

cardres

COLLABORATORS

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REVISION HISTORY

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Chapter 1

cardres

1.1 cardres.doc

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CardChangeCount()	CardResetRemove()	OwnCard()
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1.2 card.resource/BeginCardAccess

NAME

BeginCardAccess -- Called before you begin credit-card memory access

SYNOPSIS

```
result=BeginCardAccess( handle )
d0                                a1
```

```
BOOL BeginCardAccess( struct CardHandle * );
```

FUNCTION

This function should be called before you begin access to credit-card memory.

Its effect will depend on the type of Amiga machine your code happens to be running on. On some machines it will cause an access light to be turned ON.

INPUTS

handle - Same handle as that used when OwnCard() was called.

RETURNS

TRUE if you are still the owner of the credit-card, and memory access is permitted. FALSE if you are no longer the owner of the credit-card (usually indicating that the card was removed).

NOTES

This function may be called from within a task, or from a level 1 or level 2 interrupt.

It is highly recommended that you call this function before accessing credit-card memory, as well as checking the return value. If it is a return value of FALSE, you should stop accessing credit-card memory.

SEE ALSO

OwnCard(), EndCardAccess()

1.3 card.resource/CardAccessSpeed

NAME

CardAccessSpeed -- Select best possible memory access speed.

SYNOPSIS

```
result=CardAccessSpeed( handle, nanoseconds );  
d0                      a1          d0
```

```
ULONG CardAccessSpeed( struct CardHandle *, ULONG );
```

FUNCTION

This function is used to set memory access speed for all CPU accesses to card memory.

Typically this information would be determined by first examining the Card Information Structure.

Then you would use this function to let the card.resource select the best possible access speed for you, however note that the range of possible access speeds may vary on some machines (depending on the type of credit-card interface hardware being provided).

INPUTS

handle - Same handle as that used when OwnCard() was called.

nanoseconds - Preferred access speed in nanoseconds.

RETURNS

Speed - Access speed selected by resource (in nanoseconds).

0 - Not successful. Either because the credit-card was removed, or the access speed you requested is slower than that supported by the credit-card interface hardware.

NOTES

This function may be called from within a task, or from a level 1 or level 2 interrupt.

SEE ALSO

OwnCard()

1.4 card.resource/CardChangeCount

NAME

CardChangeCount -- Obtain card change count.

SYNOPSIS

```
count = CardChangeCount( VOID )
d0

ULONG CardChangeChange( VOID );
```

FUNCTION

This function returns the card change count. The counter is incremented by one for every removal, and for every successful insertion (a card which is inserted long enough to be debounced before it is removed again).

RESULT

The change count number.

NOTES

This function may be called from a task, or any level interrupt.

SEE ALSO

1.5 card.resource/CardForceChange

NAME

CardForceChange -- Force a card change.

SYNOPSIS

```
success = CardForceChange( VOID )
d0

BOOL CardForceChange( VOID );
```

FUNCTION

This function is not intended for general use. Its purpose is to force a credit-card change as if the user had removed, or inserted a card.

This function is intended to be used by a utility program which needs to force the current card owner to release ownership of the card, thereby allowing the utility an opportunity to own the credit-card.

RESULT

TRUE if the function succeeded, FALSE if card change is not allowed. This function will generally succeed, unless someone is using the card in reset remove mode at the time this function is called.

NOTES

This function should only be called from a task.

SEE ALSO

1.6 card.resource/CardInterface

NAME

CardInterface -- Determine the type of card interface.

SYNOPSIS

```
return = CardInterface()
d0
```

```
ULONG CardInterface( void );
```

FUNCTION

This function is used to determine the type of credit-card (hardware) interface available. For the most part the card.resource hides the hardware details from devices within its function calls. However should we need to provide a work-around because of differences, or limitations imposed by future interface hardware, this function must be used to identify which interface is available.

RETURN

A ULONG value as defined in card.h/i.

NOTES

In general only I/O devices (e.g., a device which interfaces with a modem card) would need to provide work-arounds, or alternative code. An example would be a change in the way interrupt requests from the card are handled. Specific details will be provided as need in the future. I/O devices) should abort properly if this function returns a value which is unknown.

Current implementations (see card.h/i) -

CARD_INTERFACE_AMIGA_0

The card slot can be configured for use as an I/O interface by using the CardMiscControl() function.

The card slot inhibits writes to cards which do not negate the WP status bit. This can be overridden by using the CardMiscControl() function.

Changes in the interrupt request line are latched by a gate-array, and have to be obtained via the status change mechanism provided when you call the OwnCard() function. The interrupt is cleared when you return from the status change interrupt. A level 2 interrupt is generated. The interrupt should also be cleared on the card at this time. The IRQ line is the same as the RDY/BSY line.

Changes in BVD1, WP, and RDY/BSY are also latched by the gate-array,

and are obtainable via the status change mechanism provided by the OwnCard() function. A level 2 interrupt is generated.

Changes in BVD2 (also used for digital audio) have to be monitored via polling. Generally this will cause no problem. Monitoring changes in BVD1 & BVD2 to monitor for low battery condition can be handled by a low priority tool which periodically checks the condition of both lines using the ReadCardStatus() function.

Some PC oriented eight (8) bit cards may require you read odd-byte I/O address registers at the corresponding even-byte address plus 64K. There is sufficient I/O address space provided that exceeding I/O address space should not be a problem.

Your code should wait at least 1 millisecond for Vpp to stabilize after voltage change (see CardProgramVoltage()).

SEE ALSO

CardMiscControl(), resources/card.i, resources/card.h

1.7 card.resource/CardMiscControl

NAME

CardMiscControl -- Set/Clear miscellaneous control bits

SYNOPSIS

```
control_bits=CardMiscControl( handle, control_bits );
d0                               a1                               d1
```

```
UBYTE CardMiscControl( struct CardHandle *, UBYTE );
```

FUNCTION

Used to set/clear miscellaneous control bits (generally for use with I/O cards).

INPUTS

handle - Same handle as that used when OwnCard() was called.

control_bits - A mask value of control bits to be turned on/off.

The bit values which might be usable are defined in card.h/i.

For example, to enable digital audio, and disable hardware write-protect (if supported), you would call this function with these values --

```
CARDF_DISABLE_WP|CARDF_ENABLE_DIGAUDIO
```

Then to turn off digital audio, but leave write-protect disable, you would use a value of --

```
CARDF_DISABLE_WP
```

Finally too reenable write protect, call this function with

a mask value of 0.

RETURNS

control_bits - The same mask value you called this function with if successful. If one, or more bits has been cleared in the return mask, this would indicate that the control bit is not being supported, or that the card has been removed by the user.

For example, if you called this function with a mask value of --

```
CARDF_DISABLE_WP|CARDF_ENABLE_DIGAUDIO
```

And this function returned a value of --

```
CARDF_DISABLE_WP
```

This would indicate that it is not possible to enable digital audio (most likely because this feature has not been implemented).

NOTES

This function may be called from within a task, or from a level 1 or level 2 interrupt.

!!!IMPORTANT!!!

You should ALWAYS try to enable digital audio for I/O cards as this will also configure the card socket for the I/O interface (if supported).

Not all cards will connect the write-enable line (e.g., some I/O cards). On some machines (e.g., the A600) it will not be possible to write to such cards unless you disable write-protection by using this function.

SEE ALSO

CardInterface(), resources/card.h, resources/card.i

1.8 card.resource/CardProgramVoltage

NAME

CardProgramVoltage -- Set programming voltage.

SYNOPSIS

```
success=CardProgramVoltage( handle, voltage );
                           al      d0
```

```
LONG CardProgramVoltage( struct CardHandle *, ULONG );
```

FUNCTION

Used to set programming voltages (e.g., for FLASH-ROM/EPROM cards).

INPUTS

handle - Same handle as that used when OwnCard() was called.

voltage - See card.i/h for valid values.

RETURNS

1 - Successful.

0 - Not successful. Most likely because the credit-card card has been removed, and you are no longer the owner.

-1 - This function is not being supported. On some machines with a minimal (hardware) credit-card interface, this feature may not be possible.

NOTES

This function may be called from within a task, or from a level 1 or level 2 interrupt.

!!!WARNING!!!

Flash-ROM programming requires careful coding to prevent leaving the Erase command on too long. Failure to observe the maximum time between the Erase command, and the Erase-Verify command can make a Flash-ROM card unusable. Some Flash-ROM cards may provide an internal watch-dog timer which protects the card.

Because of the relatively long time (e.g., 10ms) between Erase, and Erase-Verify which must be observed, the need for such critical timing can be problematic on a multi-tasking machine.

Vendors of Flash-ROM's recommend a high priority interrupt generated by a 10ms timer be used to turn off Erase. On the Amiga this can be accomplished by using a CIA-B interval timer. The timer.device also provides a mechanism for generating a low priority interrupt. The timer.device is easier to use than CIA interval timers, though not as accurate or as safe.

Even if the Flash-ROM card provides an internal watch-dog timer, implementation of the code during Erase should assume that the Flash-ROM does not.

SEE ALSO

OwnCard(), resources/card.h, resources/card.i

1.9 card.resource/CardResetCard

NAME

CardResetCard -- Reset credit-card.

SYNOPSIS

```
success=CardResetCard( handle );  
                        al
```

```
BOOL CardResetCard( struct CardHandle * );
```

FUNCTION

Used to reset a credit-card. Some cards, such as some configurable cards can be reset.

Asserts credit-card reset for at least 10us.

INPUTS

handle - Same handle as that used when OwnCard() was called.

RETURNS

TRUE - Successful.

FALSE - Not successful. Most likely because the credit-card card has been removed, and you are no longer the owner.

NOTES

This function may be called from within a task, or from a level 1 or level 2 interrupt.

IMPORTANT

It is the responsibility of the card owner to reset configurable cards, or any other type of card such as some I/O cards before calling ReleaseCard() if the owner has made use of that card such that it is no longer in its reset state (unless you are releasing the card because it has been removed).

If the card manufacturer indicates that a certain amount of time must elapse between end of reset, and completion of card initialization, you should wait at least that long before releasing the card (unless you are releasing the card because it has been removed).

SEE ALSO

OwnCard(), ReleaseCard()

1.10 card.resource/CardResetRemove

NAME

CardResetRemove -- Set/Clear reset on card removal.

SYNOPSIS

```
success=CardResetRemove( handle, flag );
                        al      d0
```

```
BOOL CardResetRemove( struct CardHandle *, ULONG );
```

FUNCTION

Used to set/clear HARDWARE RESET on card change detect.

This function should generally not be used by devices which support HOT-REMOVAL. HARDWARE RESET on removal is generally intended for execute-in-place software, or ram cards whose memory has been added as system ram.

INPUTS

handle - Same handle as that used when OwnCard() was called.

flag - TRUE if you want to SET HARDWARE RESET on credit card removal. FALSE if you want to CLEAR HARDWARE RESET.

RETURNS

1 - Success.

0 - Function failed (most likely because the card was removed by the user, and you are no longer the owner of the card).

-1 - This function is not being made available.

NOTES

This function should only be called from a task.

SEE ALSO

OwnCard()

1.11 card.resource/CopyTuple

NAME

CopyTuple -- Find/copy a credit card tuple.

SYNOPSIS

```
success = CopyTuple( CardHandle, buffer, tuplecode, size );  
d0              a1      a0      d1      d0
```

```
BOOL CopyTuple( struct CardHandle *, UBYTE *, ULONG, ULONG );
```

FUNCTION

This function scans credit-card memory for a tuple, and if found, copies it into a supplied buffer. The entire tuple (including the tuple code, and link) are copied to the supplied buffer. The number of bytes copied to the buffer will be 2 bytes, plus the argument "size", or the value in the tuple LINK field (whichever is SMALLER).

The software calling this function is responsible for examining the copy of the tuple (e.g., recognition of fields, recognition of stop bytes, etc. within the tuple).

This function does the best job it can to find a tuple in attribute, or common memory. It follows tuple chains, and skips odd bytes in attribute memory.

This function monitors for credit-card removal while reading data. If the credit-card is removed while a byte is being read, it will stop searching, and return FALSE.

This function does not protect against another task writing to credit-card memory while data is being read. The device

is responsible for single-threading reads/writes to the credit card as needed.

This function can be used to find multiple tuple codes; this is a very rare case, so the mechanism provided for doing so is unusual. See INPUTS below for more information.

This function does not read bytes within the body of any tuples except for the tuple you want copied, and the basic compatibility tuples this function understands (see list below).

On some machines this function may slow down memory access speed while reading the tuple chain. This is done to prevent potential problems on slow cards. By examining the CISTPL_DEVICE, and CISTPL_DEVICE_A tuples, you can determine the best possible memory access speed for the type of card inserted. Because memory access speed may be slowed down, calls to this function should be single-threaded.

The Card Information Structure must start with a CISTPL_DEVICE tuple stored as the first tuple in attribute memory. If not, this function will search for a CISTPL_LINKTARGET tuple stored at byte 0 of common memory. Therefore it is possible to store a CIS on cards which do not have any writeable attribute memory, though this may cause problems for other software implemented on other machines. For example, some SRAM cards do not come with writeable attribute memory, and/or some may have OPTIONAL EEPROM memory which may not have been initialized by the card manufacturer. While it could be argued that such cards do not conform to the PCMCIA PC Card Standard, such cards are cheaper, and therefore likely to be used.

INPUTS

CardHandle - Same handle as that used when OwnCard() was called.

buffer - Pointer to a buffer where the tuple will be copied.

The buffer should be at least as large as "size" + 8 (see use of "size" argument below). Therefore the minimum buffer size is 8 bytes. See NOTES below.

tuplecode - The tuple code you want to search for. This is a ULONG value. The upper 16 bits should be 0, or a number between 1-32K where a value of 0 means you want to find the first tuple match, a value of 1 the second, etc. For example -

0x41 means find the FIRST tuple equal to \$41.

((1<<16)|(0x41)) means find the SECOND tuple equal to \$41.

((2<<16)|(0x41)) means find the THIRD tuple equal to \$41.

size - The maximum number of bytes you want copied (not including the tuple code, and link). The actual number of bytes copied may be less than "size" if the tuple

link field is less than "size".

A size of 0 will result in only the tuple code, and link being copied to your buffer if the tuple is found.

If you do not care how many bytes are copied, any unsigned value of 255 or greater will do. In this case a maximum of 257 bytes might be copied to your buffer (if the tuple link field is the maximum of 255).

Other sizes are useful if you know the size of the tuple you want copied, or you know there are active registers stored within the tuple, and only want to copy a portion of a tuple.

RETURNS

TRUE if the tuple was found, and copied, else FALSE.
This function may also return false if the CIS is believed to be corrupt, or if the card is removed while reading the tuples.

NOTES

This function can be called multiple times (adjusting the "size" argument) to read a tuple of variable length, or unknown size.

Your supplied buffered is used by this function for working storage - the contents of it will be modified even if this function fails to find the tuple you want a copy of.

This function should NOT be used to find/copy tuples of type :

- CISTPL_LONGLINK_A
- CISTPL_LONGLINK_C
- CISTPL_NO_LINK
- CISTPL_LINKTARGET
- CISTPL_NULL
- CISTPL_END

These tuples are automatically handled for you by this function.

SEE ALSO

OwnCard()

1.12 card.resource/DeviceTuple

NAME

DeviceTuple -- Decode a device tuple

SYNOPSIS

```
return=DeviceTuple( tuple_data, storage)
                   a0          a1
```

```
ULONG DeviceTuple( UBYTE *, struct DeviceTData *);
```

FUNCTION

Extracts SIZE, TYPE, and SPEED from a device tuple (generally obtained with CopyTuple()).

INPUTS

tuple_data - Pointer to a CISTPL_DEVICE tuple (generally obtained with CopyTuple()).

storage - Pointer to a DeviceTData structure in which results are to be stored.

```
struct DeviceTData {
    ULONG   dtd_DTsize;           /* Size of card (bytes) */
    ULONG   dtd_DTspeed;         /* Speed in nanoseconds */
    UBYTE   dtd_DTtype;          /* Type of card          */
    UBYTE   dtd_DTflags;         /* Other flags           */
};
```

RETURN

SIZE (same as dtd_DTsize) if the Device Tuple could be decoded.
FALSE (0) if the tuple is believed to be invalid. The tuple is considered to be invalid if:

The tuple link value is 0.

The device type/speed byte is \$00, or \$FF.

The device type is DTYPE_EXTEND, which is undefined as of this writing.

The extended speed byte is a value which is undefined as of this writing.

The extended speed byte is extended again which is undefined as of this writing.

The device Size byte is \$FF.

NOTES

Some cards may not have a size specified in the device tuple. An example would be an I/O card. The size would be returned as one (1) in this case.

You should not call this function with a partial CISTPL_DEVICE tuple, or the return values may be junk.

SEE ALSO

CopyTuple(), resources/card.h, resources/card.i

1.13 card.resource/EndCardAccess

NAME

EndCardAccess -- Called at the end of credit-card memory access

SYNOPSIS

```
result=EndCardAccess( handle )
```

d0 a1

```
ULONG EndCardAccess( struct CardHandle * );
```

FUNCTION

This function should be called when you are done accessing credit-card memory.

Its effect will depend on the type of Amiga machine your code happens to be running on. On some machines it will cause an access light to be turned OFF in approximately 1/2 second.

On machines which support an access light, the light will automatically be turned off when you call `ReleaseCard()`.

INPUTS

handle - Same handle as that used when OwnCard() was called.

RETURNS

TRUE if you are still the owner of the credit-card. FALSE if you are no longer the owner of the credit-card (usually indicating the card was removed).

NOTES

This function may be called from within a task, or from a level 1 or level 2 interrupt.

It is highly recommended that you call this function after accessing credit-card memory, as well as checking the return value. If it is a return value of FALSE, you should stop accessing credit-card memory, and conclude that the card was removed before this function was called.

On some machines it is possible that the credit-card will be removed before you receive the removed interrupt.

SEE ALSO

OwnCard(), ReleaseCard(), BeginCardAccess()

1.14 card.resource/GetCardMap

NAME _____

GetCardMap -- Obtain pointer to CardMemoryMap structure

SYNOPSIS

```
pointer=GetCardMap()  
d0
```

```
struct CardMemoryMap *GetCardMap( void );
```

FUNCTION

Obtain pointer to a CardMemoryMap structure. The structure is READ only.

Devices should never assume credit-card memory appears at any particular place in memory. By using this function to obtain pointers to the base memory locations of the various credit-card memory types, your device will continue to work properly should credit cards appear in different memory locations in future hardware.

RETURNS

Pointer to CardMemoryMap structure -

```
struct CardMemoryMap {
    UBYTE    *cmm_CommonMemory;
    UBYTE    *cmm_AttributeMemory;
    UBYTE    *cmm_IOMemory;
};
```

NOTES

If any pointer in the structure is NULL, it means this type of credit-card memory is not being made available.

SEE ALSO

resources/card.h, resources/card.i

1.15 card.resource/IfAmigaXIP

NAME

IfAmigaXIP -- Check if a card is an Amiga execute-in-place card.

SYNOPSIS

```
result=IfAmigaXIP( handle )
d0                                a2

struct Resident *IfAmigaXIP( struct CardHandle * );
```

FUNCTION

Check to see if a card in the slot is an Amiga execute-in-place card. The Card Information Structure must have a valid CISTPL_AMIGAXIP tuple.

Tuples can be treated like structures. The format of a CISTPL_AMIGAXIP tuple is -

```
struct TP_AmigaXIP {
    UBYTE    TPL_CODE;
    UBYTE    TPL_LINK;
    UBYTE    TP_XIPLOC[4];
    UBYTE    TP_XIPFLAGS;
    UBYTE    TP_XIPRESRV;
};
```

The TPL_CODE field must be equal to CISTPL_AMIGAXIP (0x91).

The TPL_LINK field must be equal to the length of the body

of a CISTPL_AMIGAXIP tuple (0x06).

The TP_XIPLOC array is the memory location of your ROM-TAG stored in little-endian order. This value is stored as an "offset" into common memory as is the standard for storing 32 bit bit pointers in tuples.

For example, a pointer to a ROM-TAG stored at an offset of 0x00000200 would be stored as four bytes like so:

0x00, 0x02, 0x00, 0x00

Currently credit-card common memory is mapped starting at memory location 0x600000. Because a ROM-TAG is used, it is implied that execute-in-place code can be compiled/linked to use absolute references. It is believed that most developers will not want to have to write pc-relative code only.

The TP_XIPFLAGS field is treated as a set of flag bits. See card.i/h for defined bits. All undefined bits MUST be 0.

The TP_XIPRESRV field must be 0 for now.

The system polls for cards which have a CISTPL_AMIGAXIP tuple at the same time that it searches for devices to boot off. When a card with a valid CISTPL_AMIGAXIP tuple is found, the system will call your ROM-TAG via Exec's InitResident() function.

The system examines the return code from InitResident(). A NULL return in D0 means you are done with the card, and it can be removed by the user. A successful return indicates you are still using the card. Some programs (e.g., some games) may never return. The only requirement is that if you do return, you must leave the system in a "good" state (including returning most of, or all the memory you allocated). The standard convention for preserving registers apply.

Note that your execute-in-place code will not be called a second time, unless you have returned a non-successful result. In this case your execute-in-place code MUST assume the user can remove, and insert your card again. There are a variety of ways to check for re-insertion (e.g., search for a message port, device, library, task, etc., that you created).

Note that your execute-in-place code runs in an environment similar to boot block games; before DOS has been initialized!

Your execute-in-place code should NOT try to initialize DOS because DOS requires a suitable disk-like device be at the head of the expansion base mountlist to boot off.

If you need DOS, it is possible to boot off a credit-card using carddisk.device. Such cards will require a valid CISTPL_DEVICE tuple, and CISTPL_FORMAT tuple. A portion

of the card can be used for a minimal number of data blocks like the method described above.

However this method is not recommended, though it is anticipated that some developers will have thought of, and used this method anyway. If you must do this, at least use the `CardHandle` returned by `OwnCard()` to set hardware reset on removal else the machine will likely crash anyway if the card is removed while your execute-in-place code is running.

RETURNS

Pointer to a ROM-TAG on the card, or `NULL` indicating that:

- o The card does not meet the above requirements, or
- o The card has been removed, or
- o You are not the owner of the credit-card.

NOTES

This function is being made public so developers can test test that their execute-in-place credit-cards meet the requirements for an Amiga execute-in-place card. In general there is no reason for devices, or applications to use this function.

Amiga execute-in-place software is identified via a tuple code reserved for manufacturer specific use, therefore the manufacturer of the card may freely use the `CISTPL_VERS_1`, or `CISTPL_VERS_2` tuples to place identification information on the credit-card.

No attempt has been made to make use of the MS-DOS execute-in-place method; it is believed that most manufacturers of Amiga execute-in-place software will prefer a simple, and small scheme for running their execute-in-place code.

SEE ALSO

`OwnCard()`, `resources/card.h`, `resources/card.i`

1.16 card.resource/OwnCard

NAME

`OwnCard` -- Own credit card registers, and memory

SYNOPSIS

```
return = OwnCard( handle )
d0          a1

struct CardHandle *OwnCard( struct CardHandle * );
```

FUNCTION

This function is used to obtain immediate, or deferred ownership of a credit-card in the credit-card slot.

Typically an `EXEC STYLE DEVICE` will be written to interface between an application, and a credit card in the slot. While applications, and libraries can attempt to own a credit-card

in the card slot, the rest of this documentation assumes a device interface will be used.

Because credit-cards can be inserted, or removed by the user at any time (otherwise known as HOT-INSERTION, and HOT-REMOVAL), the card.resource provides devices with a protocol which lets many devices bid for ownership of a newly inserted card.

In general, devices should support HOT-REMOVAL, however there are legitimate cases where HOT-REMOVAL is not practical. For these cases this function allows you to own the resource using the CARDB_RESETRMOVE flag. If the card is removed before your device calls ReleaseCard(), the machine will RESET.

INPUTS

handle - pointer to a CardHandle structure.

```
struct CardHandle {
    struct Node          cah_CardNode;
    struct Interrupt     *cah_CardRemoved;
    struct Interrupt     *cah_CardInserted;
    struct Interrupt     *cah_CardStatus;
    UBYTE               cah_CardFlags;
};
```

The following fields in the structure must be filled in by the application before calling OwnCard() -

cah_CardNode.ln_Pri -

See table below. The Node field is used by the resource to add your handle to a sorted list of CardHandle structures. This list is used by the resource to notify devices when the device owns the credit-card.

Your device will only be notified (at most) one time per card insertion, and perhaps less often if some higher priority device on the notification list retains ownership of a card in the slot.

Priority	Comments

>= 21	Reserved for future use
10-20	To be used by third party devices (e.g., I/O CARD manufacturers) which look for specific card tuples to identify credit-cards.
01-19	Reserved for future use
00	To be used by general purpose devices which have loose card specification requirements.
<= -1	Reserved for future use

cah_CardNode.ln_Type -

Must be set to 0 for now. This field may be used in the future to identify an extended CardHandle structure.

cah_CardNode.ln_Name -

Must be initialized to NULL, or name of device which owns this structure.

cah_CardRemoved -

Pointer to an initialized interrupt structure. Only the is_Data, and is_Code fields need to be initialized. This is the interrupt code which will be called when a credit-card which your device owns is removed. Once you receive this interrupt, all credit-card interface control registers are reset (e.g., programming voltage, access speed, etc.), and you should stop accessing the card as soon as possible.

Because your code is called on interrupt time, you should do the least amount possible, and use little stack space.

This pointer can be NULL if you have asked for reset on card-removal, and you never turn reset off.

cah_CardInserted -

Pointer to an initialized interrupt structure. Only the is_Data, and is_Code fields need to be initialized. This is the code which will be called when your CardHandle owns the credit-card in the slot.

Note that your code may be called on the context of an interrupt, or a task in FORBID, therefore you should do the least amount possible, and use little stack space.

Note that it is possible to receive a card removed interrupt immediately before you receive this interrupt if the card is removed while your CardInserted interrupt is being called.

Your device owns the credit-card until the card is manually removed by the user, or you release the card by calling ReleaseCard().

Your device should examine the card in the slot (e.g., look for specific tuples), and decide if the card is of a type your device understands.

If not, release ownership of the card by calling ReleaseCard() so that other devices will be given a chance to examine the current card in the credit-card slot.

cah_CardStatus -

Pointer to an initialized interrupt structure. Only the

is_Data, and is_Code fields need to be initialized.

Note that your code will be called on the context of an interrupt, therefore you should do the least amount possible, and use little stack space.

Note that it is possible to receive a card removed interrupt immediately before you receive this interrupt if the card is removed during this interrupt.

If this pointer is NULL, you will not receive card status change interrupts.

Your interrupt code will be called with a mask value in register D0, and a pointer to your data in A1.

The mask value in D0 can be interpreted using the same bit definitions returned by ReadCardStatus(). Note that more than one bit may be set, and the mask only tells you what has changed, not the current state.

Use ReadCardStatus() if you need to determine the current state of the status bits.

Not all status change interrupts will necessarily be enabled on all systems. For example, on some systems BVD2/DA status change interrupts will not be enabled so that digital audio can occur without generating many interrupts. Status change interrupts are typically meant to be used for monitoring BSY/IRQ, WR, and BVD1/SC. Battery voltage low detection would best be done by a separate utility which periodically polls BVD1 & BVD2 by using the ReadCardStatus() function.

Typically the mask value in D0 MUST be returned unchanged on exit from your code. The return value in D0 is then used to clear the source(s) of the interrupt.

In the rare case that you need to keep a status change interrupt active, clear the appropriate bit(s) in D0 before returning via RTS. Clear no bits other than those defined as valid bits for ReadCardStatus()!

cah_CardFlags -

Optional flags (all other bits must be 0).

- CARDB_RESETPREMOVE means you want the machine to reset if the credit-card in the slot is removed while you own the credit-card.
- CARDB_IFAVAILABLE means you only want ownership of the credit-card in the slot if it is immediately available.

If it is available, your CardHandle structure will be added to a list so that you can be notified via an interrupt when

the credit-card is removed by the user.

If the credit-card is not immediately available (either because there is no credit-card in the slot, or because some other device owns the credit-card), your CardHandle structure will NOT be added to the notification list.

- CARDB_DELAYOWNERSHIP means you never want a successful return from OwnCard() even if the credit-card is available. Rather you will be notified of ownership via your cah_CardInserted interrupt. If you use this flag, OwnCard() will always return -1. This flag cannot be used with the CARDB_IFAVAILABLE flag.

ALL other fields are used by the resource, and no fields in the structure may be modified while the structure is in use by the resource. If you need to make changes, you must remove your CardHandle (see ReleaseCard()), make the changes, and then call OwnCard() again.

RESULTS

- 0 - indicates success, your device owns the credit card.
- 1 - indicates that the card cannot be owned (most likely because there is no card in the credit card slot).
- ptr - indicates failure. Returns pointer to the CardHandle structure which owns the credit card.

NOTES

This function should only be called from a task.

CardHandle interrupts are called with a pointer to your data in A1, and a pointer to your code in A5. With the exception of status change interrupts, D0-D1, A0-A1, and A5-A6 may be treated as scratch registers. Status change interrupts are also called with meaningful data in D0, and expect D0 be preserved upon RTS from your code. No other registers are guaranteed to contain initialized data. All other registers must be preserved.

SEE ALSO

ReleaseCard(), ReadCardStatus(), resources/card.i, resources/card.h

1.17 card.resource/ReadCardStatus

NAME

ReadCardStatus -- Read credit card status register

SYNOPSIS

```
status=ReadCardStatus()
d0
```

```
UBYTE ReadCardStatus( void );
```

FUNCTION

Returns current state of the credit card status register.

See `card.h/i` for bit definitions.

Note that the meaning of the returned status bits may vary depending on the type of card inserted in the slot, and mode of operation. Interpretation of the bits is left up to the application.

RETURNS

A UBYTE value to be interpreted as status bits.

NOTES

This function may be called from within a task, or from any level interrupt.

SEE ALSO

`resources/card.h`, `resources/card.i`

1.18 `card.resource/ReleaseCard`

NAME

`ReleaseCard` -- Release ownership of credit card

SYNOPSIS

```
ReleaseCard( handle, flags )
             a1      d0
```

```
void ReleaseCard( struct CardHandle *, ULONG );
```

FUNCTION

This function releases ownership of the credit card in the slot.

The access light (if any) is automatically turned off (if it was turned on) when you release ownership of a card you owned, and all credit-card control registers are reset to their default state.

You must call this function if -

You own the credit-card, and want to release it so that other devices on the notification list will have a chance to examine the credit-card in the card slot.

You took a Card Removed interrupt while you owned the credit-card. If so, you **MUST** call this function, else no other task will be notified of newly inserted cards. On some machines the credit-card interface hardware may also be left disabled until you respond to the card removed interrupt by calling this function.

You want to remove yourself from the notification list (see optional flags below).

INPUTS

handle - Same handle as that used when OwnCard() was called.

flags - Optional flags.

- CARDB_REMOVEHANDLE means you want remove your CardHandle structure from the notification list whether or not you currently own the credit-card in the card slot. The node structure in your CardHandle will be removed from the notification list, and ownership will be released if you were the owner of the card.

NOTES

This function should only be called from a task.

SEE ALSO

OwnCard(), resources/card.i, resources/card.h