A BULLETIN BOARD SYSTEM FOR THE CROMEMCO COMPUTER

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INTRODUCTION

In any organization or group there is a need for good communications. In large complex organizations timely and effective communications without breakdowns has always been one of management’s primary challenges. The following documentation describes how a computer can be used to play a constant and current communications role. In a sense this computer usage could be referred to as "A Bulletin Board" system, but in actuality, it can be used as many separate "Stations" for timely information, directives, etc. All such communications are not necessarily directed to, or available to everyone. Password protection can be incorporated to determine who can receive what.

Obviously there are many possible applications for such systems. Here are some examples:

1. BUSINESS MAIL USE: a business could use the computer as an electronic information exchange system between selected key personnel regardless of geographical location.

2. PERSONAL USE: friends or family could leave or receive messages when one party is not immediately available.

3. CLUB USE: provide a central place accessible by phone where notices can be left, questions can be
answered, and general messages can be left for designated members.

4. SWAP AND SHOP USE: operate as a "flea" market where people could call, select and examine areas of interest, and if appropriate, reply.

The following is one specific application. Currently Robert Diersing, my Graduate Project Advisor, is running a Bulletin Board on his home computer for world-wide use by HAM Radio Operators who have computer terminals. His program is written in BASIC Language, and although the program is currently effective, one major problem is that it requires too much of the computer memory. A second problem is that his program does not have the capability to allow users to back up when information is being entered.

PROJECT SCOPE

For my Graduate Project I first attempted to improve the Diersing program by transposing his BASIC Language program to Assembly Language with certain improvements. This turned out to be impractical because of the major differences in the languages. Finally it was necessary to abandon his program completely and start from scratch using only the basic outline of his disk files. This resulted in a completely new program which successfully solved the two problems previously mentioned. The memory requirements were reduced to approximately one fourth the previous requirement. The lack
of back up capability was eliminated. Additionally, the new program allows the user to store message text in lower case as well as upper case letters.

In accomplishing this project I have gained experience in writing a real time machine language program that interacts with both disk files and a telephone interface. At the same time I greatly increased my skill in Z80 Assembly Language Programming.

DIFFICULTIES ENCOUNTERED

The major difficulties encountered were:

1. Determining what information a disk file record should have and what pointers were needed to create the different linked lists.

2. Remembering to save the updated File Control Block on disk when exiting the program in both normal and error mode. (At the start of the checkout the error routine did not save the updated File Control Block on disk and it caused confusion before the problem was identified.)

3. Determining the compatibility between my home computer running CP/M and the CCSU computer running CDOS.

4. Losing hours of typing because of home computer hardware difficulties. (I finally did all program input on the CCSU computers using my home computer
only for writing the documentation and report.)

5. Getting access to the CCSU Cromemco Hard Disk Computer in the evening and on weekends. (This semester the number of students using the CCSU microprocessors was considerably greater than in past semesters. This made it difficult for me to find open time slots to sign up for computer use.)

6. Testing delays caused by phone line problems. (The phone lines failed during the final program checkout, making it impossible to continue testing the system from a remote location. The phone line is still out of service.)

7. Determining how to read the computer’s clock. (The assembly language program was too fast for the computer’s clock. A delay had to be put into the program to allow the computer’s clock enough time to answer the program’s queries.)

ABSTRACT

The Bulletin Board Program allows a Cromemco Computer running CDOS to be used as a computer bulletin board. The program uses system calls that are compatible with CP/M, so that the program may also be put on any computer running CP/M. A user with a computer terminal can access the Bulletin Board by telephone. The Bulletin Board will answer the phone and allow the user to log on. Once the user is logged on, he can
add, change, print, or delete messages. When the user is finished, the Bulletin Board hangs up the phone and waits for the next caller.

Although this Bulletin Board program runs on a Cromemco computer, users can log in with any computer terminal that transmits ASCII at 300 baud.

FUNCTIONAL DESCRIPTION

When a user logs on, the Bulletin Board displays the main menu. The user then selects one of the major functions. If the user selects "add a message", the Bulletin Board will prompt the user for the message and save this message on the disk and then return to the main menu. If the user selects a function to find a message, the Bulletin Board will go find the message and then ask the user what to do with the message. At this time the user can print, change, or delete the message. When the user is finished with the message, he can find the next message or return to the main menu. When the user is finished with all his options, he can exit the Bulletin Board by typing "E". However, if the user hangs up the phone or becomes disconnected before logging off, the Bulletin Board will automatically log the user off and hang up the phone.

Logon Operation:

When a user dials the Bulletin Board phone number, the Bulletin Board answers the phone and sends an originate
carrier. The user's modem then sends back an answer carrier. If the Bulletin Board does not detect an answer carrier within 30 seconds, it will hang up the phone and wait for another caller. However, if the carrier is detected, the Bulletin Board sends the following message:

WELCOME TO THE BULLETIN BOARD, JRF

HAVE YOU LOGGED ON BEFORE (Y/N)?

The Bulletin Board then waits until one of the following characters is entered "Y", "y", "N", or "n". If the user answered "yes", the Bulletin Board asks the user to enter their ID#. Once the ID# is entered, the Bulletin Board checks the log file to see if it is a valid ID#. If the ID# is valid, the user is logged onto the Bulletin Board. If the ID# is invalid (i.e. the ID# is not in the log file) then the Bulletin Board prints "INVALID ID#, BYE", hangs up the phone, and waits for the next caller. If the user answered "no" to the logon question, the Bulletin Board asks the user to enter the following information: ID#, Name, Street Address, and City. The Bulletin Board then takes this information and creates a new log file entry. At this time the new user is logged onto the Bulletin Board.

Once the user is logged on, the Bulletin Board prints the user ID#, Name, and Time-of-day on the system printer to provide a record of who has logged on. The Bulletin Board then sends the main menu to the user and waits for the user to select which option is to be performed.
Main Menu:
The main menu is as follows:

***** MENU *****
---------------------
ENTER IF YOU WANT TO :
---------------------
A ADD A MESSAGE
X CHANGE SIZE OF MENUS (SHORT/LONG)
I SHOW INSTRUCTIONS
E END SESSION (EXIT)

SELECT A MESSAGE:
S BY SUBJECT
N BY NUMBER
T BY PERSON ADDRESSED TO
F BY PERSON IT IS FROM

ENTER CHOICE (A,X,I,E,M,S,N,T,F):
Main Menu Commands:

The following paragraphs explain what happens when the user selects one of the menu options.

"A" -- Add a Message:

The Bulletin Board asks the user to input the message header information: TO, FROM, SUBJECT, and PASSWORD. During this time, all character inputs are converted to upper case to avoid confusion when locating messages. Once the user has entered the message header information, the Bulletin Board prompts the user with a ":". At this time the user can type in the message. Each line is terminated with a carriage return and the message is terminated when a blank line has been input. If the first line of the message is blank, then the Bulletin Board returns to the main menu and ignores the message header information (i.e. all messages must contain at least one line of text). When a message is entered with at least one line of text, the message is stored on disk for later recall.

In entering lines of text, the Bulletin Board inputs information with the following features: Backspace and Delete keys erase the previous character and back up the cursor one position. Control "R" retypes the current information on the next line. This is useful if you are using a printer and want to see the line as it currently reads. Control "U" erases the information and puts the user back at the start of the line.
The only way to end a line is with a Carriage Return. If the user tries to enter a line past the line limit of 70 characters, the computer ignores the extra inputs and does not echo them back to the terminal. Message text entered in lower case is saved and printed in lower case.

"X" --- Change Size of Menus (Short/Long):

The "X" command controls how much of the menus are printed. When the user logs onto the Bulletin Board all menus are printed in the full form. An experienced user who does not need to see the entire menu each time can select command "X" and the menus will be printed from then on in a shortened form. If the user wants to see full menus again, performing a second command "X" will cause the Bulletin Board to print full menus again. The "X" command can be used repeatedly to go from short to long menus. When short menus are being printed, the main menu prints out as follows:

ENTER CHOICE (A,X,I,E,M,S,N,T,F):

Also, when in the short form, no instructions are printed when looking through message headers.

"E" --- End Session (EXIT):

When a user selects an "E" command from the main menu, the Bulletin Board logs the user off, hangs up the phone, and waits for the next caller.
Find Message By Parameter:
The remaining main menu commands are used to find a message. Each command allows a different parameter to be used in finding the message.

"S" -- find messages with a given SUBJECT

"N" -- find messages with NUMBER greater than or equal

"T" -- find messages addressed TO somebody

"F" -- find messages addressed FROM somebody

The Bulletin Board asks the user to enter the message header parameter which will be used to locate the message. After the user has entered his reply, the Bulletin Board looks through the message headers to find the first occurrence of the parameter requested. When an occurrence is found, the Bulletin Board sends the message header information to the user and requests what to do with this message (see next paragraph). If no more occurrences are found, the Bulletin Board prints "NO MORE FOUND" and returns the user to the main menu.

Options When a Message Has Been Found:

Once the user has found a message, he has the following options:

"M" -- Return to the main menu

"P" -- Print the message and wait for next option

"D" -- Delete the message and return to main menu

"C" -- Edit the message and then select another option

CR -- Carriage Return - Search for next occurrence
Message Editor:

When a message is found and the "C" option is selected, the Bulletin Board goes into a message edit mode. The message editor works as a line editor, in that a line can be replaced, inserted, or deleted. The following commands are used when in the message editor:

"T" -- Redisplay the current line
cr -- Advance to next line and display it
"-" -- Back up one line and display it
"D" -- Delete the current line
"I" -- Insert new line before current line
"R" -- Replace current line
"E" -- Exit the editor

In the above line editor commands, the following additional things happen: When using the "D" (delete line) command, if the line being deleted is the last line in the message, then the message header is deleted and the user is returned to the main menu. When using the "I" (insert line) or "R" (replace line), the user will be asked to input the new line which will be terminated by a carriage return. Notice, the new line can be a blank line. When using the "E" command, the user is returned back to the message header from which he entered the message editor. At this point the user selects another option to decide what else to do with the message.
LOSS OF CARRIER

During inputs from the user, the Bulletin Board Program checks for the presence or absence of the return carrier. If the Bulletin Board detects the absence of the return carrier, it will do one of the following:

1. If the carrier is lost during a logon, the logon is aborted, the Bulletin Board hangs up the phone, and waits for the next caller.

2. If the carrier is lost during the input of commands from the main menu, the user is logged off the same as if the user had requested a logoff ("E").

3. If the carrier is lost when the user is adding a new message title or the first line of a new message, then the Bulletin Board ignores the new message and performs a logoff. This is the same as if the user had entered the "E" command in the main menu.

4. If the carrier is lost when the user is adding a new message and has already entered the first message line, then the program will exit the "add message mode" saving the part of the message that has already been entered. The program then sends the main menu and requests a command. If the carrier is still not present, the user is logged off.

5. After the Bulletin Board has found a message, if the carrier is not present, then the Bulletin Board logs the user off.
6. If the carrier is lost when editing a message in the insert or replace line modes, the current information is saved as the new line and the user is logged off.

7. If the carrier is lost when looking at a message in the edit message mode, the user is logged off.

PROGRAM STANDARDS

The program uses the following standards:

Register Usage:

<HL> -- Pointer to Memory-1
<DE> -- Pointer to Memory-2
<B> -- Counter
<A> -- Status of subroutine

Program Location Labels:

INIT ---------------------- L1nnn
(Sets up where modem inputs and outputs go)

CONNECT ------------------ L2nnn
(Answers the phone and sets the modem parameters)

LOGON --------------------- L3nnn
(Asks for user ID# and logs the user on)

OPTION --------------------- L5nnn
(Does all message handling)

MWRITE --------------------- L51nn
(Add new message)
SMNUMBER --------------- L52nn
(Select Message by NUMBER)

SMTD --------------- L53nn
(Select Message by who it is TO)

SMFROM --------------- L54nn
(Select Message by who it is FROM)

SMSUBJECT --------------- L55nn
(Select Message by SUBJECT)

LOGOFF --------------- L6nnn
(Logs user off and closes files)

DISCONNECT --------------- L7nnn
(Hangs up the phone)

UTILITIES --------------- L8nnn
(See Utility section below)

Utilities:

CRLF --------------- Carriage Return & Line Feed
CHIN --------------- Character input - no echo
CHINE --------------- Character input - with echo
CHINNW --------------- Character input - with no wait
CHOUT --------------- Character output from <C>
CHOUTA --------------- Character output from <A>
CONVERT --------------- Convert Hex to ASCII
HXBOUT --------------- Hex Byte output
HXWOUT --------------- Hex Word output
COMPARE --------------- L801n
(Compares two strings)

GETLINE & UGETLINE ---- L802n
(Inputs line of text)

OUTLINE --------------- L803n
(Outputts line of text, length <B>)

BLANK --------------- L804n
(Puts blanks in section of memory)

HEXOUT --------------- L805n
(Outputts in hexadecimal)

MOVEDAT --------------- L806n
(Moves data from mem1 to mem2)

MPRINT --------------- L807n
(Prints one of the Bulletin Board messages)

MHPRT --------------- L808n
(Prints message header information)

MSERVICE --------------- L809n
(Inputs option to service a message)

TXTPRINT --------------- L810n
(Prints text, stops when encounters "$")

Disk Utilities:

SETFCB --------------- L831n
(Sets up a File Control Block)

LOPEN --------------- L832n
(Opens the Log file)
MOPEN -------------- L833n
(Opens the Message file)

GETTEXT -------------- L834n
(Inputs a line of text from the user)

MRREAD -------------- L836n
(Reads a disk record)

MRWRITE -------------- L837n
(Writes a disk record)

FREAD -------------- L838n
(Reads message file header)

MCHANGE -------------- L839n & L840n
(Message editor)

MDELETE -------------- L841n
(Deletes a message)

Test Utilities:
These utilities are only for use in troubleshooting and have to be added to the program when needed.

DUMP -------------- L880n
(Dump first part of each buffer)

DUMPREG -------------- L881n
(Dump registers and top of stack)

Modem Utilities: (L9nnn)

MCHOUT -------------- L901n
(Output character in \texttt{<C> to modem})
MCHIN ----------------- L902n
(Input character from modem)

MCHINNW -------------- L903n
(Input character from modem without waiting)

MOUTLINE ------------ L904n
(Output line to modem)

MGETLINE -------------- L905n
(Input line from modem)

MTXTPRINT -------------- L906n
(Output text to modem, end at "#")

Data Areas:

LOGFCB --------------- Log FCB (33)

LBUFFER --------------- Log record buffer (256)

MSGFCB --------------- Message FCB (33)

FHBUFFER --------------- Msg file header buffer (128)

MHBUFFER --------------- Message header buffer (128)

MTBUFFER --------------- Message text line buffer (128)

DBUFFER --------------- Misc. data buffer (50)

D2BUFFER --------------- No. 2 misc. data buffer (128)

MHCURRENT -------------- Record # for last MH read

MTCURRENT -------------- Record # for last MT read

MHNEXT --------------- Pointer to next MH record

MHLAST --------------- Pointer to last MH record

MTNEXT --------------- Pointer to next text line

MTLAST --------------- Pointer to last text line
OUTPUTS --------------- Send modem outputs to:
    0 = console only
    1 = modem only
    2 = console and modem

STACK --------------- Stack area (500)

TPSTACK --------------- Top of Stack (1)