

BACS Payment Facility

1. Introduction

This document outlines how to set-up the PC-BACS software and use it to make BACS payments from vouchers in the TESS database.

2. The BACS Payment System

The BACS system uses a "client server" approach to make BACS payments. A number of vouchers are selected for payment on the system, using a normal terminal emulation session. To progress further a PC must be used. The BACS PC uses the PC-BACS software to produce a file detailing the items for payment and provides this as input to the APT-BACS software. APT-BACS is responsible for transferring the payment details to BACS using a modem. The PC-BACS software then updates the database to indicate that the vouchers have been paid and can produce reports and remittance advice letters.

The BACS PC must use a Network Operating System to access the database on the UNIX host. The primary requirement is for a Remote Command Execution facility. The PC-BACS software executes the `ubax` command on the UNIX host to access the database. The output from this command is captured by the PC to retrieve data. Also remote printing is supported through the Network Operating System. The PC-BACS software supports two Network Operating Systems; PC-Interface and MS-DOS Network Client.

3. PC Requirements

The BACS PC must run one of the supported Network Operating Systems and the APT-BACS software. It must have a RAM disk and at least one free drive for a network connection. The PC's console must be set up for ANSI emulation. The PC must also have a modem to transmit data to BACS. The RAM disk is used as a temporary store for `ubax` output as its contents will be destroyed permanently when the PC is rebooted. The network drive is connected at login to validate the password; it is not used to store data.

The PC-BACS software can operate from a floppy disk (key disk), or from the hard disk but must be set-up from the BACS SETUP disk. It cannot simply be copied from disk to disk or from PC to PC. For highest security it should be installed on a key disk as this can be removed and kept in a secure place. If installed on the hard disk, the PC should be protected with a BIOS password or otherwise protected to prevent unauthorised use. The BACS SETUP software can only operate from a floppy disk.

The supporting software (Network Operating System and APT-BACS) can be installed on either the hard disk or the key disk. For maximum security it should be on the key disk although space limitations may mean that some supporting software has to go on the hard disk. If the PC-BACS software is installed on the hard disk there will not be a key disk. If there is no key disk, another floppy could be used as a boot disk for the Network Operating System or to contain the APT-BACS software.

If more than one PC is used for BACS transmission, the Network Operating System should be installed on each PC's hard disk set-up for the correct network adapter, IP address, etc.

4. Setting up the System

The standard BACS SETUP disk is a bootable disk (MS-DOS 6.2) containing both the PC-BACS and BACS SETUP software in the root directory. Before key disks are created, any supporting software that is to be put on the floppy should be copied to the BACS SETUP disk (ideally into sub-directories). The key disk creation process copies all files from the BACS SETUP disk to the key disk apart from `SETUP.EXE`.

4.1 Setting up the Network Operating System

The standard BACS SETUP disk contains commands in the `AUTOEXEC.BAT` file to automatically start `SETUP.EXE` if it exists on the floppy drive and otherwise to start `PC-BACS.EXE`. If PC-BACS is to be used from a key disk, the commands to initialise the network should be added to the `AUTOEXEC.BAT` on the BACS SETUP disk before the command to start PC-BACS. Otherwise the commands to start the network should be added to the `CONFIG.SYS` and `AUTOEXEC.BAT` on the C: drive.

The minimum number of TSRs should be started in the AUTOEXEC.BAT to allow the network connections to be made. This is because the network software, PC-BACS and APT-BACS will all be loaded in memory at once.

For further information on setting up the Network Operating System see section 7, Network Operating Systems supported.

4.2 Setting up APT-BACS

The APT software must be installed on the hard disk or BACS SETUP disk according to APT's instructions and set up readied for BACS transmissions. If APT-BACS for Windows is used, it must be installed on the hard disk. It is too large for the floppy disk.

If APT-BACS is installed on the BACS SETUP disk it will be copied to the key disk when the key disk is created.

For further information on APT-BACS see section 8, APT-BACS software supported.

4.3 The BACS SETUP disk

The CONFIG.BAX file is modified by the BACS SETUP program and used by PC-BACS to determine the Network Operating System, UNIX host and user, APT-BACS command, etc.

Each line in the CONFIG.BAX file begins with two number symbols (#) and a space. This is then followed by the name of the configuration variable, an equal symbol (=) and the value. Comments appear at the end of the line after an exclamation mark (!). Any line that does not start with two number symbols is ignored by PC-BACS. The file should not normally be modified except by the BACS SETUP and PC-BACS programs. The CONFIG.BAX file must be in the root directory of the drive that the BACS SETUP or PC-BACS program is run from.

4.4 Initialising the BACS SETUP disk

When the supporting software has been installed and configured, the BACS SETUP disk must be initialised. Run SETUP.EXE on the BACS SETUP disk either from the DOS prompt or by booting from the BACS SETUP disk.

Select option 1 from the BACS SETUP menu and press Y to confirm. Enter the configuration parameters when prompted. The meaning of each parameter is explained below.

Parameter	Default	Meaning
BACS transfer command	APTBACS	This command will be run when the payment details file has been created on the RAM drive. To run APT-BACS for Windows use WIN /N \APTWIN\APTWIN.EXE
BACS transfer directory	A:\APT	PC-BACS will change to this directory before starting APT-BACS. The original directory will be restored afterwards.
APT-BACS user number	994928	This is the six digit BACS user code. It must correspond with the user set up for APT-BACS.
Network (PCI or MSDOSCLIENT)	PCI	The Network Operating System to be used. This determines what commands are used to establish a connection to and execute commands on the UNIX host.
UNIX host name		The name of the UNIX host that will run the ubax program to access the database. This must appear in the hosts file on the PC unless DNR is used.
Printer	LOCAL	The command (for PC-Interface) or printer share name on the UNIX host (for MS-DOS Network Client) for printing APT-BACS reports. If this is set to LOCAL, these reports will be printed to LPT1 on the PC.
Printer (Remittance Advices)	lpr	The command used to print remittance advices by ubax. These may require different stationery to other reports. All other printouts from ubax will go to the default printer on the UNIX host.

Parameter	Default	Meaning
Database name	tess	The name of the TESS database on the UNIX host.
Ingres directory (II_SYSTEM)	/u/r6	The location of the Ingres software. This is translated to ING_HOME for Ingres release 5.
Full path of "ubax" is	/u/tess/comas6/bin /ubax	The path to the ubax program on the UNIX host.

Running SETUP.EXE the first time binds the SETUP.EXE executable to the BACS SETUP floppy disk. After this, the DOS DISKCOPY command will not produce a useful disk. The BACS SETUP disk can be re-initialised at any time to change the above settings.

4.5 Creating a key disk

The key disk creating process involves copying all the contents of the BACS SETUP disk to a new disk except for the SETUP.EXE program. The PC-BACS.EXE program is then initialised for the new key disk (PC-BACS cannot be run on the BACS SETUP disk). The CONFIG.BAX file is customised for the key disk user.

Run the SETUP.EXE program on the BACS SETUP disk. Select option 2 from the BACS SETUP menu and press Y to confirm. Note that option 2 will not be available until the BACS SETUP disk has been initialised (See section 4.4, Initialising the BACS SETUP disk).

When prompted, enter the UNIX login name of the user of the key disk. If the key disk is to be used by more than one UNIX user, leave this entry blank and PC-BACS will prompt for it each time the key disk is used.

You will then have the opportunity to choose a different printer for the APT-BACS report. If this is changed, the specified printer will be used only for the new key disk; it will not affect the default setting on the BACS SETUP disk.

When these are correct, BACS SETUP will modify itself to increment the key disk number. It will then ask you to write protect the BACS SETUP disk to prevent accidental corruption during the copy process.

The DOS DISKCOPY command is started automatically to copy the BACS SETUP disk to the new key disk. PC-BACS is then initialised for use on the new key disk.

4.6 Installing PC-BACS on the hard disk.

If desired, PC-BACS can be installed on the hard disk of a PC. Note that this is less secure than using a key disk and the PC should be password protected.

The installation process involves copying only the PC-BACS.EXE and CONFIG.BAX files from the BACS SETUP disk to the hard disk (C: drive). The PC-BACS.EXE program is then initialised for the hard disk. The CONFIG.BAX file is customised for the user. The hard disk effectively takes the place of the key disk.

Run the SETUP.EXE program on the BACS SETUP disk. Select option 3 from the BACS SETUP menu and press Y to confirm. Note that option 3 will not be available until the BACS SETUP disk has been initialised (See section 4.4, Initialising the BACS SETUP disk).

When prompted, enter the UNIX login name of the user. If the machine is to be used by more than one UNIX user, leave this entry blank and PC-BACS will prompt for it each time PC-BACS is used.

You will then have the opportunity to choose a different printer for the APT-BACS report. If this is changed, the specified printer will be used only for the new installation; it will not affect the default setting on the BACS SETUP disk.

When these are correct, BACS SETUP will modify itself to increment the key disk number. It will then copy the files to the C:\ directory. PC-BACS is then initialised for use on the PC.

5. Using PC-BACS

Once you have created a key disk or installed PC-BACS on the hard disk you will be able to use it. You cannot run the PC-BACS.EXE on the BACS SETUP disk.

5.1 Selecting vouchers for payment

The vouchers for payment are stored in the TESS database on the UNIX host. Use a terminal emulator to access TESS and use fivousel to select vouchers due for payment. Exit TESS.

5.2 Preparing for PC-BACS

The CONFIG.SYS and AUTOEXEC.BAT files should load drivers and TSRs used by the Network Operating System so that PC-BACS can access the UNIX host. See section 7, Network Operating Systems supported, for details of the commands that PC-BACS.EXE uses.

5.3 Starting PC-BACS

PC-BACS should normally be started from the AUTOEXEC.BAT file after initialising the network, especially if it is used from a key disk. PC-BACS must not be started from Windows. Note that once you have started PC-BACS you cannot return to the DOS prompt before rebooting the machine.

5.4 Operating PC-BACS

PC-BACS asks for a user name (unless a default was specified during BACS SETUP initialisation) and a password for the UNIX host. You will be given three attempts to enter the correct user name and password. PC-BACS will then connect to the UNIX host and connect the printer if necessary.

A list of TEC bank accounts is requested from the UNIX host and displayed. Select a payment date, choose whether to post to the next month and choose the TEC bank from the displayed list. Confirm the selection.

PC-BACS will then request the selected vouchers from the UNIX host and produce the APT-BACS format file on the RAM drive. The summary details of the file are displayed. Press RETURN to start APT-BACS.

Transmit the payments to BACS according to the instructions for APT-BACS. Exit the APT-BACS software. If you are using APT-BACS for Windows, you will also have to exit Windows.

PC-BACS will ask if the transfer was successful. If not, you will be able to start the process again to regenerate the file.

If the transfer was successful, PC-BACS will update the status of the vouchers on the TESS database to indicate that they have been paid.

You will have the option to print various reports about the payments and also remittance advice notes. These are printed by the UNIX computer.

5.5 Exiting PC-BACS

PC-BACS can only be exited by rebooting the PC.

6. Security

For maximum security follow these procedures.

- Install the PC-BACS software on a key disk kept by the authorised user.
- Keep the BACS SETUP disk in a secure place.
- Keep the PC with the BACS modem in a secure room.
- Use a power on password on the PC with the BACS modem.
- Use the DOS version of APT-BACS to prevent access to the APT-BACS file from other Windows applications.
- Always use passwords that will be difficult to guess.

7. Network Operating Systems supported

PC-BACS supports two Network Operating Systems. These are PC-Interface and the MS-DOS Network Client. See the Advantages and Disadvantages sections below for each network when deciding which to use.

The Network Operating System should be loaded before PC-BACS.EXE is started. You do not have to run a Network Operating System to use SETUP.EXE.

7.1 PC-Interface Network

PC-Interface is produced by Locus Computing Corporation. PC-BACS has been tested with PC-Interface V3.0.3 and PC-Interface V5.0.0 (available with PC-Interface Plus V2.0). The PC-Interface network is the better Network Operating System to use if all the software is to be stored on the key disk as it uses very little disk space.

7.1.1 Advantages

- As PC-Interface uses very little disk space it will easily fit on a key disk.
- PC-Interface uses less conventional memory.
- The previous versions of PC-BACS supported only PC-Interface, therefore, upgrading should be easy.
- PC-BACS operates slightly faster with PC-Interface.

7.1.2 Disadvantages

- There is an extra cost associated with buying this Network Operating System.
- The UNIX server has to run the PC-Interface server software.

7.1.3 Setting up

The PC-Interface server software must be installed on the UNIX server. The client software can be installed on either the hard disk or the BACS SETUP disk (so that it will be copied to the key disk). PC-BACS uses the LOGIN, ON and PRINTER commands. These should be in the PATH. The following examples show CONFIG.SYS and AUTOEXEC.BAT settings for PC-Interface V3.0.3 on the floppy disk. The machine here has a DEPCA Ethernet card
PC-Interface CONFIG.SYS

```
DEVICE=A:\DOS\HIMEM.SYS
BUFFERS=10,0
FILES=30
DOS=HIGH,UMB
LASTDRIVE=H
FCBS=4,0
COUNTRY=044,,A:\DOS\COUNTRY.SYS
STACKS=9,256
SHELL=A:\DOS\COMMAND.COM A:\DOS /P /e:1024
DEVICEHIGH=A:\DOS\ANSI.SYS
DEVICEHIGH=A:\DOS\RAMDRIVE.SYS 1024 512 20 /e
DEVICEHIGH=A:\PCI\DECLAN.DRV
DEVICEHIGH=A:\PCI\BRIDGE.DRV
```

PC-Interface AUTOEXEC.BAT

```
@ECHO OFF
PROMPT $p$g
PATH A:\;A:\DOS
LOADHIGH A:\DOS\KEYB UK,,A:\DOS\KEYBOARD.SYS
LOADHIGH A:\DOS\NLSFUNC
CHCP 850
SET PATH=A:\PCI;%PATH%
SCH.EXE
DEPCA /adapter=de100
LOADHIGH A:\PCI\PCIINIT
```

7.2 MS-DOS Network Client

MS-DOS Network Client is produced by Microsoft Corporation. MS-DOS Network Client version 3.0 is the better Network Operating System if the PC-Interface server software is not running on the UNIX host.

7.2.1 Advantages

- Free to Microsoft DOS users.
- No special server software is needed.

7.2.2 Disadvantages

- Uses more memory and disk space than PC-Interface.

7.2.3 Setting up

The client software will have to be installed on the hard disk. The NET START BASIC command should be run successfully before starting PC-BACS.

PC-BACS uses the NET and RSH commands. These should be in the PATH. The RSH.EXE is included in the root directory of the BACS SETUP disk. This can be copied to the hard disk. If RSH gives the message

```
Network modules not loaded. Program aborted.
```

then the following line needs to be added to your CONFIG.SYS file on the C drive.

```
;DEVICE=\PROTMAN\PROTMAN.DOS /i:C:\MSNETCLI
```

Replace C:\MSNETCLI above with the directory containing the file TCPUTILS.INI. The line is ignored at start-up but is read by the RSH command.

The RSH command also requires sockets to be loaded which itself requires entries in TCPUTILS.INI in the [tcpglobal] section for hostname and username. The username is the user used by RSH. DNR should be loaded for domain name resolution or failing that there should be a HOSTS file containing the name and IP address of the UNIX host.

The following examples show CONFIG.SYS and AUTOEXEC.BAT settings for MS-DOS Network Client version 3.0 on the hard disk.

MS-DOS Network Client CONFIG.SYS

```
DEVICE=C:\DOS\HIMEM.SYS
BUFFERS=10,0
FILES=30
DOS=HIGH,UMB
LASTDRIVE=H
FCBS=4,0
COUNTRY=044,,C:\DOS\COUNTRY.SYS
STACKS=9,256
SHELL=C:\DOS\COMMAND.COM C:\DOS /P /e:1024
;DEVICE=\PROTMAN\PROTMAN.DOS /i:C:\MSNETCLI
DEVICEHIGH=C:\DOS\ANSI.SYS
DEVICEHIGH=C:\DOS\RAMDRIVE.SYS 1024 512 20 /e
DEVICEHIGH=C:\MSNETCLI\IFSHLP.SYS
```

MS-DOS Network Client AUTOEXEC.BAT

```
@ECHO OFF
PROMPT $p$g
PATH C:\WINDOWS;A:\;C:\DOS
LOADHIGH C:\DOS\KEYB UK,,C:\DOS\KEYBOARD.SYS
LOADHIGH C:\DOS\NLSFUNC
CHCP 850
SET PATH=C:\MSNETCLI;%PATH%
net initialize
netbind.com
umb.com
tcptsr.exe
tinyrfc.exe
nmtsr.exe
emsbfr.exe
dnr.exe
sockets.exe
net start basic
```

8. APT-BACS software supported

PC-BACS is compatible with both DOS and Windows versions of APT-BACS.

Before APT-BACS is started, PC-BACS creates the APT format transfer file on the RAM drive. It is called BACS.DAT. Select this file to transmit in APT-BACS. The BACS.DAT file includes the BACS user number. This number should correspond with the APT-BACS user.

8.1 APT-BACS for Windows

If you use the Windows version of APT-BACS in Windows for Workgroups you must use the /N switch on the WIN command to prevent the Windows for Workgroups network from starting. Do not start other Windows applications as there may not be enough free conventional memory. This is because the network software and PC-BACS are already in memory when Windows is started.

8.2 DOS versions of APT-BACS

If you use a DOS version of APT-BACS and the command APTBACS reports the message

```
The Application Program Interface (API) entered
will only work in Microsoft Operating System/2 mode.
```

then you must check the CONFIG.SYS file. If it includes a DEVICE=EMM386.EXE line, you must remove it.

You must set the BACS transfer directory to the directory where APT-BACS has been installed.

9. Problems and Error messages

9.1 Start-up problems

The table below explains possible causes of errors when starting up PC-BACS.

Problem	Solution
Cannot start PC-BACS	May be due to insufficient memory. Remove unnecessary drivers and TSRs.
Cannot start APT-BACS	May be due to insufficient memory. Remove unnecessary drivers and TSRs. Check the Bacscommand and Bacsdire entries in CONFIG.BAX. If using the Windows version of APT-BACS, use WIN /N followed by the full path of the APTWIN command. Remove applications from the StartUp group.
Garbage appears on screen when running SETUP or PC-BACS	PC-BACS uses ANSI escape sequences to position text on the screen. Include DEVICE=ANSI.SYS in CONFIG.SYS and reboot.
Cannot restart network after reboot	If using a DEPCA card, it may be necessary to power off the machine and switch it on again to fully reset the card. Pressing Ctrl-Alt-Delete does not do this.
APT-BACS user does not match the user number in the BACS.DAT file.	The user number placed in the BACS.DAT file is fixed for the key disk (or hard disk installation). Changing the Bacsuser entry in CONFIG.BAX will not correct this. Re-initialise the BACS SETUP disk with the new number and then generate a new key disk or reinstall on the hard disk.

9.2 PC-BACS error messages

The table below lists the errors that can be reported by PC-BACS and suggested solutions.

Message	Meaning	Solution
System failure	A fatal error has occurred. Another error message should be shown below this to indicate the reason for failure.	See other errors to determine the cause of failure.
No disk drives available on Machine	Either there is no RAM drive or there are no drives available for use as a network drive. PC-BACS checks if the drive label is MS-RAMDRIVE to determine a RAM drive.	Include DEVICE=RAMDRIVE.SYS in CONFIG.SYS and reboot. Do not re-label the RAM drive. Check that there is an unassigned network drive available on drive D through N. Set LASTDRIVE in CONFIG.SYS if necessary.
Failed to Write to BACS disk	The PC-BACS and BACS SETUP disks must be write enabled. The PC-BACS programs have to update the files to record the status.	Write enable the disk.
Failed to open temporary file ...	PC-BACS failed to open a temporary file on the RAM drive.	Check the status of the RAM drive.
Failed to open file ...	PC-BACS failed to open the specified file.	Check the status of the drive.
Failed to install the Control C Interrupt	PC-BACS is unable to trap interrupt signals.	
Retry the current operation	When creating a key disk, SETUP was unable to perform a DISKCOPY.	Enter Y to continue. Check that DISKCOPY.COM is available and in the PATH.
User indicated failure to transmit to BACS	After running APT-BACS, the user indicated that the transfer was unsuccessful. The vouchers will not be marked as paid and reports will not be printed.	Correct any problems in APT-BACS and restart the process.
No transactions to transfer.	The total value of the APT-BACS format file is zero. There is nothing to transfer.	Select vouchers to pay in TESS.
Unable to display Bank details	PC-BACS could not display the list of bank accounts.	Check the other errors for details of why this failed.
Failed to login to host ... as user ...	The user name and password combination were specified incorrectly three times.	Check the password and try again. Test connecting to a drive from outside PC-BACS.
Unknown keyword in configuration file	A keyword was read from CONFIG.BAX that is not recognised by the software.	Check the CONFIG.BAX file. Comments in the file should not begin with two # symbols. Run the SETUP program again if necessary.
Unable to open the configuration file ...	The CONFIG.BAX file could not be opened.	Check that the file exists in the specified location and is not read-only. The BACS SETUP and key disks should be write enabled.
Error reading configuration file	A read error occurred when updating the CONFIG.BAX file.	Check that the disk is inserted correctly.
End of file Encountered	The file was smaller than expected.	This error normally related to problems with the CONFIG.BAX file, or, if the error occurs after running APT-BACS, to the BACS.DAT file

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Message	Meaning	Solution
Command ... is unavailable for spawn	The specified command could not be started.	Check that the command is in the PATH and that there is enough conventional memory available to start it.
The ... command was unable to execute correctly	The specified command was started but returned an error status.	Check for errors returned by the command.
Security Violation... Killing Disk	The disk is an invalid copy so its contents have been destroyed to prevent unauthorised use.	Regenerate the key disk from the BACS SETUP disk.
Invalid volume serial ID	The volume serial number is unavailable or is incorrect.	Check that the key disk or BACS SETUP disk has not been copied. Do not run SETUP or PC-BACS from Windows. At a DOS prompt, change to the drive where SETUP or PC-BACS is installed and check that the VOL command outputs a message with the form Volume in drive A is BACS SETUP Volume Serial Number is 1B59-15F4
Illegal copy of PC-BACS.	The BACS SETUP or key disk has been copied.	Use the original BACS SETUP disk to create new key disks.
String to be replaced is too long	A file cannot be updated.	
String to be inserted is too long	A file cannot be updated.	
Processing Error	An error occurred while updating a file. The position could not be set.	
File Read/Write Error	A file could not be opened for reading.	Check that the disk is inserted correctly in the drive.
Disk Write Error (WRITE PROTECTED)	A file could not be written to during update.	Check the write permission of the drive.
Invalid date	An invalid date was entered.	Enter the date in the numeric format dd/mm/yyyy.
User pressed Escape to abort	The program was aborted by pressing the 'Esc' key.	Start again.
Error message stack is full. Too many errors	No more than 10 errors can be reported.	Correct the other problems.
Trainers may only use the training database	Trainers (i.e. users whose name contains 'train') are only allowed to use a database name that starts 'trn'.	Use the training database or login as a non-trainer.
Users may not use the training database	Non-trainers (i.e. users whose name does not contain 'train') are not allowed to use a database that starts 'trn'.	Use a different database or login as a trainer.
Other errors	Other errors come from UNIX or the ubax program.	Check the ubax documentation.