1. What is AM4PM?

AM4PM is a simple answering machine program for OS/2 2.x PM and ZyXEL 1496. I wrote it for personal use because I could not find a suitable program. When I started to write it I had the following objectives:

- To be able to distinguish between voice/fax/modem.
- To be able to use external programs for modem and fax handling. I did not want to write these.
- To be able to listen to recorded messages from a remote phone.
- To make a program that could easily be modified without having to recompile my code.
- To make the program give up the COM port if another program needs it.

Other things on the wish list were: call my personal pager or a special phone number if an important message is recorded, change the greeting message from a remote phone or at a specified time, use some external program such as ZIP to compress the voice files.

Not all these features have been implemented yet, but be patient; some day they will. I must also admit the documentation might need some further work.

PLEASE note that this documentation does not describe how the ZyXEL modem works. To be able to modify the program a good knowledge of the voice AT commands is required.

AM4PM is a public domain program. It is free to use and free to distribute as long as unmodified versions of all the original programs and this document are included. Please report any grammatical or spelling errors in this text to me. How else can I learn to write correct English?

I take no responsibility whatsoever for any damage AM4PM can cause. Neither do I guarantee the functionality of the program.

I might not be able to fix all bugs and answer all questions about AM4PM, but I would like to be informed about problems and ideas on further development.

The program have been tested on a 486 clone with a 16550A running OS/2 2.1 march beta and a ZyXEL 1496+ ROM v6.00.

Thomas Olsson
Göteborg, Sweden
email d8olsth@dtek.chalmers.se

2. What is included in this version?

Most of the functionality is programmed in REXX. AM4PM adds some functions to the REXX language that makes it possible to control the modem. The REXX scripts that comes with AM4PM gives the following functionality:

- The program can be set to answer after a predifined number of rings. It will answer after the programmed number of times minus one if there are messages waiting. It will then play a greeting message. A short beep indicates the end of the greeting message and the beginning of the recording.

- If a voice is heard during recording the message will be saved. The end of the message is determined either by 7 s of silence or after a specific maximum time.

- If a fax calling tone or a DTMF '5' is heard during playback or recording AM4PM will try to see if it is a fax or a modem. This will also happen if no voice has been heard for the first 7 s of recording.

- If a DTMF '*' is heard during playback or recording AM4PM will enter command mode. A command consists of a DTMF '*' and a number followed by a DTMF '#'. The only available command will make it possible listen to recorded messages from a remote phone.

- The COM port can be released by starting *AM4PMCMD* with the command 'R'. The port can also be released by pressing the 'Release' button in the PM window. AM4PM will try to open the port again after 30 s and thereafter every ten seconds.

3. The functions of the program

The main window presents a list of recorded messages. The date of the recording is displayed together with the length of the message if it was recorded in CELP mode.

To display the popup menu press the right mouse button or sh-F10.

Play

By selecting one or more messages in the list and then selecting *Play* the messages will be played in the modem's internal speaker.

Delete

By selecting one or more messages in the list and then selecting *Delete* the messages will be deleted. If *Delete* is pressed during playback the messages will be played first.

File | Play...

A file dialog will be displayed when *File | Play...* is selected. When the *Play* button is pressed the selected file will be played in the speaker of the modem.

File | Record...

A file dialog will be displayed when *File | Record...* is selected. When the *Record* button is pressed the recording of a message from the microphone connected to the modem will start.

Abort

By selecting *Abort* the current playback or recording is aborted. If a delete operation is delayed due to a playback the delete operation will also be aborted.

Stop

The current playback or recording will be stopped when *Stop* is selected.

Release

Selecting *Release* will release the COM port for 30 s. The program will then try to reopen to COM port every ten seconds.

This can also be accomplished by starting the program *AM4PMCMD* with the parameter 'R'.

4. How to get started

- Put at least all the following files in one directory:

  AM4PM.EXE

  AM4PM.MSG

  *.AMC

- Start AM4PM.EXE. The status bar at the bottom of the screen will display "Initializing..." and then "Waiting for call". If any other message is written instead check the settings by selecting *Settings...* from the menu.

- Make recordings of the following messages:

Name	Description
GREETINGS.ZVD	Played when a call is answered.
GREET2.ZVD	Played when someone has pressed the code for listening to the recorded messages.
NOMSG.ZVD	Played to tell that there are no recorded messages.
DELMSG.ZVD	Played to tell that a message has been deleted.
ENDMSG.ZVD	Played to tell that are no more waiting messages.

- Change the remote code and the password in RING.AMC.

- If you want to use OS2YOU make sure it is in your path. If FaxWorks is to be used to receive faxes see to that FxRcv is in the path.

To play recorded messages from a remote phone press '*' on the phone during the greeting message. This will be acknowledged by a beep. Enter your code (the default code is '123') and press '#'. The message GREET2.ZVD will be played. If there are any messages they will now be played. After all the messages have been played you will hear ENDMSG.ZVD. If there are no messages NOMSG.ZVD is played. During playback of a message you can press any of the following keys:

1 Skip to the next message

2 Delete the current message

3 Play the message from the start again

5. The REXX scripts

AM4PM uses REXX scripts for many tasks. This makes it easy to modify and costomize the operation of AM4PM. The scripts called normally have the file extension *AMC*. Some functions are added to the REXX language to control the modem.

RING.AMC

This script is called when AM4PM receives 'VCON' or a string starting with 'RING' from the modem.

The first parameter is the string that was recieved before this script was started. If it is 'VCON' the hook is already off. If it is a string starting with 'RING' the second parameter tells the number of rings that has been detected so far for this call. When the time between two successive rings are greater than five seconds they are considered to belong to different calls.

The script normally checks if it should answer the phone. When it answers a greeting message is played and then the recording of a message is started. The script can also start a fax or modem communiction program if it detects a fax or a modem. Features for listening to recorded messages from a remote phone might also be included.

To save hard disk space this script can call a compression program such as *LHARC* to compress the recorded messages.

If CID is supported this script can attach a suitable text as an EA with the name .SUBJECT to the recorded file. The text will be displayed in the list of messages.

The first parameter can be used together with the distinctive ring feature of some modems to make AM4PM answer in different ways

PLAY.AMC

This script is called when the user have selected one or more messages from the list in the main window in AM4PM and then selected *Play* from the menu.

Input parameter is the name of the file to play.

Normally this script just plays the message through the speaker in the modem, but if the message is stored in a compressed format it is necessay to uncompress it first.

Other functionality in this script can be to play the message on another device such as a SB card.

RECORD.AMC

This script is called when the user selects *File | Record...* from the menu.

Input parameter is the name of the file to record.

Normally this script just starts a recording from the microphone connected to the modem. The recording continues until *Stop* is selected.

Other functionality in this script can be to record the message from another device such as a SB card.

DELETE.AMC

This script is called when the user have selected one or more messages from the list in the main window in AM4PM and then selected *Delete* from the menu.

Input parameter is the name of the file to delete.

This script just deletes the file.

CID.AMC

This script is called when AM4PM receives CID information from the modem. The CID messages are identified by the string 'TIME' at the beginning.

Input parameter is the the string starting with 'TIME'.

The CID information can be displayed in the *last event* field of AM4PM.

INIT.AMC

This script is called every time AM4PM want to reninitialize the modem.

Normally this script resets the modem (ATZ), disables echo (ATE0) and sets answer mode (AT+FCLASS=8).

Other scripts

Other scripts can be called by using the program AM4PMCMD (see separate description below).

This can be used when another program wants to access to functions of AM4PM. For example if a voice message should be delivered at a specific time the alarm application can call AM4PMCMD to start a script. That script can then call the number and play the message.

6. The REXX functions

handle = AMGetHotComm()

AM4PM stops using the COM port until AMReleaseHotComm is called. The port is not closed. A file handle to the open port is returned and can be used as a parameter to other programs such as REFAX/2 and OS2YOU.

The settings for data format and handshaking are restored to the same values they had when AM4PM was started.

CALL AMReleaseHotComm

AM4PM reinitializes the port and starts listening for input again.

port = AMCloseComm()

AM4PM closes the COM port to make it available to other programs. The port can be reopened by calling AMOpenComm. The port will also be reopened if the script is ended.

CALL AMOpenComm

AM4PM opens the port and sets the port mode settings. If the port can not be opened this function will retry to open it every ten seconds.

CALL AMDPrint *text*

Prints *text* to the debug window. Debugging printouts are enabled by starting the debug printout application and then start AM4PM with the switch '-d'.

filename = AMOpenRecFile(*mode)*

Creates a unique file to be used for storing messages. The filename is returned. The file is created in the current directory and is called M*nnnn*.ZVD where *nnnn* is a unique number.

The *mode* parameter is used for setting the voice mode in the modem by sending 'AT+VSM'. The following modes are supported on a ZyXEL 1496E+ with ROM v6.00:

1. CELP 9600 baud. High compression. Fairly good quality.
2. bit ADPCM 19200 baud. Bad quality.
3. bit ADPCM 28800 baud. Good quality.

Reception of a message is started by calling AMStartRec and ended by calling AMEndRec.

The file must be closed by calling AMCloseRecFile.

CALL AMCloseRecFile

Closes the message file opened by calling AMOpenRecFile.

This function also attaches an EA with the name AM4PM.LEN to the file that tells the length of the message in seconds. This EA should be of type BINARY and stored as a 32-bit unsigned integer. The length information will be displayed in the list of messages. If this EA is not found the length will be calculated as the file size divided by 2000.

dlecode = AMPlayFile(*filename*)

Plays the file *filename*. If a DLE code is returned from the modem the playback is aborted and the code is returned. Otherwise a blank is returned. At least following codes can be returned:

'0'-'9', '*', '#'	A DTMF code was received.
c	A fax calling tone was received.
b	A busy tone was received.

CALL AMStartRec

Starts recording. The message is saved in the current message file opened by calling AMOpenRecFile. The recording is stopped by calling AMEndRec and the file is closed by calling AmCloseRecFile.

The function AMWaitDLECode is normally called between this call and AMEndRec to see if any DLE codes are heard.

CALL AMEndRec

Ends the recording. The file must be closed by calling AMCloseRecFile.

CALL AMStartListenDLECode

Start recording but does not save the message to a file. This is used to listen for DLE codes. The listening must be stopped by calling AMEndListenDLECode.

The function AMWaitDLECode is normally called between this call and AMEndListenDLECode to see if any DLE codes are heard.

CALL AMEndListenDLECode

Ends the listening for DLE codes.

dlecode = AMWaitDLECode()

Listen for DLE codes during recording started either by AMStartRec or AMStartListenDLECode. At least the following codes can be returned

'0'-'9', '*', '#'	A DTMF code was received.
c	A fax calling tone was received.
b	A busy tone was received.
q	Quiet detected. Some voice was heard at the beginning, but now there is silence.
s	Silence detected. No voice has been heard at all.

dceresp = AMSendW(*text*)

Sends the text *text* followed by CR/LF to the modem and then waits for a response. The response is returned. Note that this functions waits for a LF to be received from the modem.

dceresp = AMGetMoreDCEResp()

If more then one string is returned from the modem as a response to AMSendW this function can the be used to retrieve them.

rc = AMStartProg(*command*)

Starts the program found at the beginning of the string *command*. The program name must be given without path and extension. The environment variable *path* will be used when searching for the file. All text following the program name will be used as a parameter to the program.

The return code of the program is returned.

The program will be started minimized and closed when the session ends unless AM4PM is in debug mode.

CALL AMSetStateText *text*

Sets the text in the AM4PM window under the heading '*State'* to *text*.

The text is reset to *'Waiting for call'* when the rexx program terminates.

CALL AMSetLastEventText *text*

Sets the text in the AM4PM window under the heading '*Last event*' to *text*.

The text is set to *'Abort'* when *Abort* is pressed.

value = AMReadIni(*key*, *default*)

Retreives a value from the file AM4PM.INI.

CALL AMWriteIni(*key*, *value*)

Sets a value in the file AM4PM.INI.

7. The REXX variables

AM4PM adds some variables to the REXX script language.

vAMRings

The number of rings that should be heard before AM4PM answers. This value can be changed by the script and the new value will be stored.

vAMMsgs

The number of messages recorded.

8. AM4PMCMD

This program is used for controlling AM4PM from other programs. It sends messages to AM4PM. All messages are queued.

Command	Description
R	Release COM port for 30 s. AM4PM will then try to reopen the port every 10 s. AM4PMCMD waits until the port is released.
C *command*	Tells AM4PM to run the script *command*. AM4PMCMD does not wait for the script to execute. All text after the first space in *command* will be sent as a parameter to the script. For example the command `AM4PMCMD C "play.amc greeting.zvd"` will play the message *greeting.zvd*.

A return code of zero indicates a successful call.

9. The file AM4PM.INI

Key	Description
Rings	The number of rings before answering.
Com	The name of the COM port to open.
Baud	The baud rate to use when communicating with the modem.
Titles	Set to 'Y' if the field titles should be displayed in the list of messages.

The values used by AM4PM must not be changed when the program is running. To modify the settings use the variables in the Rexx script language.

This file can also be used to store values of other keys used by scripts written for AM4PM. No version of AM4PM will ever use a key starting with an 'x'. This can be used to make sure that there is no conflict with future versions.

10. Functions I will add some day

- Better error handling.
- Keep track of messages that have never been listened to and mark them in some way in the list.
- The icon displayed when the program is minimized should be changed when there are messages waiting.
- Make it possible to use AM4PM with Rockwell chip set modems.
- Make it possible to change greeting message from a remote phone.
- An installation program that generates the AMC script files.