All My Papers

AX9LIB/X9TOOLS

Input File Formats™

Feb 2014

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OVERVIEW

An interface process must be created from your check scanning process to the AMP X9 products. This would include reading the check image files and creating one of the following formats for input into X9 processing.

After the input file is created, enter AX9Lib and use the correct Convert From function to create the appropriate X9.37 file. If you are using a X9.37 as input, you would use the correct Convert To function to create the various output files available.

If your output file is a X9.37 or CSV, you can display in AMP's X9Viewer to analyze, update or correct errors.

INPUT FILE FORMATS

AX9 processing will accept the following input formats:

1. **NSF (Normalized Scanner Format)** – There is four NSF formats for creating X9.37 files. The first line of each has the file type information and additional other information that may be needed by the file. This could include a file name and/or translation table.

   The Convert From NSF function will automatically detect the various NSF formats.

   - NSF – AMP's AX9lib function Convert From NSF will read a NSF formatted file and construct a X9.37 file in the working directory. It can be created by using editing software such as Notepad.

     For this function to finish successfully, all of the Single Image TIFF or JPEG files referenced in the source NSF file must exist and be valid TIFF or JPEG files. Each image is represented by a single TIFF file with one image in the file. The name of the file is stored in the NSF file. The NSF format has a comma separated item for each X9.37 MICR line field.

     The ECE Institution Item Sequence Number may be included on the NSF line after the other data. If the NSF data does not have Item Sequence Number data, then the numeric value in the parameter Sequence will be incremented and used as the ECE Institution Item Sequence Number for entry in field 8 of the first record type 25. The NSF file generated by the X9.37 to NSF also contains the Cash Letter, Bundle and Item numbers, but that information does not need to be present for input.

   - NSF2 – The NSF2 is the format that would typically come from a scanner. This format only contains the front and back image file names and the MICR line data. The full MICR line is input as a single field and the software parses into the proper fields. This format requires that the first line of the file contain a client's

translation table so that the special MICR codes can be represented in text. There is no AX9LIB function to generate an output NSF2 format.

- NSF/MIT - Multi Image TIFF format for NSF files. The source of the front and back side image data is a multi image Tiff file.

  When the check images are stored in a Multi Image Tiff file, the NSF format must be able to identify that it is a MIT file. Therefore, the header line in this case is NSFMIT.

  For each check to be included in the file, a single text line is needed in the NSF/MIT file. The source line contains the file names for TIFF images of the check front, its index and the file name for the back image and its index. It also contains the MICR line data in a simple parsed format. There are a few parameters added by the calling function to identify source and destination routing numbers and a few other elements. However what comes from the scanner is the critical data. The parsed MICR line follows the X9.37 and X9.90 definitions of MICR line parsing. *NOTE: This function requires a special license.*

  - NSF/BLOB – A "BLOB" is a generic usage that would be an unformatted concatenation of data. This format does not have individual file names for each image, but has only a reference to the location and length of the image in a master BLOB whose name is in the NSF header line of the file and is NOT repeated with each line that uses it. Each image is represented by a reference offset and size into a multi image BLOB. *NOTE: This function requires a special license.*

2. CSV Format – Comma Separated Variable – this is a comma delimited file with a one to one correspondence with X9.37 format as specified in the DSTU X9.37 manual. Many times this is used to output a full X9.37 file to a CSV for editing in a text editor or via software and then the edited CSV file is used to rebuild a new X937 file. An example is included with the installation package.

3. X9.37 Format – This format is necessary for electronic exchange as specified in the DSTU X9.37-2003 Manual for specifications for the X9.37 file. A X9.37 formatted file can also be used as input to create various classes of output files for further dissection of contents. See Output section for file formats that can be created from the X9.37 format, including NSF/SIT, NSF/BLOB, CSV/SIT, CSV/BLOB, SOP, 180, and MAL.

4. MAL – This is a FRB Payers Services formatted ASCII file. The title is MAL because the header records are "mal formed" 937 formatted files from a version of a 1994 - X9.37. It is the same as the current X9.37 format but without the image records and a wrong value for the record length field. *NOTE: This function requires the X9180 license feature bit.*

NSF FILE FORMAT

NSF is a format of All My Papers. The NSF format is probably the simplest format to use and the easiest to create for product verification. There is only one line item per check image using this format and a single image TIFF image per line.

The following shows an example of a NSF file that could be created from a scanned image prior to entering into AMP's AX9Lib and an example inserting a Credit Record 61.

Example 1 - NSF Input Text File

```
NSF," ",0,0,"Copyright 2005 All My Papers"
C:\temp\00000008.tif","C:\temp\00000010.tif"," "," ","011000112","       77777777/0377","0000600000","011000112
C:\temp\00000015.tif","C:\temp\\0000017.tif"," "," ","011000112","       88888888/0596","0000900000"
```

Field Name	Data Length	Field Value Examples

File Header Record

Field Name	Data Length	Field Value Examples
File Type	Alphanumeric Variable	NSF,
Input File Name	Alphanumeric Variable	" ",
Reserved	Numeric	0,
Reserved	Numeric	0,
Proprietary Information	Alphanumeric Variable	"Copyright 2005 All My Papers"

Item Record:

Field Name	Data Length	Field Value Examples
Front Side Image File Name	Alphanumeric Variable	"C:\temp\0000008.tif",
Back Side Image File Name	Alphanumeric Variable	"C:\temp\0000010.tif",
MICR Aux On US	Alphanumeric, Blank (right-justify)	" ",
MICR EPC	Alphanumeric, Blank	" ",
MICR Routing Number	Alphanumeric	"011000112",
MICR On Us	Alphanumeric, Blank (right-justify)	" 77777777/0377",
MICR Item Amount	Numeric (Zero-fill)	"0000600000",
ECE Institution Item Seq Nbr	NB	"01100012 ", (if any)
Payee Name	Alphanumeric	"John Doe ",
Deposit Account Number	NB	"123456789",
Branch	NB	" 8888",

Example 2 - NSF Credit Record

```
NSF," ",0,0,"Copyright 2006 All My Papers"
"REC+61+VER+01","c:\temp\00000038.tif","c:\temp\00000041.tif","000000000000151","1","123456780",
"00000000005610167180","0000900000","00000000001500K"
C:\temp\00000008.tif","C:\temp\00000010.tif"," "," ","011000112","       77777777/0377","0000900000","011000112
```

Field Name	Data Length	Field Value

Credit Item Record:

Field Name	Data Length	Field Value
Record 61 type	Mandatory	"REC+61+VER+01",
Front Side Image File Name	Alphanumeric Variable	"C:\temp\0000038.tif",
Back Side Image File Name	Alphanumeric Variable	"C:\temp\0000041.tif",
MICR Aux On US	Alphanumeric, Blank	"000000000000151",
MICR EPC	Alphanumeric or Blank	"1",
MICR Routing Number	Alphanumeric	"123456780",
MICR On Us	Alphanumeric, Blank	"00000000005610167180",

MICR Item Amount	Numeric	"0000900000",
BOCL Item Sequence	Numeric	"00000000001500K"

Example 3 - NSF Input Text File with a "28" parameter

NSF,"H:\All My Papers\X9.37\Copy of Fed\ForwardSample[1].txt",0,0,"Copyright 2005 All My Papers","28"

```
C:\temp\00000008.tif","C:\temp\00000010.tif"," "," ","011000112","      77777777/0377","0000600000","011000112
C:\temp\00000015.tif","C:\temp\\0000017.tif"," "," ","011000112","      88888888/0596","0000900000"
```

Field Name	Data Length	Field Value Examples
File Header Record		
File Type	Alphanumeric Variable	NSF,
Input File Name	Alphanumeric Variable	" ",
Reserved	Numeric	0,
Reserved	Numeric	0,
Proprietary Information	Alphanumeric Variable	"Copyright 2005 All My Papers"
Parameter	Numeric	"28"
Item Record:		
Front Side Image File Name	Alphanumeric Variable	"C:\temp\0000008.tif",
Back Side Image File Name	Alphanumeric Variable	"C:\temp\0000010.tif",
MICR Aux On US	Alphanumeric, Blank (right-justify)	" ",
MICR EPC	Alphanumeric, Blank	" ",
MICR Routing Number	Alphanumeric	"011000112",
MICR On Us	Alphanumeric, Blank (right-justify)	" 77777777/0377",
MICR Item Amount	Numeric (Zero-fill)	"0000600000",
ECE Institution Item Seq Nbr	NB	"01100012 ", (if any)

NSF2 FILE FORMAT

NSF2 is a format of All My Papers. The NSF2 format provides more user flexibility. There is only one line item per check image using this format. This format only contains the file names for the TIFF front and back image file names and the MICR line data. This format requires that the first line of the file contain a translation table so that the special MICR codes can be represented in text. See AX9Lib/Help/AX9Lib Reference Manual for further definition of Translation Table.

NSF2 Translation Table

> 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,15,16,17
> 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, ⑆, ⑈, ⑇, ⑉,   , ? ,NA
> (Route Code, Amount Code, Onus Code,
> Dash Code, Blank, Unknown, NA)

Example - NSF2 Input File

The user must supply a Translation Table in the File Header Record to show how the MICR special characters relate to the input.

```
NSF2," ","0123456789ABCD *n","Copyright 2005 All My Papers"
"c:\temp\00000008.tif","c:\temp\00000010.tif",A011000112A777777777C 0377B0000900000B,"111111111111111"
"c:\temp\00000015.tif","c:\temp\00000017.tif",A011000112AC88888888C 0496B0000600000B,"111111111111111"
```

Field Name	Data Length	Field Value Examples
File Header Record		
File Type	Alphanumeric Variable	NSF2,
Input File Name	Alphanumeric Variable	" ",
Translation Table	Alphanumeric	"0123456789ABCD *n",
Proprietary Information	Alphanumeric Variable	"Copyright 2005 All My Papers"
Item Record:		
Front Side Image File Name	Alphanumeric Variable	"C:\temp\0000008.tif",
Back Side Image File Name	Alphanumeric Variable	"C:\temp\0000010.tif",
MICR Line		A011000112A777777777C 0377B0000900000B,
ECE Item Sequence Number	Alphanumeric(15)	"111111111111111"

NSFMIT FILE FORMAT

The NSFMIT format is a multi image file and supports all of the normal NSF fields plus it allows for input of the Payee and Deposit Account number as seen on the last line of this example. When the check images are stored in a Multi Image Tiff file, NSF format must be able to identify that it is a Multi Image file and the image index within the multi image Tiff file. The header line in this case is NSFMIT.

Example - NSFMIT

NSFMIT,"",0,0,"Copyright 2014 All My Papers"

"C:\Image file.tif",1,,,"C:\\Image file.tif",2,,," "," ","",""   77777777/0377","0000900000","11111111111"

"C:\Image file.tif",3,,,"C:\Image file.tif",4,,," "," ","011000112","88888888/0596","0000600000","2222222222222"

"C:\Image file.tif",7,,,"C:\Image file.tif",8,,," "," ","661866434","6718669047/0006641","0000000400",

"555555555555555","Franklin","232323"

Field Name	Data Length	Field Value Examples
File Header Record		
File Type	Alphanumeric Variable	NSFMIT,
Input File Name	Alphanumeric Variable	"",
Reserved	Alphanumeric	0,
Reserved	Alphanumeric	0,
Proprietary Information	Alphanumeric Variable	"Copyright 2014 All My Papers"
Item Record:		
Front Side Image	Alphanumeric Variable	"C:\Image file.tif",
Front Side Index in Tiff	Numeric	1,
Front Side Image 2	Alphanumeric Variable	"", or image file
Front Side Index 2 in Tiff	Numeric	"", or image index into file
Back Side Image	Alphanumeric Variable	"C:\Image file.tif",
Back Side Index in Tiff	Numeric	2,
Back Side Image 2	Alphanumeric Variable	"", or image file
Back Side Index in Tiff	Numeric	"", or image index into file
MICR AUX On Us		" ",
MICR EPC		" ",
MICR Routing		"",
MICR ONUS		" 7777777/0377",
MICR Amount		"00009000000",
ECE Institution Item Seq Nbr		"11111111111",
Payee		"",
Deposit Account Number		""

NSFBLOB FILE FORMAT

A "BLOB" is a generic usage that identifies an unformatted concatenation of data. This
format does not have individual file names for each image, but has only a reference to the
location and length of the image in a master BLOB whose name is in the NSF header line of
the file and is not repeated with each line that uses it. Each image is represented by a
reference offset and size into a multi image BLOB.

```
NSFBLOB,"",0,0,"Copyright 2005 All My Papers"
0000000625,0000007036,"36DA29E25F78EF5392F39A5ABCD8704EA908D651",0000007950,0000003330,"0622D9A
681267A9D8225E80120A2C1DC058C669C","                ","  ","011000112","
77777777C0377","0000900000","987654320"

0000011737,0000005620,"6C4996B783E58B2F1E08AF3CC2DA7AD1C3CDB635",0000017646,0000003082,"E28EFF9
5051228F4943CD0A66D1702441852DFF5","                ","  ","011000112","
88888888C0596","0000600000","987654320","20090721","011000112
```

Field Name	Data Length	Field Value Examples
File Header Record		
File Type	Alphanumeric Variable	NSFBLOB,
Input File Name	Alphanumeric Variable	" ",
Reserved	Alphanumeric	0,
Reserved	Alphanumeric	0,
Proprietary Information	Alphanumeric Variable	"Copyright 2005 All My Papers"
Item Record:		
Front Side Image Index	Numeric	0000000625,
Front Side Image Length	Numeric	0000007036,
Front Side Image	Alphanumeric	"36DA29E25F78EF5392F39A5ABCD8704EA908D651",
Back Side Image Index	Numeric	0000007950,
Back Side Image Length	Numeric	0000003330,
Back Side Image	Alphanumeric	"0622D9A681267A9D8225E80120A2C1DC058C669C",
MICR AUX On Us		" ",
MICR EPC		" ",
MICR Routing		"01000112",
MICR ONUS		" 7777777/0377",
MICR Amount		"00009000000",
ECE Institution Item Seq Nbr		"987654320",

CSV FILE FORMAT

In CSV format there is a **one to one** correspondence between each field in the X9.37 file and a comma separated field in the CSV file. The exceptions are the variable length fields such as image data. The CSV file will have an image reference or the name of a file where the image data is placed.

Definitions are only given for a few of the records necessary. AMP will supply Records 10, 20, 26, 28, 70, 90, and 99. If records 10 and 20 are not supplied, the file will process, but will not have the necessary valid fields for exchange and will need to be manually edited.

A Credit Record 61 can also be inserted in this file format.

The CSV file can be edited via Notepad. **Note**: Excel does not convert well for use with AX9Lib. The example shows a file similar to what is included with the AX9Lib installation.

Example - CSV Input Text File

```
"'01","'03","'T","'011000015","'011000112","'20040916","'0909","'N","'John Doe Bank    ","'Presidents Bank   ","'1","'  ","'
","'  "
"'10","'01","'011000015","'011000112","'20040809","'20040812","'0431","'I","'G","'10111011","'John Smith
","'1234567890","'1","'   ","'  "
"'20","'01","'011000015","'011000112","'20040809","'20040809","'BU10111011","'0001","'3 ","'011000112","'      ","'
"
"'25","'             ","'  ","'01100011","'2","'        77777777/0377","'0000900000","'210041944
","'G","'1","'1","'Y","'02","'4","'F"
"'26","'1","'011000015","'20040809","'210041940     ","'                 ","'       ","'                ","'Y","'2","'1","'
","'   "
"'28","'01","'011000112","'20040809","'210041940     ","'Y","'2","'1","' ","'            ","'                 "
"'50","'1","'301171285","'20040809","'00","'00","'0007036","'0","'00","'0","'00","'00000","'0000000","'0000000","'0","'
","'           "
"'52","'211870870","'20040809","' 3","'210041944     ","'             ","'                 ","'
","'0","'0000","'0000","'0000","'0000","'    0","'''","'    0","'''","'   7036","'C:\temp\00000008.tif"
"'50","'1","'301171285","'20040809","'00","'00","'0003330","'1","'00","'0","'00","'00000","'0000000","'0000000","'0","'
","'           "
"'52","'211870870","'20040809","' 3","'        210041944","'             ","'                 ","'
","'0","'0000","'0000","'0000","'0000","'    0","'''","'    0","'''","'   3330","'C:\temp\00000010.tif"
"'70","'0002","'000001500000","'             ","'00004","'                ","'                    "
"'90","'000001","'00000002","'000000000900000","'000000004","'Presidents Bank   ","'20040809","'           "
"'99","'000001","'00000020","'00000002","'0000000001500000","'John Smith    ","'1234567890","'          "
```

Field Name	Data Length	Field Value

File Header Record

Field Name	Data Length	Field Value
Record Type	Numeric	"'01',
Standard Level	Numeric	"'03",
Test File Indicator	Alphabetic	"'T",
Immediate Destination Routing Number	Numeric	"'011000015",
Immediate Origin Routing Number	Numeric	"'011000112",
File Creation Date	Numeric	"'2004080916",
File Creation Time	Numeric	"'0909",
Resend Indicator	Alphabetic	"'N",
Immediate Destination Name	Alphabetic	"'John Doe Bank",
Immediate Origin Name	Alphabetic	"'Presidents Bank",
File ID Modifier	Alphanumeric	"'1",
Country Code	Alphanumeric	"' ",
User Field	Alphanumeric	"' ",
Reserved	Alphanumeric	"' "

Field Name	Data Length	Field Value Examples

Record 25 – Image View Detail

Field Name	Data Length	Field Value Examples
Record Type	Numeric	"'25',
Micr Auxiliary On-Us	NUBSM	"' ",
Micr EPC	ANS	"' ",
Micr Payor Bank Routing Number	Numeric	"'01100011",
Micr Payor Bank Routing Number	Numeric	"'2",
Micr On-Us	NBSM	"' 77777777/0377",
Micr Item Amount	N	"'0000900000",
ECE Institution Item Sequence Nbr	NB	"'210041944 ",
Documentation Type Indicator	AN	"'G',
Return Acceptance Indicator	AN	"'1",
MICR Valid Indicator	Numeric	"'1",
BOFD Indicator	Alphabetic	"'Y",
Check Detail Record Addendum Count	Numeric	"'02" ,
Correction Indicator	Numeric	"'4" ,
Archive Type Indicator	Alpha	"'F"

X9.37 FILE FORMAT

This format is necessary for electronic exchange as specified in the DSTU X9.37-2003. It can also be used as an input format into AX9Lib to create various output files for additional processing. Output formats created from the X9.37 format, including NSF/SIT, NSF/BLOB, CSV/SIT, CSV/BLOB, SOP, 180, and MAL.
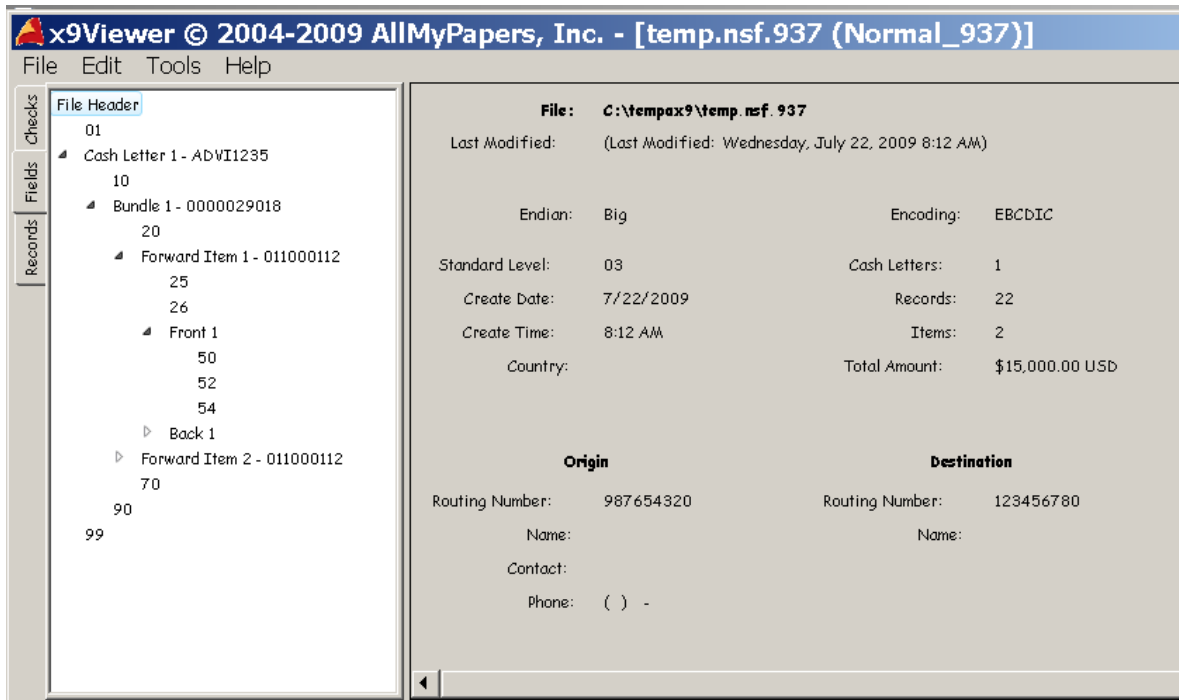
MAL FILE FORMAT

The MAL file format is a Federal Reserve Bank (FRB) Payers Services formatted ASCII file. The title is MAL because the header records are "mal formed" 937 format. Using the function Convert From MAL will read this format and generate an exchange ready 937 file.

Example - MAL Input Text File

```
    &0103T123456780987654320200907211924N                                1
&10011234567809876543202009072120090721192 4IGADVT2436                                      C
&20011234567809876543202009072120090721000003102700010000000000 00              &25
011000112         77777777/0377000900000011000112        G01Y01     &26198765432020090721011000112
210041944               20040809       Y         &25                 011000112
88888888/0596000060000001 1000112        G01Y01     &26198765432020090721011000112      210041946
20040809        Y         &7000020000001500000000000150000000000
&900000010000000200000001500000000000000
&990000001000000100000000020000000000001500000
```

OUTPUT FILES

The following output files can be created by using a X9.37 formatted file as the source and using the correct function to convert.

1. X9.37 Format - Format necessary for electronic exchange as specified in the DSTU X9.37-2003 Manual for specifications for the X9.37 file. An output X9.37 can be created from any of the Convert From functions excluding Convert From Mal.

2. CSV/SIT – Comma Separated Variable – A X9.37 file is read to build a CSV file with a one to one correspondence with X9.37 format as specified in the DSTU X9.37 manual. Primarily used to output a full X9.37 file for editing in a text editor or via software and then the edited file is used to rebuild a new X9.37 file. Each record in the X9.37 file generates a single text line in the CSV file. The captured images are stored as TIFF files and the text data placed in the CSV format.

3. CSV/BLOB – This function will read a X9.37 file and generate an output file in the working directory. The image files are pointed to in the CSV Blob format and not moved from the original source X9.37 file. The CSV file will have the same name as the original file appended with a .CSV extension.

4. *SOP - The Convert to SOP function will read an exchange ready X9.37 file and generate an output SOP IV.8 formatted file in the working directory. Warning: The SOP IV.8 file format is described with limited detail in a FRB document. NOTE: This function requires the X9180 license feature bit.*

5. NSF/SIT – The function Convert To NSF/SIT function will read a X9.37 file and construct a NSF file in the working directory.

6. NSF/BLOB – A X9.37 file can be read to create a NSF/BLOB output format. This is a Multi Image format for NSF Files. A "blob" is a generic usage that is an unformatted concatenation of data. This format does not have individual file names for each image, but has a reference to the location of the image. NSFBLOB is stored n the NSF header record.

7. *X9.100-180 - The Convert to 180 function will read an X9.37 file and generate an output X9.100-180 formatted file in the working directory. Warning: The X9.100-180 file conforms to the Second Ballot format of X9.100-180. This file is substantially different than previous non balloted reversions of the standard. NOTE: This function requires the X9180 license feature bit.*

8. MAL – The Convert to MAL function will read a X9.37 file and generate a FRB Payers Services formatted ASCII file. The title is MAL because the header records are "mal formed" 937 format from a version of a 1994 - X9.37.

It is the same as the current X9.37 format but without the image records and a wrong value for the record length field. *NOTE: This function requires the X9180 license feature bit.*

cppAX9 Demo

The cppAX9 Demo is a GUI dashboard displaying all the functions of AX9Lib. It can be used to test the functionality of the system.