

# ***MQCE for z/OS Cluster Configuration Manual***



Capitalware Inc.  
Unit 11, 1673 Richmond Street, PMB524  
London, Ontario N6G2N3  
Canada  
sales@capitalware.com  
<https://www.capitalware.com>



Last Updated: July 2020.  
© Copyright Capitalware Inc. 2010, 2020.

# Table of Contents

<b>1 INTRODUCTION.....</b>	<b>1</b>
1.1 OVERVIEW.....	1
<b>2 Z/MQCE CLUSTERING OVERVIEW.....</b>	<b>2</b>
2.1 CLUSTER-SENDER AND CLUSTER-RECEIVER CHANNEL PAIR.....	2
2.2 CHANNEL AUTO-DEFINITION.....	3
<b>3 Z/MQCE CLUSTERING PREREQUISITES.....</b>	<b>4</b>
3.1 PREREQUISITE # 1.....	4
3.2 PREREQUISITE # 2.....	4
3.3 PREREQUISITE # 3.....	4
<b>4 IMPLEMENTING Z/MQCE WITH CLUSTER CHANNELS.....</b>	<b>5</b>
4.1 STOP THE CLUSTER CHANNELS.....	5
4.2 EDITING THE CHANNEL AUTO-DEFINITION INIFILE.....	5
4.2.1 z/OS.....	5
4.3 CONFIGURING THE CWCHAD EXIT.....	6
4.3.1 z/OS.....	6
4.4 CONFIGURING A CLUSTER-RECEIVER CHANNEL.....	7
4.4.1 z/OS.....	7
4.5 CONFIGURING A CLUSTER-SENDER CHANNEL.....	8
<b>5 CWCHAD CHANNEL AUTO-DEFINITION INIFILE.....</b>	<b>9</b>
5.1 CHANNEL AUTO-DEFINITION INIFILE SEARCH ORDER.....	9
5.2 CHANNEL AUTO-DEFINITION INIFILE KEYWORDS.....	9
5.2.1 <i>ConName</i> .....	9
5.2.2 <i>Partner</i> .....	9
5.2.3 <i>MsgExit and MsgData</i> .....	9
5.2.4 <i>RcvExit and RcvData</i> .....	10
5.2.5 <i>ScyExit and ScyData</i> .....	10
5.2.6 <i>SendExit and SendData</i> .....	11
<b>6 CWCHAD INIFILE.....</b>	<b>12</b>
6.1 LOGGING.....	12
6.2 SETMESSAGEEXIT.....	12
6.3 SETRECEIVEEXIT.....	12
6.4 SETSECURITYEXIT.....	13
6.5 SETSENDEXIT.....	13
<b>7 APPENDIX A – CHANNEL AUTO-DEFINITION INIFILE SUMMARY.....</b>	<b>14</b>
<b>8 APPENDIX B – CWCHAD INIFILE SUMMARY.....</b>	<b>17</b>
<b>9 APPENDIX D – LICENSE AGREEMENT.....</b>	<b>19</b>

**10 APPENDIX E – NOTICES.....21**

# 1 Introduction

## 1.1 Overview

*MQ Channel Encryption for z/OS* (z/MQCE) provides encryption for MQ message data. In cryptography, encryption is the process of transforming information into an unreadable form (encrypted data). Decryption is the reverse process. It makes the encrypted information readable again. Only those with the key (PassPhrase) can successfully decrypt the encrypted data.

z/MQCE provides encryption for message data, which flows between IBM MQ resources. z/MQCE operates with MQ v5.3.1, v6.0, v7.0, v7.1, v8.0, v9.0, v9.1 and v9.2 for z/OS environments. It operates with Sender, Receiver, Server, Requester, Cluster-Sender, Cluster-Receiver, Server Connection and Client Connection channels of the MQ queue managers.

z/MQCE is a simple drop-in solution that provides cryptographic protection for MQ queue managers. The protection can be queue manager to queue manager or client application to queue manager.

- Queue manager to queue manager protection means all messages flowing over a channel between 2 queue managers will be encrypted.
- Client application to queue manager protection means application-level message data flowing between a MQ client application and queue manager will be encrypted.

The z/MQCE can be configured as a queue manager channel message exit or as a channel sender/receive exit pair.

z/MQCE uses Advanced Encryption Standard (AES) to encrypt the data. AES is a data encryption scheme, adopted by the US government, that uses three different key sizes (128-bit, 192-bit, and 256-bit). AES was announced by National Institute of Standards and Technology (NIST) as U.S. FIPS PUB 197 (FIPS 197) on November 26, 2001 after a 5-year standardization process.

z/MQCE uses the SHA-2 to create a cryptographic hash function (digital signature) for the message data.

## 2 z/MQCE Clustering Overview

This section provides an overview of how z/MQCE encrypt/decrypt messages flowing between queue managers participating in the cluster.

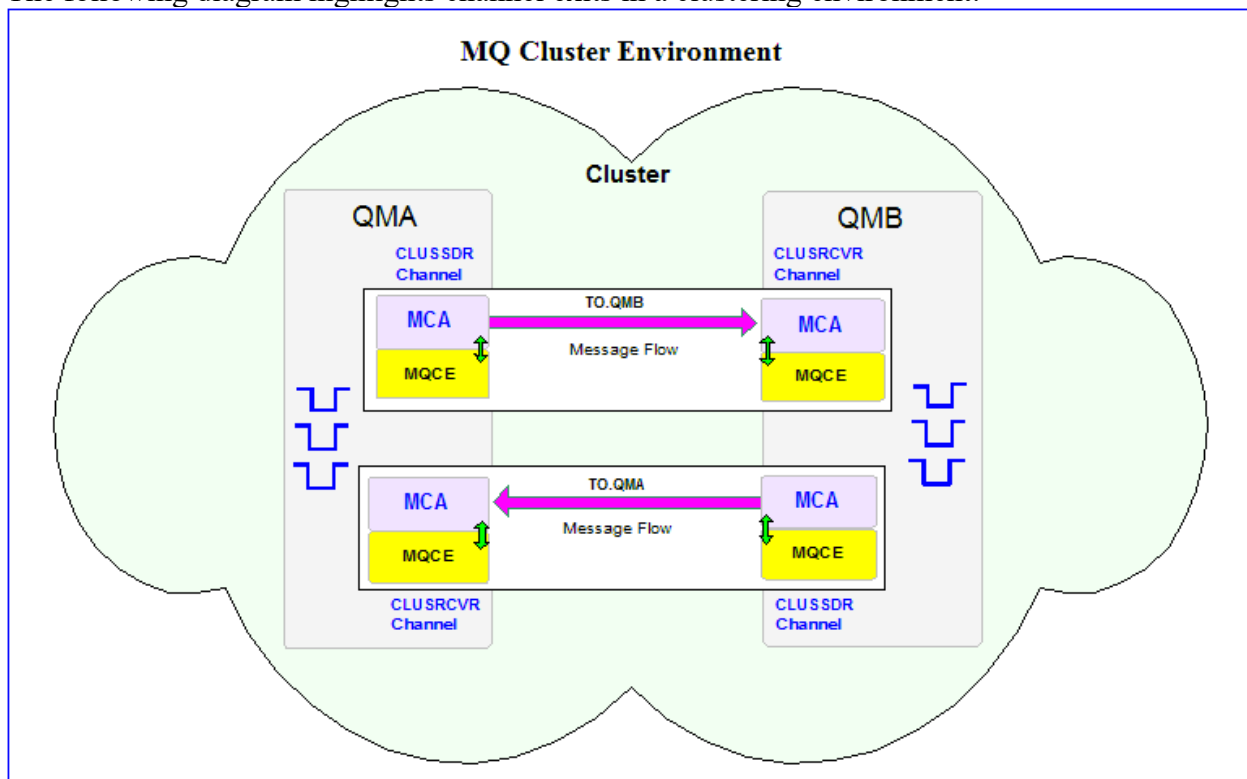
### 2.1 Cluster-Sender and Cluster-Receiver Channel Pair

As mentioned in Chapter 1, z/MQCE is comprised of a MQ message exit. As noted below (in yellow) in the diagram, the z/MQCE message exit inter-operates with both the Cluster-Sender (CLUSDR) channel and Cluster-Receiver (CLUSRCVR) channel.

There is a Message Channel Agent (MCA) at each end of the channel. The MCA is a component that handles the sending and receiving of messages between queue managers.

- The sending-side MCA invokes MQCE to encrypt the message before it is sent.
- The receiving-side MCA invokes MQCE to decrypt the incoming message before it is placed in the destination queue.

The following diagram highlights channel exits in a clustering environment:



## 2.2 Channel Auto-Definition

When a queue manager has joined a cluster, MCA creates, by auto-definition, the Cluster-Sender channel from the attributes of the Cluster-Receiver channel. If an MQAdmin manually defines a Cluster-Sender channel, the queue manager will automatically modify those values to match the Cluster-Receiver channel's attributes. In other words, the MQAdmin cannot modify an auto-created Cluster-Sender channel via MQSC commands.

To explicitly set the Cluster-Sender channel attributes, a Channel Auto-Definition exit must be used. The z/MQCE installation package includes a Channel Auto-Definition exit called ***CWCHAD***.

The CWCHAD exit has been designed to override 9 attributes of a Cluster-Sender channel as listed below:

- CONNAME - The connection information for the channel
- MSGEXIT - The message exit name for the channel
- MSGDATA - The message exit data for the channel
- RCVEXIT - The receive exit name for the channel
- RCVDATA - The receive exit data for the channel
- SCYEXIT - The security exit name for the channel
- SCYDATA - The security exit data for the channel
- SENDEXIT - The send exit name for the channel
- SENDDATA - The send exit data for the channel

The CWCHAD exit does not only work with auto-created Cluster-Sender channels but as an added bonus, it also works with these other channels: Cluster-Receiver, Receiver and Server-Connection channels.

## 3 z/MQCE Clustering Prerequisites

This section details the necessary steps that must be completed *BEFORE* implementing z/MQCE and the CWCHAD exit in a MQ clustering environment. The implementation of channel exits in an MQ clustering environment is extremely complex and must be completed very carefully.

### 3.1 Prerequisite # 1

The MQAdmin must read and understand Chapters 1 through 4 of IBM's *IBM MQ Queue Manager Clusters* manual. The IBM MQ manuals can be found at the following link: <http://www.ibm.com/software/integration/wmq/library/>

### 3.2 Prerequisite # 2

The MQAdmin must make sure that all of the cluster channels have been successfully started. i.e. all cluster channels must have a channel status of 'Running'.

### 3.3 Prerequisite # 3

MQAdmin must stop and restart all Cluster-Sender channels (since the Channel Auto-Definition does not kick-in until they have been restarted) at least twice (yes, twice). They must have a channel status of 'Running'. *This step is absolutely crucial.*



## 4 Implementing z/MQCE with Cluster Channels

This section describes the necessary steps to enable z/MQCE and the CWCHAD exit with cluster channels. All steps must be followed exactly. i.e. no skipping of steps.

### 4.1 Stop The Cluster Channels

The MQAdmin must stop *ALL* CLUSSDR and CLUSRCVR channels (to which you are applying the z/MQCE channel exits to). *The channels must be in the 'Stopped' state before continuing any further.*

### 4.2 Editing the Channel Auto-Definition IniFile

This section describes the necessary entries to enable the CWCHAD exit. Please review Chapter 5 for more information on editing the Channel Auto-Definition IniFile.

Notes:

- The MQAdmin can simply use the **[default]** section if all of the cluster channels will be authenticated with the same UserId and Password. Otherwise, the MQAdmin will need to create a new section for each CLUSSDR channel in the Channel Auto-Definition IniFile.
- If the MQAdmin did not perform a default install of z/MQCE then they will need to update the value of ScyExit to reflect the new path information.
- If the MQAdmin wishes to have a different Path and/or filename for the Client IniFile then they will need to update the value of ScyData to reflect the new path information.

#### 4.2.1 z/OS

For z/OS, a sample Channel Auto-Definition IniFile with the name: DD *CHADCS* has been included with the z/MQCE installation package.

The following is the contents of the DD *CHADCS*:

```
[TO.QMGRNAME]
MsgExit=MQCE
MsgData=MQCEIN
[default]
MsgExit=MQCE
MsgData=MQCEIN
```

## 4.3 Configuring the CWCHAD Exit

This section describes how to configure the CWCHAD exit for a queue manager.

*Note: Do NOT alter the QMGR CHAD parameter, as it is not required for clustering.*

### 4.3.1 z/OS

For z/OS, CHADEXIT will contain the following values, assuming a default install:

- CHADEXIT  
CWCHAD

The following is an example of an MQSC command:

```
ALTER QMGR CHADEXIT('CWCHAD')
```

## 4.4 Configuring a Cluster-Receiver Channel

This section describes the necessary entries to enable the server-side channel exit on a Cluster-Receiver Channel. The server-side channel exit and its data will be applied to 2 fields of the Cluster-Receiver Channel. The MQ Administrator will need to update these 2 fields of the Cluster-Receiver Channel.

For more information on server-side IniFile parameters, please review *Appendix A* of the *MQCE for z/OS Server-side Installation and Operation* manual.

### 4.4.1 z/OS

For z/OS, MSGEXIT and MSGDATA will contain the following values, assuming a default install:

- MSGEXIT  
**MQCE**
- MSGDATA  
**MQCEIN**

The following is an example of an MQSC command for creating a Cluster-Receiver Channel with the server-side message exit and its data:

```
DEFINE CHANNEL ('TO.QMA') CHLTYPE(CLUSRCVR) +  
  TRPTYPE(TCP) +  
  CONNAME(127.0.0.1(1414)) +  
  MSGEXIT('MQCE') +  
  MSGDATA('MQCEIN') +  
  REPLACE
```

## **4.5 Configuring a Cluster-Sender Channel**

There is no z/MQCE configuration required for the Cluster-Sender channel, as the CWCHAD exit will handle the setting of the values of the MSGEXIT and MSGDATA fields.

## 5 CWCHAD Channel Auto-Definition IniFile

This section describes how to configure the CWCHAD Channel Auto-Definition IniFile.

### 5.1 Channel Auto-Definition IniFile Search Order

The CWCHAD exit supports individual DD *CHADCS* file.

### 5.2 Channel Auto-Definition IniFile Keywords

IniFile keywords are grouped together in sections. A section name is the actual CLUSSDR channel name. A section name is surrounded by square brackets ('[' and ']').

```
[SECTION-NAME]
ScyExit=keyword-value
ScyData= keyword-value
```

To specify default values for any Channel Auto-Definition IniFile keyword, use the default section. The default section is optional.

```
[default]
ScyExit=MQAUSXCL
ScyData=CLNTINI
```

The IniFile supports the following keywords and their respective values:

#### 5.2.1 ConName

The ConName keyword specifies a value to override the current CONNAME field in the CLUSSDR channel definition. ConName is optional. If the keyword is not specified or its value is blank then no override is performed.

#### 5.2.2 Partner

The Partner keyword specifies a value to be verified against the incoming connection request's Partner name. Partner is optional. If the keyword is not specified or its value is blank then no check is performed.

#### 5.2.3 MsgExit and MsgData

The MsgExit and MsgData keywords are only used if SetMessageExit is set to 'Y' in the DD SYSCHAD.

### 5.2.3.1 MsgExit

The MsgExit keyword specifies a value in order to override the current MSGEXIT field in the CLUSSDR channel definition. MsgExit is optional. If the keyword is not specified or its value is blank then no override is performed.

### 5.2.3.2 MsgData

The MsgData keyword specifies a value in order to override the current MSGDATA field in the CLUSSDR channel definition. MsgData is optional. If the keyword is not specified or its value is blank then no override is performed.

Below is a sample Channel Auto-Definition IniFiles using MsgExit and MsgData entries:

```
[TO.QMGRNAME]
MsgExit=MQCE
MsgData=MQCEIN
```

### 5.2.4 RcvExit and RcvData

The RcvExit and RcvData keywords are only used if SetReceiveExit is set to 'Y' in the DD SYSCHAD.

#### 5.2.4.1 RcvExit Keyword

The RcvExit keyword specifies a value in order to override the current RCVEXIT field in the CLUSSDR channel definition. RcvExit is optional. If the keyword is not specified or its value is blank then no override is performed.

#### 5.2.4.2 RcvData Keyword

The RcvData keyword specifies a value in order to override the current RCVDATA field in the CLUSSDR channel definition. RcvData is optional. If the keyword is not specified or its value is blank then no override is performed.

Below is a sample Channel Auto-Definition IniFiles using RcvExit and RcvData entries:

```
[TO.QMGRNAME]
RcvExit=RcvExit
RcvData= MyData
```

### 5.2.5 ScyExit and ScyData

The ScyExit and ScyData keywords are only used if SetSecurityExit is set to 'Y' in the DD SYSCHAD.

#### 5.2.5.1 ScyExit

The ScyExit keyword specifies a value in order to override the current SCYEXIT field in the CLUSSDR channel definition. ScyExit is optional. If the keyword is not specified or its value is blank then no override is performed.

### 5.2.5.2 ScyData

ScyData The ScyData keyword specifies a value in order to override the current SCYDATA field in the CLUSSDR channel definition. ScyData is optional. If the keyword is not specified or its value is blank then no override is performed.

Below is a sample Channel Auto-Definition IniFiles using ScyExit and ScyData entries:

```
[TO.QMGRNAME]
ScyExit=MQAUSXCL
ScyData=CLNTINI
```

### 5.2.6 SendExit and SendData

The SendExit and SendData keywords are only used if SetSendExit is set to 'Y' in the DD SYSCHAD.

#### 5.2.6.1 SendExit

The SendExit keyword specifies a value in order to override the current SENDEXIT field in the CLUSSDR channel definition. SendExit is optional. If the keyword is not specified or its value is blank then no override is performed.

#### 5.2.6.2 SendData

The SendData keyword specifies a value in order to override the current SENDDATA field in the CLUSSDR channel definition. SendData is optional. If the keyword is not specified or its value is blank then no override is performed.

Below is a sample Channel Auto-Definition IniFiles using SendExit and SendData entries:

```
[TO.QMGRNAME]
SendExit=SendExit
SendData=MyData
```

## 6 CWCHAD IniFile

This section describes how to configure the CWCHAD IniFile. The DD *SYSCHAD* file is optional.

### 6.1 Logging

This section describes the necessary entries to enable CWCHAD to record log information. To enable and control logging, you need 2 keywords in the IniFile:

1. **LogMode** specifies what type of logging the user wishes to have. LogMode supports 4 values [Q / N / V / D] where Q is Quiet, N is Normal, V is Verbose and D is Debug. The default value is N.
2. **LogFile** specifies the location of the log file. The default values are as follows:

For z/OS:

**LogFile=SYSPRINT**

```
LogMode=N  
LogFile=SYSPRINT
```

### 6.2 SetMessageExit

This section describes the necessary steps to enable the overriding of the channel's MSGEXIT and MSGDATA fields. SetMessageExit specifies whether or not the CWCHAD exit will override the MSGEXIT and MSGDATA fields.

SetMessageExit can have a value of either Y or N. If you want the CWCHAD exit to override the MSGEXIT and MSGDATA fields, set the SetMessageExit value to Y as shown below.

```
SetMessageExit=Y
```

### 6.3 SetReceiveExit

This section describes the necessary steps to enable the overriding of the channel's RCVEXIT and RCVDATA fields. SetReceiveExit specifies whether or not the CWCHAD exit will override the RCVEXIT and RCVDATA fields.

SetReceiveExit can have a value of either Y or N. If you want the CWCHAD exit to override the RCVEXIT and RCVDATA fields, set the SetReceiveExit value to Y as shown below.

```
SetReceiveExit=Y
```



## 6.4 SetSecurityExit

This section describes the necessary steps to enable the overriding of the channel's SCYEXIT and SCYDATA fields. SetSecurityExit specifies whether or not the CWCHAD exit will override the SCYEXIT and SCYDATA fields.

SetSecurityExit can have a value of either Y or N. If you want the CWCHAD exit to override the SCYEXIT and SCYDATA fields, set the SetSecurityExit value to Y as shown below.

```
SetSecurityExit=Y
```

## 6.5 SetSendExit

This section describes the necessary steps to enable the overriding of the channel's SENDEXIT and SENDDATA fields. SetSendExit specifies whether or not the CWCHAD exit will override the SENDEXIT and SENDDATA fields.

SetSendExit can have a value of either Y or N. If you want the CWCHAD exit to override the SENDEXIT and SENDDATA fields, set the SetSendExit value to Y as shown below.

```
SetSendExit=Y
```

## 7 Appendix A – Channel Auto-Definition IniFile Summary

A sample Channel Auto-Definition IniFile below is the DD *CLUSCS* supplied for z/OS.

```
[TO.QMGRNAME]
MsgExit=MQCE
MsgData=MQCEIN
[default]
MsgExit=MQCE
MsgData=MQCEIN
```

IniFile keywords are grouped together in sections. A section name is the actual CLUSSDR channel name. A section name is surrounded by square brackets ('[' and ']'). To specify default values for any Channel Auto-Definition IniFile keyword, use the default section. The default section is optional. The IniFile supports the following keywords and their respective values:

**Note: Keywords are case sensitive.**

Keyword	Description of keywords
ConName	<p><b>ConName</b> specifies a value in order to override the current CONNAME field in the CLUSSDR channel definition. ConName is optional. If the keyword is not specified or its value is blank then no override is performed.</p> <p>e.g. ConName=127.0.0.1(1415)</p>
Partner	<p><b>Partner</b> specifies a value to be verified against the incoming connection request's Partner name. Partner is optional. If the keyword is not specified or its value is blank then no check is performed.</p> <p>e.g. Partner=QM5</p>
ScyData	<p><b>ScyData</b> specifies a value in order to override the current SCYDATA field in the CLUSSDR channel definition. ScyData is optional. If the keyword is not specified or its value is blank then no override is performed.</p> <p>For. z/OS: ScyExit=CLNTINI</p>

Keyword	Description of keywords
ScyExit	<p><b>ScyExit</b> specifies a value in order to override the current SCYEXIT field in the CLUSSDR channel definition. ScyExit is optional. If the keyword is not specified or its value is blank then no override is performed.</p> <p>For. z/OS: ScyExit=MQAUSXCL</p>
MsgData	<p><b>MsgData</b> specifies a value in order to override the current MSGDATA field in the CLUSSDR channel definition. MsgData is optional. If the keyword is not specified or its value is blank then no override is performed.</p> <p>e.g. MsgData=MQCEIN</p> <p>Note: Only used if SetMessageExit is set to 'Y' in the DD SYSCHAD</p>
MsgExit	<p><b>MsgExit</b> specifies a value in order to override the current MSGEXIT field in the CLUSSDR channel definition. MsgExit is optional. If the keyword is not specified or its value is blank then no override is performed.</p> <p>e.g. MsgExit=MQCE</p> <p>Note: Only used if SetMessageExit is set to 'Y' in the DD SYSCHAD</p>
RcvData	<p><b>RcvData</b> specifies a value in order to override the current RCVDATA field in the CLUSSDR channel definition. RcvData is optional. If the keyword is not specified or its value is blank then no override is performed.</p> <p>e.g. RcvData=SampleMessageData</p> <p>Note: Only used if SetReceiveExit is set to 'Y' in the DD SYSCHAD</p>
RcvExit	<p><b>RcvExit</b> specifies a value in order to override the current RCVEXIT field in the CLUSSDR channel definition. RcvExit is optional. If the keyword is not specified or its value is blank then no override is performed.</p> <p>e.g. RcvExit =SampleExit</p> <p>Note: Only used if SetReceiveExit is set to 'Y' in the DD SYSCHAD</p>

Keyword	Description of keywords
SendData	<p><b>SendData</b> specifies a value in order to override the current SENDDATA field in the CLUSSDR channel definition. SendData is optional. If the keyword is not specified or its value is blank then no override is performed.</p> <p>e.g. SendData=SampleMessageData</p> <p>Note: Only used if SetSendExit is set to 'Y' in the DD SYSCHAD</p>
SendExit	<p><b>SendExit</b> specifies a value in order to override the current SENDEXIT field in the CLUSSDR channel definition. SendExit is optional. If the keyword is not specified or its value is blank then no override is performed.</p> <p>e.g. SendExit =SampleExit</p> <p>Note: Only used if SetSendExit is set to 'Y' in the DD SYSCHAD</p>

## 8 Appendix B – CWCHAD IniFile Summary

The CWCHAD IniFile is optional. The sample CWCHAD IniFile below is the z/OS IniFile DD *SYSCHAD*.

```
LogMode=Q
LogFile=SYSPRINT
```

The CWCHAD IniFile supports the following keywords and their respective values:

**Note: Keywords are case sensitive.**

Keyword	Description of keywords
SetMessageExit	<p><b>SetMessageExit</b> specifies whether or not the CWCHAD exit will override the MSGEXIT and MSGDATA fields. SetMessageExit supports 2 values [Y / N] where the default value is N.</p> <p>e.g. SetMessageExit=Y</p>
SetReceiveExit	<p><b>SetReceiveExit</b> specifies whether or not the CWCHAD exit will override the RCVEXIT and RCVDATA fields. SetMessageExit supports 2 values [Y / N] where the default value is N.</p> <p>e.g. SetReceiveExit=Y</p>
SetSecurityExit	<p><b>SetSecurityExit</b> specifies whether or not the CWCHAD exit will override the SCYEXIT and SCYDATA fields. SetMessageExit supports 2 values [Y / N] where the default value is Y.</p> <p>e.g. SetSecurityExit=Y</p>
SetSendExit	<p><b>SetSendExit</b> specifies whether or not the CWCHAD exit will override the SENDEXIT and SENDDATA fields. SetMessageExit supports 2 values [Y / N] where the default value is N.</p> <p>e.g. SetSendExit=Y</p>
LogFile	<p><b>LogFile</b> specifies the location of the log file. The default is as follows:</p> <p>For z/OS: LogFile=SYSPRINT</p>

Keyword	Description of keywords
LogMode	<p><b>LogMode</b> specifies what type of logging the user wishes to have. LogMode supports 3 values [Q / N / V] where Q is Quiet, N is Normal and V is Verbose where the default value is N.</p> <p>e.g. LogMode=N</p>

## 9 Appendix D – License Agreement

This is a legal agreement between you (either an individual or an entity) and Capitalware Inc. By opening the sealed software packages (if appropriate) and/or by using the SOFTWARE, you agree to be bound by the terms of this Agreement. If you do not agree to the terms of this Agreement, promptly return the disk package and accompanying items for a full refund.

### SOFTWARE LICENSE

1. **GRANT OF LICENSE.** This License Agreement (License) permits you to use one copy of the software product identified above, which may include user documentation provided in on-line or electronic form (SOFTWARE). The SOFTWARE is licensed as a single product, to an individual user, or group of users for Multiple User Licenses and Site Licenses. This Agreement requires that each user of the SOFTWARE be Licensed, either individually, or as part of a group. A Multi-User License provides for a specified number of users to use this SOFTWARE at any time. This does not provide for concurrent user Licensing. Each user of this SOFTWARE must be covered either individually, or as part of a group Multi-User License. The SOFTWARE is in use on a computer when it is loaded into the temporary memory (i.e. RAM) or installed into the permanent memory (e.g. hard disk) of that computer. This software may be installed on a network provided that appropriate restrictions are in place limiting the use to registered users only.

2. **COPYRIGHT.** The SOFTWARE is owned by Capitalware Inc. and is protected by United States Of America and Canada copyright laws and international treaty provisions. You may not copy the printed materials accompanying the SOFTWARE (if any), nor print copies of any user documentation provided in on-line or electronic form. You must not redistribute the registration codes provided, either on paper, electronically, or as stored in the files MQCE IniFile or any other form.

3. **OTHER RESTRICTIONS.** The registration notification provided, showing your authorization code and this License is your proof of license to exercise the rights granted herein and must be retained by you. You may not rent or lease the SOFTWARE, but you may transfer your rights under this License on a permanent basis, provided you transfer this License, the SOFTWARE and all accompanying printed materials, retain no copies, and the recipient agrees to the terms of this License. You may not reverse engineer, decompile, or disassemble the SOFTWARE, except to the extent the foregoing restriction is expressly prohibited by applicable law.

### LIMITED WARRANTY

**LIMITED WARRANTY.** Capitalware Inc. warrants that the SOFTWARE will perform substantially in accordance with the accompanying printed material (if any) and on-line documentation for a period of 365 days from the date of receipt.

**CUSTOMER REMEDIES.** Capitalware Inc. entire liability and your exclusive remedy shall be, at Capitalware Inc. option, either (a) return of the price paid or (b) repair or replacement of the SOFTWARE that does not meet this Limited Warranty and that is returned to Capitalware Inc. with a copy of your receipt. This Limited Warranty is void if failure of the SOFTWARE has resulted from accident, abuse, or misapplication. Any replacement SOFTWARE will be

warranted for the remainder of the original warranty period or thirty (30) days, whichever is longer.

**NO OTHER WARRANTIES.** To the maximum extent permitted by applicable law, Capitalware Inc. disclaims all other warranties, either express or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose, with respect to the SOFTWARE and any accompanying written materials.

**NO LIABILITY FOR CONSEQUENTIAL DAMAGES.** To the maximum extent permitted by applicable law, in no event shall Capitalware Inc. be liable for any damages whatsoever (including, without limitation, damages for loss of business profits, business interruption, loss of business information, or other pecuniary loss) arising out of the use or inability to use the SOFTWARE, even if Capitalware Inc. has been advised of the possibility of such damages.



## 10 Appendix E – Notices

### **Trademarks:**

AIX, IBM, MQSeries, OS/2 Warp, OS/400, iSeries, MVS, OS/390, WebSphere, IBM MQ and z/OS are trademarks of International Business Machines Corporation.

HP-UX is a trademark of Hewlett-Packard Company.

Intel is a registered trademark of Intel Corporation.

Java, J2SE, J2EE, Sun and Solaris are trademarks of Sun Microsystems Inc.

Linux is a trademark of Linus Torvalds.

Mac OS X is a trademark of Apple Computer Inc.

Microsoft, z/OS, z/OS NT, and the z/OS logo are trademarks of Microsoft Corporation.

UNIX is a registered trademark of the Open Group.

WebLogic is a trademark of BEA Systems Inc.