

Digilent Adept Device Management (DMGT) Programmer's Reference Manual

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Introduction

This document describes the Digilent Adept Device Management (DMGT) subsystem for version 2 of the Digilent Adept software system. This document describes the capabilities of the DMGT subsystem and the API functions used to access its features.

The DMGT interface is used to control various global capabilities of Adept compatible devices. This includes such things as controlling or monitoring device power and device reset.

Device Management Capabilities

The DMGT interface allows software to determine which portions of the DMGT interface are supported by a given device. The following bits flags, defined in *dmgt.h*, are used to indicate support for a feature:

<code>mgtcapPowerOnOff</code>	The device supports turning power on or off via the DMGT interface
<code>mgtcapQueryPower</code>	The device supports querying the current power on/off state
<code>mgtcapMonitorPower</code>	The device supports querying the voltage, current, power and/or temperature of the power supplies on the board.
<code>mgtcapConfigReset</code>	Reset the configuration memory of programmable logic devices on the Adept compatible device.
<code>mgtcapQueryDone</code>	Query the configuration state of programmable logic devices on the Adept compatible device.
<code>mgtcapUserReset</code>	The device supports performing a remote device reset. This generally applies to resetting the user defined logic on a board featuring programmable logic devices.

Power Supply Monitor

The power supply monitor facility supports monitoring up to eight power supplies on the device. It is possible to query the voltage, current, power and/or temperature of each power supply. The number of power supplies and the specific quantities that can be measured are device specific. The *mgtcapMonitorPower* bit is set on devices that support some or all of the power supply monitor facility.

The following API functions are part of the power supply monitor facility:

- `DmgtGetPowerSupplyCount`
- `DmgtGetPowerSupplyProperties`
- `DmgtGetPowerSupplyData`
- `DmgtGetPowerSupplyLabels`

The following status bits are defined in the power supply status value returned by the DmgtGetPowerSupplyData function:

pwrMgtPowerOn	The power supply is turned on
pwrMgtVoltageFault	The power supply voltage is out of spec.
pwrMgtCurrentFault	The power supply has an over-current fault
pwrMgtTempFault	The power supply has an over-temperature fault

DMGT API Functions

The following API functions make up the DMGT interface.

DmgtGetVersion(char * szVersion)

Parameters:

szVersion - pointer to buffer to receive version string

This function returns a version number string identifying the version number of the DMGT DLL. The symbol cchVersionMax declared in dpcdecl.h defines the longest string that can be returned in *szVersion*.

DmgtGetManagementCapabilities(HIF hif, MGTCAP * pmgtcap)

Parameters:

hif - interface handle to the device
pmgtcap - pointer to variable to receive management capabilities bits

This function returns the bit vector of device management capabilities supported by the device.

DmgtPowerSwitch(HIF hif, BOOL fOn)

Parameters:

hif - interface handle to the device
fOn - power state to set for the device

This function allows remote control of the state of the power supplies on the device. Power to the device is turned on if *fOn* is TRUE and power is turned off if *fOn* is FALSE.

DmgtQueryPowerState(HIF hif, BOOL * pfPowerCur)

Parameters:

hif - interface handle to the device
pfPowerCur - pointer to variable to receive current power state of device

This function returns the current state of the power supply control on the device. The value returned in **pfPowerCur* will be TRUE if the power supplies are on and FALSE if not.

DmgtConfigReset(HIF hif, BOOL fReset)

Parameters:

hif - interface handle to the device
fReset - reset state to set for the device

This function allows remote reset of the configuration memory of a programmable logic devices on the Adept compatible device. The configuration memory is reset by setting the value of *fReset* to TRUE. This function should be called twice, once with *fReset* TRUE to reset the device configuration memory, then a second time with *fReset* FALSE to allow the configuration memory on the device to be reconfigured.

DmgtQueryDone(HIF hif, BOOL * pfState)*Parameters:*

hif	- interface handle to the device
pfState	- pointer to variable to receive done state

This function is used to query the configuration state of a programmable logic device on the Adept compatible device. Programmable logic devices that are dynamically configurable indicate that they have been successfully configured by asserting the 'done' state TRUE. The value returned in **pfState* will be TRUE if the logic device has been successfully configured, or FALSE if not.

DmgtUserReset(HIF hif, BOOL fReset)*Parameters:*

hif	- interface handle to the device
fReset	- reset state to set for the device

This function allows remote reset of the logic on the device. The exact meaning and behavior associated with the user reset operation is device dependent. See the documentation for the Adept compatible device.

The reset function on the device is implemented using a reset signal controlled by the communications interface (e.g. USB controller) on the board. This signal is driven low by passing TRUE for the value of *fReset*. The reset signal is put into the inactive state with a weak pull-up when the value for *fReset* is FALSE.

This function should be called twice, once with *fReset* TRUE to put the device into the reset state, and then a second time with *fReset* FALSE to allow the device to leave the reset state.

Power Supply Monitor Functions

DmgtGetPowerSupplyCount(HIF hif, INT32 * pcnt)

Parameters:

hif	- interface handle to the device
pcnt	- variable to receive number of monitored power supplies

This function returns the number of monitored power supplies on the specified device.

DmgtGetPowerSupplyData(HIF hif, INT32 idps, INT32 * pdwVlt, INT32 * pdwAmp, INT32 * pdwPwr, INT32 * pdwTmp, DWORD * pdwStatus)

Parameters:

hif	- interface handle to the device
idps	- power supply number
pdwVlt	- variable to receive voltage value
pdwAmp	- variable to receive current value
pdwPwr	- variable to receive power value
pdwTmp	- variable to receive temperature value
pdwStatus	- variable to receive power status value

This function returns the power supply data values for the requested power supply. The values returned are unsigned, dimensionless integer quantities giving the raw sample values taken from the converters in the sampling circuits. These values need to be multiplied by the conversion factors for the power supply to yield the actual measurement values.

A value of 0 will be returned for measurements not supported by the power supply.

The power supply status value is a bit vector indicating the status and/or fault states of the power supply. This will be made up of the bit-wise OR of the values defined above for power supply status. An Adept compatible device can have up to 8 monitored power supplies. The power supply status value is divided into eight 4-bit fields. Bits 0-3 give the status for power supply 0, bits 4-7 give the status for power supply 1, and so on. Refer to the documentation for a given device to find which particular status conditions are reported by the device.

A value of NULL can be passed for any of the pointers to indicate that the corresponding data value shouldn't be returned.

DmgtGetPowerSupplyProperties(HIF hif, INT32 idps, INT32 * pdwCnvVlt, INT32 * pdwCnvAmp, INT32 * pdwCnvPwr, INT32 * pdwCnvTmp)*Parameters:*

hif	- interface handle to the device
idps	- power supply number
pdwCnvVlt	- variable to receive voltage conversion factor
pdwCnvAmp	- variable to receive current conversion factor
pdwCnvPwr	- variable to receive power conversion factor
pdwCnvTmp	- variable to receive temperature conversion factor

This function returns the conversion factors for the specified power supply. This value is used to convert the quantities returned by the *DmgtGetPowerSupplyData* function into appropriately scaled values with the correct units. The conversion factor returned in *pdwCnvVlt* gives the number of microvolts corresponding to the least significant bit of the voltage sample value. Similarly, the conversion *pdwCnvAmp* factor yields micro-amps, the *pdwCnvPwr* conversion factor gives micro-watts, and the *pdwCnvTmp* conversion factor yields micro-degrees Kelvin.

A return value of 0 for a conversion factor indicates that that data value isn't available from the power supply monitor circuitry for the power supply.

If a particular conversion factor isn't needed, then a NULL pointer for the value causes it to not be returned.

DmgtGetPowerSupplyLabel(HIF hif, INT32 idps, char * szLabel)*Parameters:*

hif	- interface handle to the device
idps	- power supply number
szLabel	- buffer to receive power supply label string

This function will return a string that can be used to label/describe the specified power supply. The maximum size of the string that will be returned is defined by *cchMgtPowerLabelMax* declared in *dmgt.h*.

Some devices may not implement this function, in which case a NULL string will be returned.