

Flexible MyCANIC Script Tool User Manual



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Revision History

Revision	Release Date	Change Descriptions
1.01	Oct. 4, 2017	First draft.
1.02	Oct. 30, 2017	Numerous updates.
1.03	Dec. 18, 2017	Numerous updates.
1.04	Dec. 29, 2017	Added HLCD, PERIODIC and LOG commands. Added several example scripts.
1.05	Jan. 4, 2018	Added LED, ENDDO and INHALE/EXHALE commands. Numerous other updates.
1.06	June 6, 2018	Added DID MODIFY and WRITE operations. Added SECURITY command..
1.07	July10, 2018	Added XOR and equal to DID MODIFY operation.
1.08	Oct 9, 2018	Add BIT, HEX, and {} detail.
1.09	Oct. 29, 2018	Added more examples of HEX and BIT data types.
1.10	Dec. 6, 2018	Added GETTIME command and TIME data type.
1.11	Jan. 11, 2019	Added EXEC command.
1.12	Jan. 18, 2019	Added PROGNC command.
1.13	Feb. 26, 2019	Added PROGNR command.
1.14	Mar. 27, 2019	Added support for multiplier and offset in LCD commands.
1.15	Apr. 26, 2019	Added firmware update and licensed compiler instructions. Removed security from Exhale command.
1.16	Aug. 1, 2019	Added more installation and usage notes.
1.17	Sep. 8, 2019	Add multiplier and offset to LOG command
1.18	Dec. 11, 2019	Update FW_VERSION to add minor version check.
1.19	June 9, 2020	Added bitwise AND logic operator
1.20	Mar. 18, 2021	Added CAN_FD_HS and CAN_FD_MS protocols
1.21	Nov. 1, 2022	Added ability to set number of debug log file data bytes. Added ability to read voltage of pin 8 and pin12. Added ability to log DTCs.
1.23	Mar. 1, 2023	Added comment about license issues with PCs that are used with a docking station.

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1.24	Mar. 16, 2023	Added IOT picture / updates. Added GOTO, REQUEST and SET_VALUE commands. Added LOGADD.EXE utility.
1.25	Mar. 20, 2023	Added P_TIME data type.
1.26	May 17, 2023	Added VERSION update for FSCR_DBG.XXX files.
1.27	Nov. 8, 2023	Added UDATA type.
1.28	Dec.16, 2023	Added numeric data variables and security level 0x61.
1.29	Jan. 29, 2024	Added RETURN from GOTO support.
1.30	Mar. 8, 2024	Changed to only use RETURN with new GOSUB command.
1.31	Mar. 18, 2024	Added support for logical operations with VAR (variables). Added new DAT_STATUS data type to check the status of a saved .DAT file.
1.32	May 23, 2024	Added new UPLOAD, MEM (modify), DOWNLOAD functions. For modifying ECU memory. Minor fixups.
1.33	Sep. 5, 2024	Changed order of functions in manual. Minor fixups.
1.34	Oct. 22, 2024	Added RTC, VOLTS, AMPS, IGN_LINE data types and REQ_FILE command support.

1 Introduction

The EEPod Flexible MyCANIC Script Tool is designed to create ECU reprogramming and diagnostic script files to be placed on the SD-Card of MyCANIC-IoT, MyCANIC-FD and MyCANIC tools running the EEPod FSCRIPT firmware. The following manual describes the supported commands.

1.1 MyCANIC / MyCANIC-FD /MyCANIC-IOT Firmware (FSCRIPT)

The script processing firmware (FSCRIPT) allows the user to select and run reprogramming script files as well as perform a number of other functions, including reading OBDII parameters, reading/clearing DTCs and running J2534 pass-thru applications. The latest FSCRIPT firmware is always available from the EEPod FTP server. For the MyCANIC (gold keypad), the firmware is updated with a Windows PC console mode application (e.g. FSCRIPTv5291.EXE). Simply connect the MyCANIC to power (OBDII cable) and USB to your PC, then run the application to update the firmware (it only takes about 15 seconds). For the MyCANIC-FD and MyCANIC-IOT (black keypad), connect it to your PC via USB and run the FW.EXE console mode application in the same directory that contains the APP.LDR file to update the firmware. Alternatively, you can copy the APP.LDR file to the SD-Card of the MyCANIC-FD/IOT and then power-cycle to update the firmware.

1.2 FSCRIPT Compiler Installation

The FSCRIPT compiler (FSCRIPT.EXE) is a console-mode Windows PC application that is used to compile script files for use on the MyCANIC or MyCANIC-FD/IOT and is available on the EEPod FTP server as an installation package (e.g. fscript_0.0.27_setup.exe). After running the setup program, the FSCRIPT program will be available on the Windows Start Menu. When you select FSCRIPT from the Start Menu, a console mode command prompt window will appear. Using this window, you can compile scripts using the fscript.exe compiler.

1.3 FSCRIPT Compiler License Setup

The compiler is licensed via the EEPod LLC cloud license server, so you must be connected to the internet when compiling script files. If you need a license or are having any issues with a current license, please send an email to support@eepod.com.

When you receive your license key/token email from the FSCRIPT license server, go to the FSCRIPT console mode window (located under your Start menu after installation) and run the following command using your email and license key/token information. Make sure to use the double quotes around the email, license token and IP/port information.

Internal Ford Employees:

```
fscript -l -e "support@eepod.com" -t "PA963BTIMT0S188WHQZ6ND3E1" -x "19.12.80.237:83"
```

External Ford and other Manufacturer/Supplier Employees:

```
fscript -l -e "support@eepod.com" -t "PA963BTIMT0S188WHQZ6ND3E1"
```

NOTE: Since the license uses the network hardware ID as part of the license verification, PCs (laptops) that are used with and without a docking station may experience issues when trying to

use in both cases. Please pick the configuration you would like to use when compiling scripts and enable your license in that configuration.

After successfully installing your license, you will be able to use the FSCRIPT compiler when you are connected to the internet.

1.4 Automatically Script Run on Power-up

You can automatically run any script file on power-up by renaming the script file to AUTOEXEC.FSF.

1.5 FSCRIPT Compiler Command Line Options

For a list of FSCRIPT compiler command line options, just type “fscript” in the command prompt window and see the following:

FSCRIPT Compiler Version 0.0.4

Usage: fscript <options> <script file>

- h, --help Help
- a, --aes AES encrypt program binary
- v, --verbose Increase debug verbosity
- o, --outfile Set output filename
- l, --license Activate license
- t, --token Set license token
- e, --email Set license email
- x, --proxy Set HTTP proxy server

1.6 FSCRIPT Compiler Example

For most cases, you will want to set the output filename and turn on the AES encryption with a command similar to the following:

```
fscript -a -osample.fsf sample.scr
```

NOTE: If the output file is not specified, the default output file is a.out.

2 Reprogramming and Diagnostic Script File Commands

Script files are plain ASCII text files that get compiled into an encrypted binary file that is placed on the SD-Card of the MyCANIC or MyCANIC-FD/IOT. The following describes the commands and features of the scripting language. Note that there are several limitations to the scripting language (e.g. allows only one diagnostic filter and one periodic message at a time) of which the user must be aware when creating new script files.

2.1 Comment Line

Place a comment line in the script file.

Format:

; <comment>

Parameters:

None

Examples:

; This is a comment

2.2 FW_VERSION Command

Add a check in the script of the major and minor firmware version numbers. If the FW_VERSION operation fails (i.e. the MyCANIC/MyCANIC-FD/MyCANIC-IOT firmware major version does not match the command version or the firmware minor version is less than the command version), the script will be terminated.

Format:

FW_VERSION <Version Number>

Parameters:

Version Number - Version number of the firmware.

Examples:

Both examples below would check to make sure the major firmware version is fifty. The second example would also make sure the minor version is at least 11.

FW_VERSION 50

FW_VERSION 50.11

2.3 VERSION Command

Assign a version string to the script file for validation purposes. Note that if the version string has the characters “DBG” anywhere, it will automatically enable the debug log (FSCR_DBG.LOG) feature. If there is a number after the “DBG” characters, it will be used for the maximum number of message data bytes in the debug log. If the VERSION command has the “DBG” characters and is used multiple times in a script, it will save the FSCR_DBG.LOG file with the next available file extension (FSCR_DBG.000 to FSCR_DBG.999).

Format:

VERSION “<Version String>”

Parameters:

Version String - Any string of text/numbers to describe the script version.

Examples:

VERSION “TEST_v23.125”

VERSION “PROG_1.23DBG12”

2.4 DELAY Command

Delay a number of milliseconds.

Format:

DELAY <Milliseconds>

Parameters:

Milliseconds – Number of milliseconds to delay (must be between 1 and 1,000,000,000).

Examples:

; Delay 100 milliseconds

DELAY 100

2.5 EXIT Command

EXIT the script file.

Format:

EXIT

Parameters:

None

Examples:

EXIT

2.6 GETKEY Command

Check for a key press. Key is stored in the special data value identifier 'KEY' for use in logic comparisons. (To refer to special data identifiers click [here](#))

Format:

GETKEY

Parameters:

None

Examples:

GETKEY

2.7 WAITKEY Command

Wait for the user to press a key. Key is stored in a special value KEY. (To refer to special data identifiers click [here](#))

Format:

WAITKEY <Key Type>

Parameters:

Key Type – ENTER, ESCAPE, UP, DOWN, LEFT, RIGHT or ANY

Examples:

WAITKEY ANY

WAITKEY ENTER

WAITKEY ESCAPE

WAITKEY UP

WAITKEY DOWN

WAITKEY LEFT

WAITKEY RIGHT

2.8 GETTIME Command

Get the current tick count.. Tick count is stored in the special data value identifier 'TIME' for use in logic comparisons. (To refer to special data identifiers click [here](#))

Format:

GETTIME

Parameters:

None

Examples:

GETTIME

2.9 GOTO Command

Goto a label in the script. The label name must end with a colon ':' character.

Format:

GOTO <label>

Parameters:

Label name ending in a colon character

Examples:

```
IF VBAT < 10000
  GOTO VBAT_LOW:
ENDIF
LED GREEN ON
WAITKEY ANY
EXIT
VBAT_LOW:
LED RED ON
```

2.10 LCD / HLCD Command

Display characters on the LCD screen with or without highlighting. (To refer to special data identifiers click [here](#))

Format:

LCD <Row> <Column> <ASCII text, DATA, HEX, TEXT or VBAT> <Multiplier> <Offset>
 HLCD <Row> <Column> <ASCII text, DATA, HEX, TEXT or VBAT> <Multiplier> <Offset>

Parameters:

Row – 1 to 8

Column – 1 to 16

ASCII Text – Any string of printable ASCII characters, encapsulated in double quotes. An empty string (“”) will clear the LCD screen from the row/column specified to the end of the screen.

DATA – Display numeric data from a previous READ command.

HEX - Display hexadecimal data bytes from a previous READ command.

FLOAT - Display numeric data from a previous READ command as floating point with a multiplier and offset.

TEXT – Display data from a previous READ command as ASCII text.

VBAT – Display the battery voltage.

Multiplier - Optional floating point multiplier value

Offset - Optional floating point offset value

Examples:

```
; Display a string of characters
LCD 1 1 “Any text”
```

```

; Clear everything but the first line
LCD 2 1 ""
; Display the first byte of a CAN / DIAG response message
LCD 2 4 DATA[0, 1]
; Display the first byte of a CAN / DIAG response message in hexadecimal
LCD 2 4 HEX[0, 1]
; Display the first four bytes of a CAN / DIAG response message as a 32-bit value in hexadecimal
LCD 2 4 HEX[0, 4]
; Display the highlighted text in a CAN / DIAG response message, starting at the fifth byte and up to 8
characters long
HLCD 3 0 TEXT[4, 8]
; Display the battery voltage using highlighted text.
HLCD 4 0 VBAT
; Display a value as floating point number with a multiplier of 0.001 and offset of 0.000
LCD 3 0 DATA[7,2] 0.001 0.000

```

2.11 LOG Command

Create and add to an ASCII text CSV (comma-separated variable) log file. (To refer to special data identifiers click [here](#))

Format:

```
LOG <Type> <ASCII text, DATA, TEXT or VBAT> <Multiplier> <Offset>
```

Parameters:

Type – FILE (creates or opens log file). *NOTE: Only one FILE type command is allowed per script file.*

Any additional FILE type commands will be ignored.

NEW (starts a new record with the first field)

ADD (adds another field to the record)

Text – Any string of printable ASCII characters, encapsulated in double quotes.

DATA – Log numeric data from a previous READ command.

DTC - Log DTC information for current DIAG ECU.

TEXT – Log data from a previous READ command as ASCII text.

VBAT – Log the battery voltage.

AMPS - Log the amperage measurement from the FlexStation.

Multiplier - Optional floating point multiplier value

Offset - Optional floating point offset value

Examples:

```
; Start a new log file named VIN.LOG
```

```
LOG FILE "VIN.LOG"
```

```
; Start a new record in the log file with the first field as the text from a CAN / DIAG response message
```

```
LOG NEW TEXT[7,17]
```

```
; Add a field to the current log record with the data from a CAN / DIAG response message
```

```
LOG ADD DATA[7,2]
```

; Add a field to the current log record with the vehicle battery voltage.

LOG ADD VBAT

; Add a field to the current log record with a value as floating point number with a multiplier of 0.01 and offset of 1.000

LOG ADD DATA[7,2] 0.01 1.000

2.12 READ Command

Read a diagnostic response or CAN message. The data is placed in the DATA/HEX/TEXT buffer for logic comparisons.

Format:

READ <Type> <Data>

Parameters:

Type = SID (Service ID).

Type = MSG (Message ID) followed by CAN ID value (11 or 29 bit).

Examples:

; Read the last response to a diagnostic WRITE of a SID request

READ SID

; Read the last received CAN message with an ID of 0x123

READ MSG 0x123

2.13 WRITE Command

Write a diagnostic command or CAN message.

Format:

WRITE <Type> <Data>

Parameters:

Type = SID (Service ID) followed by data bytes (e.g. PID, Routine, etc.)

Type = MSG (Message ID) followed by CAN ID value (11 or 29 bit) and data bytes.

Examples:

; Send a SID request for SID 0x31 with three data bytes to the currently selected diagnostic ECU ID

WRITE SID 0x31 0x06 0x11 0x22

; Send a CAN message with an ID of 0x123 and eight data bytes

WRITE MSG 0x123 0x11 0x22 0x33 0x44 0x55 0x66 0x77 0x88

2.14 REQUEST Command

Request a diagnostic service and wait for the response.. The response data is placed in the DATA/HEX/TEXT buffer for logic comparisons. This command is the equivalent of the WRITE SID, followed by READ SID with two retries of the request built-in if there is no response or negative response.

Format:

```
REQUEST <Message ID> <Data>
```

Parameters:

Message ID = CAN message ID (11-bit or 29-bit).

Data = Request message service ID and data bytes.

Examples:

```
; Request the F188 part number and get the response.
```

```
REQUEST 0x22 0xF1 0x88
```

```
; Check for an exact part number match
```

```
IF TEXT[7,15]="PC3C-14C199-AAB"
```

```
...
```

```
ENDIF
```

2.15 SET_VALUE Command

The SET_VALUE command can be used to set several different features in the MyCANIC.

Format:

```
Security <Type> <Value>
```

Parameters:

Type = TERMINATION - CAN bus termination for current network. 0 = No termination, 1 = 120ohm termination.

Type = INTERFRAME - CAN interframe spacing. Value in microseconds.

Type = STMIN_TX - ISO15765 STMIN override. Value in milliseconds

Type = BS_TX - ISO15765 BS override. Value in bytes

Type = VPROG - Programmable output voltage (pin 13 of DB15HD connector for MyCANIC, TIP on TRRS connector for MyCANIC-FD and MyCANIC-IOT). Value in millivolts.

Value (see Types above)

Examples:

```
; Turn on CAN_HS network termination to 120ohm
```

```
NET CAN_HS 11 500000
```

```
SET_VALUE TERMINATION 1
```

```
; Set interframe spacing to 100usec
```

```
SET_VALUE INTERFRAME 100
```

```
; Set the output voltage to 3.5V
```

```
SET_VALUE VPROG 3500
```

; **NOTE: FlexStation-IOT only.** Set the Vout voltage to 12VDC (0-24000mV range).

SET_VALUE VOLTS 12000

; **NOTE: FlexStation-IOT only.** Set the Ignition line (Vout-SW) off (0V)

SET_VALUE IGN_LINE 0

; **NOTE: FlexStation-IOT only.** Set the Ignition line (Vout-SW) on (same voltage as Vout)

SET_VALUE IGN_LINE 1

; **NOTE: FlexStation-IOT only.** Calibrate the current measurement with no load attached

SET_VALUE AMPS 0

2.16 NET Command

Initialize a CAN network.

Format:

NET <CAN network> <# CAN ID Bits> <CAN Bit Rate>

Parameters:

CAN Network – CAN_HS (pins 6 & 14), CAN_FD_HS (pins 6 & 14), CAN_MS (pins 3 & 11) or CAN_FD_MS (pins 3 & 11)

CAN ID Bits – 11 or 29

CAN Bit Rate – 500000 or 125000

Examples:

; Initialize the HSCAN network (OBDII J1962 pins 6 & 14) to use 11-bit identifiers and 500K baud rate

NET CAN_HS 11 500000

; Initialize the FD HSCAN network (OBDII J1962 pins 6 & 14) to use 11-bit identifiers and 500K baud rate

NET CAN_FD_HS 11 500000

; Initialize the MSCAN network (OBDII J1962 pins 3 & 11) to use 29-bit identifiers and 125K baud rate

NET CAN_MS 29 125000

2.17 DIAG Command

Initialize ISO15765 diagnostic flow control filter for an ECU. If a different DIAG command were previously run in the script file, this command would supersede the previous command and replace the filter. Note that the DIAG command needs to be preceded by a NET command to select the CAN network to use.

Format:

DIAG <Type> <Request ID> <Response ID>

Parameters:

Type – ISO14229 or KWP2000

Request ID – 11-bit or 29-bit CAN ID value

Response ID – 11-bit or 29-bit CAN ID value

Examples:

; Setup 11-bit ISO14229/ISO15765 diagnostic flow control filter for powertrain ECU

DIAG ISO14229 0x7E0 0x7E8

```
; Setup 29-bit ISO14229/ISO15765 diagnostic flow control filter for powertrain ECU
DIAG ISO14229 0x18DB10F1 0x18DAF110
; Setup 11-bit KWP2000/ISO15765 diagnostic flow control filter for body module ECU
DIAG KWP2000 0x730 0x738
```

2.18 REQ_FILE Command

The **REQ_FILE** command allows setting DID (Data Identifier) bytes by referencing an external file containing byte configurations, simplifying scripts when handling large byte modifications.

Syntax:

```
REQ_FILE <Filename / DID>
```

Filename: The external file that contains the byte data for the request or a DID value that will be used to determine the filename.

Example:

```
REQ_FILE "XYZ.REQ"
DELAY 50
REQ_FILE "0xF188"
DELAY 50
```

In this example, the **XYZ.REQ** file contains pre-configured request byte data. The data in the file is similar to the data you would use in a REQUEST command, but without the 255 byte limit and no "0x" prefix on each byte. Below is an example of a DID DE01 write request:

```
2E DE 01 00 11 22 33 44 55 66 77 88 99 00
```

When using a DID to specify the file, the DID must return a valid ASCII string to be used for the request data file name. For instance, if the 0xF188 returns a string of "ABC-AA", that is the name of the data file that will be used.

2.19 DTCVAL (Diagnostic Trouble Code Value) command

The DTCVAL feature in the FScript language allows users to retrieve and compare DTCs stored in the vehicle's ECUs.

Syntax:

```
IF DTCVAL = {byte1, byte2, ..., byteN}
// Statements executed when the specified DTC is found
ELSE
// Statements executed when the specified DTC is not found
```

Example:

```
// Example script to check for a specific DTC and display a message
IF DTCVAL = {0x07, 0x15, 0x00, 0xAF}
  LCD 7 1 "DTC 0715 Found!"
ELSE
  LCD 7 1 "DTC not found!"
```

Use Case: The DTCVAL feature is used in vehicle diagnostic scripts where specific actions need to be taken based on the presence or absence of certain DTCs. It provides a convenient and expressive way to handle diagnostic scenarios in FScript.

2.20 DAT_... Commands

Read either the vehicle VIN (read with OBDII mode 9) or a diagnostic DID and create a VIN or ECU specific data file for storing ECU configuration values. On a MyCANIC, due to 8.3 filename limitations, the file created will be the last eight characters of the VIN or DID with a .DAT extension. For the MyCANIC-FD/IOT, the filename will be the full VIN plus CAN ID or DID value with a .DAT extension.

Format:

```
DAT_INIT <Type> <Data>
DAT_CREATE <Type> <Data>
DAT_CHECK <Type> <Data>
DAT_DELETE <Type> <Data>
```

Parameters:

Type = VIN

Type = DID followed by DID value

Examples:

; Initialize and create a data file based on the vehicle VIN

```
DAT_INIT VIN
```

; Check if the data file already is created and complete

```
IF DAT_STATUS=2
```

```
  GOTO USE_EXISTING_DATA:
```

```
ENDIF
```

; Check if the data file is created but not complete

```
IF DAT_STATUS=1
```

```
  DAT_DELETE VIN
```

```
ENDIF
```

```
DAT_CREATE VIN
```

; Save DID information in data file

```
DID SAVE 0xDE00
```

; Finish the data file and mark it as complete

```
DAT_CHECK VIN
```

USE_EXISTING_DATA:

; Continue script...

; Delete data file before exit

DAT_DELETE VIN

EXIT

or

; Initialize and create a data file base on the ECU serial number

DAT_INIT DID 0xF18C

; Check if the data file already is created and complete

IF DAT_STATUS=2

 GOTO USE_EXISTING_DATA:

ENDIF

; Check if the data file is created but not complete

IF DAT_STATUS=1

 DAT_DELETE DID 0xF18C

ENDIF

DAT_CREATE DID 0xF18C

; Save DID information in data file

DID_SAVE 0xDE00

; Finish the data file and mark it as complete

DAT_CHECK DID 0xF18C

USE_EXISTING_DATA:

; Continue script...

; Delete data file before exit

DAT_DELETE DID 0xF18C

EXIT

2.21 VIN_VERIFY Command

Read the vehicle VIN (read with OBDII mode 9) and verify it exists in the VIN list file on the SD-Card. If the VIN is in the list, the script will continue. If the VIN is not in the list, an error message will display and the script will stop and return to the main menu.

Format:

VIN_VERIFY "<VIN File>"

Parameters:

VIN File - Filename of VIN list file on the SD-Card. If the last letter in the filename is an 'E' (e.g. VIN.CSE), the file is assumed to be encrypted. Otherwise, it is in ASCII CSV format.

Examples:

```
VIN_VERIFY "VIN.CSV"
```

```
VIN_VERIFY "VIN.CSE"
```

2.22 DID Command

Command for saving, recalling, comparing, modifying and writing DID values using services 22 and 2E. If a DID COMPARE operation fails (i.e. the saved DID value did not match the current DID value), the script will be terminated.

Format:

```
DID <Operation> <DID Number> <Data Byte Offset> < Number of Bytes> <Operator> <Operand>
```

Parameters:

Operation – SAVE, RECALL, COMPARE, MODIFY or WRITE

DID Number – 16-bit DID value in hexadecimal notation

Data Byte Offset - Only for MODIFY operation. Offset into DID data, starting at byte zero (0).

Number of Bytes - Only for MODIFY operation. Number of bytes, starting at the Data Byte Offset.

Operator - Only for MODIFY operation. Can be '+'(add), '-'(subtract), '*'(multiply), '/'(divide) , '&'(bitwise AND), '|' (bitwise OR), '^'(bitwise XOR) or '='(equal).

Operand - Only for MODIFY operation. Data value to be used with Operator.

Examples:

```
; Read DID F188 and save in DAT file
```

```
DID SAVE 0xF188
```

```
; Recall saved DID F188 from DAT file (put in DATA[ ] array for IF/WHILE commands)
```

```
DID RECALL 0xF188
```

```
; Read DID F188 and compare to saved DID F188 in DAT file
```

```
DID COMPARE 0xF188
```

```
; Read DID DE01 and save in DAT file
```

```
DID SAVE 0xDE01
```

```
; Remove the LSB of the third data byte of DID DE01 (read-modify-write operation)
```

```
DID MODIFY 0xDE01 2 1 & 0xFE
```

```
; Write DID 0xDE01 from saved DAT file
```

```
DID WRITE 0xDE01
```

2.23 GOSUB/RETURN Commands

Goto a label in the script. The label name must end with a colon ':' character. See the RETURN command for returning from a sub-routine.

Format:

```
GOSUB <label>
RETURN
```

Parameters:

GOSUB: Label name ending in a colon character
RETURN: None

Examples:

```
DO
  LCD 2 1 ""
  DELAY 1000
  LCD 2 1 "Press Enter for"
  LCD 3 1 "subroutines or *"
  LCD 4 1 "to exit."
  IF KEY=ENTER
    GOSUB SUB1:
  ENDIF
  WAITKEY ANY
WHILE KEY!ESCAPE
EXIT
```

```
SUB1:
LCD 5 1 "SUB 1"
DELAY 500
GOSUB SUB2:
RETURN
```

```
SUB2:
LCD 6 1 "SUB 2"
DELAY 500
GOSUB SUB3:
RETURN
```

```
SUB3:
LCD 7 1 "SUB 3"
DELAY 500
```

RETURN

2.24 RETURN Command

The RETURN command is for returning from the last GOSUB command (up to 8 levels deep).

Format:

RETURN

Parameters:

None

2.25 DO / WHILE / ENDDO Command

Perform DO / WHILE / ENDDO logic. Special identifiers like 'DATA', 'TEXT', 'VBAT' and KEY can be used in logic comparisons. (To refer to special data identifiers click [here](#))

Format:

DO

<set of commands>

WHILE <logic comparison>

Parameters:

None

Examples:

; Display the battery voltage until a key is pressed or goes above 12.000VDC

DO

 ; Display the battery voltage on line 4

 LCD 4 1 VBAT

 ; Delay between readings to make it readable

 DELAY 200

 ; Check for a key press

 GETKEY

 IF KEY=ESCAPE

 ; Stop the loop if the Escape key was pressed

 ENDDO

 ENDIF

; Go back to beginning of DO loop if the battery is below 12.000VDC

WHILE VBAT<12000

; Display the final battery voltage reading on line 4

LCD 4 1 VBAT

2.26 IF / ELSE / ENDIF Command

Perform IF / ELSE logic. Special identifiers like 'DATA', 'TEXT', 'VBAT' and 'KEY' can be used in logic comparisons. Nesting of IF/ELSE/ENDIF commands is only allowed if the ENDIF commands are sequential (see example below). (To refer to special data identifiers click [here](#))

Format:

```
IF <logic comparison>
<set of commands>
ELSE
<set of commands>
ENDIF
```

Parameters:

None

Examples:

```
; Voltage check loop
DO
; Display the battery voltage on line 4
LCD 4 1 VBAT
IF VBAT>13000
; If the voltage is above 13.000VDC, turn off the green LED and start blinking the red LED
LED GREEN OFF
LED RED TOGGLE
ELSE
IF VBAT<10000
; If the voltage is below 10.000VDC, turn off the green LED and turn on the red LED
LED GREEN OFF
LED RED ON
ELSE
; If the voltage is between 10.000-13.000VDC, turn off the red LED and turn on the green LED
LED GREEN ON
LED RED OFF
ENDIF
ENDIF
; Delay a short while so the display of the voltage does not update too fast
DELAY 500
GETKEY
; Stay in the loop until the escape key is pressed
WHILE KEY!=ESCAPE
```

2.27 LED Command

Turn on or off the green and red LEDs. For the original MyCANIC, the LEDs are external. For the MyCANIC-FD, the LEDs are in the keypad.

Format:

LED <Selection> <State>

Parameters:

Selection – GREEN or RED

State – ON, OFF or TOGGLE

Examples:

; Turn on the red LED

LED RED ON

; Toggle the green LED

LED GREEN TOGGLE

2.28 PERIODIC Command

Setup a periodic CAN message. If a previous PERIODIC command occurred in the script file, this message from this command would replace the previous one.

Format:

PERIODIC <Type> <Timing> <Data>

Parameters:

Type = SID (Service ID) followed by Timing value and data bytes (e.g. PID, Routine, etc.)

Type = MSG (Message ID) followed by Timing value, CAN ID value (11 or 29 bit) and data bytes.

Timing = Time between messages, in milliseconds. A value of zero (0) will stop a previously started periodic message.

Examples:

; Start a periodic diagnostic request (tester present message) every 5000 milliseconds

PERIODIC SID 5000 0x3E 0x02

; Start a periodic CAN message every 1000 milliseconds with a CAN ID of 0x123 and eight data bytes

PERIODIC MSG 1000 0x123 0x11 0x22 0x33 0x44 0x55 0x66 0x77 0x88

; Stop the current periodic message

PERIODIC MSG 0

2.29 PROG Command

Download a VBF file to an ECU. Note that the LCD lines 3 thru 7 are used during programming to display progress/status.

Format:

PROG "<VBF Filename>" <Security Bytes>

Parameters:

VBF Filename – Any valid VBF file, encapsulated in double quotes.

Security Bytes – 5-byte or 12-byte security seed, only used with SBL files.

Examples:

; Download a VBF file (SBL) with a 5-byte security code to the currently selected ECU diagnostic ID

PROG "JL3A-14C273-EA.VBF" 0x1122334455

; Download a VBF file (EXE) to the currently selected ECU diagnostic ID

PROG "JL3A-14C204-BDE.VBF"

2.30 PROGNC Command

Download a VBF file to an ECU without a check routine after the download.

Format:

PROGNC "<VBF Filename>"

Parameters:

VBF Filename – Any valid VBF file, encapsulated in double quotes.

Examples:

PROGNC "JL3A-14C204-DA.VBF"

2.31 PROGNR Command

Download a VBF file to an ECU without a reset before downloading the SBL.

Format:

PROGNR "<VBF Filename>" <Security Bytes>

Parameters:

VBF Filename – Any valid VBF file, encapsulated in double quotes.

Examples:

PROGNR "JL3A-14C204-DA.VBF" 0x1122334455

2.32 SECURITY Command

The SECURITY command is for entering a security level.

Format:

SECURITY <Level> <Security Bytes>

Parameters:

Level – 1, 3, 5 or 0x61

Security Bytes - Security bytes (a.k.a. fixed bytes)

Examples:

; Enter security level 3 using a 5-byte security value

SECURITY 3 0x1122334455

; Enter security level 0x61 using a 12-byte security value

SECURITY 0x61 0x112233445566778899001122

2.33 EXEC Command

Set the script filename of the next script to execute upon EXIT of the current script.

Format:

EXEC <Filename>

Parameters:

Filename - Next script file to execute.

Examples:

EXEC "NEXTTEST.FSF"

EXIT

2.34 INHALE / EXHALE Commands

The INHALE / EXHALE commands are for saving and restoring vehicle-specific data in an ECU.

Format:

INHALE <Method>

EXHALE <Method>

Parameters:

Method – A (DID DE00-DExx scan), B (Routine 020A)

Examples:

; Inhale ECU data using method A

INHALE A

; Exhale ECU data from method A

EXHALE A

Note: Need to use DAT_INIT and DAT_CREATE to use Inhale/Exhale commands. Refer [here](#)

2.35 UPLOAD / MEM / DOWNLOAD Commands

The UPLOAD / MEM / DOWNLOAD commands are meant to be used in sequence to modify an area of memory in a module. Since these operations normally require the module to be in programming mode, they are usually preceded by a programming session request and PROG command for the SBL.

Format:

UPLOAD <Address> <Length>

MEM <Offset> <Operator> <Operand>

DOWNLOAD <Address> <Length>

Parameters:

Address - Memory address in the module.

Length - Number of bytes to upload / download.

Offset - Byte offset into the data downloaded.

Operator - Can be '+'(add), '-'(subtract), '*'(multiply), '/'(divide), '&'(bitwise AND), '|' (bitwise OR), '^'(bitwise XOR) or '='(equal).

Operand - The data value to be used with the operator. Can be hexadecimal or text up to 255 bytes.

Examples:

; Connect to the appropriate network

NET CAN_HS 11 500000

; Periodic tester present message to stay in programming session

PERIODIC MSG 2000 0x7DF 0x02 0x3E 0x80 0x00 0x00 0x00 0x00 0x00

; Setup the diagnostic filter to the module

DIAG ISO14229 0x7E0 0x7E8

; Download the SBL without doing a reset at the beginning

PROG NR "ML3A-14C273-GA.VBF" 0x112233445566778899001122

; Upload 32 bytes starting at address 0x40008000

UPLOAD 0x40008000 0x20

; Modify the first 3 of the 32 bytes to enable bit 0

MEM 0x00000000 | 0x010101

; Modify the 4 bytes starting a offset 3 to boolean AND with 0xAA

MEM 0x00000003 & 0xAAAAAAAA

; Modify 1 byte at offset 7 to set equal to 0xFE

MEM 0x00000007 = 0xFE

; Modify 14 bytes at offset 8 to set equal to "PRCA-14C599-AC"

MEM 0x00000008 = "PRCA-14C599-AC"

; Erase the 32 byte area in the module and download the modified data

DOWNLOAD 0x40008000 0x20

3 Script File Logic Comparison

3.1 Operators For Use In Logic Comparisons

All comparison operators are a single ASCII character as described below.

Equal Operator: **=**

Not Equal Operator: **!** or **!=**

Less Than Operator: **<**

Greater Than Operator: **>**

Bitwise AND Operator: **&**

3.2 Data Identifier Names For Use In Logic Comparisons, LCD and LOG Functions

The following data identifiers can be used for logic comparisons in the script file:

BIT[x,y] = Bit value from a diagnostic response message or CAN broadcast message, where 'x' is the bit offset into the data and 'y' is the number of bits and endian direction (-32 to +32, excluding 0).

CH1 = Input voltage (pin 8 of DB15HD connector on MyCANIC, RING1 of TRRS connector on MyCANIC-FD and MyCANIC-IOT) in millivolts.

CH2 = Input voltage (pin 12 of DB15HD connector on MyCANIC, RING2 of TRRS connector on MyCANIC-FD and MyCANIC-IOT) in millivolts.

DAT_STATUS = Data file status (0=Non-existent, 1=Exists but not complete, 2=Exists and complete)

DATA[x,y] = Signed data value from a diagnostic response message or CAN broadcast message, where 'x' is the offset into the data and 'y' is the size of the data in bytes (1-4).

UDATA[x,y] = Unsigned data value from a diagnostic response message or CAN broadcast message, where 'x' is the offset into the data and 'y' is the size of the data in bytes (1-4).

DTC = List of DTCs when logging. Number of DTCs when used in an expression/comparison.

HEX[x,y] = Data bytes from a diagnostic response message or CAN broadcast message, where 'x' is the offset into the data and 'y' is the size of the data in bytes (1-16). **HEX[x,y]** can only be used with the Equal and Not Equal operators and will be compared byte-by-byte against the byte array on the other side of the logic expression. The 'y' parameter must match the length of the array.

KEY = Last key pressed.

P_TIME = Programming time (since start of programming) in milliseconds.

SERNUM = 8-digit MyCANIC-FD/IOT electronic serial number in text format.

TEXT[x,y] = Data from a diagnostic response message or CAN broadcast message, treated as ASCII text, where 'x' is the offset into the data and 'y' is the maximum length of the text.

TIME = Current tick count in milliseconds since last GETTIME command.

VBAT = Battery voltage (at OBDII J1962 connector) in millivolts.

{ a, b, c, ... } = Array of numbers used for comparisons against **HEX[x,y]**. The commas separating the array values are optional.

VAR[x] = A numeric data variable that can be used for comparisons and counters, where 'x' can be 0 thru 8.

VOLTS = **NOTE: FlexStation-IOT only.** This variable can be used to read the Vout voltage of a FlexStation in millivolts. When used with the SET_VALUE command it will set the Vout voltage.

AMPS = **NOTE: FlexStation-IOT only.** This variable can be used to read the current draw of the ECU(s) attached to a FlexStation in milliamps. When used with the SET_VALUE command, it will perform a zero calibration function with no load.

IGN_LINE = **NOTE: FlexStation-IOT only.** This variable controls the ignition line state (Vout-SW on FlexStation), allowing you to turn it on or off. A value of 1 turns the ignition line on (save voltage as Vout), while a value of 0 turns it off (approximately 0VDC).

RTC = **NOTE: Works only with MyCANIC-IOT connected to wireless network.** Real Time Clock in GMT (format YYYY/MM/DD HH:MM.SS).

Examples:

```
IF HEX[0,4] = { 0xFF, 0x12, 0x55, 0x24 }
```

```
ENDIF
```

```
IF DATA[5,1] < -1
```

```
ENDIF
```

```
IF UDATA[6,1] > 130
```

```
IF BIT[48, -3] >= 6
```

```
ENDIF
```

```
; Variables example
VERSION "DBG"
HLCD 1 1 "VARIABLES v1.00"
LCD 2 1 SERNUM
FW_VERSION 52.92
LED RED OFF
LED GREEN OFF
GETTIME
VAR[0] = 0
DO
  VAR[0] = VAR[0] + 1
  IF VAR[0] > 10
    EXIT
  ENDIF
LCD 3 12 TIME
LCD 4 5 DAC
LCD 5 5 CH1
LCD 6 5 CH2
LCD 7 5 VAR[0]
DELAY 500
GETKEY
WHILE KEY!ESCAPE
EXIT
```

4 Script File Compiler

After the engineer has created the script file, place the script file along with all referenced VBF files in the same directory and run the FSCRIPT.EXE command line script file compiler (e.g. FSCRIPT.EXE <Filename>). Upon successful completion, the output file will have the same base filename as the script file, but with a .FSF extension. Place the .FSF file on SD-Card of the MyCANIC or MyCANIC-FD when complete. Any errors while processing the script file will be noted as a response in the command window and the output (.FSF) file will not be created.

4.1 Example VIN and Module ID Logging Script

```

; Read, log and display the VIN and module ID
HLCD 1 1 "VIN & Module ID"
; Start the log file
LOG FILE "VIN.LOG"
; Initialize the CAN network
NET CAN_HS 11 500000
; Start the diagnostic filter
DIAG ISO14229 0x7E0 0x7E8
; Request the VIN using OBDII Mode $09 Inf $02
WRITE SID 0x09 0x02
; Get the response to the VIN request
READ SID
; Display and log the VIN in a new record
LCD 2 1 TEXT[7,17]
LOG NEW TEXT[7,17]
; Request the module ID using Service $22 and PID $F188
WRITE SID 0x22 0xF1 0x88
; Get the response to the module ID PID request
READ SID
; Display and add the module ID to the current log record
LCD 3 1 TEXT[7,16]
LOG ADD TEXT[7,16]
WAITKEY ENTER

```

4.2 Example Vehicle Battery Voltage Read And Compare Do-While Loop Script

```

; Read/display the vehicle battery voltage and wait for it to go above 13.0V
HLCD 1 1 " VBAT DO/WHILE "
LCD 2 1 "VBAT < 13V"
DO
  LCD 4 1 VBAT
  GETKEY
  IF KEY=ESCAPE
    ENDDO
  ENDIF
  DELAY 200
WHILE VBAT < 13000
  LCD 4 1 VBAT
  LCD 2 1 "VBAT >= 13V"
  WAITKEY ENTER

```

4.3 Example Periodic Message Script

```

; Periodic message test
HLCD 1 1 "Periodic Msg Tst"
; Initialize the CAN network
NET CAN_HS 11 500000
; Start the diagnostic filter
DIAG ISO14229 0x7E0 0x7E8
LCD 2 1 "Sending MSG..."
; Send a message every 1000msec
PERIODIC MSG 1000 0x123 0 1 2 3 4 5 6 7
WAITKEY ENTER
; Stop the periodic message
PERIODIC MSG 0
LCD 2 1 "Sending SID..."
; Send a diagnostic request every 1000msec
PERIODIC SID 1000 0x22 0xF1 0x88
WAITKEY ENTER
; Stop the periodic message
PERIODIC MSG 0

```

4.4 Example Module Programming Script With Module ID Comparison Script

```

; Copperhead Programming Script
HLCD 1 1 " Copperhead "
; Start the log file
LOG FILE "VIN.LOG"
; Initialize the CAN network
NET CAN_HS 11 500000
; Start the diagnostic filter
DIAG ISO14229 0x7E0 0x7E8
; Request the VIN using OBDII Mode $09 Inf $02
WRITE SID 0x09 0x02
; Get the response to the VIN request
READ SID
; Start a new log record with the VIN
LOG NEW TEXT[7,17]
; Request the module ID using Service $22 and PID $F188
WRITE SID 0x22 0xF1 0x88
; Get the response to the module ID PID request
READ SID
; Add the current module ID to the log record
LOG ADD TEXT[7,15]
; Compare the module ID to determine what file(s) to program
IF TEXT[7,15]="BR3A-SEMAMM-GCO"
    PROG "BC3A-14C273-BD.VBF" 0x1122334455
    PROG "CR3A-14C204-ACC.VBF"
ENDIF
IF TEXT[7,15]="CR3A-14C204-ACC"
    PROG "BC3A-14C273-BD.VBF" 0x1122334455
    PROG "BR3A-SEMAMM-GCO.VBF"
ENDIF
; Reset the module and give it some time to be ready
WRITE SID 0x11 0x01
DELAY 1000
; Request the module ID using Service $22 and PID $F188
WRITE SID 0x22 0xF1 0x88
; Get the response to the module ID PID request
READ SID
; Add the new module ID to the log record

```

```

LOG ADD TEXT[7,15]
LCD 8 1 "Done!"
WAITKEY ENTER

```

4.5 Example Do-While Loop With Timeout Script

```

; Read the current time
GETTIME
; Wait 5 seconds or until the ESCAPE key is pressed
DO
  GETKEY
  IF KEY=ESCAPE
    ENDDO
  ENDIF
WHILE TIME < 5000
WAITKEY ENTER

```

4.6 Example Variable Testing within Do-While Loop

```

; Testing variables
VERSION "VAR_TEST 1.0"
HLCD 1 1 "VAR_TEST 1.0"
LED RED OFF
LED GREEN OFF
; Initialize counters
VAR[0] = 0 ; Counter for the outer loop
VAR[1] = 0 ; Counter for the inner loop
; Display initial values of counters
LCD 2 1 "BEFORE ENTERING"
LCD 3 1 VAR[0]
LCD 3 5 VAR[1]
DELAY 2000
; Wait for a valid response
DO
  ; Increment Counter 0
  VAR[0] = VAR[0] + 1
  ; Display current state in the outer loop
  LCD 2 1 ""
  LCD 2 1 "INCREMENT VAR[0]"
  ; LCD 4 1 "COUNTER 0:"
  LCD 3 1 VAR[0]
  DELAY 500

```

```

; Check if Counter 0 is equal to 10
IF VAR[0] = 10
  DO
    ; Display a message when inside the inner loop
    LCD 4 1 "INCREMENT VAR[0]"
    ; Increment Counter 0
    VAR[1] = VAR[1] + 1
    LCD 5 1 VAR[1]
    DELAY 500
    WHILE VAR[1] < 15
  ENDIF
WHILE VAR[1] < 10
; Display values of counters
LCD 6 1 "AFTER LOOP"
LCD 7 1 VAR[0]
LCD 7 5 VAR[1]
DELAY 2000
; Exit the script
EXIT

```

The added variable feature allows dynamic counter manipulation, offering flexibility in loop control.

4.7 Example snippet for variables within VOP for 80 Iterations

```

; Initialize variable for the number of Sawtooths
VAR[8] = 0

; Outer loop for multiple sawtooth ramps
DO
  LCD 2 1 "Sawtooth no:"
  LCD 2 15 VAR[8]
  VAR[1] = 0

; Inner loop for one sawtooth ramp
DO
  LCD 3 1 "Sawtooth ITR:"
  LCD 3 15 VAR[1]
  LCD 4 1 "Idle @ 3500RPM "

; Code for ramp execution, including oil pressure and RPM checks

VAR[1] = VAR[1] + 1

```

```
WHILE VAR[1] < 10
```

```
; Additional code after completing one sawtooth ramp  
; (e.g., returning to idle, releasing overrides)
```

```
VAR[8] = VAR[8] + 1
```

```
WHILE VAR[8] < 8
```

Without variables, this logic would involve manual code duplication for each sawtooth iteration, leading to a larger and error-prone script with repeated blocks for each ramp. The absence of variables would also require replicating code for setting oil pressure high, waiting, and checking in each iteration.

Introducing variables, like VAR[8] and VAR[1], enables dynamic control within loops, reducing redundancy and enhancing script readability. With variables, the script becomes concise, adaptable, and easier to maintain.

Moreover, lacking variables required splitting the script into three files due to its extensive length, totaling 64KB. Each file had repeated code sections for different ramps, resulting in redundancy and increased storage needs. However, with variables, the script is consolidated into a single 7.1KB file, optimizing storage and improving overall script organization and management.

5 LOGADD.EXE Windows Console Mode Utility

The LOGADD.EXE Windows console mode program is available for quickly combining script log files via USB (no need to access the SD-Card or plug in the OBDII cable) from several different MyCANIC-FD and MyCANIC-IOT tools into a single consolidated log file. Note that this utility will not work with the classic (gold keypad) MyCANIC.

Simply run the LOGADD program from a console mode window along with the name of the log file to be collected from each MyCANIC-FD/IOT. For example, the following command will read the VIN_LIST.LOG file from the MyCANIC-FD/IOT connected via USB, save it to a sub-directory based on the electronic serial number of the MyCANIC-FD/IOT, add it to the combined VIN_LIST.LOG file on the PC in the current directory and then delete the VIN_LIST.LOG file on the MyCANIC-FD/IOT.

LOGADD.EXE VIN_LIST.LOG

6 References and Acronyms

6.1.1 References

SAE J2534 Recommended Practice For Pass Thru Vehicle Reprogramming

6.1.2 Acronyms

BIN	Binary File
CAN	Controller Area Network
CSV	Comma Separated Variable
DTC	Diagnostic Trouble Code
ECU	Electronic Control Unit
ISO	International Standards Organization
LCD	Liquid Crystal Display
MSG	Message
PID	Parameter ID
OBD	On-Board Diagnostic
SAE	Society of Automotive Engineers
SD	Secure Digital
SID	Service ID
VBF	Volvo Binary Format
VIN	Vehicle Identification Number