# 1 File Info

## 1.1 System Version

SYS-File: 70096706v210.SYS
SYS-File Family: 70104511
Hardware: DP720 (11126325/11126326/11126327)

# 2 General

## 2.1 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 one variable:
C1p02.Volt.

Etc.

## 2.2 BIOS Default Settings

The default value of variables is 0 if otherwise is not specified.

# Contents

# 3 BIOS Variables

## 3.1 Monitoring

### 3.1.1 Power Supply

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| C1p02 | - | | Range = 0. . . 36 V | **Note4** Supply Voltage |
| *Elements* | | | | |
| .Voltage | U32 | Read | Analog in scaled [mV] | |

### 3.1.2 Ambient Illuminance

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| Ambient | - | | | |
| *Elements* | | | | |
| .Light | U32 | Read | Illuminance on the front of the display. Experimentation is required to determine the expected range for the application. | **Note:** This measurement is only accurate when light shines directly onto the display front sensor.<br><br>It is only usable for the implementation of a binary night/direct sunlight detector. |

## 3.2 Touch Screen

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| TouchScreen | - | | | |
| *Elements* | | | | |
| .Stream[n] | - | | 0 = Touch Stream. Only one stream is currently supported. | |
| *Elements* | | | | |
| .State | U16 | Read | Touch State<br>0 = Idle State (No Touch)<br>1 = Touch Active<br>2 = Touch Release (Active for only one loop)<br>3 = Double Click<br>4 = Long Press<br>5 = Swipe Left<br>6 = Swipe Right<br>7 = Swipe Up<br>8 = Swipe Down | |
| .X | U16 | Read | X position on the screen. Zero when idle. | |
| .Y | U16 | Read | Y position on the screen. Zero when idle. | |
| .Config | - | | | |
| *Elements* | | | | |
| .TouchDetection | U16 | Write | Touch Delay Count.<br>This is used to detect double taps/swipe durations/etc. (ms)<br>Default value is 250ms<br>Minimum value is 10ms. | |
| .LongTouchDuration | U16 | Write | Minimum press length to determine a long touch. (ms)<br>Default value is 1000ms<br>Minimum Value is 4 times the TouchDetection. | |
| .SwipeX | U16 | Write | Number of pixels a swipe must pass to count as a X swipe.<br>Default Value is 10 pixels.<br>Minimum value is 5 pixels. | |
| .SwipeY | U16 | Write | Number of pixels a swipe must pass to count as a Y swipe.<br>Default Value is 10.<br>Minimum value is 5 pixels. | |
| .MaximumTouchDuration | U32 | Write | Configure the number of milliseconds before a touch is ignored. May only be one of three values.<br><br>5000 ms (default)<br>20000 ms<br>40000 ms<br><br>If a different value is used, the delay time will be rounded up to the nearest preset value, or 40000 is used if a greater value is entered. The actual delay seen on the touchscreen will vary due to environmental variance and location on the screen. | |

## 3.3 Buttons

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| Button | - | | Buttons located on the front panel. | |
| *Elements* | | | | |
| .One | - | | | |
| .Two | - | | | |
| .Three | - | | | |
| .Four | - | | | |
| .Five | - | | | |
| .Six | - | | | |
| .Seven | - | | | |
| .Eight | - | | | |
| .X | - | | | |
| .Left | - | | | |
| .Up | - | | | |
| .Down | - | | | |
| .Right | - | | | |
| .O | - | | | |
| *Elements* | | | | |
| .Brightness | U8 | Write | 0 = Minimum/Off brightness<br>100 = Maximum brightness | |
| .Pressed | BOOL | Read | True = Button is pressed. | |

## 3.4 Analog Inputs

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| C1p05 | - | | 0. . . 5.25 V | **Note4** |
| *Elements* | | | | |
| .Voltage | U32 | Read | Analog in scaled [mV] | |

## 3.5 Multi Function Inputs (Ana/Dig)

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| C1p06 | - | | 0. . . 5.25 V<br>0. . . 36 V | **Note4** |
| C1p07 | - | | 0. . . 5.25 V<br>0. . . 36 V | **Note4** |
| *Elements* | | | | |
| .DigIn | BOOL | Read | Digital in<br>True = Active | |
| .Voltage | U32 | Read | Analog in scaled<br>[mV] | |
| .Bias | U16 | Write | 0 = No Pull Down, No Pull Up<br>Digital input activated when input voltage is higher than DigThresHigh<br>1 = Pull Up to 5 Volt<br>Digital input activated when input voltage is lower than DigThresLow<br>2 = Pull Down to GND Digital input activated when input voltage is higher than DigThresHigh<br>3 = Pull Down to GND and Pull Up to 5 Volt Digital input activated when input voltage is higher than DigThresHigh | **Note1** |
| .Range | U16 | Write | 0 = 0. . . 5.25 Volt range<br>1 = 0. . . 36 Volt range | **Note1** |
| .InputMode | U16 | Write | 0 = Normal Measurement Mode<br>1 = CAN Mode<br>Default value 1 | **Note1**<br>This value only applies to first input. If = 1 then Bias must be set to 0 |
| .DigThresLow | U32 | Write | Digital Input threshold Low [mV]<br>Default value 2000<br>This will define when DigIn goes from true to false when Bias= 0, 2 or 3.<br>This will define when DigIn goes from false to true when Bias= 1. | **Note1** |
| .DigThresHigh | U32 | Write | Digital Input threshold High [mV]<br>Default value 3000<br>This will define when DigIn goes from false to true when Bias= 0, 2 or 3.<br>This will define when DigIn goes from true to false when Bias= 1. | **Note1** |

Continued on next page

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| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| .Status | U16 | Read | **Bit0**<br>True = Bias Config Error<br>False = OK<br>**Bit1**<br>True = Range Config Error<br>False = OK<br>**Bit2**<br>True = Input Mode Config Error<br>False = OK | Bit0 = True if InputMode = 1 and Bias ≠ 0 |

## 3.6 Multi Function Inputs (Dig/Ana/Temp/Rheo/Freq/4-20mA)

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| C1p10 | - | | 0. . . 0.3675 V<br>0. . . 5.25 V<br>0. . . 36 V<br>0. . . 10 kΩ<br>0. . . 20 mA<br>0. . . 10 kHz<br>0. . . 64 s | **Note4**<br>Master/Slave when InputMode = 3 or 4 |
| C1p11 | - | | 0. . . 0.3675 V<br>0. . . 5.25 V<br>0. . . 36 V<br>0. . . 10 kΩ<br>0. . . 20 mA<br>0. . . 10 kHz<br>0. . . 64 s | **Note4**<br>Master/Slave when InputMode = 3 or 4 |
| *Elements* | | | | |
| .DigIn | BOOL | Read | Digital in<br>True = Active | Only valid when InputMode = 0, 3 or 4 |
| .Voltage | U32 | Read | Analog in scaled<br>[mV] | Only valid when InputMode = 0, 3 or 4 |
| .Current | U16 | Read | Analog in scaled<br>[$\mu$A] | Is set to 65535 when Bias $\neq$ 0 or Range $\neq$ 0 or InputMode $\neq$ 2. |
| .Resistance | U16 | Read | Analog in scaled<br>[Ω] | Is set to 65535 when Bias $\neq$ 0 or Range $\neq$ 0 or InputMode $\neq$ 1. Saturate at 10000 Ω. Is set to 65535 for much higher resistance (open circuit). |
| .Freq | U16 | Read | Frequency in scaled [Hz] | |
| .Per | U32 | Read | Period in scaled [0.1$\mu$s] | |
| .Count | U16 | Read | Number of measured counts since previous processing loop | |
| .Duty | U16 | Read | Positive duty cycle in scaled [0.01%] | |
| .QuadCount | S16 | Read | Number of measured counts since previous processing loop. Sign defines direction. | Only valid for first input when InputMode = 3 |
| .Phase | S32 | Read | Phase shift [0.1$\mu$s], sign defines direction. | Only valid for first input when InputMode = 4 |

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| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| .Bias | U16 | Write | 0 = No Pull Down, No Pull Up<br>Digital input activated when input voltage is higher than DigThresHigh<br>1 = Pull Up to 5 Volt<br>Digital input activated when input voltage is lower than DigThresLow<br>2 = Pull Down to GND Digital input activated when input voltage is higher than DigThresHigh<br>3 = Pull Down to GND and Pull Up to 5 Volt Digital input activated when input voltage is higher than DigThresHigh | **Note1** |
| .Range | U16 | Write | Config<br>0 = 0. . . 5.25 Volt range (middle range)<br>Thresholds when measuring frequency:<br>Rising Min/Max TBDV/TBDV<br>Falling Min/Max 0.96V/2.68V<br>1 = 0. . . 36 Volt range (high range)<br>Thresholds when measuring frequency:<br>Rising Min/Max 18.3V/26.8V<br>Falling Min/Max 6.50V/18.0V<br>2 = 0. . . 0.3675 Volt range (low range)<br>Thresholds when measuring frequency:<br>Rising Min/Max 0.191V/0.279V<br>Falling Min/Max 0.067V/0.187V<br>3 = N/A | **Note1** |
| .DigThresLow | U32 | Write | Digital Input threshold Low [mV]<br>Default value 2000<br>This will define when DigIn goes from true to false when Bias= 0, 2 or 3.<br>This will define when DigIn goes from false to true when Bias= 1. | **Note1** |
| .DigThresHigh | U32 | Write | Digital Input threshold High [mV]<br>Default value 3000<br>This will define when DigIn goes from false to true when Bias = 0, 2 or 3.<br>This will define when DigIn goes from true to false when Bias = 1. | **Note1** |
| .InputMode | U16 | Write | Config<br>0 = No additional measure mode<br>1 = Resistance mode<br>2 = Current mode<br>3 = Quad encoder enabled, result in .QuadCount<br>4 = Phase shift enabled, result in .Phase | **Note1**<br>**Note:** Bias and Range must be set to 0 when InputMode = 1 or 2. InputMode = 3 or 4 is only valid for first pin listed. |

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| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| .Status | U16 | Read | **Bit0**<br>True = Bias Config Error<br>False = OK<br>**Bit1**<br>True = Range Config Error<br>False = OK<br>**Bit2**<br>True = Input Mode Config Error<br>False = OK<br>**Bit3**<br>True = Over Current Error (Only possible if InputMode = 2)<br>False = OK | |
| .FreqStatus | U16 | Read | **Bit0**<br>True = ConfigError at .InputMode<br>False = Ok<br>**Bit1**<br>True = Over frequency error<br>False = Ok | Over frequency error indicates that the frequency and count related measurements are disabled because the input signal has been above 10 kHz. This is done in order to avoid using all CPU power for these measurements.<br>Use the .OverFreqReset variable to recover. |
| .OverFreqReset | BOOL | Write | True = Reset the frequency and count related measurements and recover from over frequency protection mode. | |

## 3.7 Multi Function Inputs (Ana/Dig) / 5V Sensor Power Measurement

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| C1p08 | - | | 0. . . 5.25 V<br>0. . . 36 V | |
| *Elements* | | | | |
| .DigIn | BOOL | Read | Digital in<br>True = Active | |
| .Voltage | U32 | Read | Analog in scaled<br>[mV] | |
| .Bias | U16 | Write | 0 = No Pull Down, No Pull Up<br>Digital input activated when input voltage is higher than DigThresHigh<br>1 = Pull Up to 5 Volt<br>Digital input activated when input voltage is lower than DigThresLow<br>2 = Pull Down to GND Digital input activated when input voltage is higher than DigThresHigh<br>3 = Pull Down to GND and Pull Up to 5 Volt Digital input activated when input voltage is higher than DigThresHigh | **Note1** |
| .Range | U16 | Write | 0 = 0. . . 5.25 Volt range<br>1 = 0. . . 36 Volt range | **Note1** |
| .InputMode | U16 | Write | 0 = Measurement Mode. The pin is a Ana/Dig Input.<br>1 = Sensor Power Mode. The pin is the sensor power output. Measurement is of Sensor Power. | **Note1** |
| .DigThresLow | U32 | Write | Digital Input threshold Low [mV]<br>Default value 2000<br>This will define when DigIn goes from true to false when Bias = 0, 2 or 3<br>This will define when DigIn goes from false to true when Bias = 1. | **Note1** |
| .DigThresHigh | U32 | Write | Digital Input threshold High [mV]<br>Default value 3000<br>This will define when DigIn goes from false to true when Bias= 0, 2 or 3.<br>This will define when DigIn goes from true to false when Bias = 1. | **Note1** |
| .Status | U16 | Read | **Bit0**<br>True = Bias Config Error<br>False = OK<br>**Bit1**<br>True = Range Config Error<br>False = OK<br>**Bit2**<br>True = Input Mode Config Error<br>False = OK | |

## 3.8 Digital Output

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| C1p12 | - | | | |
| *Elements* | | | | |
| .DigOut | BOOL | Write | True = Drive output to GND<br>False = High impedance | |
| .FeedBackCurrent | U32 | Read | Actual Value Current<br>[0.1 mA] | The current flowing into the pin when activated.<br>**Note:** Measurement has low accuracy. |
| .Status | U16 | Read | **Bit1**<br>True = Overload<br>False = OK | Overload indicates that the output is either switched off or toggling because the load current has been too high. |

## 3.9 Service Tool Access

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| ServiceTool | - | | | |
| *Elements* | | | | |
| .DisableRead | BOOL | Write | True = The Service Tool has no read access to the unit. | |
| .DisableWrite | BOOL | Write | True = The Service Tool has no write access to the unit. | |
| .DisableDownload | BOOL | Write | True = The Service Tool has no access to download any file to the unit. | |
| .Connect | BOOL | Read | True = The unit has received a Service Tool Command during the last execution loop. | |
| .MasterPassword | - | | | |
| *Elements* | | | | |
| .Read | U32 | Write | This value can be read by the Service Tool even if .DisableRead is True. | |
| .Write | U32 | Read | This value can be written to by the Service Tool even if .DisableWrite is True. It can also be read by the Service Tool even if .DisableRead is True. | |

## 3.10 ECU Information

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 = $\frac{1}{100}$s |
| .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, 0x0000, 0x0000, 0x0000, 0x0000, 0x0000, 0x0000, 0x0000, 0x0000, 0x0000, 0x0000, 0x0000, 0x0000, 0x0000, 0x0000, 0x0000, 0x0000, 0x0000, 0x0000, 0x0000, 0x0000, 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. | |
| .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. 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. | |
| .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 ProG is presented as {0x7250, 0x476F}. | |
| .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. | |

## 3.11 Clock Ticks

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| CK1S | BOOL | Read | Set during one processing loop every second. | **Note3** |
| CK60S | BOOL | Read | Set during one processing loop every minute. | **Note3** |

## 3.12 OS Measurements

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| OS | - | | | |
| *Elements* | | | | |
| .Reboot | BOOL | Write | True = Reboot the unit.<br>False = | A reboot will abort all pending CAN, application log, and non-volatile memory transactions. |
| .Start | BOOL | Read | Set during the first processing time. | |
| .LoopCnt | U32 | Read | Counter, increments by 1 every processing time. | |
| .ExecTime | U16 | Read | Processing time [ms] | |
| .ExecTimeOut | U16 | Write | Requested processing loop time [ms]<br>0. . . 400 | **Note1** |
| .ExecTimeWork | U16 | Read | Actual work time during processing time [ms] | |
| .ExecTimeAppl | U16 | Read | Actual time in application [ms] | |
| .ExecTimeGraph | U16 | Read | Actual time updating in graphics routines [ms] | |
| .ETime | U32 | Read | Time since power on [10ms] | |

## 3.13 LED

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| LED | - | | Enable both Red and Green to get an Amber color. | |
| *Elements* | | | | |
| .RedBrightness | U8 | Write | 0 = Minimum/Off brightness<br>100 = Maximum brightness | |
| .GreenBrightness | U8 | Write | 0 = Minimum/Off brightness<br>100 = Maximum brightness | |

## 3.14 Real Time Clock

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| RTC | - | | | Maximum time is 03:14:08 on 19 January 2038. |
| *Elements* | | | | |
| .Year | U16 | Bi-Directional | 2000. . . 2038 Real time clock year. | |
| .Month | U8 | Bi-Directional | 1. . . 12 Real time clock month | |
| .Day | U8 | Bi-Directional | 1. . . 28/29/30/31 Real time clock Day | |
| .DayOfWeek | U8 | Read | 0. . . 6 Real time clock week day<br>0 = Monday | Set automatically when the date is changed. |
| .Hour | U8 | Bi-Directional | 0. . . 23 Real time clock hours | |
| .Minute | U8 | Bi-Directional | 0. . . 59 Real time clock minute | |
| .Second | U8 | Bi-Directional | 0. . . 59 Real time clock second | |
| .Stop | BOOL | Write | True = Don't update OS-Variables<br>False = Read time from real time clock | |
| .Set | BOOL | Write | True = Write Date and Time to real time clock if RTC.Error is false | |
| .Status | U16 | Read | **Bit0**<br>True = Config Error<br>False = OK | |

## 3.15 Non-volatile Memory

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| NVMem | - | | | |
| *Elements* | | | | |
| .Status | U16 | Read | Status of Non Volatile memory after reset.<br>The status code is bit coded.<br>**Bit0**<br>True = The NVMem was restored to a previous state. This may happen when a store operation was aborted. For example due to power off.<br>**Bit1**<br>True = The NV Memory checksums are not correct. This may for instance occur the first boot up after a new application is downloaded, if the NV Memory usage is changed.<br>**Bit2**<br>True = The reset routine could not access the NV memory. For instance due to a hardware problem.<br>**Bit3. . . 15**<br>Reserved | |

## 3.16 Display

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| Display | - | | | |
| *Elements* | | | | |
| .Backlight | U8 | Write | 0 = Off<br>1 = Minimum brightness<br>100 = Maximum brightness<br>The brightness of the LCD backlight is automatically limited by the software to ensure the unit is not damaged if temperature exceeds the maximum allowable value. | |
| .Status | U16 | Read | Bit0<br>0 = OK<br>1 = Backlight is non-functional | |
| .Port | PORT | Read | A handle for the graphical 800x480 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. |

## 3.17 Diagnostic Identity

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| ID | - | | | |
| *Elements* | | | | |
| .Net[n] | - | | 0 = CAN[0]<br>1 = CAN[1] | |
| *Elements* | | | | |
| .Addr | U8 | Write | The net number.<br>Default settings:<br>CAN[0]: 0<br>CAN[1]: 1 | **Note1**<br>**Note2** |
| .Node | - | | | |
| *Elements* | | | | |
| .ServerAddr | U8 | Write | The node number of this unit.<br>Default setting: 238 | **Note1**<br>**Note2** |
| .ClientAddr | U8 | Read | The node number of the diagnostic tool (PC) | |

## 3.18 CAN Interfaces

**CAN[0]** is connected to the following pins:
C1p03- normal CAN bus - high
C1p04- normal CAN bus - low

**CAN[1]** is connected to the following pins:
C1p06- CAN bus - high
C1p07- CAN bus - low

**Note:** CAN[0] is connected to the same pins as CAN[0] in the PLUS+1 Microcontroller Family.

**Note:** CAN[0] can be used for diagnostics and for download. **Note:** CAN[0. . . 1] can be used for diagnostics and for download.

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| CAN[n] | - | | | |
| *Elements* | | | | |
| .Baudrate | U32 | Write | Bus baud rate<br>Supported Baud rates:<br>50000 = 50 kBd<br>100000 = 100 kBd<br>125000 = 125 kBd<br>250000 = 250 kBd<br>500000 = 500 kBd<br>1000000 = 1 MBd<br>Default setting:<br>250 kBd | **Note1**<br>An invalid value results in a fallback to the default baud rate. |
| .ErrorPassive | BOOL | Read | True = The CAN-controller is in error passive mode | |
| .BusOff | BOOL | Read | True = The CAN-controller is in Bus Off mode | |
| .Reset | BOOL | Write | True = Resets the CAN controller and recovers from Bus Off mode. | |
| .Overflow | BOOL | Read | True = The internal CAN message queue was full during the last execution loop. A message may have been lost. | |
| .Port | PORT | Read | A handler for the CAN port n, used as an input to a CAN symbol to select which CAN port to use. | |

## 3.19 Colors

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| Color | - | | | |
| *Elements* | | | | |
| .Transparent | COLOR | Read | The color to use when opening a transparent window | |

A color can also be specified by using components of the COLOR datatype.

### 3.19.1 How to Define a Color Constant

0xRRGGBB00
The row above is a hexadecimal value with the RR, GG and BB pairs each represent an 8 bit hexadecimal number (00. . . FF).
The RR, GG and BB pairs control the red, green respective blue color component on color displays.

Example: 0xFFFF0000 ⇒ Yellow

## 3.20 Video Input

This group contains variables that handle the video inputs. NTSC and PAL video formats are supported. Currently only one image may be displayed.

All settings of the Video are handled through the screen editor components. If always on top is requested (Overlay Mode), several additional conditions must also be met.

Due to hardware limitations on the platform, full screen video in overlay mode may not function as expected. The maximum resolution is application dependent. If the video is non-functional, this may be the cause. Try reducing the video resolution or switching to non-overlay (software) mode. Note that the software mode can reach near overlay performance if the number of other screen elements is small (recommended also to not use text on the video screen).

- Video area must be less than 240K (Width * Height) pixels.
- The entire image must be within the boundaries of the screen.
- Each dimension must be evenly divisible by eight.
- Each dimension must be scaled by a factor of 8 or less. (Width of 88 Pixels or more / Height of 64 Pixels or more)
- Rotation is only supported for multiples of 90° (i.e. 0°, 90°, 180° or 270°).
- Regardless of screen editor z-order the video image will always be rendered on top of the other graphics.

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| VideoIn | - | | | |
| *Elements* | | | | |
| .Status | U16 | Read | **Bit0**<br>True = Video hardware not available.<br>**Bit1**<br>True = Video signal not recognized. | |
| Power | - | | | |
| *Elements* | | | | |
| .DigOut | BOOL | Write | True = Turn on the video power supply. | |
| .VoltageMode | U16 | Write | Camera supply voltage on pin C3p02_C4p02<br>0 = 12V<br>1 = 24V | **Note1**<br>If an illegal value is set the configuration will fall back to the default value. |
| .Voltage | U32 | Read | Actual value voltage<br>[mV] | **Note4** |

## 3.21 Serial Port/USB Host

### 3.21.1 Serial Port/USB Host Configuration

The USB Host and RS232 functionality share pins on a single connector. USB device is always enabled.

If a USB device (e.g. a USB memory) is connected to C5p06_C5p07while C5p06_C5p07is configured in RS232 mode, the USB device may be damaged.

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| C5p06_C5p07 | - | | | |
| *Elements* | | | | |
| .Mode | U16 | Write | 0 = High impedance mode<br>1 = RS232 mode<br>2 = USB host mode | **Note1**<br>**Note:** If .Mode is set to 1 while a USB device is connected, the USB device may be damaged. |

### 3.21.2 Serial Port - RS-232

Serial port routines are available in asynchronous mode. This means for transmitting data that RS232.TxMsg.Len bytes of data from the buffer RS232.TxMsg are transmitted when RS232.TxMsg.Tx is set. For receiving data this means that bytes coming in on the serial port are put in the buffer RS232.RxMsg. The number of received bytes are stored in RS232.RxMsg.Len. RS232.RxMsg.Len can be zeroed by setting RS232.RxMsg.Clear. The data should be handled and the clear flag set before the length variable reach the maximum size of the data buffer to avoid loss of incoming data.

| BIOS-name | Variable Type | Variable Direction | Function, Scaling | Miscellaneous |
|---|---|---|---|---|
| | | | | |
| UART[n] | - | | n = 0 | |
| *Elements* | | | | |
| .Baudrate | U32 | Write | Bus baud rate<br>Supported Baud rates:<br>110 = 110 Bd<br>1200 = 1200 Bd<br>2400 = 2400 Bd<br>4800 = 4800 Bd<br>9600 = 9600 Bd<br>19200 = 19.2 kBd<br>38400 = 38.4 kBd<br>57600 = 57.6 kBd<br>115200 = 115.2 kBd<br>Default setting:<br>9600 Bd | **Note1**<br>An invalid value results in a fallback to the default baud rate. |
| .TwoStopBits | BOOL | Write | True = Two stop bits<br>False = One stop bit | **Note1** |
| .TxMsg | - | | | |
| *Elements* | | | | |
| .Len | U8 | Write | Tx Message length | |
| .Tx | BOOL | Write | True = Send message | |
| .Data | ARRAY[241]U8 | Write | Data buffer, n = 0. . . 240 | |
| .RxMsg | - | | | |
| *Elements* | | | | |
| .Rx | BOOL | Read | Data received during last processing time | |
| .Len | U8 | Read | Length of the received message | |
| .Data | ARRAY[128]U8 | Read | Data buffer, n = 0. . . 127 | |
| .Clear | BOOL | Write | True = Set RS232.RxMsg.Len to 0 | |

## 3.22 Application Log

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

# 4 Font Character Tables

Please contact Danfoss Power Solutions HELPDESK if problems arise when compiling projects created with old HWD versions.

# 5 Notes

## 5.1 Note1

This signal can use both symbols "Initialize Hardware Output" and "Hardware Output". "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.

## 5.2 Note2

Example:
You have set ID.Node.ServerAddr to 3 in your application and are using the default settings for ID.Net[n].Addr. If you connect your Service Tool to CAN[0] then you will read the identity 0,3 in the Service Tool. If you instead connect your Service Tool to CAN[1] you will read the identity 1,3 in the Service Tool.

## 5.3 Note3

Use Time and Date if long-term accuracy is important.

## 5.4 Note4

This signal may show higher values. The range is the narrowest calculated value based on component tolerances.

# 6 Miscellaneous

- All Scaling for inputs and outputs are theoretical values, for exact data see engineering specification for hardware.
- PLUS+1 GUIDE 7.1.7.0 or higher is required.

## 6.1 Supported PLUS+1 GUIDE Components

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

- Initialize Hardware Output
- Integer Sine
- Integer Cosine
- Integer Tangent
- Integer Arc Sine
- Integer Arc Cosine
- Integer Arc Tangent
- Integer Square Root
- Module Input
- Module Bus Input
- Module Bus Output
- Hardware Input/Output
- Hardware Input
- Read Output from Hardware
- Open Parameter Set
- Close Parameter Set
- Read-only Parameter Input with Namespace
- Read-only Parameter Input
- Accessrights History
- Accessrights Read
- Accessrights Write
- Transmit CAN
- Receive CAN with Filter
- Receive CAN with ID Mask
- Receive CAN Basic
- Non Volatile memory Dynamic with Default
- Non Volatile memory Dynamic
- Non Volatile memory Dynamic Input
- Access App Log Enable

- Disable Raw Applog data Readout
- Accessrights App Log Diagnostics
- Accessrights App Log Errors
- Accessrights App Log Others
- Array Constant from Binary File
- Repeat
- Until
- Get Time us
- Create Externally Defined Class
- Call Method Of Externally Defined Class
- Write Array to File
- Read Array from Application Log

## 6.2 Screen Editor/ Multi Language

Supported.

## 6.3 Diagnostic Data (PLG) in Target

Diagnostic Data (PLG file) is dynamic allocated in target FLASH memory,

## 6.4 ToolKey

"LOGKEY" Supported.

## 6.5 TimeBase

The following time bases are supported

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

## 6.6 Unit History

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

## 6.7 Read Only Parameters Support

This software supports Multiple Read Only Parameters.
131072 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 569 files can be used.

### 6.7.1 Needed Information for csv File

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

## 6.8 Application Log Support

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

The maximum size allocated for application log is 16777216 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 64 files for Linear Type and 32 files for Circular Type can be used.

### 6.8.1 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
- PWM outputs usage
- Graphic update
- OS.ExecTime - OS.ExecTimeWork (-OS.ExecTimeGraph)
- Non-Volatile memory access
- Array Constant from Binary File
- Multiple application log files accessed

## 6.9 Compiled Code Package Support

This software supports Compiled Code Package.
Use the CCP_SGL_2010Q1202 IDL type.

## 6.10 Removable storage media

This software supports USB mass storage devices with FAT16 or FAT32 formatted file systems.
**Note:** To prevent data corruption, do not remove the media before all the status bits, with the exception of the bad file name bit, turn clear of each and every Write Array to File symbol in the application.

## 6.11 Host Settings

In General the PLUS+1 Setup program does this.

## 6.12 Known Issues

See the revision history document included in the HWD.