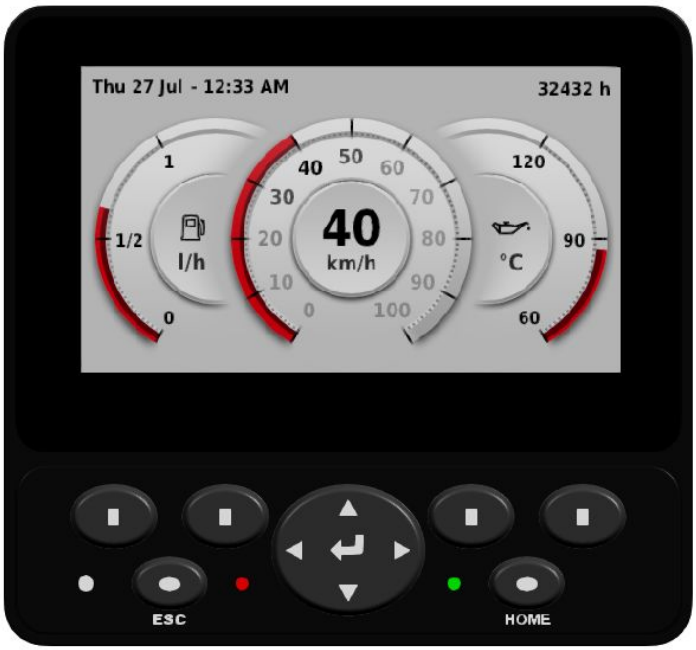
SYS-File: 70298408v170.SYS
SYS-File Family: 70298416
Hardware: DM430E_1_1_X_X(11197974, 11197976)

1 General

BIOS Functionality; The functionality is defined around the pin. If no *Variable Type* is specified the *Variable Name* contains elements, defined later. The pins are defined as C(ConnectorNumber)p(PinNumber).
Example:
The pin C1p02 has 2 variables; C1p02.AnIn, C1p02.Volt.

Etc.



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2 BIOS Variables

2.1 Digital Analog Input

BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
C1p06	-			
C1p07	-			
Elements				
AnIn	U16	Read	Analog In 0-32767	AD Count
Voltage	U16	Read	Analog in scaled [mV]	
Bias	U8	Write	Bias Configuration 0 = No Pull-Down, No Pull-Up 1 = No Pull-Down, Pull-Up to internal +5V 2 = Pull-Down to internal GND, No Pull-Up 3 = Pull-Down to internal GND, Pull-Up to internal +5V	**Note2**
Range	U8	Write	Range Configuration 0 = 0-5.25V range 1 = 0-35.3V range	**Note2**
DigThresLow	U16	Write	Digital Input Threshold Low Configuration [mV] Default value 2000 **If activated with 5V Supply** This will define when DigIn goes from True to False. **If activated with GND** This will define when DigIn goes from False to True.	**Note2**
DigThresHigh	U16	Write	Digital Input Threshold High Configuration [mV] Default value 3000 **If activated with 5V Supply** This will define when DigIn goes from False to True. **If activated with GND** This will define when DigIn goes from True to False.	**Note2**
Status	U16	Read	Status 0 = OK Bit 1 (0x0002) = True : Config Error Bias Bit 2 (0x0004) = True : Config Error Range	**Note2**
DigIn	BOOL	Read	Digital Input True = Active	**Note2**

2.2 Digital Analog Input

BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
C1p05	-			
Elements				
AnIn	U16	Read	Analog In 0-32767	AD Count
Voltage	U16	Read	Analog in scaled [mV]	
DigThresLow	U16	Write	Digital Input Threshold Low Configuration [mV] Default value 2000	**Note2**
DigThresHigh	U16	Write	Digital Input Threshold High Configuration [mV] Default value 3000	**Note2**
DigIn	BOOL	Read	Digital Input True = Active	

2.3 Buttons

BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
Button	-		The following Elements are only available on DM430E-1-1-1-X: Up Left Center Down Right Home Esc	
Elements				
Type	U16	Read	Defines the mounted button pad type 4 - Standard 4 Button Layout 11 - Navigation 11 Button Layout	
Backlight	BOOL	Write	Button backlight True = On	
One	BOOL	Read	Button state True = Button depressed	
Two	BOOL	Read	Button state True = Button depressed	
Three	BOOL	Read	Button state True = Button depressed	
Four	BOOL	Read	Button state True = Button depressed	
Up	BOOL	Read	Button state True = Button depressed	
Left	BOOL	Read	Button state True = Button depressed	

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BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
Center	BOOL	Read	Button state True = Button depressed	
Down	BOOL	Read	Button state True = Button depressed	
Right	BOOL	Read	Button state True = Button depressed	
Home	BOOL	Read	Button state True = Button depressed	
Esc	BOOL	Read	Button state True = Button depressed	

2.4 LED

BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
Led	-		The following Elements are only available on DM430E-1-1-0-X: RedLeft AmberLeft GreenRight AmberRight	
Elements				
GreenRight	BOOL	Write	LED True = Light up the LED	
RedRight	BOOL	Write	LED True = Light up the LED	
AmberRight	BOOL	Write	LED True = Light up the LED	
GreenLeft	BOOL	Write	LED True = Light up the LED	
RedLeft	BOOL	Write	LED True = Light up the LED	
AmberLeft	BOOL	Write	LED True = Light up the LED	

2.5 Multifunction Inputs -Dig/Ana/Freq/Resis/Curr

BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
C1p10	-			
C1p11	-			
Elements				

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BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
Phase	S32	Read	Phase shift [0.1 μs], sign defines direction.	Only valid when InputMode = 4
Per	U32	Read	Period in scaled [0.1 μs]	
Freq	U16	Read	Frequency In Scaled [Hz]	0-10kHz
Count	U16	Read	Number of measured edges this loop.	
Duty	U16	Read	Positive duty cycle in scaled [0.01%]	
QuadCount	S16	Read	Number of measured counts this loop, sign defines direction.	Only valid when InputMode = 3
Current	U32	Read	Current In [μA]= 0xFFFFFFFF if this signal not valid	0-25300 μA
AnIn	U16	Read	Analog In 0-32767	AD Count
Voltage	U16	Read	Analog in scaled [mV]	
Resistance	U16	Read	Resistance [Ω] = 65535 if this signal not valid	0-10000Ω
Bias	U8	Write	Bias Configuration 0 = No Pull-Down, No Pull-Up 1 = No Pull-Down, Pull-Up to internal +5V 2 = Pull-Down to internal GND, No Pull-Up 3 = Pull-Down to internal GND, Pull-Up to internal +5V	**Note2**
Range	U8	Write	Range Configuration 0 = 0-5.25V range 1 = 0-35.3V range 2 = 0-0.3675V range 3 = 0-2.465V range (lower resolution)	**Note2**
InputMode	U16	Write	Input Mode Configuration 0 = Normal Analog Input 1 = Resistance Mode 2 = Current 3 = Quad encoder enabled, result in .Quad-Count 4 = Phase shift enabled, result in .Phase	**Note2** Quad count/ Phase shift pairing: Only on C1p10
DigThresLow	U16	Write	Digital Input Threshold Low Configuration [mV] Default value 2000 **If Bias is configured with 0, 2 or 3** This will define when DigIn goes from True to False. **If Bias is configured to 1** This will define when DigIn goes from False to True.	**Note2**

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BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
DigThresHigh	U16	Write	Digital Input Threshold High Configuration [mV] Default value 3000 **If Bias is configured with 0, 2 or 3** This will define when DigIn goes from False to True. **If Bias is configured to 1** This will define when DigIn goes from True to False.	**Note2**
Status	U16	Read	Status 0 = OK Bit 0 (0x0001) unused Bit 1 (0x0002) = True : Config Error Bias Bit 2 (0x0004) = True : Config Error Range Bit 3 (0x0008) = True : Config Error Input-Mode Bit 4 (0x0010) = True : Over-current Error in .InputMode = 2	
DigIn	BOOL	Read	Digital In True = Active	

2.6 Digital Outputs 1A (low side switches)

BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
C1p12	-			
Elements				
DigFeedBack	BOOL	Read	Digital Feedback; feedback from the output driver True = Digital output is activated or pin is open False = Digital output is not activated while load is connected between pin and positive voltage	
DigOut	BOOL	Write	Digital Out True = Activated (switched to GND) False = Not activated (disconnected from GND)	

2.7 Supply Voltage

BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous

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BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
C1p02	-		Range = 0-32.0V Battery Voltage averages 1024 samples every 109uS for an update rate of 112mS	
Elements				
AnIn	U16	Read	Analog In 0-32767	AD Count
Voltage	U16	Read	Analog In Scaled [mV]	

2.8 OS

BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
OS	-			
Elements				
ETime	U32	Read	Time since power on [10ms]	
LoopCnt	U32	Read	Counter that increments by 1 every processing loop.	
ExecTime	U16	Read	processing time [ms]	
ExecTimeOut	U16	Write	Requested processing time 1-250[ms] Default: 10[ms]	
ExecTimeWork	U16	Read	Actual work time during processing loop [ms].	
ExecTimeGraph	U16	Read	Actual work time for processing graphical task [ms].	
CrcStatus	U16	Read	0 = CRC calculation matches 1 = CRC calculation is not implemented 2 = CRC calculation does not match 3 = CRC data missing; unable to perform test 4 = CRC calculation is in progress 5 = CRC is not present in the downloaded file	
CrcCalcTime	U16	Read	Calcuation time to for CRC [ms]	
ChecksumFailure	U16	Read	**Bit0** True = Flash checksum error False = Flash check OK **Bit1** True = RAM initialization error False = RAM initialization OK **Bit2** True = Bootloader checksum error False = Bootloader check OK	Bit 0 will be true if OS.CrcFailed = 2.

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BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
ChecksumFailure-Treatment	U16	Write	**Bit0** True = A system reset will automatically occur in case of a Flash checksum error. Application will not be executed. False = Application continues to run. Default: True **Bit1** True = A system reset will automatically occur in case of a RAM initialization error. Application will not be executed. False = Application continues to run. Default: True **Bit2** True = A system reset will automatically occur in case of a Bootloader checksum error. Application will not be executed. False = Application continues to run. Default: False	**Note2**
ResetExecTime	BOOL	Write	Reset the execution time. Try to set OS.ExecTime to the requested value in OS.ExecTimeOut on change from TRUE to FALSE.	
Start	BOOL	Read	True during the first processing loop after power on.	
RAMTestTimeInterval	U16	Read	Time interval of last RAM diagnostic self-check [s]. Will be "0" before first check is completed.	

2.9 Application Log

BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
AppLog	-			
Elements				
EraseOnDownload	BOOL	Write	True = All application logs erased on new application download. False = Application logs are left untouched on new application download. Default Value: True	May only be set on initialization.

2.10 NVMem

BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous

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BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
NVMem	-			Each U8, S8 or BOOL variable will occupy 16 Bit in NV memory.
Elements				
Status	U16	Read	Status of Non-Volatile memory after reset. The status code is bit coded. **Bit 0** True = The NV Memory was restored to a previous state. This may happen when a store operation was aborted. For example due to power off. **Bit 1** True = The NV Memory checksums are not correct. This may, for instance, occur during the first boot up after a new application is downloaded, if the NV Memory usage is changed. **Bit 2** True = The reset routine could not access the NV memory. This may, for instance, occur due to a hardware problem. **Bit3-15** Reserved	
PendingCount	U16	Read	Number of pending NV cells (data captured at the end of last application loop, data may contain number for several loops if not processed yet).	

2.11 Service Tool Access

BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
ServiceTool	-			
Elements				
MasterPassword	-			
Elements				
Write	U32	Read		
Read	U32	Write		
DisableRead	BOOL	Write		
DisableWrite	BOOL	Write		
DisableDownload	BOOL	Write		
Connect	BOOL	Read		

2.12 Real Time Clock

BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
RTC	-			
Elements				
Status	U16	Read	0 = OK Bit 0 (0x0001) =True: Config Error	
Year	U16	Read/Write	2000...2099 Real time clock year	
Second	U8	Read/Write	0...59 Real time clock minute	
Minute	U8	Read/Write	0...59 Real time clock minute	
Hour	U8	Read/Write	0...23 Real time clock hours	
Day	U8	Read/Write	1...28/29/30/31 Real time clock Day	
DayOfWeek	U8	Read	0...6 Real time clock week day 0 = Monday	Set automatically when the date is changed.
Month	U8	Read/Write	1...12 Real time clock month	
Set	BOOL	Write	True: Write date and time to real time clock if bit 0 of RTC.Status is false.	
Stop	BOOL	Write	True: Don't update OS-Variables, False: Read time from real time clock.	

2.13 Display

BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
Display	-			
Elements				
Backlight	U8	Write	0: Off 100: Full brightness	
Status	U16	Read	0 = everything OK	
Port	PORT	Read	A handle for the graphical 480x272 display, used as an input to the screen editor to select which graphical port to use.	Only for use in the PLUS+1 GUIDE Screen Editor.

2.14 Ambient Illuminance

BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
Ambient	-			

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BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
Elements				
AnIn	U16	Read	Analog In 0-32767	AD Count

2.15 Packed Infoblock

The packed infoblock contains data about the controller, application and embedded operating system of a hardware unit. Each field consists of a number of bytes which are packed in arrays of U16 in little endian byte order.

BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
ECUInfoPacked	-			
Elements				
AppCmplTime	ARRAY[4]U16	Read	Application compilation time stamp in the format yy yy mm dd hh mm ss cc, where each of the four elements is a hexadecimal number representing four digits. Consider the following example: If an application is compiled December 2nd 2009 at 16:54:49.22 this is presented as {0x0920, 0x0212, 0x5416, 0x2249}.	cc=1/100s
AppId	ARRAY[26]U16	Read	Application identity. It consists of a null terminated ASCII string. As an example, Untitled is presented as {0x6E55, 0x6974, 0x6C74, 0x6465, 0x0000}.	
AppType	ARRAY[16]U16	Read	Application type. It has the same format as AppId.	
AppVer	ARRAY[11]U16	Read	Application version. It has the same format as AppId.	
BDate	ARRAY[4]U16	Read	Production time stamp in the same format as AppCmplTime.	
BootVer0	U16	Read	Bootloader version. It is a 16 bit number.	

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BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
PNr0	ARRAY[6]U16	Read	Part number 0. It consists of a right justified ASCII string padded with space characters; e.g. a part number equal to 1002096 is presented as {0x2020, 0x2020, 0x3120, 0x3030, 0x3032, 0x3639}.	
PNr1	ARRAY[6]U16	Read	Part number 1. It has the same format as PNr0.	
PNr2	ARRAY[3]U16	Read	Part number 2. It is a numerical value. As an example, consider the part number 025125980137. Its hexadecimal representation is 0x05D9A007E9 and this number is presented as {0x07E9, 0xD9A0, 0xXX05}, where XX is undefined and should be masked away.	**Note3**
PRev0	ARRAY[2]U16	Read	The revision level of part number 0. It consists of four ASCII characters. For example, a revision level equal to RevA is presented as {0x6552, 0x4176}.	
PRev1	ARRAY[2]U16	Read	The revision level of part number 1. It has the same format as PRev0.	
SerNr0	ARRAY[3]U16	Read	40 bit serial number. It has the same format as PNr2.	

2.16 UART

BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
UART[n]	-		n = 0	
Elements				
Baudrate	U32	Write	Default 9600 baud Supported baud rates: 2400 4800 9600 19200 38400 57600 115200	**Note2**
TwoStopBits	BOOL	Write	True = Two stop bits. False = One stop bit	

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BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
TxMsg	-			
Elements				
Len	U16	Write	Tx Message length	
Tx	BOOL	Read/Write	Write True to send. Is cleared when data is sent	
Rdy	BOOL	Read	True = No ongoing transmission	
Data[n]	U8	Write	n = 0. . . 240 GUIDE array.	
RxMsg	-			
Elements				
Len	U16	Read	Length of the received message	
Rx	BOOL	Read	Data received during last processing loop.	
Clear	BOOL	Write	True = Set .Len to 0, .Rx to FALSE	
Overflow	BOOL	Read	RX Buffer overflow occurred during the last loop. Data are may not valid.	
Data[n]	U8	Read	n = 0. . . 127 GUIDE array.	

2.17 CAN

CAN-Controller internal in CPU is used for CAN[0] (C1p03-C1p04) bus.
In addition to the following Application Interface, CAN[0] can be used for diagnostics and for download.
CAN-Controller internal in CPU is used for CAN[1] (C1p08-C1p09) bus.
In addition to the following Application Interface, CAN[1] can be used for diagnostics and for download.
Following CAN-signals are implemented.

BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
CAN[n]	-		n = 0. . . 1	
Elements				
Baudrate	U32	Write	Default 250000 baud Supported baud rates: 50000 100000 125000 250000 500000 1000000	**Note2**
BusOff	BOOL	Read	True = The CAN controller is in Bus Off mode.	
Reset	BOOL	Write	True = Resets the CAN controller and Bus off mode.	

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BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
DriverError	BOOL	Read	True = The CAN driver could not be initialized and the whole CAN functionality is shut down. This flag could be set if other CAN-Nodes already communicate during initialization phase.	
DriverReset	BOOL	Write	True = Reinitialize the CAN driver if DriverError is Set.	
Overflow	BOOL	Read	True = The internal CAN message queue was full during the last execution loop. A message may have been lost.	
ErrorPassive	BOOL	Read	True = The Can controller is in error passive state.	
Port	PORT	Read	A handler for the CAN port x, used as an input to a CAN symbol to select which CAN port to use.	

2.18 ID

BIOS-name	Variable Type	Variable Direction	Function, Scaling	Miscellaneous
ID	-			
Elements				
Node	-			
Elements				
ServerAddr	U8	Write	Server Address (Node ID) of the ECU	**Note1**
ClientAddr	U8	Read	The node number of the diagnostic tool	
Net[n]	-		n = 0. . . 2	
Elements				
Addr	U8	Write		**Note1**

3 Notes

3.1 Note1

This signal must use the symbol "Intialize Hardware Output". "Initialize Hardware Output" means that this output will be updated before the application starts.

3.2 Note2

This signal can use both symbols Intialize Hardware Output and Hardware Output if Variable Direction is Write. Initialize Hardware Output means that this output will be updated before the application starts. Hardware Output means that this output will be updated every loop in the application.
This signal must use the symbol Hardware Input if Variable Direction is Read. In case of a Safety Controller the value is set from the primary processor.

3.3 Note3

.PNr2 may be either a part number or an EAN number. If the formula below matches it is a part number; if the high byte of .PN2[2] is a valid EAN checksum it is an EAN number.
PNr2[2]:HB = CRC8(PNr2[0]:LB ...PNr2[2]:LB)
where:
LB = low Byte
HB = high Byte
CRC8 =8 Bit CRC with polynomial is x8 + x2 + x + 1; startvalue to be 0xFF

4 Miscellaneous

All scaling and ranges presented are nominal values. More technical details can be found in PLUS+1 Controller Family Technical Information. Maximum nested levels are 10
Maximum number of supported NV memory cells is 4000.
PLUS+1 GUIDE 10.1.7 or higher is required.

4.1 Supported PLUS+1 GUIDE Components

The following PLUS+1 GUIDE components which need support from the SYS are allowed

- Get Time us
- Until
- Repeat
- Initialize Hardware Output
- Sin
- Cos
- Tan
- Square Root
- Arc Sin
- Arc Cos
- Arc Tan
- Hardware Input
- Read Output from Hardware
- Module Input
- Module Bus Input
- Module Bus Output
- Access App Log Enable
- Set Pulse
- Disable Raw Applog Data Readout
- Accessrights App Log Statistics
- Accessrights App Log Errors
- Accessrights App Log Others
- Read Array from Application Log
- Accessrights History
- Accessrights Read
- Accessrights Write
- Create Externally Defined Class
- Call Method Of Externally Defined Class

- Define Window
- Define Window
- Application Log
- Graphic
- Line
- Select Language
- Language Definition Input
- Transmit CAN
- Receive CAN Basic
- Receive CAN with ID Mask
- Receive CAN with Filter
- Close Parameter Set

4.2 Diagnostic Data (PLG) In Target

Diagnostic Data (PLG file) is dynamically allocated in target FLASH memory.

4.3 ToolKey

"LOGKEY" Supported.

4.4 TimeBase

The following time bases are supported

- T1M
- T10M
- T100M
- T1S
- T60S
- T1H
- TLOOP

4.5 Unit History

Unit History is supported. The 20 latest activities are logged.

4.6 Read-Only Parameters Support

This software supports Multiple Read Only Parameters. 32768 bytes are allocated and there is theoretically no limit on the number of files that can be used. However, the minimum size for each file is 230 bytes, so no more than 142 files can be used.
This SYS has a parameter named ReadOnlyParameters which enables or disables this function. The parameter can have the values ENABLE or DISABLE. DISABLE is the default value. This value can be set in the GUIDE. Select this SYS in the Project manager and Edit the Parameter in the Inspector. NOTE: The memory calculation will not be correct when the ReadOnlyParameters is in ENABLE mode. The total amount of ROM should be reduced by 32768 to get the correct calculation.
Needed information for csv file:

```
ADDRESSMODE:     LSBFIRST
DEFAULTTYPEDATA: 1
MIN_DATASIZE:    8
```

4.7 Application Log Support

This software supports Multiple Application Log.
Both Circular and Linear type is supported.

The maximum size allocated for application log is 33292288 bytes and the block size is 262144 bytes. There is theoretically no limit on the number of files that can be used. However, because the minimum size for each file is 1 block size for Linear Type and 2 block sizes for Circular Types, no more than 128 files for Linear Type and 64 files for Circular Type can be used. A single text string is limited to 511 characters.

Performance of application log;
The application log memory is updated as a low priority task.
Examples (hardware dependent) that have an impact on the application log performance:
Speed of memory writing
Frequency inputs
CAN communication
Graphic update
OS.ExecTime - OS.ExecTimeWork - OS.ExecTimeGraph
Non-Volatile memory access
Multiple application log files accessed

4.8 Screen Editor/ Multi Language

Supported.

4.9 Compiled Code Package Support

This software supports compiled_code package (CCP) using IDL type .

4.10 HOST-settings

In General the PLUS+1 Setup program does this.
This setting use STM32F7XX Compiler v5.4.1, Key is; ARM-GCC 5.4 2016Q3-20160926