

COM-MASTER USER'S GUIDE

A communications monitor for the Commodore SuperPET *

Version 1.2 - February, 1984 - Serial # _____

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INTRODUCTION

COM-MASTER, in its most basic function, is a communications monitor for the Commodore SuperPET which runs on the SuperPET's 6809 processor. Besides allowing the SuperPET to emulate a Lear-Siegler ADM-3A terminal, this program has many other very useful features:

1. Fully buffered and interrupt-driven input and output through the SuperPET's serial port;
2. ASCII control codes via use of the OFF/RVS key as a CONTROL key;
3. A true serial BREAK key using the SuperPET's STOP key;
4. A software-implemented upper-case alpha lock which does not shift all the top-row keyboard numerics to punctuation (as the keyboard SHIFT-LOCK key does);
5. Full control of the port: baud rates from 50 to 19,200; data word lengths of 5,6,7, or 8 bits; full parity control; 1 or 2 stop bits;
6. Software handshaking (XON/XOFF) available on either input, output, or both;
7. The ability to transmit data from (upload) or receive data into (download) disk files stored under any DOS 2+ Commodore disk drive.
8. 11 user-defineable function keys using the shifted numerics keypad; each function key may be defined to be any character sequence up to 18 characters in length (45 characters for Function 0);
9. Choice of ASCII or APL character sets;
10. Operating parameters (including Function Key definitions) for different host systems can be stored and loaded from user-created Command Files.

Use of the file uploading and downloading features requires an understanding of the Waterloo file system as described in the SuperPET System Overview manual, a copy of which should have accompanied your SuperPET. If you do not have this manual and find that you are not able to properly specify Read and Write File names, call 1-800-428-3696 (1-317-298-5566 in Indiana, Alaska, and Hawaii) to find out the name of your nearest Howard W. Sams & Co., Inc. retailer or distributor to obtain a copy.

SETTING UP THE HARDWARE

The only hardware needed to make use of COM-MASTER (besides the SuperPET itself and a CBM disk drive) is an appropriate cable to connect the SuperPET's serial port to the remote device. This serial port is a DB-25F connector which, unfortunately for convenience sake, is located inside the SuperPET's housing. It can only be accessed by removing the two screws under the left and right sides of the housing and lifting the hinged housing off its base. (Note that there is a hinged support rod for holding the housing open located along the front of the housing's base.)

On the older 3-board models, the serial port is located on the front, right side of the upper board, while on the more recent 2-board models it is located on the left, front side. Note that there is a groove on the left side of the metal housing base through which a cable can be channelled when the housing is closed. If you are planning on using COM-MASTER with multiple remote systems, it is strongly recommended that a short piece of cable be wired to extend the serial port to a separate connector just outside the housing so it will not be necessary to open the housing in order to switch cables. This will save a good deal of wear and tear on your SuperPET. This cable should be a straight cable which extends at minimum, pins 1 to 8 and 20, which are the only pins used by the SuperPET's serial support chip (an SY6551 ACIA).

The definitions of these pins are standard for Data Terminal Equipment (DTE) which is specifically:

1	Chassis Ground	
2	Transmit Data	(output)
3	Receive Data	(input)
4	Request to Send	(output)
5	Clear to Send	(input)
6	Data Set Ready	(input)
7	Signal Ground	
8	Carrier Detect	(input)
20	Data Terminal Ready	(output)

It is important for the COM-MASTER user to understand that the serial port will not work unless a positive voltage signal is provided on pins 5, 6, and 8. If you are using COM-MASTER with a modem, it is common (although not guaranteed) for most modems to provide a positive voltage on these pins so it is only necessary to have these pins connected straight through to the modem. If, however, you are connecting the SuperPET directly to another computer, it is fairly uncommon for other computers, especially other microcomputers, to provide these voltages. For cases where the modem or remote computer are not providing these signals, it is necessary to use a connector on the SuperPET side which "fakes" these required voltages. This is most commonly accomplished by building a special connector where pin 4 is jumpered directly into pin 5, and pin 20 is jumpered into both pins 6 and 8. Such a specially wired connector should permit COM-MASTER to be used with any remote device, modem or computer, with only 3 wires interconnecting pins 2, 3, and 7.

Also, it is important to know what type of communications standard that the remote device is using; i.e., Data Communications Equipment (DCE) or Data Terminal Equipment (DTE). This will determine how pins 2 and 3 are to be connected to the remote device. If the remote device is DCE (as most modems are), then pins 2 and 3 of the SuperPET should be connected directly to pins 2 and 3, respectively, of the remote device. If the remote device is DTE (as is common, but not guaranteed, for most computer ports), then pins 2 and 3 must be cross-wired; i.e., pin 2 on the SuperPET must be connected to pin 3 of the remote device, and pin 3 of the SuperPET must be connected to pin 2 of the remote device.

HOW TO USE COM-MASTER

As you should with any program you receive, be sure to copy the distribution program to a working diskette and store the distribution diskette in a safe place. It is suggested that the working copy of the program be placed on a diskette which contains, at minimum, a copy of a file manager/editor (such as the Waterloo EDIT program) since it could frequently be needed to maintain COM-MASTER Command Files.

To use COM-MASTER, first be sure that the forward two toggle switches on the lower right side of the SuperPET are set to 'R/W' and '6809'. When these switches are so positioned, the Waterloo Selection Menu should be displayed on the screen. You may then insert the program diskette in either drive of your Commodore disk drive. If you choose drive 1, you can simply enter 'cm' to load and execute the program. If you choose drive 0, you must enter 'disk/0.cm'.

Once the program begins executing, you are immediately placed in Control Mode (versus On-Line Mode). In Control Mode, the following text appears on the screen:

```
-----
SuperPET COM-MASTER - Version 1.2 - Serial # xxxxxx
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Emulator =  dumb  adm3a
Character Set .. = ascii  apl  DUPlex ..... = full  half
Data Word Length =  5  6  7  8  Number of Stop Bits =  1  1.5  2
PARity =  none  odd  even  mark  space  Auto New-Line = on  off
Baud Rate  =  extclk  50  75  109.92  134.58  150  300  600
                  1200  1800  2400  3600  4800  7200  9600  19200
Software Handshaking =  none  input  output  both
Read File Protocol =  none  pause  wait
Read File Protocol Data =  0  Remote End-Of-Record =  cr  crlf  lf
Read File =  Write File =
F7 =          F8 =          F9 =
F4 =          F5 =          F6 =
F1 =          F2 =          F3 =
F0 =          F. =
```

Enter a command :_

```
(current Read File name) (current Write File name) (time) lower-case
-----
```

All items above which are displayed in boldface type print will appear in reverse video on the SuperPET screen. These items represent the current value for each of these Control Mode parameters and may be changed to some other value by entering the appropriate response to the 'Enter a command:' prompt. A description of how to do this starts on page 10 under the section HOW TO ENTER COMMANDS IN CONTROL MODE. A general discussion of

these parameters follows:

The parameters on the upper part of the screen (from 'Emulator' down to 'Read File Protocol' and 'Remote End-of-Record') are list-controlled parameters, meaning that their values are selected from the list of valid responses displayed immediately to the right of the 'equals' sign which follows each parameter heading. For example, the list of valid responses for the 'Software Handshaking' parameter is 'none', 'input', 'output', or 'both'.

The Read File Protocol Data parameter is assigned a decimal value from 0 to 255. Its actual allowable range and meaning depends upon the current value of the Read File Protocol parameter. This is explained further on page 14 under the Detailed Description for the RFP (Read File Protocol) keyword.

The Read File, Write File, and Fx (where x=0-9 or .) parameters are assigned free-format character string values. These values may contain any valid ASCII character (including control characters) which can be generated on the terminal keyboard. More information on entering these values can be found on page 11 under the HOW TO ENTER COMMANDS IN CONTROL MODE section.

When a null response (i.e. hitting only the RETURN key) is entered in response to the 'Enter a command :' prompt, COM-MASTER clears the Control Mode screen and enters On-Line Mode. In this mode, the SuperPET behaves like a terminal with the OFF/RVS key becoming the terminal's CONTROL key and the STOP key (either shifted or unshifted) becoming the terminal's BREAK key.

Access to Control Mode may be regained at anytime by typing CONTROL-SHIFT-ESC (i.e., by holding down both the CONTROL and SHIFT keys while depressing the ESC key). Each time Control Mode is entered this way, COM-MASTER will save the On-Line Mode screen to a buffer which will be restored when the user again returns to On-Line Mode. Also, any Read or Write File which should happen to be enabled when Control Mode is invoked will be automatically disabled and must be manually re-enabled after On-Line Mode is re-accessed. (See the sections of this manual on DOWNLOADING (page 16) and UPLOADING (page 19) files for an explanation of what it means to enable and disable Read and Write Files.)

Whether in Control Mode or On-Line Mode, the 25th (bottom) screen line will always display :

1) at the left screen margin: the file name string for the currently specified Read File, if any exists, in normal video if disabled or in reverse video if enabled;

2) near the screen center: the file name string for the currently specified Write File, if any exists, in normal video if disabled or in reverse video if enabled;

3) just to the left of the screen right margin, a ticking time clock (if enabled with the TIME keyword);

and

4) at the screen right margin: either the text **lower-case**, **UPPER-CASE**, or **APL** depending on the current states of the 'Character Set' parameter and the software alpha lock. The software alpha lock may be toggled to the opposite state whenever the 'Character Set' parameter is set to **ascii** by entering CONTROL-SHIFT-REPEAT (i.e., by holding down both the CONTROL and SHIFT keys when depressing the REPEAT key).

While in Control Mode, any data received on the serial port is ignored.

To exit the program and return to the Waterloo master menu, enter CONTROL-SHIFT-STOP while in On-Line Mode. Any Read or Write Files which are open when the program is exited will be properly closed. If, after exiting, the SuperPET attempts to load a program with a file name that contains a graphic character, there is no need to be concerned. This is caused by the OFF/RVS key reverting to its normal SuperPET code (after COM-MASTER restores the SuperPET to its ROM-based interrupt service routine) and by having held this key down as part of the CONTROL-SHIFT-STOP entry long after the program has exited. To illustrate this, try typing the OFF/RVS key when the SuperPET is waiting at the Waterloo menu. This will produce the identical result.

HOW TO ENTER COMMANDS IN CONTROL MODE

Commands entered in Control Mode take on the general format of (KEYWORD) or (KEYWORD)=(data). Input of any command must be precise (i.e., with no preceding or imbedded blanks allowed). Typing errors can be corrected by using the DEL key to erase the most recently typed character.

A summary list of all possible keywords is listed on this page. A detailed explanation of each begins on page 12.

Notice that the correct keyword for any item can be determined by picking out those letters which are capitalized on the left side of the 'equals' sign on the Control-Mode screen.

KEYWORD	DESCRIPTION
ANL	Turn the auto new-line feature on or off;
BR	Set the serial port baud rate;
CF	Specify a command file name.
CS	Choose between an ASCII or APL character set;
DI	Produces a disk directory listing;
DUP	Set the duplex mode;
DWL	Set the data word length;
E	Choose between dumb or ADM-3A screen emulation;
Fx (where x = 0-9 or .)	Specify the character string to represent the indicated function number;
NSB	Set the number of stop bits;
PAR	Set the transmission parity type;
REOR	Specify the End-Of-Record mark used by the remote system;
RF	Specify the file name to be transmitted;
RFP	Specify a protocol for how the Read File data is to be transmitted out the serial line;
RFPD	Specify a data byte whose meaning depends on the current Read File Protocol (RFP) value;
SH	Specify the amount of software handshaking;
TIME	Set the system time clock and/or toggle the 25th screen line display on or off;
WF	Specify the file name to receive data;

When in Control Mode, any characters entered prior to entering the 'equals' sign are automatically translated to upper-case. For example, if the command 'dup=half' is entered in order to change COM-MASTER's duplex mode, what will appear on the screen is 'DUP=half'. When a command which is entered with the proper format, it is executed, the Control Mode screen is immediately updated, and the text 'O.K.' is printed to the right of the input. If, for any reason, the command is rejected, the text '???' is printed. A few commands also display a short explanation of why the command was rejected.

For the parameters to which free-formatted string values are assigned (i.e., Read File, Write File, and F0-9 or .), quote delimiters are usually optional, however, they are required if the data string is to contain an ASCII carriage return character (control-m). When quotes are not used, the string to be installed will consist of all characters entered between the command's 'equals' sign and the terminating RETURN, including any leading, imbedded, or trailing space characters. If quotes are used, then a closing quote must be entered before the command can be terminated with a RETURN. (While within quotes, the RETURN key is simply interpreted as a control-m.) Also, if quote delimiters are used, a quote may be entered as part of the data by simply entering two consecutive quotes.

Whenever an ASCII control character is entered, it will appear as the two-character sequence consisting of an 'up-arrow' and the appropriate corresponding ASCII character (e.g., control-D will appear as ^D, escape will appear as ^[). Control characters can also be entered by simulating the two-character 'up-arrow' sequence instead of actually keying the actual control character (e.g., control-D may be entered by keying the two-character sequence ^ D rather than entering a D with the control key depressed). This capability has been included to accommodate data entry from Command Files which have been created with editors (such as the Waterloo EDIT program) which do not allow control characters to be imbedded in the file text. To enter an up-arrow character as part of the data string, two consecutive up-arrow characters must be input.

If more than 6 commands are entered during any one Control Mode session, then only the 19-24th screen lines will scroll (with the 19th line disappearing). This allows all the operating parameters to be constantly visible while in Control Mode.

To exit Control Mode (and enter On-Line Mode), enter a null response to the 'Enter a command:' prompt. Control Mode can be re-accessed at any time from On-Line Mode by entering CONTROL-SHIFT-ESC.

DETAILED DESCRIPTION OF COMMANDS

- ANL** This controls what happens when the cursor is positioned in column 80 and a non-control character is received:
- on:** The cursor will advance to column 1 of the next screen line after printing the received character. If the cursor is on the 24th screen row, screen lines 1-24 will first be scrolled up one line;
 - off:** The cursor will remain in its column 80 position after printing the received character.
- BR** Set the serial port baud rate: Any of the baud rates listed may be selected. The 'extclk' selection stands for 'external clock' and would only be useful if some appropriate hardware modifications have been made to provide an external clock signal to the SY6551 ACIA IC (the SuperPET's serial interface chip).
- CF** Specify a command file name: This is the name of a disk file from which COM-MASTER will read records and interpret each as Control Mode commands. This file must be created outside of COM-MASTER using any available editor (such as the Waterloo EDIT program). For more information, please see page 22, HOW COMMAND FILES ARE USED.
- CS** Choose between the ASCII or APL character sets: this only applies to On-Line Mode; Control Mode will always appear using ASCII characters. See Appendix C for illustrations of the character codes that are generated for each character set's keyboard.
- DI** Causes the Control Mode screen to be cleared and a two-column directory listing of disk drive 0 to appear; if there are more directory entries than will fit on the screen, the word 'PARTIAL' is displayed at the bottom of the second column and a RETURN must be entered before the listing will continue. When the listing is complete, the number of free blocks is listed, the word 'COMPLETE' is displayed, and the next RETURN causes the Control Mode screen to reappear. To obtain a listing for a unit other than drive 0, the command must be entered as 'DI DISK/x' where x is the desired unit number.
- DUP** Set the duplex mode:
- full:** The only data displayed on the screen is that which is received as input on the serial port. (This mode should be used where the remote system echoes each character as it is received.)
 - half:** All data entered on the keyboard (or transmitted from a Read File) will be displayed on the SuperPET screen as soon as it is transmitted out the serial port.
- DWL** Set the data word length: Most remote systems require 7 bit data words, although some may permit 8. 5 and 6 are provided

only because they are supported by the SY6551 ACIA. Note that changing this parameter to 5 may effect the current PARity and Number of Stop Bits values as a 5-bit, no-parity combination implies a 1.5 stop bit value.

E Select the protocol of terminal emulation to be performed. See Appendix D for more detailed information.

dumb: Employs a minimal number of control codes. See Appendix D for more information.

adm3a: Emulates the Lear-Siegler ADM-3A protocol. See Appendix D for more information.

Fx (where x = 0-9 or .) Specify the character string to represent the indicated Function number. Once specified, the entire string can be invoked in On-Line Mode with a single shifted keystroke (as though it was being typed out on the keyboard) by simply entering the corresponding shifted numeric on the SuperPET's numeric keypad. A Function can be disabled (i.e., the string value removed), by entering 'Fx=' (i.e., with no data between the 'equals' sign and the RETURN) when in Command Mode. For other information regarding entering control characters, see page 11 under HOW TO ENTER COMMANDS IN CONTROL MODE.

NSB Set the number of stop bits: typically, 1 or 2, depending on what is expected by the remote device; 1.5 is a pseudo case used only with a 5-bit data word length and no parity;

PAR Set the serial parity option: (a vertical redundancy check)

none: parity disabled; no parity bit generated, no parity bit received;

odd: odd parity both receiver and transmitter;

even: even parity, both receiver and transmitter;

mark: mark parity bit transmitted, parity check disabled;

space: space parity bit transmitted, parity check disabled; used only with a 5-bit data word length and no parity;

REOR Specify the type of End-Of-Record mark used by the remote system:

cr: ASCII carriage-return only; this is the type used by most Commodore disk drives; when this option is selected, files which are being uploaded or downloaded are transmitted character by character with no special handling;

crlf: ASCII carriage-return, line-feed sequence; there are many remote system types which use this two byte sequence as its end-of-record marker; When COM-MASTER is downloading files with this parameter set to this value,

all ASCII line-feed characters which follow ASCII carriage-returns will be filtered out of the character stream before it is written to any currently enabled Write File. Conversely, when uploading files, an ASCII line-feed will be inserted after each ASCII carriage-return in the data stream before it is transmitted to the remote system.

lf: ASCII line-feed only; there are some remote system types which will use this type; When downloading from such systems, this value will cause all incoming ASCII line-feeds to be replaced by ASCII carriage-returns before they are written to any currently enabled Write File. Likewise, when uploading, this value will cause all outgoing ASCII carriage-returns to be replaced by ASCII line-feeds.

RF Set the Read File: This is the name of a disk file which is to be transmitted out (uploaded) through the serial port when CONTROL-CRSR/UP is typed in On-Line Mode. (Notice that CRSR/UP is a shifted character, so this is accomplished by holding down both CONTROL and SHIFT when depressing CRSR/UP.) Transmission may be stopped at any instant by again entering CONTROL-CRSR/UP. This may be any legal Waterloo file name. (See the Waterloo SuperPET System Overview Manual for details.) The file is actually opened for READ access when this command is entered in Control Mode, so the diskette containing the file must be loaded in the appropriate drive when the command is entered.

RFP Specify the Read File Protocol: Useful if the remote system does not have software handshaking (XON/XOFF) implemented and/or is not interrupt driven for character input.

none: the Read File is transmitted with no pause or wait after any character;

pause: after each ASCII carriage-return character read from the Read File is transmitted, COM-MASTER will pause the number of seconds specified by the current Read File Protocol Data value before continuing to transmit. This pause may be as long as 25.5 seconds. When selecting this option, the RFPD value will default to 1.0 second. If some duration other than 1.0 second is desired, the RFPD command must be subsequently used to set in the desired duration value.

wait: after each ASCII carriage-return character read from the Read File is transmitted, COM-MASTER will suspend transmitting the Read File until a particular 8-bit character as determined by the Read File Protocol Data value is received at which time transmission of the Read File will continue. When this option is selected, the RFPD will default to 10, which is the ASCII decimal equivalent for a line-feed (i.e., transmission will resume when a line-feed is received from the remote device). If some 8-bit character other than an ASCII line-feed is desired, it must be specified via a

subsequent RFPD command.

RFPD Specify data relative to the type of Read File Protocol specified with RFP. Read the description for RFP above for details on what is controlled by this parameter.

SH Specify the amount of software handshaking: determines when XON/XOFF handshaking is to be observed;

none: no handshaking on either input or output;

input: handshaking will be implemented on input only; i.e., if incoming data fills the input buffer to 90% full, a XOFF character will be sent to the remote device which should interpret the XOFF as a command to quit sending data; when the input buffer has emptied to less than 10% full, a XON character will be sent to the remote device which should interpret the XON as a command to resume sending data.

output: handshaking will be implemented on output only; i.e., any incoming XOFF character will cause COM-MASTER to stop sending data until a subsequent XON character is received;

both: both input and output handshaking, as described above, will be implemented simultaneously;

TIME Set the system time clock or toggle the 25th screen line time display on or off: When entered without appending an 'equals' sign and data, COM-MASTER will turn on the 25th screen line if it is currently off, or turn it off if it is currently on. To set the clock, append an 'equals' sign and a data string in either of the formats (hour):(minute)X or (hour):(minute):(second)X (where X is either A for AM or P for PM). Examples of valid inputs are 'TIME=1:30P' and 'TIME=11:20:30A'.

WF Set the Write File: This is the name of a file which is to receive (download) a copy of any data which comes in the serial port. Transmission actually begins when CONTROL-CRSR/DOWN is typed in On-Line Mode and may be stopped at any time by entering a subsequent CONTROL-CRSR/DOWN. The file name may be any legal Waterloo file name string. (See the Waterloo SuperPET System Overview Manual for details.) This includes file name strings such as 'printer' or 'ieee5' which might be used to cause incoming serial data to be copied to a Commodore printer or any other device which can be attached to the SuperPET's IEEE-488 bus. The file device is actually opened for WRITE access when this command is entered in Control Mode, so the file device must be powered up and monitoring the IEEE-488 bus when the command is entered.

HOW TO DOWNLOAD FILES

A powerful feature of COM-MASTER is its ability to receive data via the SuperPET's serial port and store it into a file on a Commodore disk drive. This capability is known as downloading and is achieved with COM-MASTER via the specification of a Write File in Control Mode (using the WF keyword) and the subsequent enabling of this file in On-Line Mode. When enabled, any characters which are received at the serial port, in addition to being printed on the SuperPET screen, are also sequentially stored in the specified file.

The filename to be used for a Write File is input while in Control Mode just like any other Control Mode parameter and can consist of any legal Waterloo file name string. (See the SuperPET System Overview manual for details.) This includes file name strings such as 'printer' or 'ieee5' which could be used to cause incoming data to be copied to a Commodore printer or any other device which can be attached to the SuperPET's IEEE-488 bus. It is important to note that the file device is actually commanded to 'listen' (i.e., 'accept') any subsequent bus data when the command is entered so it must be powered up and monitoring the IEEE-488 bus when the command is input. Please note that no error is reported for unsuccessful 'listen' commands when the target device is not tied into the bus, so it is the user's responsibility to be sure that the command was successful. For a device such as a printer, the only clue to the bus command being unsuccessful might be the fact that it does not print anything when enabled. To correct this, enter Control Mode (CONTROL-SHIFT-ESC) and re-input the WF command with the target device properly monitoring the bus.

For non-disk devices, such as a printer, a technique that can be used to insure a successful bus command is to append a period and some other character (such as a blank) to the device name. This will cause the character following the period to be sent to the device. If the device does not respond to the bus handshake, COM-MASTER will reject the WF command with a '*** DEVICE NOT PRESENT ***' message. Also, be aware that most IEEE devices will automatically 'unlisten' themselves when a soft reset is performed even though AC power is maintained. For this situation, it will also be necessary to re-input the WF command.

For disk files, the file need not exist, however, if it does exist, it will be deleted WITH NO USER WARNING prior to being opened as a newly created file. The default drive for floppy units is drive 0 so if the file is to be written to drive 1 then the filename must be preceded with 'disk/1.'. Once a valid file device is opened, the file name string will be displayed both within its normal Control Mode screen area in reverse video and at the center of the 25th screen line in normal video. The fact that the 25th screen line is in normal video indicates that the Write File is opened but disabled. If the file is a disk file on a floppy disk unit, the drives LED light will remain lit indicating that the file was successfully opened.

Attention should also be given to the value of the Remote End-Of-Record option. If you are receiving from a system which separates records with a single ASCII carriage-return (including

other Commodore systems), then this parameter should be set to **cr**. If the remote system will be sending the two-byte ASCII sequence of carriage-return, line-feed as the inter-record marker, then this parameter should be set to **crlf**. Failure to do this will result in a Commodore file which has unwanted line-feeds imbedded in it and will likely cause the file to appear to most editors as though it is double spaced. For remote system types which use a single ASCII line-feed as the inter-record marker, this option should be set to **lf**.

At this point, switch to On-Line Mode, and do whatever is necessary to instruct the remote system to begin sending the data which is to be copied to the Write File. However, in order to have the data be actually copied to the Write File, it must be enabled. This is done by entering **CONTROL-CRSR/DOWN** which acts as a toggle switch for alternately enabling and disabling the Write File. When enabled, the Write File name on the 25th screen line will change to a reverse video display. When subsequently disabled, it will again revert to a normal video display. This feature allows control of precisely when downloading is to begin and end. Note that any characters which appear on the screen while the Write File is enabled will be stored, including those which are typed on the keyboard when you are using half duplex mode, or full duplex and the remote system is echoing your keyboard input. Thus, if you do not wish to have your instruction input stored then you must not enable the Write File until after the command is typed in.

Once all desired data has been copied in, the Write File can be closed (i.e., commanded to 'unlisten') by invoking Control Mode (**CONTROL-SHIFT-ESC**) and simply entering the command **'WF='** (with no filename).

One other noteworthy feature is the ability to have the Write File remotely enabled and disabled by having the remote system send an ASCII DC4 character (control-t). This capability is active only when the Software Handshaking parameter is set to handshake on **output** (or **both**). The DC4 character toggles the current Write File between the enabled and disabled state exactly as the keyboard entered **CONTROL-CRSR/DOWN** does.

Although the downloading capability is strictly character oriented and thus suggests that the downloading of binary, program, or other non-text files should be possible, in reality, there are several factors that must be considered before non-text files can be successfully downloaded. First of all, if the incoming data can potentially include an ASCII DC3 character (control-s) or DC4 (control-t), then it would be necessary to disable Software Handshaking on **output**, as the DC3 character would be interpreted as a command to suspend output, the DC4 would disable the Write File, and both would be filtered out of the data stream. Secondly, if the incoming data can include 8-bit data values, then both the remote system and COM-MASTER must be configured for 8-bit transmission. This can be accomplished in COM-MASTER via the Data Word Length parameter, however, it could be a problem on some remote system types. Thirdly, the ASCII SI character (control-o) causes the ADM-3A emulation to lock the keyboard until a subsequent ASCII SO character (control-n) is received. If the remote transmission should end leaving the keyboard locked, it may be

manually unlocked by entering CONTROL-SHIFT-CLR. A better idea would be to set the Emulator parameter to 'dumb', thus avoiding the possibility of having the keyboard locked.

HOW TO UPLOAD FILES

Uploading of data is the ability of COM-MASTER to copy disk files out the serial port. Its effectiveness is largely dependent on the remote system's ability to capture the data. The file name to be transmitted is specified in Control Mode using the RF keyword and, once specified, becomes the current Read File. It can consist of any legal Waterloo file name string. (See the SuperPET System Overview manual for details.) Because COM-MASTER attempts to open the file immediately after being specified, the diskette containing the file must be loaded and ready when the RF command is entered. The default disk drive for floppy units is drive 0 so if the file to be accessed is on drive 1, the file name must be preceded with 'disk/1.'. If the open is successful, the floppy unit's LED will remain lit. Once a valid file device is opened, the file name string will be displayed both within its normal Control Mode screen area in reverse video and at the left margin of the 25th screen line in normal video. The fact that the 25th screen line is in normal video indicates that the Read File is opened but disabled.

Attention must also be given to the value of the Remote End-Of-Record parameter. If the remote system uses only a single ASCII carriage-return as its inter-record marker (such as another Commodore system), then this parameter should be set to `cr`. If the remote system requires the two-byte ASCII sequence carriage-return, line-feed as the inter-record marker, then this parameter should be set to `crlf`. This will cause COM-MASTER to insert a line-feed character into the data stream after each carriage-return character read from the current Read File is transmitted. Failure to do this will likely result in a file on the remote system which is not a useable file. If the remote system uses only a single ASCII line-feed as its inter-record marker, then this parameter should be set to `lf` which will cause COM-MASTER to substitute ASCII line-feeds for carriage-returns before transmitting Read File data to the remote system.

At this point, switch to On-Line Mode, and do whatever is necessary to instruct the remote system to prepare to begin capturing the data. Then, in order to have the data begin being transmitted out the serial port, enable the Read File by entering `CONTROL-SHIFT-CRSR/UP`, which acts as a toggle switch for alternately enabling and disabling the Read File. When enabled, the Read File name on the 25th screen line will change to a reverse video display. When subsequently disabled or when the entire file has been transmitted, it will again revert to a normal video display. This feature allows control of precisely when uploading is to begin and end. If the transmission ends because the end of file was reached, COM-MASTER closes and re-opens the Read File so that any subsequent enable will restart the transmission from the beginning of the file. Note that any characters typed on the keyboard while the Read File is enabled will also be transmitted so if you do not wish to have your remote instruction input be transmitted then you must not enable the Read File until after the command is typed in.

Once all desired data has been transmitted, the Read File can be closed by invoking Control Mode (`CONTROL-SHIFT-ESC`) and simply entering the command `'RF='` (with no filename).

One other noteworthy feature is the ability to have the Read File remotely enabled and disabled by having the remote system send an ASCII DC2 character (control-r). This capability is active only when the Software Handshaking parameter is set to handshake on **output** (or **both**). The DC2 character toggles the current Read File between the enabled and disabled state exactly as the keyboard entered CONTROL-CRSR/UP does.

To provide flexibility for uploading to a variety of remote system types, COM-MASTER allows several protocols for transmitting the Read File data to the remote system. This involves the use of the Read File Protocol (RFP) and Read File Protocol Data (RFPD) parameters. How these parameters should be used depends a lot on the capabilities available with the remote system.

Before discussing strategies for transmitting to these various system types, a few comments on how COM-MASTER transmits Read File data is in order. COM-MASTER simply views a disk file as a stream of 8-bit characters which it reads one character at a time and transfers each character to a serial output buffer. Unfortunately, individual text file records on a Commodore disk drive are separated only by a single ASCII carriage-return character instead of a 2 character carriage-return, line-feed sequence. This fact means that as the data is being transmitted, the lack of the line-feed character may cause the data to appear on a single screen line with each subsequent record over-printing the previous record on the screen. (This will be true unless the remote system is programmed to insert a line-feed into the data it is echoing after each carriage-return character.) Although this can be avoided by setting the Remote End-Of-Record (REOR) parameter to **crlf**, consideration must be given to the fact that the inserted line-feed will also be transmitted and may cause undesired results on the remote system.

If the remote system is interrupt driven and uses XON/XOFF handshaking on its serial input, then it is probably sufficient to leave the RFP parameter set to **none** while the Software Handshaking parameter is set to either **output** or **both**. This method simply allows the XON/XOFF handshaking to insure that all data is being correctly captured. Setting RFP to **none** simply causes the Read File data to be transmitted character by character, including the inter-record carriage returns, without any programmed pauses or waits. As long as the remote system has an adequate input buffer space, this method should work even at the higher baud rates. A potential problem can occur at higher baud rates (e.g., 9600) if the remote system is echoing its received data as this sometimes causes interference with the incoming data stream and results in some garbling. If you find this to be a problem, try either disabling the remote system's echo (and run COM-MASTER in half duplex) or try transmitting at a lower baud rate.

If the remote system is interrupt driven but does not have XON/XOFF handshaking available, then the method used will depend on how fast the data capturing program on the remote system is able to empty its serial input buffer. If the remote system is NOT a time-sharing system and this program is implemented in machine code, then it is possible that an RFP value of **none** will work as

long as not too high of a baud rate is used. Start with a high baud rate such as 9600 and try a test transmission. If you find that data is missing, try successively lower baud rates until you find one that works. If the data capturing program is written in a higher level language such as BASIC, then it is likely that it will not be able to keep up with the higher baud rates and may require an RFP of **pause** or **wait**. These values cause the data transmission to be record oriented; i.e., after each ASCII carriage-return character is read and transmitted, COM-MASTER will either **pause** the number of seconds as determined by the current RFPD value (in tenths of a second) or will **wait** for the remote system to send a particular character as a signal that it is ready to receive the next record. For the **wait** method, the value of the particular character is selected by setting the current RFPD value be the ASCII decimal equivalent for the desired character. Note that when the RFP value is set to **pause**, the RFPD value will automatically default to 1.0 second, and when it is set to **wait**, RFPD will automatically default to 10, which is the ASCII decimal equivalent for a line-feed. If some other value is desired, then it must be installed with an RFPD command entered after the RFP command.

For remote systems which poll their serial input ports, it is quite likely that both a lower baud rate and one of the record-oriented handshaking protocols will be required. The choice of **pause** versus **wait** will be largely dependent on how much control you have over how the remote system reacts to the incoming data. If you have the ability to program the remote system to send any particular character when it is ready to receive a record, then programming it to send an ASCII line-feed would be the best choice. This will not only be the quickest way of getting the data transmitted, but will also compensate for the above-mentioned side effect of the data being printed over and over on one screen line by causing the screen to advance to the next line between each record. If you do not have this programming control, then a pause of suitable length between each record's transmission may be the only viable alternative.

In summary, because the ability to upload files is largely dependent upon the capabilities of the remote system to capture data, finding the right handshaking technique will likely require some thought and/or experimentation to bring about a clean, successful transmission. It is hoped that the **pause** and **wait** features included in COM-MASTER can be used to adapt transmission for a wide variety of remote system types.

HOW COMMAND FILES ARE USED

The Command File feature of COM-MASTER is useful for storing any non-default Control Mode parameters (and/or especially function strings) so that they may be quickly installed with a single command without having to retype a series of commands each time COM-MASTER is invoked. In particular, if there are several different types of remote systems or application packages to be accessed, then command files can be created to tailor COM-MASTER for each.

Since COM-MASTER does not contain any text file managing capabilities, the Waterloo EDIT program (or any other comparable product) must be used to create a text file of commands. Each record should be formatted to contain a command line just as you would enter it directly to the 'Enter a command:' prompt. It is not necessary to capitalize the keywords as COM-MASTER will automatically convert all characters to the left of the 'equals' sign as it processes each command record. An example of a command file which sets the duplex mode to half, the baud rate to 1200, and disables parity could be formatted as follows:

```
dup=half  
br=1200  
par=none
```

A very practical use of Command Files is to load up the numeric keypad Functions with data that is appropriate for the particular remote system type or applications system being accessed. Very often, this requires loading the Function keys with character strings that include ASCII control characters. For editors (such as the Waterloo EDIT program) which cannot imbed control characters into the dataset, simulated control characters can be generated using two-character sequences consisting of the 'up-arrow' character and the corresponding representative character (e.g., ^Q for control-q, ^[for escape).

Once created, the file can be executed by simply entering CF=(filename). If, for any reason, COM-MASTER is unable to open the file, a '*** FILE NOT FOUND ***' message is displayed. If the open is successful, then each record is displayed and interpreted as it is input until the end of the file is reached. Command records which are successfully executed will have the text 'O.K.' printed after them while those which are not executable will instead be followed by the text '???'.

The default disk drive is drive 1 so if the command file is loaded on drive 0, the file name must be preceded with 'disk/0.'.

A CLOSING COMMENT

Quality Data Services has, as its name suggests, a dedication to producing quality software that provides customer satisfaction. Should you find that you are not getting adequate service from the distributor from whom you purchased your COM-MASTER license, you may contact Quality Data Services for assistance. The address is:

Quality Data Services
2847 Waiālae Ave., #104
Honolulu, Hi. 96826

Telephone : (808)735-1202

APPENDIX A**QUICK REFERENCE USAGE GUIDE**

ABORT Read File: CONTROL-SHIFT-CRSR/UP

ABORT Write File: CONTROL-CRSR/DOWN

CLOSE Read File: ENTER Control Mode (CONTROL-SHIFT-ESC);
then RF=<RETURN>

CLOSE Write File: ENTER Control Mode (CONTROL-SHIFT-ESC);
then WF=<RETURN>

COMMANDS In Control Mode, (keyword) or (keyword) = (data)
(see Appendix B for list of keywords)

EXIT Control Mode: Hit <RETURN> with no previous character entry.

EXIT On-Line Mode to Waterloo Menu: CONTROL-SHIFT-STOP

EXIT On-Line Mode to Control Mode: CONTROL-SHIFT-ESC

ENTER Control Mode: Automatic upon loading program;
From On-Line Mode: CONTROL-SHIFT-ESC

ENTER On-Line Mode: From Control Mode: Hit <RETURN> alone.

LOAD : From Waterloo Menu, enter cm <RETURN> if disk in drive 1
enter disk/0.cm <RETURN> if disk in drive 0

OPEN Read File: From Control Mode, RF=(filename) <RETURN>

OPEN Write File: From Control Mode, WF=(filename) <RETURN>

START sending Read File: From On-Line Mode, CONTROL-SHIFT-CRSR/UP

START writing Write File: From On-Line Mode, CONTROL-CRSR/DOWN

STOP sending Read File: CONTROL-SHIFT-CRSR/UP

STOP writing Write File: CONTROL-CRSR/DOWN

UNLOCK ADM-3A keyboard: CONTROL-SHIFT-CLR

APPENDIX B

ALPHABETICAL COMMAND CROSS-REFERENCE GUIDE

KEYWORD	FUNCTION	PARAMETERS
ANL	turn Auto New-Line on or off	ON or OFF
BR	set serial port Baud Rate	any specified on menu
CF	specify a Command File name	any legal SPET filename
CS	select Character Set	ASCII or APL
DI	display a disk DIrectory	disk/8.0 default; specify other (DI DISK/1)
DUP	set DUPlex mode	FULL or HALF
DWL	set Data Word Length	5, 6, 7, or 8
E	set Emulator type	DUMB or ADM3A
Fx	specify Function String	x=0 to 9 or .
NSB	specify Number of Stop Bits	1, 1.5, or 2
PAR	set PARity	NONE,EVEN,ODD, MARK, or SPACE
REOR	specify Remote End-Of-Record character	CR = ASCII CR only CRLF = ASCII CR & LF LF = ASCII LF only
RF	specify the Read File filename	any legal SPET filename
RFP	specify the Read File Protocol	For no DC1/DC3 handshaking: NONE = no pause, no wait PAUSE = time delay between records (1 second default) WAIT = cease transmit until receipt of signal; (defaults to ASCII LF)
RFPD	specify Read File Protocol Data	implements details of RFP: for PAUSE: number of seconds for WAIT: 'resume sending' signal character
SH	specify Software Handshaking	NONE = no handshaking INPUT = observe XON/XOFF in incoming data OUTPUT = send XON/XOFF to avoid buffer overrun BOTH = combine above INPUT & OUTPUT options
TIME	set System TIME clock or toggle screen display on or off	(hr):(min):(sec)(A or P)
WF	specify the Write File filename	TIME <RETURN> to toggle any legal SPET filename

APPENDIX C: ASCII KEYBOARD DEFINITION

[illegible]

	9	81	87	69	82	84	89	85	73	79	80	123	124	11	127
SHIFTED\Hex:	09	51	57	45	52	54	59	55	49	4F	50	7B	7C	0B	7F
TAB	Q q	W w	E e	R r	T t	Y y	U u	I i	O o	P p	{ }	 	\ /	CRS ^	INS DEL
	9	113	119	101	114	116	121	117	105	111	112	91	92	10	127
UNSHIFTED\Hex:	09	71	77	65	72	74	79	75	69	6F	70	5B	5C	0A	7E

SHIFTED	Dec:	27	65	83	70	71	72	74	75	76	43	96	125	13
Hex:		1B	41	53	46	47	48	4A	4B	4C	2B	60	7D	0D
ESC			A	S	D	F	G	H	J	K	+	,	}	RETURN
			a	s	d	f	g	h	j	k	;	@	}	
27	Dec:	97	115	100	102	103	104	106	107	108	59	64	93	13
1B	Hex:	61	73	64	66	67	68	6A	6B	6C	3B	40	5D	0D

SHIFTED\Dec:		90	88	67	86	66	78	77	60	62	63	127	26
Hex:		5A	58	43	56	42	4E	4D	3C	3E	3F	7F	1A
OFF	SHIFT	Z	X	C	V	B	N	M	<	>	?		CLR
RVS		z	x	c	v	b	n	m	,	.	/		HOM
UNSHIFTED\Dec:		122	120	83	118	98	110	109	44	46	47	127	30
Hex:		7A	78	53	76	62	6E	6D	2C	2E	2F	7F	1E

SHIFTED/Dec: 32
Hex: 20

UNSHIFTED/Dec:	Hex:
	32
(space bar)	20

APPENDIX C: APL KEYBOARD DEFINITION

SHIFTED/Dec: 27	39	27	33	64	36	35	23	37	94	95	26	42	40	28	29	41	95	43	126	8
UNSHIFTED/Dec: 5F	31	5F	49	50	52	51	33	35	36	25	26	38	39	57	30	48	2D	61	7E	12
SHIFTED/Dec: 09	9	09	81	57	82	69	87	84	89	85	55	73	79	49	50	80	5D	93	124	11
UNSHIFTED/Dec: 09	9	09	71	77	72	65	101	114	116	117	121	79	105	69	6F	70	5B	91	92	10
SHIFTED/Dec: 1B	27	1B	65	83	70	68	53	44	71	72	48	74	75	4B	4C	76	2B	34	125	13
UNSHIFTED/Dec: 1B	27	1B	97	115	100	64	73	66	102	103	67	106	107	6B	6C	58	3A	27	7B	13
SHIFTED/Dec: 5A	90	5A	88	67	86	56	43	66	78	4E	78	77	60	3C	3E	62	3F	127	7E	1A
UNSHIFTED/Dec: 7A	122	7A	120	83	118	53	78	53	83	118	98	110	109	44	2C	46	2E	47	127	7F
SHIFTED/Dec: 32	20	32	20	32	20	32	20	32	20	32	20	32	20	32	20	32	20	32	20	32
UNSHIFTED/Dec: 32	20	32	20	32	20	32	20	32	20	32	20	32	20	32	20	32	20	32	20	32

(space bar)

APPENDIX C (continued)

NUMERIC KEYPAD DEFINITION: ASCII AND APL

SHIFTED/Dec: Hex:	135	136	137
	87	88	89
	7	8	9
UNSHIFTED/Dec: Hex:	55	56	57
	37	38	39
SHIFTED/Dec: Hex:	132	133	134
	84	85	86
	4	5	6
UNSHIFTED/Dec: Hex:	52	53	54
	34	35	36
SHIFTED/Dec: Hex:	129	130	131
	81	82	83
	1	2	3
UNSHIFTED/Dec: Hex:	49	50	51
	31	32	33
SHIFTED/Dec: Hex:	138	139	
	8A	8B	
	0	.	
UNSHIFTED/Dec: Hex:	48	46	
	30	2E	

APPENDIX D **EMULATOR TABLES**

Control Characters:

Hex	Dec	ASCII	Char.	:	DUMB	ADM-3A
----	----	-----	-----		-----	-----
00	0	NUL				
01	1	SOH	A	:		
02	2	STX	B	:		
03	3	ETX	C	:		
04	4	EOT	D	:		
05	5	ENQ	E	:		
06	6	ACK	F	:		
07	7	BEL	G	:	bell	bell
08	8	BS	H	:	backspace	backspace
09	9	HT	I	:		
0A	10	LF	J	:	linefeed	linefeed
0B	11	VT	K	:		
0C	12	FF	L	:	forespace	forespace
0D	13	CR	M	:	carriage return	carriage return
0E	14	SO	N	:		unlock keyboard
0F	15	SI	O	:		lock keyboard
10	16	DLE	P	:		
11	17	DC1	Q	:		
12	18	DC2	R	:		
13	19	DC3	S	:		
14	20	DC4	T	:		
15	21	NAK	U	:		
16	22	SYN	V	:		
17	23	ETB	W	:		
18	24	CAN	X	:		
19	25	EM	Y	:		
1A	26	SUB	Z	:		clear screen
1B	27	ESC	[:		escape
1C	28	FS	\	:		
1D	29	GS]	:		
1E	30	RS	^	:		home
1F	31	US	_	:		

APPENDIX D (continued)

EMULATOR TABLES

ESCAPE SEQUENCES:

Escape Sequences consist of the Escape Character,
(as defined by the particular emulator's control character table)
followed by one or more other characters.

DUMB:

The DUMB emulator does not have a defined escape character.
Thus, escape sequences are not applicable.

ADM-3A: Escape Character = Hex: 1B Dec: 27

Hex	Dec	Char.	:	Function
---	---	----	:	-----
3D	61	=	:	Direct Cursor Addressing;
			:	additionally follow with
			:	(screen-row-character) (screen-column-character)
			:	where
			:	(screen-row-character) = ASCII character
			:	whose decimal equivalent is the
			:	screen row (0-23) + 32.
			:	and
			:	(screen-column-character) = ASCII character
			:	whose decimal equivalent is the
			:	screen column (0-79) + 32

RELEASE NOTES

SuperPET* COM-MASTER Version 1.2

February 21, 1984

* - SuperPET is a trademark of Commodore Electronics, Ltd.

NEW FEATURES:

1. A new parameter, 'Emulator', has been added to Control Mode. This parameter allows the user to specify the type of terminal to be emulated. The possible values for Version 1.2 are 'dumb' and 'adm3a', the default value being 'dumb'. This parameter controls 2 internal tables within COM-MASTER which define how control characters and escape sequences are interpreted. The control character table consists of 32 entries which define the action to be performed for data values 00-1F (hex). The escape sequence table consists of 256 entries which define the action to be performed for any character which immediately follows an escape character. The escape character itself is defined within the control character table. The particular definitions of these tables for 'dumb' and 'adm3a' are given in a newly added Appendix D of the COM-MASTER USER'S GUIDE, a copy of which is attached. Note that 'dumb' is actually a subset of 'adm3a'. This feature was added to solve problems that were occurring due to incompatibilities of the ADM-3A protocol with some remote systems, such as the Dow Jones Information Services. (On Dow Jones, the ADM-3A 'home-cursor' control character is sent prior to each prompt.) Use of the 'dumb' emulator will solve many of these problems. Future updates of COM-MASTER will likely contain additional emulator selections, possibly even the ability for the user to totally define the emulation tables.
2. The default disk drive for the Command File (CF) command has been changed from drive 0 to drive 1. This accommodates easier access to command files being stored on the same diskette as the COM-MASTER program itself.
3. The default value for the Remote End-Of-Record parameter has been changed from 'cr' to 'crlf'. This simply reassigns the default to what is expected to be the most commonly desired value.
4. The pitch of the audible 'bell' has been substantially lowered, and the duration of the sound has been increased.
5. For the 'pause' mode Read File Protocol, the increment of the pause timer has been changed from full seconds to tenths of seconds. The range of possible pause times is now .1 to 25.5 seconds.
6. All screen emulators will no longer display the ASCII DEL character (hex 7F). Previous versions displayed this character as a small box on the SuperPET screen. This will

not effect the character being transmitted to any actively enabled Write File.

7. The STOP key, in addition to sending a BREAK out the serial port, has been additionally programmed to reset all system ring buffers and to simultaneously disable any active Read or Write Files. This feature allows a very quick method of aborting uploading, downloading, and/or the transmission of data which has already been buffered.
8. When using the ADM-3A emulator, it is now possible to override the keyboard-locked condition by entering CONTROL-SHIFT-CLR. Although this emulator contains the lock/unlock feature to be fully ADM-3A compatible (for programs which selectively lock and unlock the keyboard under program control), it is possible that either a garbled character or the transmission of binary data may cause the keyboard to be unwantonly locked. This new feature will thus allow the keyboard to be subsequently unlocked without resorting to exiting and restarting the program.
9. For the APL character set, the screen handler will now generate true overstrike characters as defined by Appendix C of the Waterloo microAPL manual. These characters are displayed anytime that the three-character sequence (character, backspace, character) which makes up the overstrike is received at the serial port (or keyed at the keyboard when DUPlex is set to half). Also, anytime a character is overstruck with the APL underscore character (hex 46), the screen handler will display the overstruck character in reverse video rather than overwriting it with the underscore.

PREVIOUSLY UNREPORTED BUGS:

1. The ability to remotely toggle COM-MASTER's Write File between the enabled and disabled state by having a control-t sent by the remote system does not work in earlier versions of the program because the program was actually looking for control-u instead of control-t. This has been fixed in Version 1.2.
2. In Control Mode, using the DI command on a drive on which there is an active Write File causes the Write File's file control block to be destroyed, and thus the disk directory cannot be correctly updated when the file is actually closed (by entering 'WF='). This effectively causes the transmitted data to be lost because it cannot be located by the DOS through the disk directory. VERSION 1.2 HAS NOT RESOLVED THIS PROBLEM. Please be careful NOT to run DDirectory listings on drives which have active Write Files. An attempt to fix this problem will be made on a future update.
3. The ADM-3A emulator's keyboard lock and unlock control feature was not actually implemented in previous versions. It has been implemented in Version 1.2.

PREVIOUSLY REPORTED BUGS:

1. The ability of previous versions of COM-MASTER to accept undocumented keywords in Control Mode as substitutes for other keywords has been fixed in Version 1.2. Command keywords must now be entered exactly as specified in the COM-MASTER USERS GUIDE.
2. The inability of previous versions of COM-MASTER to accept disk filenames with an upper-case alphabetic character on the default disk drive under the Control Mode's 'Read File' parameter (keyword RF) has been fixed in Version 1.2.
3. An attempt to implement Write File disk-write error checking using the Waterloo ROM software resulted in high speed downloading being slowed to approximately 60 characters per second. This being unacceptable, implementation of error checking will have to wait until a future release. In the meantime, it will still be necessary to use error-free diskettes, and to be sure that sufficient free disk space is available before initiating any downloading. Although unrecoverable disk errors rarely occur (unless available disk space is exceeded), they are still manifested by an extreme slow down in the data being displayed on the screen, to about 1 character per second. In Version 1.2, however, the downloading can be terminated by depressing the STOP key (see paragraph 7 under NEW FEATURES above) rather than having to exit and restart the program.
4. The previously reported problem concerning use of the Read File protocol 'none' has been solved by a) only moving one disk record at a time to the serial output ring buffer (and not moving the next record until the previous record has been transmitted) and b) by the availability of the STOP key to reset the buffer (see paragraph 7 under NEW FEATURES above). Consequently, Read File Protocol 'none' now behaves exactly as 'pause' with a zero timer.
5. The problem where the Read File 'pause' mode timer was inaccurate due to the timer starting when the last byte of a record was transferred into the serial ring buffer rather than when the last byte was transferred out the serial port has been fixed in Version 1.2. The 'pause' mode timer is now accurate for all Baud Rate settings.