The BankScan Program

If you have to work with financial documents obtained by outside sources you probably understand the difficulty involved in turning such documents into an electronic form suitable for analysis. Certainly investigators and forensic accountants working money laundering and fraud cases deal with a large amount of bank statements obtained through subpoenas. Banks mostly provide these statements as paper or PDF files. Usually the PDF files are just scanned images of the statements, but they can also contain the underlying textual data as well. The task of the investigator is to organize and analyze this financial data, a task best done if the data is normalized into a common electronic format like a spreadsheet or database.

How does one do this? With the advent of inexpensive scanners and accurate optical character recognition (OCR) programs such as OmniPage or Abbyy FineReader, one can quickly convert paper or PDF images into electronic text files. But these text files are raw and unstructured. OCR programs can attempt to tabularize what is recognized, but given the great variety of formats that banks present their statements in, the results normally require extensive manual corrections.

What is desired is an automated method to extract the specific financial transaction data from these documents. BankScan does just that; it is an expert system that uses a library of templates that encapsulate the knowledge about how different banks format their statements. Using BankScan is straightforward. First an off the shelf OCR program is used to create text files from paper or PDF files. These files are input into BankScan, along with the template to use for extracting the data. BankScan then creates a normalized output in several possible formats, such as Excel, CSV, or QIF.

If an OCR program's text recognition accuracy were 100%, BankScan would literally be a "One-Click" operation. Unfortunately banks often provide sub-par quality documents. For example, the figures below show what kind of documents banks can provide. Figure 1 is very clean and legible, and can be expected to translate very accurately into text. Figure 2, because of the small font and poor quality reproduction, will have much less accuracy. This means that the resulting text file will likely contain character errors and other "garbage" text. It may be that an amount like \$100.87 is recognized as \$100.37. BankScan has extensive error checking capabilities and a means for the operator to make corrections to the files it processes. The key to getting the most success from BankScan is to provide it with the best possible input, i.e. getting the most accurate recognition from whatever OCR program is being used.

	DUNTRUST BANK P C BOX 622227 ORLANDO PL 32862-2227				PAGE 1 OF 2 83/E00/0175/ 078200036039 03/31/2004	30/ 40 7	
S	unTrust				accourt Statement		
[QUESTIONS > P 1-800-786-87	LEASE CALL 87	
	LAST YEAR'S TAX CUTS S THESE CUTS ARE SET TO SUNTRUST OFFERS TEND 1 BY A BRANCE OR CALL 1	AKE IT A GRI EXPIRE JAN. GAME FOR BQK 877-370-5104	EAT TIME TO FUR 1, 2005, SO NO JIPHEBHT TO HELP 9 TO LEARN MORE	CHASE BUSING W MAY BE THE YOU FINANCE . NORMAL CRE	SS RQUISMANF TIME TO BUY YOUR FURCEAN DIT CRITERIA	. BUT . AND SE. STOP APPLY.	
ACCOUNT TI	(PH	ACCOUNT SUB	DIR SUNDARY	TATEMENT PER	IOD	TAXPAYER ID	
BASIC BUSI DESCRIPTIO BEGINNING DEPOSITS/C CHECKS WITHERANAL ENDING BAI	NESS CRECKING NN RALANCE JEDITS 4 JANCE	2040UNT #12,222.62 117,301.59 #24,646.13 #17,223.93 #37,654.15	03/0 DESCRIPTION AVERAGE BALA AVERAGE COLL NUMBER OF DA	1/2004 · 03/ NCE ECTED BALANC YE IN STATEM	S1/2004 E ENT PERIOD	AMOUNT \$35,869.21 \$35,794.99 31	
********	*****	DEPOSIT	rs/cREDITS				
DATE	ANCONT SERIAL #		DATE	ANOUN	T SERIAL @		
03/16	200.00	DSPOSIT	03/31	2,101.5	9	DEPOS IT	
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DEPOSITS/C	REDITS: 4	TOTAL IT	TENS DEPOSITED:	4			
Children of the State of the St	MODE DAR	CR	ICKS				
NUMBER	PAIL			NUMBER	~	PAID	
3986	160.06 03/0	2		4004		48.94 03/22	
3987	9.50 03/0	2		4005		27.95 03/23	
•3990	551.00 03/0	3		4006	4	51.01 03/19	
3991	384.53 03/0	2		4007		8.05 03/22	
3993	222.82 03/0	4		4009	1 5	30.00 03/29	
3995	39.75 03/0	I		403.0	1	66.42 03/24	
3996	42.92 03/0	1		4011		25.43 03/22	
3997	30.00 03/0	I		4032		7.46 03/26	
3998	756.56 03/0	1		4013		16.19 03/29	
3999	140.58 03/0	9		4014	3	ab.26 03/30	
4001	1,001 44 03/0	5		4016	2	15.00 03/30	
4002	390.61 03/2	3		4017		13.72 03/29	
4003	937.05 03/2	2		4018	7	56.56 03/30	
CHECKS: 10		EAK IN CRIPCE	SECTRON S				
******		*********					
DATE	AMOUNT SERIAL #	DESCRIPTI	ION				
03/01	39,95	ELECTRONI MERCHAR	C/ACH DEBIT	043205 49260	0102043205		
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		11.000	ARE POIC		CONTINUED O	N NEXT PAGE	
		PCED43	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
		N2DO					

Figure 1. Ideal statement – uniform legible font, minimal graphics, clean background

New Balance Payment Que Oate Past Due Amount Minimum Payment \$408.87 02/26/03 \$0.00 \$10.00 Amount Enclosed \$ New address or email? Price on back Y36.63 Yest Data Yest Data Pinst USA BANK, NA Y36.63 Yest Data PUB BOX 50882 Hender Store Care 01/0803 - 02/0800 Hender Store Care 01/0803 - 02/0800 CUSTOMER SEE Pinst USA BANK, NA Yest Data 01/0803 - 02/0800 PUB BOX 50882 Hender Data 01/0803 - 02/0800 Hender Care 01/0803 - 02/0800 CUSTOMER SEE Payment Due \$10.00 Español VISA ACCOUNT SUMMARY Account Mamber: \$10.00 Payments, Credits \$131.73 Total Credit Line Payments, Credits \$131.73 Total Credit Line Payments, Credits \$131.73 Total Credit Line Payments, Credits \$131.73 Available for Case Payments, Credits \$131.73 Available for Case Payments, Credits \$131.73 Available for Case Payments, Credits \$10.00 \$10.00 Payments, Credits \$10.00 \$10.00 Payments, Credits \$10.00 \$10.00	INI 172 8472 163 308 865 8060 103 844 994 8200
Amount Enclosed Amount	
FIRST USA BANK, NA	INI 177.8472 145.3308 165.8060 1604ed 194.8200
436616102303399600001000000408879 FIRST USA BANK, NA PO BOX 60822 Indit to the deducted dedu	INI 177.8472 163.308 865.8060 1030ed 194.8200
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FIRST USA BANK, NA P.O. BOX 6982 MENDESSON NY 89016-0892 II	
FIRST USA BANK, NA P.O. BOX 60882 HENDERSON INV 89016-0892 Hubble Identified Identi	INI 177.8472 163.308 865.8060 1030ed 994.8200
PENDERSON INV BRUTS 0892 Indukted and the defended and the defend	INVICE 272-0472 463-308 855-8090 1004ed 994-8200
Statement Date: 01/09/03 - 02/09/03 CUSTOMER SEE Payment Due Date: 02/26/03 tu U.S. 1-877-2 Minimum Payment Due: \$10.00 Espandel 1-888-4 VISA ACCOUNT SUMMARY Account Number: \$10.00 Payments, Credita \$13.73 Total Credit Line \$18,600 Purdenase, Cash, Debits \$40.005 Construct Notes \$10.000 Purdenase, Cash, Debits \$40.005 Cash Account Number: \$18,600 Purdenase, Cash, Debits \$40.005 Cash Account Number: \$18,600 Purdenase, Cash, Debits \$40.005 Cash Account Number: \$18,600 Purdenase, Cash, Debits \$40.005 Cash Account Number: \$18,100 Finance Charges \$40.00 Available for Cash \$18,101	IRVICE 272-8472 446-5308 165-8060 1004cd 964-8200
Statement Date 01/08/03 - 02/06/03 CUSTOMER SE Payment Due 01/08/03 - 02/06/03 CUSTOMER SE Payment Due 01/08/03 - 02/06/03 02/26/03 In U.S. 1-8/77-2 Minimum Payment Due: \$10.00 Espacht 1-886-4 TOD 1-802-6 VISA ACCOUNT SUMMARY Account Number: \$10.00 Espacht 1-802-6 1-902-6 Previous Balance \$131.73 Total Credit Line \$18,600 Account Number: 1-902-6 Payments, Credits \$131.73 Available Credit \$11,171 #0.06 metric for the set them Purchase, Cash, Debits \$40.00 \$7 Cash Account Number: \$18,600 Finance Charges \$40.00 Available for Cash \$18,191 Available for Cash	ERVICE 272-8472 445-3038 655-8060 Toolwd 594-8200
Visa Account summary Statement Due 01/08/03 - 02/08/03 CUSTONER SE 02/28/03 Full No. Visa Account summary Payment Due 01/08/03 - 02/08/03 Full No. 02/28/03 Full No. 18/07.0 Visa Account summary Account Number: 11/02.5 11/02.5 00156/01 11/02.5 Previous Balance \$131.73 Total Credit Line \$18,600 Account Number: 11/02.5 Payments, Credits \$10.00 20/06/02 \$10.00 10/02.5 10/00 Payments, Credits \$10.17.7 Available Credit Line \$18,600 Account Number: 11/02.5 Payments, Credits \$10.00 Available Credit Line \$18,600 Account Number: 11/02.5 Payments, Cath, Debits \$40.00 Available for Cash \$18,109 Available for Cash \$18,109 Finance Charges \$40.00 \$10.00 \$10.109 \$10.109 Available for Cash \$10.109	IRVICE 272-8472 445-3308 555-8060 I Icolect 94-8200
VISA ACCOUNT SUMMARY Previous Balance \$131.73 Total Credit Line \$18,000 Account Naciable U.S. cas Previous Balance \$131.73 Total Credit Line \$18,000 Account Naciable Credit Sile,150 Account Naciable Credit Sile,151 #0,56 Host Sile,151 #0,56 Hos	272 9972 445 3308 555 4050 1 rolled 594 4200
VISA ACCOUNT SUMMARY Previous Balance \$151.73 Total Credit Line \$18,600 Account Namber: Payments, Credits \$131.73 Available Credit \$18,100 # r0.56 # r0.56 televe Purchase, Cash, Dubits \$40.00 # Vavilable for Cash \$18,101 # r0.56 televe Finance Charges \$40.00 # Vavilable for Cash \$18,101 # r0.56 televe	li collect 594-8200
VISA ACCOUNT SUMMARY ACCOUNT MILLION CONTRACTORY ACCOUNT A	
Payments, Credits \$131.73 Available Credit \$181,19 # 0.6ex s04 Heats Purchases, Cash, Debits \$40.687 Cash Access Line \$15,600 Finance Charges \$40.00 Available for Cash \$16.19 Available for Cash \$16.19 Available for Cash \$16.19 Available for Cash \$16.19 Available for Cash	PSES
Finance Charges + \$0.00 Available for Cash \$18,191 PAYMENT ADDRIV	9 9950
	E55
New Salarce \$400.07 Haddeson, NV \$501	e dez
TRANSACTIONS	
Trans Data Balanana Number Marchard Name or Transaction Description	Amount Dabit
01/17 24992160-COMMSPRE AMAZON COM "SUPERSTOR 800-201-7575 WA	34.95
01.01 245921604005NV11F BALLY FITNSS 562 484 2980 CA 01.03 24492150PPWJJJ604 PAYPAL*CSNEED1937 402 935-7733 CA	<u>8.75</u> 150.00
0123 24492150PPWIERCO PAYPAL OHNBULTO 402-935-7733 CA	144.00
0127 74360100V2JU0DD0VH PAYMENT THANK YOU 13	31.73
01:50 24765010Y00902016 EBOOKS COM 617-249-0450 MA	12.29
FINANCE CHARGES PERIODIC RATE(S) AND	DAPR(S) MAY VARY
Periodic Rate APR Average Daily Balance Due To Tran Category 30 days in cycle Previous Cycle Current Cycle Periodic Rate	Fees CHARGES
Purchases 03877% 14.15%	- \$0.00
Cash advances U0425% 19,00%	- 50.00
Effective Annual Percentage Rate (APR): N/A	Sec Vira
Grace Period Type: A (Please see book of statement for the Grace Period explanation.)	
The Corresponding APR is the rate of interest you pay when you carry a balance on purchases or cash advan The Effective APR represents your total innoe charges - including transaction fees such as cash advance a fees - expressed as a percentage.	ances. and balance transfer

Figure 2. Poor statement – tiny illegible font

BankScan does not attempt to re-invent the wheel with OCR, a field that has been extensively researched for decades. Millions of lines of source code have been written to create commercial products reaching a very high level of accuracy. Our experience from scanning hundreds of different bank statement formats has determined that the OmniPage program sold by Nuance combines the most accurate recognition with a very easy to learn user interface. Features in OmniPage such as the ability to zone specific areas for recognition and a simple means of training to improve accuracy make this the recommended program to use with BankScan.

OmniPage and BankScan are not integrated together, they are standalone applications. For example, if an office has only a few scanners, then several scanning stations can be set up with a copy of OmniPage at each one. An operator can scan and recognize their statements then take the text files to their desk and use BankScan there. In this sense BankScan does not attempt to be a "systems solution". It is not an evidence management database or analysis tool. It does one thing very well, convert unusable information into usable information.

BankScan Walkthrough

In this section we will walk through the operation of BankScan on a typical generic bank statement. The first step is to check the statements to be scanned. Statements should be in date order and checked for missing pages, duplicates; any issues that would complicate processing further down the line. Then the statements are scanned in OmniPage and converted into text files. Figure 3 shows a view of the OmniPage program in operation. The recognized text can be saved in many different formats, but for BankScan we just need a simple text (.TXT) file.



Figure 3. OmniPage graphical user interface

The resulting .TXT file is shown below in WordPad. Notice that OmniPage can preserve much of the original formatting of the original image. This is important when transactions (debits or credits) can only be distinguished by what columns their amounts fall under. The next step is to start BankScan and read in this file for processing.



Figure 4. The recognized text – notice formatting is preserved

The BankScan user interface consists of two main areas. The top half has several tabs that provide information about its operation and results, the lower half is a specialized text editor window for making corrections in less than 100% accurate files.

🧀 BankScan		
File - Scan AutoBalance Find - Tools - Help -		
Messages Excel Output Skipped Balance Summary Notes		
Line # Type Message	Account	End Date
No Path No File Next Step: Use "File->Open Input File" to select input file, bank, and template.		

Figure 5. BankScan graphical user interface

The operator opens the text file to be processed, then selects the appropriate template from the BankScan library. This template tells BankScan everything it needs to know about how to extract the transactions out of a particular statement format. Each template has an associated image representing that format. Selecting the correct template is done by making a visual comparison of the statements to be processed against each template image for that bank. Early attempts to try and detect the correct

template automatically proved infeasible, it is much faster to use the pattern matching capabilities of a human! Banks can have MANY different formats, and they are constantly changing them.

Figure 6 shows how the template is selected in BankScan. First the bank is selected from a drop-down list, and then the template images for that bank are checked against the statements being scanned. The closest matching image is selected. If none of the template images match the statement then a new template must be created and added to the library.

🤌 Select Template	
65%	
Select bank: Bank of Whatever Select account type: Clatement formst A	Bank of Whatever
OK Use Last My Templates	Statement Date: 3/31/2007 Account:
Add	formats. Notice the statement date and account number. BankScan needs these in addition to the actual transactions. The first section list various deposits, made either by cash or check. Note that they look very similar to checks.
	Deposits <u>Date Amount Date Amount Date Amount Date Amount</u> 3/1 12.69 3/4 100.00 3/6 1029.34 3/7 32.69 3/10 483.29 3/15 1,200.00 Date Amount Date Amount Date Amount
	Usually there will be balance or summary information at the end of each section. BankScan should ignore all this. This statement separates debits and credits into two sections. Many statements will combine both into one section, and use either minus/plus signs to denote debits/credits or have two columns, one for debit amount and one for credit amount.
	Note below that the anount appears on the posted date line of each transaction. Also note that some transactions include the date of the actual transaction in the description text (memo).
	Debits Amount 3/2 FOS at store A #56erjw 1,500,#3 0n 3/1 Store A #04erses and stuff 2,00,43 3/10 FOS at store B #56949 200,43 0n 3/15 Store B #56949 300,00 3/15 FOS at store C #65 on 3/13 300,00 3/15 FOS at store C #65 on 3/13 500,90
	To account 3/20 Bank service fee15.99
	Total debits 12016.35
	The creats section looks just like the debit section. BankScan looks for certain words to know what type of transaction to look for.
	Credits Amount Posted Date Description 3/5 Payroll XYZ Co 3/6 Payroll XYZ Co 2/6 Payroll XYZ Co Ebay auction #1029 200.00

Figure 6. Template chooser

After the template is selected BankScan processes the text file and reports any issues it might have had extracting the transactions. It does this by displaying yellow warning messages in the Messages tab and marking the suspect area in the lower editing window. In Figure 7 we see that BankScan has found three issues that need operator attention. For example, at line #00045 a date 3/15 has been misrecognized to be 3115. In many cases BankScan knows what the problem is, but errs on the side of caution and requires operator verification. For recognition errors that are common to a particular format, the template can be built with automatic corrections. The task of the operator is to either make corrections

in the editor window or tell BankScan to ignore the warning (again erring on the side of caution. BankScan can flag non-issues).

🍻 Ban	k of Wha	tever (Form	at A)		
File 👻	Scan Au	toBalance Fin	id 👻 🔰 Tools 👻 Help 👻		
Messag	es Excel	Output Skip	oped Balance Summary Notes		
	Line #	Туре	Message	Account	End Date
	00010	INFO	Found a new account: 4839-290129	4839-290	
•	00023	WARNING	Last digit may have been missed in an amount - check OCR.	4839-290	2007/03/31
	00045	WARNING	Possible corrupted date, check for (/ or ' or I) that was recognized as a 1 (Was looking for the start of a transaction.)	4839-290	2007/03/31
	00074	WARNING	Possible corrupted check number.	4839-290	2007/03/31
		INFO	10 Credits, 12 Deposits, 9 Debits, 14 Checks were read (3 warnings, 0 ignored)		
		INFO	Output file unavailable until all WARNINGS are either fixed or ignored!		
#00020					~
#00021	:Deposi	ts			
#00022	:Date •3/1	Amount D	ate Amount Date Amount Date Amount /4 100.00 3/6 1079 34 3/7 37 <mark>.6</mark> 8		
#00024	:3/10	483.29 3	/15 1,200.00		
#00025	:				=
#00026 #00027	Total	deposits 20	858.20		
#00028	Usuall	y there wi	ll be balance or summary information at the end of each		
#00029	sectio	n BankSc	an should ignore all this This statement separates		
#00030 #00031	debits	and credi into one se	ts into two sections Many statements will combine ction and use either minus/plus signs to denote		
#00032	debits.	/credits o	r have two columns, one for debit amount and one for		
#00033	<mark>:</mark> credit	amount			
#00034	Note b	elow that	the amount annears on the nosted date line of each		
#00036	transa	ction Al:	so note that some transactions include the date of the		
#00037	actual	transactio	n in the description text (memo)		
#00038	•Dobito				
#00040	:Posted	Date	Description Amount		
#00041	:3/2	POS at Walı	mart 56erjw 1,500.93		
#00042	: • 2710	on 3/1 stor	re address and stuff		
#00043	: 01/0	on 3/9 stoi	ustrums 200949 re address ref 4737272		
#00045	:3 <mark>1</mark> 15	POS at Von	s 68 on 3/13 300.00		
#00046	:3/16	Mire trans	fer Byblos Bank Leb 59594 9,999.00		~
		C:\Examples	ACommercial test.txt • Next Step: You still have WARNING messages that need to be addressed.		

Figure 7. Messages tab

The number of warning messages the operator may have to clear depend on the accuracy of the OCR results. Poor quality statements (those with small or illegible fonts, low contrast, artifacts such as speckling, etc...) will require more corrections. For example, some fonts certain banks use make it very difficult to distinguish 6 from 8, which can cause balance checks to fail when an amount of \$606.86 gets turned into \$806.68!

In order to avoid the operator from having to flip through stacks of paper statements for making corrections, OmniPage can create a searchable PDF of statement images that BankScan can link to. For

example, suppose in Figure 8 that the amount 1,X00.93 needs to be corrected for the bad digit X. The operator can quickly locate the correct amount by double-clicking on the warning message. This causes the PDF to be displayed and the area in question to be highlighted. Then, checking the image it can be seen what the digit X should actually be. This feature is most convenient when the operator has two monitors, one for the PDF display window, and the other for the BankScan program.

🏄 Bank of W	hatever (Form	at A)		
File + Scan	AutoBalance Fir	nd 🔹 🔰 Tools 👻 Help 👻		
Messages Exc	el Output Ski	pped Balance Summary Notes		
Line #	Туре	Message	Account	End Date
00010	INFO	Found a new account: 4839-290129	4839-290	
00041	WARNING	Possible corrupted digit in amount?	4839-290	2007/03/31
	INFO	10 Credits, 12 Deposits, 10 Debits, 14 Checks were read (1 warnings, 0 ignored)		
	INFO	Output file unavailable until all WARNINGS are either fixed or ignored!		
#00023:3/1 #00024:3/10 #00025: #00026 <mark>:</mark> Total	12.89 3 483.29 3 deposits 2	/4 100.00 3/6 1029.34 3/7 32.68 /15 1,200.00 858.20		
#00027 #00028 Usual #00029 secti #00030 debi #00031 both #00032 debi #00033 credi #00035 Note #00036 trans #00037 actua #00038	ly there wi on BankSc is and credi into one se is/credits o t amount below that iaction Al il transactio	ll be balance or summary information at the end of each an should ignore all this This statement separates ts into two sections Many statements will combine action, and use either minus/plus signs to denote r have two columns, one for debit amount and one for the amount appears on the posted date line of each so note that some transactions include the date of the n in the description text (memo)		
#00039:Debit #00040:Poste #00041:3/2 #00042: #00042: #00044:3/10 #00045:3/15 #00046:3/16	ed Date POS at Wal on 3/1 sto POS at Nor on 3/9 sto POS at Von Wire trans To account	DescriptionAmountmart56erjw1,X00.93re addressand stuffdstrums568949200.43re addressref4737272is68 on 3/13300.00ferByblosBankLeb2801-389292801-38929		
#00048:3/20	Bank servi	ce fee 15.99		~
test Po	ssible corrupted d	igit in amount?		• X
	C:\Example:	s\A\Commercial test.txt - Next Step: You still have WARNING messages that need to be addressed.		

Figure 8. Warning message about a corrupted digit



Figure 9. Locating a correction in the PDF of the statement

The other tabs in the top half of BankScan show the transactions that have been extracted, lines that have been skipped over, and the results of the AutoBalance function.

🌽 Ban	k of WI	hatever (F	ormat A)							
File 🔻	Scan A	AutoBalance	Find 👻		Tools	+ Help +				
Messag	es Exc	el Output	Skipped Ba	lance Summary	Notes					
	Line #	Туре	Account	Trans	Posted	Credit	Debit	Balance	Description	^
	00024	DEPOSIT	4839-2901		2007/03/10	483.29	0.00	3,641.58	DEPOSIT	
	00024	DEPOSIT	4839-2901		2007/03/15	1,200.00	0.00	4,841.58	DEPOSIT	
	00041	DEBIT	4839-2901	2007/03/01	2007/03/02	0.00	-1,500.93	3,340.65	POS at Walmart 56erjw on 3/1 store address and stuff	
►	00043	DEBIT	4839-2901	2007/03/09	2007/03/10	0.00	-200.43	3,140.22	POS at Nordstrums 568949 on 3/9 store address ref 4737272	
	00045	DEBIT	4839-2901	2007/03/13	2007/03/15	0.00	-300.00	2,840.22	POS at Vons 68 on 3/13	
	00046	DEBIT	4839-2901		2007/03/16	0.00	-9,999.00	-7,158.78	Wire transfer Byblos Bank Leb 59594 To account 2801-38929	
	00048	DEBIT	4839-2901		2007/03/20	0.00	-15.99	-7,174.77	Bank service fee	
	00057	CREDIT	4839-2901		2007/03/05	1,120.14	0.00	-6,054.63	Payroll XYZ Co	
	00058	CREDIT	4839-2901		2007/03/06	200.00	0.00	-5,854.63	Paypal acct@95848	
	00061	CREDIT	4839-2901		2007/03/10	9,999.99	0.00	4,145.36	Wire transfer First Bank 848	
	00062	CREDIT	4839-2901	2007/03/18	2007/03/19	200.43	0.00	4,345.79	POS return Nordstrums 568949 on 3/18	
									Interest naument	<u> </u>
#00031 #00032 #00033 #00034 #00035 #00036 #00036	:both :debit :credi : Note :trans	into one s/credits t amount below th action	: section, : or have nat the amo Also note :tion in t	and use er two column ount appear that some be descrip	ther minus s, one for s on the p transaction	s/plus sig r debit amo posted dat ons inclu (memo)	gns to denc ount and c te line of ude the dat	one for each e of the		
#00038						(
#00039 #00040	'∶Debit ⊡Poste	s d Date	Descr	intion			٥	mount		
#00041	:3/2	POS at	Walmart 5	i6erjw			1,5	i00.93		
#00042	:	on 3/1	store addr	ess and st	uff					
#00043	3/10	POS at	Nordstrums	568949	77777		Z	200.43		
#00044 #00045	-: ::3/15	on 5/9 POS at	store adar Vons 68 c	'ess reт 4 in 3/13	-131212		-	100.00		
#00046	:3/16	Wire tr	ansfer Byb	ilos Bank L	.eb 59594		9,9	99.00		
#00047	' :	Το αςςοι	int 2801-	38929						
#00048	:3/20	Bank se	rvice fee					15.99		
#00049 #00050 #00051	Total	debits					120	16.35		
#00052 #00053 #00054 #00054	The c for c	redits se ertain wo	ction loc ords to kr	ıks justli ıow whatty	ke the del pe of tra	bit sectior nsaction t	n BankSc to look for	an looks ,		
#00056	:Poste	d Date	Descr	ription			۵	mount		~
		C:\Exa	mples\A\Comm	ercial test.txt	- Next Ste	p: You still have	e WARNING mes	sages that need	to be addressed.	.:

Figure 10. Output tab, transactions that have been found

🌽 Ban	k of What	ever (Fo	ormat A))	
File 🔻	Scan Auto	Balance	Find 👻	r Tools ▼ Help ▼	
Messag	es Excel	Output	Skipped	Balance Summary Notes	
	Line #	Sect	ion	(Click here to sort lines alphabetically)	_ <u>^</u>
Þ	00176	IGNO	IRED	4/20 695.23 4/21 983.29 4/25 2919.47	
	00097	IGNO	RED	Account: 4839-290129	
	00124	IGNO	RED	actual transaction in the description text (memo)	=
	00080	IGNO	RED	At the end of many statements will be a section called Daily Balance	
	00004	IGNO	RED	Bank of Whatever	
	00157	IGNO	RED	BankScan will ignore the redundant transactions	
	00011	IGNO	RED	Beginning Balance: 1983.38	
	00098	IGNO	RED	Beginning Balance: 2540.43	
	00118	IGNO	RED	both into one section, and use either minus/plus signs to denote	
	00072	CHE	CK	Checks	
	00033	IGNO	RED	credit amount	
	00055	CREI	DIT	Credits	
	00172	IGNO	IRED	Daily Balance Summary	
	00022	DEP	JSIT	Date Amount Date Amount Date Amount Date Amount	~
#00011				Beginning Balance: 1983.38	~
#00012				Ending Balance: 2540.43	
#00013					
#00014 #00015	formate	a gen Not	eric ba ice the	ank statement that contains sections typical in many e statement date and account number – BankScan needs	=
#00016	these i	n addit	ion to	o the actual transactions	
#00017					
#00018	The fir	st sec	tion li	ist various deposits, made either by cash or check	
#00019	Note ti	hat the	у Гоок	very similar to checks	
#00021	Deposit:	s			
#00022	:Date /	Amount	Date	Amount Date Amount Date Amount	
#00023	:3/1 :	12.89	3/4	100.00 3/6 1029.34 3/7 32.68	
#00024	:3/10 4	483.29	3/15	1,200.00	
#00025 #00026	Total d	eposits	2858.	.20	
#00027		•			
#00028	Usually	there	will b	be balance or summary information at the end of each	
#00029	section	Ban	kScan s	should ignore all this. This statement separates	
#00030 #00031	hoth i	unu cr nto one	sectio	on, and use either minus/plus signs to denote	
#00032	debits/	credits	or ha	ave two columns, one for debit amount and one for	
#00033	credit (amount			
#00034					
#00035 #00035	transec	ιow th tion	at the Also n	amount appears on the posted date line of each	
#00037	actual ·	transac	tion i	in the description text (memo)	
		C.In.	- Indiated	Terreneral Local And Characterial Plants On the Article Plants of the State	
		[] CitExar	npies(A)Co	.ommercial j test,txt - jivext step: Click "Hie->Open Output Hie" to open output.	

Figure 11. Skipped tab, all of the "left over" lines

AutoBalancing compares calculated statement balances for each month and account number to the expected balances pulled from the statement summaries. It provides an audit check to help make sure that the data has been accurately extracted. All of these tabs are cross indexed to the editor window, making it easy to navigate around the file being processed. BankScan has a number of tools, like daily balance summary marking and balance column checking, to help the user more quickly locate the bad amount digits that throw off the AutoBalance.

🌽 Banl	k of Wha	atever	(Format A))							
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Messag	es Excel	Outp	ut Skipped	Balance Summ	ary Note	s					
	Line #	Acc	count	End Date	e Bala	ected Starting ance	Expected Ending Balance		Calculated Ending Balance	Difference	
•	00076	483	9-290129	2007	7	1,983.38	2,54	40.43	2,540.43		0.00
	00163	483	9-290129	2007	7	2,540.43	4,78	84.62	4,784.62		0.00
#00002 #00003 #00004 #00005 #00006 #00007 #00008 #00009 #00010	! IMAGE. Bank	_FILE	C:\Progra Whateve Joe 123 San	m Files\Ban :r : Target : Elm Stree : Diego, CA	kScan∖T t	emplates∖Images∖ Statemen Account:	E\exampleA.jpg t Date: 3/31/20 4839-290129	007			
#00011						Beginnin	g Balance: 19	983.38	8		
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#00027 #00028	Usuall;	y ther	e will b	e balance	or sum	mary information	at the end of	f eacl	h		~
		- [C:\E	xamples\A\Co	ommercial test	t.txt -	Next Step: Click "File->	Open Output File" to o	pen ou	tput.		.:

Figure 12. Balance summary tab

The Excel tab is used to select the desired data columns and their names and positions in the output spreadsheet.

🔗 Bank of Whatever (Format A)	×
File - Scan AutoBalance Find - Tools - Help -	
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	>
#00002:!!MAGE_FILE C:\Program Files\BankScan\Templates\Images\E\exampleA.jpg #00003	^
#00004 <mark>.</mark> Bank of Whatever	
#00005 <mark>:</mark>	
#00006: Joe Target #00007: 173 Elm Street	
#00008: San Diego, CA	
#00009 <mark>:</mark> Statement Date: 3/31/2007	
#00010: Account: 4839-290129	
#00011: Beginning Balance: 1983.38 #00012: Fnding Balance: 2540.43	
#00013:	
#00014 <mark>.</mark> This is a generic bank statement that contains sections typical in many	
#00015.formats Notice the statement date and account number BankScan needs	
#00017	
≇00018 <mark>:</mark> The first section list various deposits, made either by cash or check	
#00019:Note that they look very similar to checks	
#00021:Deposits	
#00022:Date Amount Date Amount Date Amount Date Amount	
#00023:3/1 12.89 3/4 100.00 3/6 1029.34 3/7 32.68	
#00024:3/10 483.29 3/15 1,200.00 #00025:	
#00025. #00026 <mark>.</mark> Total deposits 2858.20	
#00027 <mark>:</mark>	
#00028 <mark>7</mark> Usually there will be balance or summary information at the end of each	~
C:\Examples\A\Commercial test.txt • Next Step: Click "File->Open Output File" to open output.	:

Figure 13. Excel tab

After the operator has cleared any warnings and checked that calculated and expected balances match, BankScan writes the output to an .XML or .XLMS file that can be opened in Excel. Once the data has been imported into Excel it is now in the hands of the analyst. The job of BankScan is finished.

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3	4839-2901	29		3/4/2007	DEPOSIT						\$100.00	\$2,096.27				
4	4839-2901	29		3/6/2007	DEPOSIT						\$1,029.34	\$3,125.61				
5	4839-2901	29		3/7/2007	DEPOSIT						\$32.68	\$3,158.29)			
6	4839-2901	29		3/10/2007	DEPOSIT						\$483.29	\$3,641.58				
7	4839-2901	29		3/15/2007	DEPOSIT						\$1,200.00	\$4,841.58				
8	4839-2901	29	3/1/2007	3/2/2007	POS at Wal	mart 56erj stuff	w on 3/1 st	ore		-\$1,500.93		\$3,340.65				
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9					address ref	4737272										
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11					To account 2	2801-3892	9									
12	4839-2901	29		3/20/2007	Bank service	e fee				-\$15.99		-\$7,174.77				
13	4839-2901	29		3/5/2007	Payroll XYZ	Co					\$1,120.14	-\$6,054.63				
14	4839-2901	29		3/6/2007	Paypal acct	@95848					\$200.00	-\$5,854.63				
15	4839-2901	29		3/10/2007	Wire transfe	r First Ba	nk 848				\$9,999.99	\$4,145.36	i			
16	4839-2901	29	3/18/2007	3/19/2007	POS return I	Nordstrun	ns 568949 o	on 3/18			\$200.43	\$4,345.79)			
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20	4839-2901	29		3/7/2007	CHECK #1	014			1014	-\$392.21		\$3,824.41				
21	4839-2901	29		3/10/2007	CHECK					-\$100.00		\$3,724.41				
22	4839-2901	29		3/12/2007	CHECK #1	015			1015	-\$129.50		\$3,594.91				
23	4839-2901	29		3/14/2007	CHECK #1	016			1016	-\$1,000.00		\$2,594.91				
24	4839-2901	29		3/20/2007	CHECK #1	017			1017	-\$54.48		\$2,540.43				
25	4839-2901	29		4/2/2007	DEPOSIT						\$22.79	\$2,563.22				
26	4839-2901	29		4/5/2007	DEPOSIT						\$150.50	\$2,713.72				
27	4839-2901	29		4/7/2007	DEPOSIT						\$1,050.30	\$3,764.02				
28	4839-2901	29		4/8/2007	DEPOSIT						\$42.88	\$3,806.90)			
29	4839-2901	29		4/11/2007	DEPOSIT						\$553.60	\$4,360.50)			
30	4839-2901	29		4/16/2007	DEPOSIT						\$1,500.00	\$5,860.50)			
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Figure 14. Output in Excel spreadsheet

The BankScan Template Library

To date the BankScan template library contains over 3800 templates covering over 2500 financial institutions. This is by no means complete, new templates are constantly being added. When a new template is needed, a sufficient sample of statement data is provided as both a PDF image file and the recognized text file. The sample should cover at least a year and include all possible account types (checking, savings, loans, etc...) and transaction types (checks, deposits, electronic, etc...) Using this sample a new template is built. A simple statement template can take as little as 15 minutes to create.

If a sample used to create a template does not contain a particular account type or transaction type, those types may be skipped over in subsequent statements that have them. The BankScan editor window contains tools for pulling in skipped transaction sections and inserting information such as account numbers, statement ending dates, and starting/ending balances as a temporary work around until the existing template can be updated with the new information.

Currently a BankScan licensee does not have the ability to create templates; it is done as a support service for the program. Not only are new templates added to the library, but updates to existing ones also occur on a regular basis. Keeping the program and library updated is done through a simple web based download. First BankScan downloads a signed list of template files along with a hash for each file. It compares these hashes with those calculated from its local templates. If they match then the files are up to date, if not the remote template is downloaded and its hash verified with that in the signed list. If it matches then the local file is replaced.

For installations running BankScan on several machines, a central library location can be defined so that only one library needs to be kept updated. For installations where an internet connection is not allowed for security reasons, an update file can be created on one internet connected machine and then installed on the isolated ones.

Extending BankScan – FileScan

BankScan is a specialized subset of a much more general built in tool called FileScan. FileScan uses templates to extract desired data fields from almost any type of document – shipping invoices, medical records, FedWire reports, etc... Figure 15 shows some of the types of documents that can have data fields pulled out of them. Because of the more generic nature of FileScan there is far less error checking involved.

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Figure 15. Sample of documents read by FileScan

To illustrate the usefulness of FileScan, consider that banks often provide images of printed checks that have been issued on an account. These images contain important items such as the payee, address, and "memo" line, which do not appear with the associated transactions in the bank statement (which will just show date, sequence number, and amount). These check images can be converted by OmniPage to text, and FileScan used to extract the additional data items. A special merge tool can also be used to match up and combine this data with the overall bank statement spreadsheet.