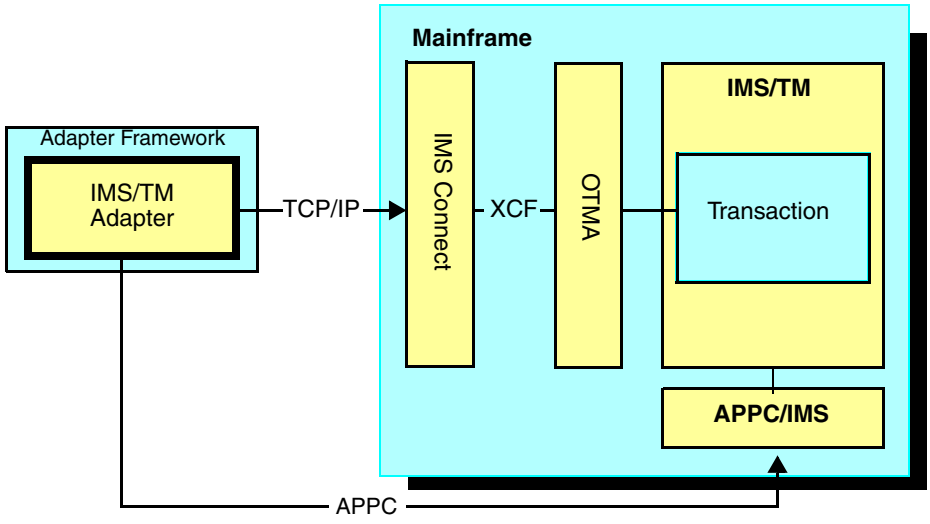


The following bidirectional scenarios are supported by the adapter:

- IMS/TM services
- IMS/TM events - Contact Customer Support Services

IMS/TM Adapter

The following diagram illustrates the IMS/TM Adapter:



The IMS/TM Adapter is the component that connects to IMS/TM. The IMS/TM Adapter is hosted in a container that can support events. The adapter enables the following functions:

- Connecting to IMS/TM
- Executing IMS/TM transactions
- Mapping XML messages to and from IMS/TM data structures

The adapter enables you to invoke an IMS/TM transaction by sending a request and retrieving the response.

The IMS/TM Adapter uses IMS Connect, available with IMS Version 7.1 and higher, to execute IMS/TM transactions from a TCP/IP client.

At design time, you describe the request and response messages by mapping them to Cobol File Descriptions. Communication with IMS/TM is through either TCP/IP or APPC.

IMS/TM Transactions

There are two kinds of IMS/TM transactions:

- Non-conversational
- Conversational - where a user interacts with a terminal screen (3270)

Because the adapter can execute only non-conversational transactions, this distinction is important.

To execute 3270 conversational programs, a screen scraper (such as the iWay Adapter for 3270) is required. For many years IMS/TM applications were structured so that the business processing, as opposed to the screen dialogue, is in non-conversational transactions. Therefore, in many cases, executing a non-conversational transaction is recommended for application integration.

Software Requirements for the IMS/TM Adapter

The following are the software requirements for the IMS/TM Adapter:

- IMS Version 5 (or higher)
- OS/390 v2.6 or higher or z/OS

For TCP/IP:

- IMS Connect and Open Transaction Manager Access (OTMA) installed and configured on the remote IMS/TM system.

For APPC Communications:

- LU6.2 sessions created within the IMS/TM region.
- When the adapter is running on a non-mainframe platform, APPC communications requires that an SNA server (or the AIX/UNIX equivalent) be available to connect to APPC/IMS.

CHAPTER 2

Configuring the iWay Adapter for IMS/TM

Topics:

- Configuring a Connection to IMS/TM
- Closing or Deleting a Connection to IMS/TM

At design time, you use the Application Explorer to create the configuration and metadata the adapter requires at run time. This section describes how to configure a connection to IMS/TM.

Configuring a Connection to IMS/TM

To access an IMS/TM region, you must configure a connection to that region. After the connection is created, it is automatically saved. You must establish a connection to the system every time you start the Application Explorer or after disconnecting.

You can connect to IMS/TM using TCP/IP Communication or APPC Communication logon options.

For information on configuring a connection to IMS using the TCP/IP Communication option, see *How to Configure a Connection to IMS/TM Using the TCP/IP Communication Option* on page 2-2.

For information on configuring a connection to IMS using the APPC Communication option, see *How to Configure a Connection to IMS/TM Using the APPC Communication Option* on page 2-4.

Procedure

How to Configure a Connection to IMS/TM Using the TCP/IP Communication Option

1. Expand the iWay Adapters node in the Application Explorer.
2. Right-click the IMS node and select *Open* from the pop-up menu.
3. In the left pane, move your pointer over *Operations,* and select *Define a new target*.

   Note: If you wish to use a connection that was previously created, see *How to Use an Existing Connection* on page 2-6.
4. In the Add a new IMS target dialog box:

   a. In the Target Name field, type a name for the connection, for example, *TCPIP_Connection.*

   The name is used to build a subdirectory underneath the Application Explorer session path, as well as to identify the connection.

   Because the connection name is also used as a subdirectory name in your session path, its characters must be considered valid for a directory name by the operating system on which the Application Explorer is executed. For example, the connection name, #IMS, is invalid on a Windows operating system.

   To determine which characters are valid for use in a directory name, see the documentation for your operating system.

   b. In the Description field, type a description for the target name you just created. For example, *Connection using TCPIP option*.

   c. In the Target Type drop-down list, select *TCP/IP Communication.*

5. Click *Next*.

   The connection name is verified for the system. If you entered an invalid instance name, a new Input dialog box opens, and prompts you for an instance name again.

   The Set connection info dialog box appears.

6. Type the connection parameters to make a new connection to IMS/TM. You can obtain this information from the IMS/TM Systems Administrator. This information should be the same for all programs in a single IMS/TM system.

   The following table lists the parameters.

   Note: The fields marked with an asterick (*) are required.

Parameter	Description
Host*	Host name, or IP address, for the computer where IMS/TM is running.
Port IMS Connect is listening on*	Port number on which IMS Connect is listening.
User*	Valid user ID for IMS/TM.
Password	Valid password for the IMS/TM user ID.
IMS Datastore*	Name of the IMS/TM datastore. For example, IMS7B.
XCF group*	Name of the XCF group. For example, IMSGRP7B.
Override of message exit	Defaults to SAMPLE (*SAMPLE*).

7. Click *Finish*.

   If the parameters are correct and the IMS application is available, the object metadata loads.

   After the IMS application loads, TCPIP_Connection appears as a node under the IMS node.

8. To connect to TCPIP_Connection, move your pointer over *Operations,* and select *Connect*.

   The Connect to TCPIP_Connection dialog box appears, populated with the values you entered for the connection parameters.

9. Verify your connection parameters and click *OK*.

10. Expand the TCPIP_Connection node.

    The Transactions node appears.

11. Expand the Transactions node.

    A sample adapter transaction called Generic_Transaction appears.

    This generic transaction is added automatically when you create a new connection to IMS. For more information about using transactions, see Chapter 3, *Designing the iWay Adapter for IMS/TM*.

    There are no sample events included under the Events node. For more information about creating events, see Chapter 3, *Designing the iWay Adapter for IMS/TM*.

Procedure How to Configure a Connection to IMS/TM Using the APPC Communication Option

1. Expand the iWay Adapters node in the Application Explorer.
2. Right-click the IMS node and select *Open* from the pop-up menu.
3. In the left pane, move your pointer over *Operations,* and select *Define a new target*.

   Note: If you wish to use a connection that was previously created, see *How to Use an Existing Connection* on page 2-6.

4. In the Add a new IMS target dialog box:

   a. In the Target Name field, type a name for the connection, for example, *APPC_Connection*.

      The name is used to build a subdirectory underneath the Application Explorer session path, as well as to identify the connection.

      Because the connection name is also used as a subdirectory name in your session path, its characters must be considered valid for a directory name by the operating system on which the Application Explorer is executed. For example, the connection name, #IMS, is invalid on a Windows operating system.

      To determine which characters are valid for use in a directory name, see the documentation for your operating system.

   b. In the Description field, type a description for the target name you just created. For example, *Connection using APPC option*.

   c. In the Target Type drop-down list, select *APPC Communication.*

5. Click *Next*.

   The connection name is verified for the system. If you entered an invalid instance name, a new Input dialog box opens, and prompts you for an instance name again.

   The Set connection info dialog box appears.

6. Enter the following parameters to make a new connection to IMS/TM. You can obtain this information from the IMS/TM Systems Administrator. This information should be the same for all programs in a single IMS/TM system.

   The following table lists the parameters.

   Note: The fields marked with an asterisk (*) are required.

Parameter	Description
User ID*	Valid user ID for IMS/TM.
Password	Valid password for the IMS/TM user ID.
Remote LU*	LU of APPC/IMS.
Local LU*	LU of the SNA access point to which you have access (for example, SNA server).
logMode	Log mode of APPC/IMS.

7. Click *Finish*.

   If the parameters are correct and the IMS application is available, the object metadata loads.

   After the IMS application loads, APPC_Connection appears as a node under the IMS node.

8. To connect to APPC_Connection, move your pointer over *Operations,* and select *Connect*.

   The Connect to APPC_Connection dialog box appears, populated with the values you entered for the connection parameters.

9. Verify your connection parameters and click *OK*.

10. Expand the APPC_Connection node.

    The Transactions node appears.

11. Expand the Transactions node.

    A sample transaction called Generic_Transaction appears.

    This generic transaction is added automatically when you create a new connection to IMS. For more information about using transactions, see Chapter 3, *Designing the iWay Adapter for IMS/TM*.

    There are no sample events included under the Events node. For more information about creating events, see Chapter 3, *Designing the iWay Adapter for IMS/TM*.

Procedure How to Use an Existing Connection

To connect to a transaction processing system, for example, IMS:

1. Expand the IMS node.
2. Click the node to which you want to connect, for example, *TCPIP_Connection*, move your pointer over O*perations,* and select *Connect* from the pop-up menu.

   The Connect to dialog box appears, populated with the values you entered previously for the connection. You must reenter the password at connect time as it is not saved.
3. Click *OK*.

   The icon for the node changes indicating that the node is connected.

Closing or Deleting a Connection to IMS/TM

To manage IMS/TM connections, you can:

- Close a connection that is not currently in use.

  Although you can maintain multiple open connections to different transaction processing systems, it is recommended that you close connections that are not in use.
- Delete a connection that is no longer required.

Procedure How to Close a Connection to IMS/TM

To close a connection:

1. Expand the IMS node.
2. Click the connection, for example, *TCPIP_Connection*, move your pointer over O*perations* and select *Disconnect* from the pop-up menu.

   Disconnecting from IMS/TM drops the connection with IMS/TM, but the node remains.

   The icon for the node changes indicating that the node is disconnected.
3. To establish the connection again, click the disconnected node, move your pointer over O*perations,* and select *Connect* from the pop-up menu.

Procedure How to Delete a Connection to IMS/TM

To delete a connection from the list of existing connections:

1. Expand the IMS node.
2. Click the connection, for example, *ITCPIP_Connection*, move your pointer over O*perations* and select *Delete* from the pop-up menu.

   A message appears, prompting you to confirm the deletion of the node.
3. Click *OK*.

   The node is removed from the list of available connections.

CHAPTER 3

Designing the iWay Adapter for IMS/TM

Topic:

- Creating an Adapter Transaction

This section describes how to create transactions for the adapter.

Creating an Adapter Transaction

After you create a connection to IMS/TM, you can add IMS/TM adapter transactions using the Application Explorer. A single IMS/TM connection may be associated with multiple transactions. Each transaction represents one service offered by IMS/TM and consists of a program and its metadata.

A generic transaction is always added automatically and represents IMS/TM services whose data will not be mapped to XML. You can use a generic transaction for transactions that accept no input and for transactions that return no output or if it is acceptable to return an unformatted answer set. For example, the IMS transaction PART connects to IMS/TM and returns PART information on successful adapter installation and configuration. One request and response schema is applicable for this generic transaction. The request schema for the generic transaction is in Appendix C, *Sample Requests, Schemas, and Cobol File Descriptions*.

Using the generic transaction, the XML request document received must have the name of the program to be called in the <Transaction> element. The payload to be sent as the IMS segment must be in the <message> tag, which can be a maximum of 32,500 bytes.

The generic response schema is constructed from the data received from IMS/TM. If the <message> element has more than 80 bytes, the received IMS segment is split into 80 byte messages. Illegal XML characters ('<', '/', and '&') are converted to XML entities. For example,

```
  <?xml version="1.0" encoding="UTF-8" ?>
- <IMS>
  - <Transaction tpname="PART" noreply="NO">
     <message>*</message>
    </Transaction>
  </IMS>
```

For IMS transactions that require input and output and a formatted response is needed, which is usually the case, you must add your own adapter transactions, as described in the following procedure. XML request messages must specify which transaction to use in the *location* attribute of the <Transaction> tag. For example, if you create a IMS/TM transaction called PART, the location is "IMS/TM/Transactions/PART". To view a sample generic request or response schema or for information about specifying a transaction to use in the location attribute of the <Transaction> tag, see Appendix C, *Sample Requests, Schemas, and Cobol File Descriptions*.

Sample Transaction PART

IBM supplies the PART transaction with an IMS system. This guide uses the PART transaction for illustration purposes and as a reference for the adapter. The PART transaction accepts an input part number with a length of seventeen (17) characters or less. Based on what is passed to the PART transaction, an answer set is returned from the DP21PART database.

- If a part number is passed and found in IMS, the transaction returns detail information.
- If an asterisk ('*') is passed in the request, the transaction returns all part numbers in the database along with their descriptions.
- If the part number is not found in IMS, the transaction "PART NOT FOUND" is returned.

This transaction is an example of a transaction that returns multiple answer sets. Three different answer sets are returned based on what is passed in the request. The adapter allows you to create a response schema that contains different possible return messages. Sample request documents, along with sample response schemas for the PART transaction, are in Appendix A, *Sample Requests, Schemas, and Cobol File Descriptions*. You specify the output as explained in *Creating an Adapter Transaction* on page 3-2. You must know the field in the Cobol description that can be used as a record type and the value of that field. You specify the value of the field to create the appropriate response schema. This is also true for events to determine what layout is returned from IMS when you configure an IMS event. If you need to configure an IMS event, contact Customer Support Services.

Procedure How to Create an Adapter Transaction

1. Expand the IMS node and connect to a IMS/TM target.
2. Expand the node to which you connected.

   The Transaction node appears under the connected node.
3. Click *Transactions*, move your pointer over *Operations,* and select *Add.*

   The Add dialog box appears.
4. Enter the appropriate information for the IMS/TM transaction to map to the Cobol descriptions.

   The following table lists the parameters.

   Note: Fields marked with an asterisk (*) are required.

Field	Description
Name*	Name to describe the adapter transaction you are creating. This name, for example, IMS_Transaction, will appear under the Transactions node for the current connection. This is the name to be used in the <Transaction location="..."> attribute.
Transaction Name*	Name of the transaction to be called in IMS/TM, for example, PART. The PART input FD is shown in Appendix A, *Sample Requests, Schemas, and Cobol File Descriptions*.
Cobol Description for Input	Location of the Cobol description that describes the input parameters of the IMS transaction to be executed. This is converted by the adapter to an XML schema that the adapter uses to map from XML to the format required by IMS/TM at run time.
Convert non printable char to	Character to convert binary zeros to in output.
Transaction has no reply	Select if you do not want to wait for a response from the program.
Maximum buffer size for retrieval	Maximum buffer size for answer set.

<table>
<tr><th>Field</th><th colspan="2">Description</th></tr>
<tr><td>Cobol Description for Output (outFD)</td><td colspan="2">Path that corresponds to the message you want returned from the IMS/TM transaction.

If the transaction can return multiple types of messages for each output Cobol description, enter the Cobol description field and value to determine which schema is created and used for a particular message.

The Application Explorer creates the schema to use for a particular message based on the contents of a field that is returned. For example, a program called PART will populate the field called RECTYPE. Depending on program logic, the Application Explorer will create the correct response schema.</td></tr>
<tr><td></td><td>Value in RECTYPE Field

space ‘ ’

parenthesis ‘)’

‘t’</td><td>Cobol Description

PART_Detail_Out

PART_All_Out

PART_Error_Out</td></tr>
<tr><td></td><td colspan="2">The PART_Detail_Out, PART_All_Out, and PART_Error_Out Cobol descriptions are shown in Appendix A, Sample Requests, Schemas, and Cobol File Descriptions.</td></tr>
</table>

Note: You must transfer the Cobol descriptions to a location accessible to theApplication Explorer. Contact your IMS/TM Administrator or Application Developer for the correct Cobol descriptions to use for the program.

5. Click *Finish*.

   The new IMS/TM transaction is added, for example, IMS_Transaction under the Transactions node for the current connection.

   The adapter generates the schemas for the selected Cobol descriptions and associates them with this transaction. The schemas generated for the sample Cobol descriptions are shown in Appendix C, *Sample Requests, Schemas, and Cobol File Descriptions*.

6. Right-click the transaction you just created.

7. Select *Save Schemas* to write the schemas to disk.

APPENDIX A

Sample Requests, Schemas, and Cobol File Descriptions

Topics:

- Request Document to Run PART as a Generic Transaction
- Request Schema for Generic Transaction PART
- Response Schema for Generic Transaction PART
- Request Documents for Adapter Transaction PART
- Request Schema for Adapter Transaction PART
- Response Schema for Adapter Transaction PART
- Sample Cobol File Descriptions for PART

After you create a connection to IMS/TM, you can add IMS/TM transactions using the Application Explorer. The generic transaction is always added automatically and represents IMS/TM services whose data will not be mapped to XML.

The request and response documents for the transaction PART are shown in the following topics. Also, the Cobol descriptions that were used as input for the sample IMS/TM transactions are shown.

Request Document to Run PART as a Generic Transaction

```
  <?xml version="1.0" encoding="UTF-8" ?>
- <IMS>
  - <Transaction tpname="PART" noreply="NO">
     <message>*</message>
    </Transaction>
  </IMS>
```

Request Schema for Generic Transaction PART

NEW CODE

Response Schema for Generic Transaction PART

NEW CODE

Request Documents for Adapter Transaction PART

The following are the sample XML request documents to run the transaction PART:

PARTAll.xml

```
  <?xml version="1.0" encoding="UTF-8" ?>
- <IMS>
  - <Transaction location="/IMS/Transaction/PART8A">
      <message>*</message>
    </Transaction>
  </IMS>
```

PARTDETAIL.xml

```
  <?xml version="1.0" encoding="UTF-8" ?>
- <IMS>
  - <Transaction location="/IMS/Transaction/PART8A">
      <message>AN960C10</message>
    </Transaction>
  </IMS>
```

PARTERROR.xml

```
  <?xml version="1.0" encoding="UTF-8" ?>
- <IMS>
  - <Transaction location="/IMS/Transaction/PART8A">
      <message>WILLNOTFIND</message>
    </Transaction>
  </IMS>
```

Request Schema for Adapter Transaction PART

NEW CODE

Response Schema for Adapter Transaction PART

NEW CODE

Sample Cobol File Descriptions for PART

The following sample Cobol File Description is used as input for the IMS/TM transactions in Chapter 3, *Designing the iWay Adapter for IMS/TM*.

PART_IN.cbl

```
01  PARTIN.
    05  MESSAGE                PIC X(80)    VALUE SPACE.
```

PART_All_Out.cbl

```
01  PARTALL.
    05  FILL                   PIC X(3).
    05  RECTYPE                PIC X(1).
    05  MESSAGE                PIC X(76).
```

PART_Detail_Out.cbl

```
01  PARTDETAIL.
    05  FILL                      PIC X(3)   VALUE SPACE.
    05  RECTYPE                   PIC X(1)   VALUE SPACE.
    05  FILL1                     PIC X(22)  VALUE SPACE.
    05  PARTNUMBER                PIC X(12)  VALUE SPACE.
    05  FILL2                     PIC X(18)  VALUE SPACE.
    05  DESCRIPTION               PIC X(20)  VALUE SPACE.
    05  FILL3                     PIC X(26)  VALUE SPACE.
    05  PROCCODE                  PIC X(12)  VALUE SPACE.
    05  FILL4                     PIC X(18)  VALUE SPACE.
    05  INVCODE                   PIC X(8)   VALUE SPACE.
    05  FILL5                     PIC X(26)  VALUE SPACE.
    05  MAKEDEPT                  PIC X(12)  VALUE SPACE.
    05  FILL6                     PIC X(18)  VALUE SPACE.
    05  PREVNO                    PIC X(8)   VALUE SPACE.
    05  FILL7                     PIC X(26)  VALUE SPACE.
    05  MAKETIME                  PIC X(12)  VALUE SPACE.
    05  FILL8                     PIC X(18)  VALUE SPACE.
    05  CCODE                     PIC X(8)   VALUE SPACE.
```

PART_Error_Out.cbl

```
01  PARTERROR.
    05  FILL                    PIC X(3)   VALUE SPACE.
    05  RECTYPE                 PIC X(1)   VALUE SPACE.
    05  MESSAGE                 PIC X(46)  VALUE SPACE.
```

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