



CSI

INTERNATIONAL

Original Printing03/20/2003
Last Revised03/20/2003

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GETTING STARTED

Introduction

M-Pact-CMPRS is a program product which compresses 3270 terminal output by removing repetitive characters, and removing all data currently on the screen. This improves transaction response time by reducing transmission time and also by reducing contention between terminals on the same line. Reduction typically varies between 15 and 75 percent, depending on the transmitting application program and data entered by terminal operators.

The data compression occurs within the CICS system, transparent to the user. No user involvement is required, except for product installation, which is quite simple.

Two compression techniques are employed to accomplish this reduction in transmission. The first is referred to as OUTBOUND, which simply combines repetitive characters into a 3270 Repeat to Address (RTA) order. The second compression technique is referred to as INBOUND, which compares the 3270 data stream to the current screen image, and removes all matching data already on the screen.

Two CRT transactions are provided with M-Pact-CMPRS. One displays statistics on compression effectiveness during product use. The other is used to turn M-Pact-CMPRS off or on entirely, (this is normally done automatically during CICS startup), or to turn it off or on for specific terminals or transactions, or to clear entries in the statistics table.

M-Pact-CMPRS consists of four CICS programs and a macro used to generate an option table:

FSICXTCP	is a CICS exit enabled by FSICXENA to capture all terminal output and pass it to the compression module FSICXRES.
FSICXRES	is the main program which compresses the terminal data.
FSICXENA	is a program provided to enable and disable data compression. FSICXENA is usually included in the CICS DFHPLT table so that compression is activated automatically when CICS is started. It may also be used to add or delete terminal id's or transaction id's from the exclude list or reset terminal statistics entries.
FSICXSTA	displays the statistics gathered by FSICXRES.

System Requirements

M-Pact-CMPRS is not expected to be either MVS, or CICS release-dependent.

M-Pact-CMPRS fully supports all 3270 terminal sizes, including 132-character wide model 5's.

Installation

M-Pact-CMPRS installation consists of three simple steps:

- Cataloging programs from distribution tape.
- CICS CEDA additions.
- Selection and assembly of FSICXDEF option table, if selected options are other than the supplied defaults.

Cataloging Programs from Distribution Tape

M-Pact-CMPRS for MVS is distributed on a standard label tape with two files in IEBCOPY format. The first file contains programs FSICXTCP, FSICXRES, FSICXENA, FSICXDEF, and FSICXSTA to be cataloged to a Load Library, and the second file contains the macros FSICXDEF and PRODKEY to be cataloged to a Source Library. The recommended procedure is to use the IBM utility IEBCOPY to restore the files to disk, then (optionally) merge them into existing user libraries. The following JCL is an example of this procedure:

```
//FSICMPRS JOB (ACCOUNT), 'CMPRS INSTALL', CLASS=A, MSGCLASS=A
//RESTORE EXEC PGM=IEBCOPY
//IN1 DD DSN=FSICMPRS.LOADLIB, DISP=(,KEEP), UNIT=TAPE,
// VOL=(,RETAIN, SER=FSI001), LABEL=(1,SL)
//IN2 DD DSN=FSICMPRS.MACLIB, DISP=(,KEEP), UNIT=TAPE,
// VOL=(,RETAIN, REF=* .IN1), LABEL=(2,SL)
//OUT1 DD DSN=&&FSILIB, DISP=(NEW,PASS),
// UNIT=SYSDA, SPACE=(TRK,(3,0,1)), DCB=BLKSIZE=6144
//OUT2 DD DSN=&&FSIMAC, DISP=(NEW,PASS),
// UNIT=SYSDA, SPACE=(TRK,(4,0,1))
//SYSPRINT DD SYSOUT=A
//SYSIN DD *
COPY INDD=IN1, OUTDD=OUT1
COPY INDD=IN2, OUTDD=OUT2
/*
//MERGE EXEC PGM=IEBCOPY, COND=(4,LT,RESTORE)
//FSILIB DD DSN=&&FSILIB, DISP=(OLD,DELETE)
//CICSLIB DD DSN=CICS.LOADLIB, DISP=OLD
//FSIMAC DD DSN=&&FSIMAC, DISP=(OLD,DELETE)
//CICSMAC DD DSN=CICS.MACLIB, DISP=OLD
//SYSPRINT DD SYSOUT=*
//SYSUT4 DD UNIT=SYSDA, SPACE=(CYL,(2,1)), DCB=KEYLEN=8
//SYSIN DD *
COPY INDD=FSILIB, OUTDD=CICSLIB
COPY INDD=FSIMAC, OUTDD=CICSMAC
/*
//
```

CICS CEDA Additions

The following entries are made in CICS:

```

DEFINE PROGRAM(FSICXDEF) GROUP(FSICMPRS)
  DESCRIPTION(FSICMPRS 3.1A)
  LANGUAGE(ASSEMBLER) RELOAD(NO) RESIDENT(YES) USAGE(NORMAL)
  USESVACOPY(NO) STATUS(ENABLED) CEDF(YES) DATALOCATION(ANY)
  EXECKEY(USER) EXECUTIONSET(FULLAPI)
DEFINE PROGRAM(FSICXENA) GROUP(FSICMPRS)
  DESCRIPTION(FSICMPRS 3.1A)
  LANGUAGE(ASSEMBLER) RELOAD(NO) RESIDENT(NO) USAGE(NORMAL)
  USESVACOPY(NO) STATUS(ENABLED) CEDF(YES) DATALOCATION(ANY)
  EXECKEY(CICS) EXECUTIONSET(FULLAPI)
DEFINE PROGRAM(FSICXRES) GROUP(FSICMPRS)
  DESCRIPTION(FSICMPRS 3.1A)
  LANGUAGE(ASSEMBLER) RELOAD(NO) RESIDENT(YES) USAGE(NORMAL)
  USESVACOPY(NO) STATUS(ENABLED) CEDF(YES) DATALOCATION(ANY)
  EXECKEY(CICS) EXECUTIONSET(FULLAPI)
DEFINE PROGRAM(FSICXSTA) GROUP(FSICMPRS)
  DESCRIPTION(FSICMPRS 3.1A)
  LANGUAGE(ASSEMBLER) RELOAD(NO) RESIDENT(NO) USAGE(NORMAL)
  USESVACOPY(NO) STATUS(ENABLED) CEDF(YES) DATALOCATION(ANY)
  EXECKEY(USER) EXECUTIONSET(FULLAPI)
DEFINE PROGRAM(FSICXTCP) GROUP(FSICMPRS)
  DESCRIPTION(FSICMPRS 3.1A)
  LANGUAGE(ASSEMBLER) RELOAD(NO) RESIDENT(NO) USAGE(NORMAL)
  USESVACOPY(NO) STATUS(ENABLED) CEDF(YES) DATALOCATION(ANY)
  EXECKEY(CICS) EXECUTIONSET(FULLAPI)
DEFINE TRANSACTION(FCST) GROUP(FSICMPRS)
  DESCRIPTION(FSICMPRS 3.1A)
  PROGRAM(FSICXSTA) TWASIZE(0) PROFILE(DFHICST)
  STATUS(ENABLED)
  TASKDATALOC(ANY) TASKDATAKEY(USER) STORAGECLEAR(NO)
  RUNAWAY(SYSTEM) SHUTDOWN(DISABLED) DYNAMIC(NO) PRIORITY(1)
  TRANCLASS(DFHTCL00) DTIMOUT(NO) INDOUBT(BACKOUT) RESTART(NO)
  SPURGE(NO) TPURGE(NO) DUMP(YES) TRACE(YES) CONFDATA(NO)
  RESSEC(NO) CMDSEC(NO)
DEFINE TRANSACTION(FSIC) GROUP(FSICMPRS)
  DESCRIPTION(FSICMPRS 3.1A)
  PROGRAM(FSICXENA) TWASIZE(0) PROFILE(DFHICST)
  STATUS(ENABLED)
  TASKDATALOC(ANY) TASKDATAKEY(CICS) STORAGECLEAR(NO)
  RUNAWAY(SYSTEM) SHUTDOWN(DISABLED) DYNAMIC(NO) PRIORITY(1)
  TRANCLASS(DFHTCL00) DTIMOUT(NO) INDOUBT(BACKOUT) RESTART(NO)
  SPURGE(NO) TPURGE(NO) DUMP(YES) TRACE(YES) CONFDATA(NO)
  RESSEC(NO) CMDSEC(NO)

```

The following entry must be added to your PLTPI for system initialization.

```
DFHPLT TYPE=ENTRY,PROGRAM=FSICXENA
```

Installers not familiar with PLTPI's should refer to the CICS System Reference Guide index, under 'PLTPI' and 'DFHPLT'. In particular, it should be noted that the name of each PLT table, for example, DFHPLTBM, as well as the programs referred to by the table, in this case FSICXENA, must be present in the CICS DFHPPT table.

Selection and Assembly of FSICXDEF Option Table

M-Pact-CMPRS provides user options via a table prepared using the FSICXDEF macro. The table is required. It is used to specify terminals or transactions to be excluded from compression. Exclusion is rarely necessary, but there are some unusual cases which M-Pact-CMPRS cannot support. A terminal example which has occurred involves a device connected to a "protocol converter" to effect 3270-compatibility (almost). To be supported by M-Pact-CMPRS, a 3270 terminal must support the "repeat-to-address" (RTA) sequence. Since this sequence may be properly issued by an application program (although it rarely is), nearly all 3270-compatible devices support the RTA sequence.

The reason for excluding a transaction from compression is usually because the transaction includes an unusual programming technique for writing out a 3270 screen. This technique involves specifying 'SAVE' on the write request, and then issuing a second I/O with the same buffer after replacing some, but not all, of the data from the first write. the technique is not available to users of Command Level, or BMS, and is rarely used in any case.

Most users will never need to exclude any terminals or transactions from compression, but the table is provided just in case. The exclude lists in the table are generated with some empty entries, so that entries may be added dynamically using the FSIC transaction, if problems are suspected with a specific terminal or transaction due to use of M-Pact-CMPRS.

The FSICXDEF table is generated and cataloged to a Load Library with a job stream similar to the following:

```
//ASMCXDEF EXEC PROC=DFHASMVS    (CICS Assembly Proc)
//SYSIN DD *
        FSICXDEF TYPE=INITIAL,COMP=FULL,EXTERM=EXCLUDE,UCTRAN=YES
        FSICXDEF TYPE=ENTRY,EXTRAN=(xxxx,xxxx,xxxx),COMP=INBOUND
        FSICXDEF TYPE=ENTRY,EXTERM=(yyyy,yyyy,yyy),COMP=FULL
        FSICXDEF TYPE=FINAL
        END
/*
//LNKCXDEF EXEC PROC=DFHLNKVS    (CICS Link Edit Proc)
//LNK.SYSLIN DD *
        INCLUDE SYSPUNCH(FSICXDEF)
        NAME FSICXDEF(R)
/*
```

The parameters and their default values are:

TYPE=INITIAL

SKIP (BTAM only) specifies a group of terminals for which compression is not to take place. Specify **SKIP=LOCAL** to skip compression for locally attached terminals. Specify **SKIP=REMOTE** to skip compression for remotely attached terminals. Omit the **SKIP** parameter altogether if compression is to take place for both locally and remotely attached terminals.

EXTERM **EXCLUDE** or **INCLUDE**, the default being **EXCLUDE**. This operand reverses the effect of the terminal exclude table for **EXTERM=INCLUDE** (see **TYPE=ENTRY**). It also reverses the effect of the 'FSIC ON,TERMID=xxxx' and 'FSIC OFF,TERMID=xxxx' transactions. This allows you to turn compression on for just a select group of terminals, instead of the default, which is to turn it on for all terminals, except a select group.

COMP specifies the type of compression that should be used:

INBOUND	Inbound compression only.
OUTBOUND	Outbound compression only.
FULL	Both Inbound and Outbound compression.
OFF	No compression until FSIC ON transaction is used.

The default is **COMP=FULL**

UCTRAN **YES** or **NO**, the default is **YES**. This operand pertains to **INBOUND** compression.

M-Pact-CMPRS uses standard CICS Global Exit facilities to perform inbound compression. If any of your terminals have the **UCTRAN** feature, the terminal input is translated from lower case to upper case before CICS passes control to the exit. This prevents M-Pact-CMPRS from correctly reflecting what is actually on the terminal screen.

When **UCTRAN=YES** is specified, or allowed to default, M-Pact-CMPRS assumes all input was keyed in lower case, and will pass all upper case data back to the terminal, maintaining the proper screen contents, but with reduced compression levels.

When **UCTRAN=NO** is specified, the lower case characters on the terminal will remain lower case until they are changed by the transaction, even though the data is being processed by the transaction in upper case. This option maintains the maximum compression level possible, but can result in some unusual looking screens of upper and lower case letters.

TRACE nnn, the default is 50. The amount of storage in (K) to reserve when the trace facility is activated. The trace facility is used by the Connectivity Systems technical staff to collect information for problem resolution.

TYPE=ENTRY

EXTRAN string of 1-4 character transaction identifications separated by commas. The entire string must be placed within parentheses. If the transaction entered is found in this table, compression will be bypassed for the specified **COMP**.

EXTERM string of 1-4 character terminal identifications separated by commas. The entire string must be placed within parentheses. If the terminal on which a transaction is entered is found in this table, compression will be bypassed for the specified **COMP**.

Note: A generic exclusion can be accomplished by using the character '?' in the terminal ID or Tran ID.

EXTERM=Q1?? will exclude all terminals that begin with 'Q1'.

EXTRAN=???L will exclude all transactions that have an 'L' in the fourth position.

COMP specifies the type of compression that should be excluded:

FULL exclude all compression.

INBOUND exclude Inbound compression.

OUTBOUND exclude Outbound compression.

Multiple TYPE=ENTRY statements can be used to exclude transactions and/or terminals. If there are no exclusions, then only the TYPE=INITIAL and TYPE=FINAL statements are necessary.

Inbound vs Outbound Compression Technique

M-Pact-CMPRS has two general techniques which can be activated via the definition module FSICXDEF. The first technique which we call Outbound, looks at the terminal data stream and changes repeated characters to RTA (Repeat to Address) orders.

The second technique, added in release 3.0 as an optional feature, which we call Inbound, keeps a copy of the terminals screen image in memory, compares the outbound terminal data stream to it, and removes characters found to be already on the screen. ("Inbound" is somewhat misleading, it reduces data to be sent to the terminal, but based on information which came "in" from the terminal previously.)

INBOUND, OUTBOUND, or FULL (both), can be used to compress terminal traffic. The actual percent saved will depend on the actual data being sent to your terminals. To determine which technique or mixture to use, you will want to get test results using all of the possibilities. Try INBOUND for a day, then OUTBOUND for a day, and finally try FULL for a day. Each time, print the FCST screen at the end of each day. Compare the total savings for each of the three days. From this you should be able to decide which technique will give you the most savings.

INBOUND compression requires a significant amount of CPU and memory. Unless the percentage of savings with INBOUND turned on is significantly larger than with it turned off, you will probably be better off, resource wise, to only use OUTBOUND compression.

For those terminals or transactions that have a low percent of savings, it would be wise to EXCLUDE them from compression. This will save memory and CPU time if Inbound is used, and CPU time if Outbound is used.

The goal is to use the best compression mix, just where it is needed, trading machine resources for better response time.

Inbound Compression Storage Use

The optional INBOUND compression feature of M-Pact-CMPRS requires keeping an image of the terminal buffer in GETMAIN storage. The amount of storage required is dependent on the number of terminals being compressed, and the models of the terminals you are using.

To get an idea of the amount of storage that will be required, use the following formula:

# of Mod 1 terminals	*	2048
# of Mod 2 terminals	*	4096
# of Mod 3 terminals	*	5376
# of Mod 4 terminals	*	6912
# of Mod 5 terminals	*	7168

Take the sum of the above calculations, divide by 1024, and then add 1K.

Example: 50 Mod-2 terminals and 20 Mod-4 terminals

50 * 4096	=	204,800
20 * 6912	=	138,240

		343,040
divide by 1024	=	335
plus 1	=	336K

USING M-Pact-CMPRS

FSICXSTA Operation

The FSICXSTA program is initiated by a 4-character CICS transaction id of 'FCST'. the following information is displayed.

Terminal	Bytes_In	Inbound	%	Outbound	%	%Saved	#Writes	#Skipped
-TOTAL-	870,596	76,249	91.2	64,170	15.8	92.6	491	0
TN03	140,744	7,326	94.7	5,733	21.7	95.9	75	0
TN13	350,686	14,357	95.9	12,751	11.1	96.3	185	0
TN15	42,846	3,979	90.7	2,440	38.6	94.3	25	0
TN16	210,234	9,814	95.3	8,335	15.0	96.0	112	0
TN17	126,086	40,773	67.6	34,911	14.3	72.3	94	0

(PF3)End (PF7)Bwd (PF8)Fwd (ENTER)Refresh (*)Off (C)2003 F S I

Memory: nnnK

is the amount of virtual storage that has been acquired to hold screen buffers.

(SOS) this indicates that a GETMAIN failed and compression for some terminals is not functioning. If this occurs, you can flush all buffers and start over by turning M-Pact-CMPRS off and back on (FSIC OFF then FSIC ON). If this condition occurs frequently, you should consider increasing the storage allocation for the next CICS startup.

Terminal terminal identification of the CICS terminal

Bytes In number of bytes before compression

Inbound number of bytes after inbound compression. An '*' following this field indicates that inbound compression is currently turned off for the terminal.

% percent saved with inbound compression

Outbound number of bytes after outbound compression. An '*' following this field indicates that outbound compression is currently turned off for the terminal.

% percent saved with outbound compression

%Saved overall percentage saved with both compression methods

#Writes number of output data streams sent

#Skipped number of output data streams bypassed by M-Pact-CMPRS
(normally zero)

The first entry displayed is cumulative for all CRT's respectively. All remaining entries will contain the CICS terminal identification.

The '#Skipped' field pertains to unusual circumstances where M-Pact-CMPRS does not compress a terminal buffer, usually because the transaction has been specified in the FSICXDEF table for exclusion from compression. Normally, the #Skipped value is zero.

You can request the statistics for a specific terminal by entering the following command:

```
FCST TERMID=xxxx
```

Where xxxx is the desired CICS terminal id. You can request the statistics for the terminal making the request by entering the following command:

```
FCST TERMID=*
```

Function Key Usage

PF3/PF15/CLEAR	Terminates the FCST transaction.
PF7/PF19	Scrolls to the previous screen of terminal statistics.
PF8/PF20	Scrolls to the next screen of terminal statistics.
ENTER	Refreshes the statistics for the current screen of terminals.

FSICXENA Operation

The FSICXENA program is initiated by a 4-character CICS transaction id of 'FSIC'. The FSIC functions are listed and explained below. There are numerous options provided to control the product use, but in practice they are used mostly during product evaluation to determine the compression effectiveness. The ability to dynamically turn compression off for specific terminals and transactions is provided in the unlikely event that compression is suspected of causing problems for those terminals or transactions.

General Format:

```

FSIC | ON | [ , COMP= | INBOUND | ] [ , RESET ] [ , | TERMID=* | ]
    | OFF |          | OUTBOUND |          | | TERMID=xxxx |
    |          |          | FULL   |          | | TRANID=xxxx |
FSIC TRACE= | xxxx |
              | OFF  |
              | DUMP |
    
```

FSIC Operands	EXPLANATIONS
<pre> ON OFF </pre>	Turn compression 'on' or 'off'
<pre> COMP= INBOUND OUTBOUND FULL </pre>	Specifies the type of compression to be turned 'on' or 'off'. If omitted, COMP=FULL is assumed
RESET	Resets the values in the statistics table
<pre> TERMID=* TERMID=xxxx TRANID=xxxx </pre>	Specifies the specific terminal or transaction for which this ON/OFF operation is to be performed. If omitted, the ON/OFF operation is performed for the entire system.
	Generic terminal ids and transaction ids can be accomplished by using the character "?":
	T??? starts with a 'T'
	???T ends with a 'T'
	?T?? contains a 'T' in second position.

TERMID=* specifies that the operation is to be performed for the terminal from which the FSIC transaction is entered.

TRACE=

xxxx
OFF
DUMP

Start/Stop/Dump the internal trace facility. This feature is used by the CSI support staff for problem determination. xxxx is a terminal id.

Only one trace can be active at a time.

Specific Examples:

FSIC ON , COMP=FULL

Turn full compression 'on' for the entire system.

FSIC OFF , COMP=INBOUND

Turn INBOUND compression 'off' for the entire system.

FSIC ON , RESET , TERMID=xxxx

Turn compression 'on' for a specific terminal and resets the terminal's statistics table entry (if one exists)

FSIC OFF , TERMID=*

Turn all compression 'off' for the terminal issuing the FSIC transaction.

FSIC OFF , COMP=OUTBOUND , TRANID=xxxx

Turn OUTBOUND compression 'off' for a specific CICS transaction id.

FSIC OFF , COMP=OUTBOUND , TRANID=T???

Turn OUTBOUND compression 'off' for all CICS transaction ids starting with 'T'.

Product Use Notes

The following comments and suggestions may be helpful if you are having problems with M-Pact-CMPRS:

PC File Transfer Performance

It has been noted that in some file transfer environments, compression in CICS will slow down the transfer rates on the PC, due to the 3270 emulator actually taking longer to 'uncompress' the data than the transmit time saved. You may want to exclude these type of terminals from compression, especially if your PCs are locally attached to your host CPU.

CICS MRO/ISC

When using M-Pact-CMPRS in a CICS MRO/ISC environment, you should install M-Pact-CMPRS in the terminal owning region (TOR).

INBOUND Compression Anomalies

M-Pact-CMPRS will emulate ERASE/WRITE operations as part of its INBOUND compression. This can cause problems with certain transactions.

If you have any transactions that transmit imbedded nulls within a screen field that can be input back to the host, these screens will not function properly with INBOUND compression.

If you encounter any of these transactions, exclude them from INBOUND compression with the following:

```
FSICXDEF TYPE=ENTRY , EXTRAN=xxxx , COMP=INBOUND
```


MESSAGES

The following messages may result from use of FSICXENA.

xxxx TRAN or TERM.

yyyy the transaction ID or the terminal ID.

FSICXENA01	M-Pact-CMPRS 3.0A HAS BEEN TURNED ON
FSICXENA02	M-Pact-CMPRS 3.0A HAS BEEN TURNED OFF
FSICXENA03	FSICXTCP PROGRAM NOT FOUND
FSICXENA04	FSICXDEF PROGRAM NOT FOUND
FSICXENA05	FSICXTCP IS ALREADY ACTIVE
FSICXENA06	UNSUPPORTED VERSION OF CICS
FSICXENA07	FSICXTCP IS NOT ACTIVE
FSICXENA09	COMPRESSION HAS BEEN TURNED ON FOR xxxx ID=yyyy
FSICXENA10	COMPRESSION HAS BEEN TURNED OFF FOR xxxx ID=yyyy
FSICXENA11	COMPRESSION STATISTICS TABLE HAS BEEN RESET
FSICXENA12	INVALID REQUEST
FSICXENA13	xxxx ID EXCLUDE TABLE IS FULL
FSICXENA14	xxxx ID=yyyy NOT FOUND IN EXCLUDE TABLE
FSICXENA15	xxxx ID=yyyy ALREADY IN EXCLUDE TABLE
FSICXENA16	STATISTICS ENTRY FOR xxxx ID=yyyy HAS BEEN RESET
FSICXENA18	EXITS=YES MISSING FROM SIT
FSICXENA19	ENABLE ERROR EXIT=xxxxxxxx EIBRCODE=xxxxxxxx
FSICXENA20	FSICXRES PROGRAM NOT FOUND
FSICXENA21	TRACE STARTED
FSICXENA22	TRACE STOPPED
FSICXENA23	TRACE DUMPED
FSICXENA24	TRACE NOT STARTED RC=xx

FSICXENA25 COMP=INBOUND ACTIVATED

FSICXENA26 COMP=OUTBOUND ACTIVATED

FSICXENA27 COMP=INBOUND DEACTIVATED

FSICXENA28 COMP=OUTBOUND DEACTIVATED

FSICXENA29 COMP=INBOUND ALREADY ACTIVE

FSICXENA30 COMP=OUTBOUND ALREADY ACTIVE

FSICXENA31 COMMAND PROCESSING COMPLETE

FSICXENA32 COMP=INBOUND ALREADY INACTIVE

FSICXENA33 COMP=OUTBOUND ALREADY INACTIVE

FSICXSTA01 PROGRAM NOT FOUND(FSICXTCP)

FSICXSTA02 NO STATISTICS COLLECTED, COMPRESSION NEVER STARTED

FSICMPRS WILL EXPIRE WITHIN 30 DAYS - CONTACT CONNECTIVITY SYSTEMS, INC.

FSICMPRS HAS EXPIRED - CONTACT CONNECTIVITY SYSTEMS, INC.

NOTE: Messages FSICXENA01, FSICXENA02, and the two EXPIRE messages will also be written to the system console.