

serial

COLLABORATORS

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Chapter 1

serial

1.1 serial.doc

```
AbortIO()
BeginIO()
CloseDevice()
CMD_CLEAR
CMD_FLUSH
CMD_READ
CMD_RESET
CMD_START
CMD_STOP
CMD_WRITE
OpenDevice()
SDCMD_BREAK
SDCMD_QUERY
SDCMD_SETPARAMS
```

1.2 serial.device/AbortIO

NAME

```
AbortIO(ioRequest) -- abort an I/O request
A1
```

FUNCTION

This is an exec.library call.

This function attempts to aborts a specified read or write request. If the request is active, it is stopped immediately. If the request is queued, it is painlessly removed. The request will be returned in the same way any completed request it.

After AbortIO(), you must generally do a WaitIO().

INPUTS

```
ioRequest -- pointer to the IORequest Block that is to be aborted.
```

RESULTS

io_Error -- if the Abort succeeded, then io_Error will be #IOERR_ABORTED (-2) and the request will be flagged as aborted (bit 5 of io_Flags is set). If the Abort failed, then the Error will be zero.

BUGS

Previous to version 34, the serial.device would often hang when aborting CTS/RTS handshake requests. This was the cause of the incorrect assumption that AbortIO() does not need to be followed by a wait for a reply (or a WaitIO()).

1.3 serial.device/BeginIO

NAME

BeginIO(ioRequest), deviceNode -- start up an I/O process
A1 A6

FUNCTION

This is a direct function call to the device. It is intended for more advanced programmers. See exec's DoIO() and SendIO() for the normal method of calling devices.

This function initiates a I/O request made to the serial device. Other than read or write, the functions are performed synchronously, and do not depend on any interrupt handling logic (or it's associated discontinuities), and hence should be performed as IO_QUICK.

With some exceptions, reads and writes are merely initiated by BeginIO, and thusly return to the caller as begun, not completed. Completion is signalled via the standard ReplyMsg routine. Multiple requests are handled via FIFO queueing.

One exception to this non-QUICK handling of reads and writes is for READS when:

- IO_QUICK bit is set
- There are no pending read requests
- There is already enough data in the input buffer to satisfy this I/O Request immediately.

In this case, the IO_QUICK flag is not cleared, and the request is completed by the time it returns to the caller. There is no ReplyMsg or signal bit activity in this case.

INPUTS

ioRequest -- pointer to an I/O Request Block of size io_ExtSerSize (see serial.i for size/definition), containing a valid command in io_Command to process, as well as the command's other required parameters.
deviceNode -- pointer to the "serial.device", as found in the IO_DEVICE of the ioRequest.

RESULTS

io_Error -- if the BeginIO succeeded, then Error will be null. If the BeginIO failed, then the Error will be non-zero. I/O errors won't be reported until the io completes.

SEE ALSO

devices/serial.h

1.4 serial.device/CloseDevice

NAME

CloseDevice -- close the serial port

SYNOPSIS

```
CloseDevice(deviceNode)
           A1
```

FUNCTION

This is an exec call that terminates communication with the serial device. Upon closing, the device's input buffer is freed.

Note that all IORequests MUST be complete before closing. If any are pending, your program must AbortIO() then WaitIO() to complete them.

INPUTS

deviceNode - pointer to the device node, set by Open

SEE ALSO

serial.device/OpenDevice()

1.5 serial.device/CMD_CLEAR

NAME

Clear -- clear the serial port buffers

FUNCTION

This command resets the serial port's read buffer pointers.

IO REQUEST

| | |
|------------|--------------------------|
| io_Message | mn_ReplyPort initialized |
| io_Device | set by OpenDevice |
| io_Unit | set by OpenDevice |
| io_Command | CMD_CLEAR |

RESULTS

Error -- If the Clear succeeded, then io_Error will be null.
If the Clear failed, then the io_Error will be non-zero.

1.6 serial.device/CMD_FLUSH

NAME

Flush -- clear all queued I/O requests for the serial port

FUNCTION

This command purges the read and write request queues for the serial device. Flush will not affect active requests.

```

IO REQUEST
  io_Message      mn_ReplyPort initialized
  io_Device       set by OpenDevice
  io_Unit         set by OpenDevice
  io_Command      CMD_FLUSH

```

```

RESULTS
  Error -- if the Flush succeeded, then io_Error will be null.
          If the Flush failed, then the io_Error will be non-zero.

```

1.7 serial.device/CMD_READ

```

NAME
  Read -- read input from serial port

```

```

FUNCTION
  This command causes a stream of characters to be read in from
  the serial port buffer. The number of characters is specified
  in io_Length.

```

The Query function can be used to check how many characters are currently waiting in the serial port buffer. If more characters are requested than are currently available, the ioRequest will be queued until it can be satisfied.

The best way to handle reads is to first Query to get the number of characters currently in the buffer. Then post a read request for that number of characters (or the maximum size of your buffer).

If zero characters are in the buffer, post a request for 1 character. When at least one is ready, the device will return it. Now start over with another Query.

Before the program exits, it must be sure to AbortIO() then WaitIO() any outstanding ioRequests.

```

IO REQUEST
  io_Message      A mn_ReplyPort is required
  io_Device       set by OpenDevice
  io_Unit         set by OpenDevice
  io_Command      CMD_READ
  io_Flags        If the IOB_QUICK bit is set, read will try
to complete the IO quickly
  io_Length       number of characters to receive.
  io_Data         pointer to buffer

```

```

RESULTS
  Error -- if the Read succeeded, then io_Error will be null.
          If the Read failed, then io_Error will be non-zero.
  io_Error will indicate problems such as parity mismatch,
  break, and buffer overrun.

```

SEE ALSO

```
serial.device/SDCMD_QUERY  
serial.device/SDCMD_SETPARAMS
```

BUGS

Having multiple outstanding read IORequests at any one time will probably fail.

Old documentation mentioned a mode where `io_Length` was set to `-1`. If you want a NULL terminated read, use the `io_TermArray` instead.

1.8 serial.device/CMD_RESET

NAME

Reset -- reinitializes the serial port

FUNCTION

This command resets the serial port to its freshly initialized condition. It aborts all I/O requests both queued and current, relinquishes the current buffer, obtains a new default sized buffer, and sets the port's flags and parameters to their boot-up time default values. The functions places the reset parameter values in the `ioRequest` block.

IO REQUEST

| | |
|-------------------------|---------------------------------------|
| <code>io_Message</code> | <code>mn_ReplyPort</code> initialized |
| <code>io_Device</code> | set by <code>OpenDevice</code> |
| <code>io_Unit</code> | set by <code>OpenDevice</code> |
| <code>io_Command</code> | <code>CMD_RESET</code> |

RESULTS

Error -- if the Reset succeeded, then Error will be null.
If the Reset failed, then the Error will be non-zero.

1.9 serial.device/CMD_START

NAME

Start -- restart paused I/O over the serial port

FUNCTION

This function restarts all current I/O on the serial port by sending an xON to the "other side", and submitting a "logical xON" to "our side", if/when appropriate to current activity.

IO REQUEST

| | |
|-------------------------|---------------------------------------|
| <code>io_Message</code> | <code>mn_ReplyPort</code> initialized |
| <code>io_Device</code> | set by <code>OpenDevice</code> |
| <code>io_Unit</code> | set by <code>OpenDevice</code> |
| <code>io_Command</code> | <code>CMD_START</code> |

RESULTS

SEE ALSO

serial.device/CMD_STOP

1.10 serial.device/CMD_STOP

NAME

Stop -- pause all current I/O over the serial port

FUNCTION

This command halts all current I/O on the serial port by sending an xOFF to the "other side", and submitting a "logical xOFF" to "our side", if/when appropriate to current activity.

IO REQUEST

| | |
|------------|--------------------------|
| io_Message | mn_ReplyPort initialized |
| io_Device | set by OpenDevice |
| io_Unit | set by OpenDevice |
| io_Command | CMD_STOP |

RESULTS

SEE ALSO

serial.device/CMD_START

1.11 serial.device/CMD_WRITE

NAME

Write -- send output to serial port

FUNCTION

This command causes a stream of characters to be written out the serial port. The number of characters is specified in io_Length, unless -1 is used, in which case output is sent until a null(0x00) is encountered.

IO REQUEST

| | |
|------------|---|
| io_Message | must have mn_ReplyPort initialized |
| io_Device | set by OpenDevice |
| io_Unit | set by OpenDevice |
| io_Command | CMD_WRITE |
| io_Flags | Set IOF_QUICK to try quick I/O |
| io_Length | number of characters to transmit, or if set to -1 transmit until null encountered in buffer |
| io_Data | pointer to block of data to transmit |

RESULTS

Error -- if the Write succeeded, then io_Error will be null.
If the Write failed, then the io_Error will be non-zero.

SEE ALSO

serial.device/SDCMD_SETPARAMS

1.12 serial.device/OpenDevice

NAME

OpenDevice -- Request an opening of the serial device.

SYNOPSIS

```
error = OpenDevice("serial.device", unit, ioRequest, flags)
D0                A0                D0    A1                D1
```

```
BYTE OpenDevice(STRPTR, ULONG, struct IOExtSer *, ULONG);
```

FUNCTION

This is an exec call. Exec will search for the serial.device, and if found, will pass this call on to the device.

Unless the shared-access bit (bit 5 of io_SerFlags) is set, exclusive use is granted and no other access to that unit is allowed until the owner closes it. All the serial-specific fields in the ioRequest are initialized to their most recent values (or the Preferences default, for the first time open).

If support of 7-wire handshaking (i.e. RS232-C CTS/RTS protocol) is required, use the serial.device/SDCMD_SETPARAMS command.

This feature should also be specified at initial OpenDevice() time.

INPUTS

"serial.device" - pointer to literal string "serial.device"
 unit - Must be zero, or a user settable unit number.
 (This field is used by multiple port controllers)
 Zero specifies the default serial port.
 ioRequest - pointer to an ioRequest block of size io_ExtSerSize
 to be initialized by the serial.device.
 (see devices/serial.h for the definition)
 NOTE use of io_SerFlags (see FUNCTION above)
IMPORTANT: The ioRequest block **MUST** be of size io_ExtSerSize,
 and zeroed (with the exeptions as noted)!
 flags - Must be zero for future compatibility

RESULTS

D0 - same as io_Error
 io_Error - If the Open succeeded, then io_Error will be null.
 If the Open failed, then io_Error will be non-zero.
 io_Device - A pointer to whatever device will handle the calls
 for this unit. This pointer may be different depending
 on what unit is requested.

BUGS

If 7-wire handshaking is specified, a timeout "feature" is enabled. If the device holds off the computer for more than about 30-60 seconds, the device will return the write request with the error SerErr_TimerErr. Don't depend on this, however. If you want a timeout, set up the timer.device and wait for either timer, or serial IO to complete.

On open, the serial.device allocates the misc.resource for the serial port. It does not return it until the serial.device is

expunged from memory. It should return it when no more openers exist. This code can force a specified device to try and expunge. Of course, if the device is in use nothing will happen:

```
#include "exec/types.h"
#include "exec/execbase.h"
#include "proto/exec.h"

void FlushDevice(char *);
extern struct ExecBase *SysBase;

void main()
{
    FlushDevice("serial.device"); /* or parallel.device */
}

/*
 * Attempts to flush the named device out of memory.
 * If it fails, no status is returned; examination of
 * the problem will reveal that information has no
 * valid use after the Permit().
 */
void FlushDevice(name)
char *name;
{
    struct Device *result;

    Forbid();
    if( result=(struct Device *)FindName(&SysBase->DeviceList,name) )
        RemDevice(result);
    Permit();
}

SEE ALSO
serial.device/CloseDevice()
serial.device/SDCMD_SETPARAMS
devices/serial.h
```

1.13 serial.device/SDCMD_BREAK

NAME

Break -- send a break signal over the serial line

FUNCTION

This command sends a break signal (serial line held low for an extended period) out the serial port. For the built-in port, This is accomplished by setting the UARTBRK bit of register ADKCON.

After a duration (user specifiable via setparams, default 250000 microseconds) the bit is reset and the signal discontinued. If the QUEUEDBRK bit of io_SerFlags is set in the io_Request block, the request is placed at the back of the write-request queue and executed in turn. If the QUEUEDBRK bit is not set, the break is started immediately, control returns to the

caller, and the timer discontinues the signal after the duration is completed. Be aware that calling BREAK may affect other commands such as ABORT, FLUSH, STOP, START, etc...

IO REQUEST

```
io_Message      mn_ReplyPort initialized
io_Device       set by OpenDevice
io_Unit         set by OpenDevice
io_Command      SDCMD_BREAK
io_Flags        set/reset IO_QUICK per above description
```

RESULTS

Error -- if the Break succeeded, then Error will be null.
If the Break failed, then the Error will be non-zero.

1.14 serial.device/SDCMD_QUERY

NAME

Query -- query serial port/line status

FUNCTION

This command return the status of the serial port lines and registers. The number of unread bytes in the serial device's read buffer is shown in io_Actual.

The break send & received flags are cleared by a query, and whenever a read IORequest is returned with a error in io_Error.

IO REQUEST

```
io_Message      mn_ReplyPort initialized
io_Device       preset by OpenDevice
io_Unit         preset by OpenDevice
io_Command      SDCMD_QUERY
```

RESULTS

| io_Status | BIT | ACTIVE | FUNCTION |
|-----------|-----|--------|--|
| LSB | 0 | --- | reserved |
| | 1 | --- | reserved |
| | 2 | high | parallel "sel" on the A1000 On the A500 & A2000, "sel" is also connected to the serial port's "Ring Indicator". Be cautious when making cables. |
| | 3 | low | Data Set Ready |
| | 4 | low | Clear To Send |
| | 5 | low | Carrier Detect |
| | 6 | low | Ready To Send |
| | 7 | low | Data Terminal Ready |
| | 8 | high | hardware overrun |
| | 9 | high | break sent (most recent output) |
| | 10 | high | break received (as latest input) |
| | 11 | high | transmit x-OFFed |
| | 12 | high | receive x-OFFed |
| MSB | | | |

13-15 --- reserved

io_Actual set to count of unread input characters

io_Error -- Query will always succeed.

1.15 serial.device/SDCMD_SETPARAMS

NAME

SetParams -- change parameters for the serial port

FUNCTION

This command allows the caller to change parameters for the serial device. Except for xON-xOFF enable/disable, it will reject a setparams call if any reads or writes are active or pending.

Note specifically:

1. Valid input for io_Baud is between 112 and 292000 baud inclusive; asynchronous i/o above 32KB (especially on a busy system) may be ambitious.
2. The EOFMODE and QUEUEDBRK bits of io_SerFlags can be set/reset in the io_Rqst block without a call to SetParams. The SHARED and 7WIRE bits of io_SerFlags can be used in OpenDevice calls. ALL OTHER PARAMETERS CAN ONLY BE CHANGED BY THE SetParams COMMAND.
3. RBufLen must be at least 64. The buffer may be any multiple of 64 bytes.
4. If not used, io_ExtFlags MUST be set to zero.
5. xON-xOFF is by default enabled. The XDISABLED bit is the only parameter that can be changed via a SetParams call while the device is active. Note that this will return the value SerErr_DevBusy in the io_Error field.

xON/xOFF handshaking is inappropriate for certain binary transfer protocols, such as Xmodem. The binary data might contain the xON (ASCII 17) and xOFF (ASCII 19) characters.

6. If trying to run MIDI, you should set the RAD_BOOGIE bit of io_SerFlags to eliminate unneeded overhead. Specifically, this skips checks for parity, x-OFF handling, character lengths other than 8 bits, and testing for a break signal. Setting RAD_BOOGIE will also set the XDISABLED bit.
Note that writing data (that's already in MIDI format) at MIDI rates is easily accomplished. Using this driver alone for MIDI reads may, however, may not be reliable, due to MIDI timestamping requirements, and possibility of overruns in a busy multitasking and/or display intensive environment.
7. If you select mark or space parity (see io_ExtFlags in serial.h), this will cause the SERB_PARTY_ON bit to be set, and the setting of SERB_PARTY_ODD to be ignored.
8. For best results, set the RAD_BOOGIE flag whenever possible. See #6 for details.
9. Note that at this time parity is *not* calculated for the xON-xOFF characters. If you have a system that is picky about the parity of

these, you must set your own xON-xOFF characters in io_CtlChar.

10. 7WIRE (CTS/RTS) handshake is bi-directional. The external side is expected to drop CTS several character times before the external buffer is full. The Amiga will drop RTS several character times before the Amiga's buffer is full.

IO REQUEST

| | |
|---|---|
| io_Message | mn_ReplyPort initialized |
| io_Device | preset by OpenDevice |
| io_Unit | preset by OpenDevice |
| io_Command | SDCMD_SETPARAMS (0x0B) |
| NOTE that the following fields are filled in by Open | |
| | to reflect the serial device's current configuration. |
| io_CtlChar | a longword containing byte values for the xON,xOFF,INQ,ACK fields (respectively) (INQ/ACK not used at this time) |
| io_RBufLen | length in bytes of input buffer |
| NOTE that any change in buffer size causes the current buffer to be deallocated and a new, correctly sized one to be allocated. Thusly, the CONTENTS OF THE OLD BUFFER ARE LOST. | |
| io_ExtFlags | additional serial flags (bitdefs in devices/serial.h) |
| mark & space parity may be specified here. | |
| io_Baud | baud rate for reads AND writes. (See 1 above) |
| io_BrkTime | duration of break signal in MICROseconds |
| io_TermArray | ASCII descending-ordered 8-byte array of termination characters. If less than 8 chars used, fill out array w/lowest valid value. Terminators are checked only if EOFMODE bit of io_Serflags is set. (e.g. x512F040303030303) |
| io_ReadLen | number of bits in read word (1-8) not including parity |
| io_WriteLen | number of bits in write word (1-8) " " " |
| io_StopBits | number of stop bits (0, 1 or 2) |
| io_SerFlags | see devices/serial.h for bit equates, NOTE that x00 yields exclusive access, xON/OFF-enabled, no parity checking, 3-wire protocol and TermArray inactive. |

RESULTS

Error -- if the SetParams succeeded, then Error will be null.
If the SetParams failed, then the Error will be non-zero.

SEE ALSO

exec/OpenDevice()