

expansion

COLLABORATORS

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NUMBER	DATE	DESCRIPTION	NAME

Contents

1	expansion	1
1.1	expansion.doc	1
1.2	expansion.library/AddBootNode	1
1.3	expansion.library/AddConfigDev	3
1.4	expansion.library/AddDosNode	3
1.5	expansion.library/AllocConfigDev	4
1.6	expansion.library/AllocExpansionMem	4
1.7	expansion.library/ConfigBoard	5
1.8	expansion.library/FindConfigDev	6
1.9	expansion.library/FreeConfigDev	7
1.10	expansion.library/FreeExpansionMem	7
1.11	expansion.library/GetCurrentBinding	8
1.12	expansion.library/MakeDosNode	9
1.13	expansion.library/ObtainConfigBinding	10
1.14	expansion.library/ReadExpansionByte	11
1.15	expansion.library/ReadExpansionRom	12
1.16	expansion.library/ReleaseConfigBinding	12
1.17	expansion.library/RemConfigDev	13
1.18	expansion.library/SetCurrentBinding	13
1.19	expansion.library/WriteExpansionByte	14

Chapter 1

expansion

1.1 expansion.doc

AddBootNode()	FindConfigDev()	ReadExpansionByte()
AddConfigDev()	FreeConfigDev()	ReadExpansionRom()
AddDosNode()	FreeExpansionMem()	ReleaseConfigBinding()
AllocConfigDev()	GetCurrentBinding()	RemConfigDev()
AllocExpansionMem()	MakeDosNode()	SetCurrentBinding()
ConfigBoard()	ObtainConfigBinding()	WriteExpansionByte()

1.2 expansion.library/AddBootNode

NAME

AddBootNode -- Add a BOOTNODE to the system (V36)

SYNOPSIS

```
ok = AddBootNode( bootPri, flags, deviceNode, configDev )
D0                D0          D1          A0          A1
```

```
BOOL AddBootNode( BYTE,ULONG,struct DeviceNode *,struct ConfigDev * );
```

FUNCTION

This function will do one of two things:

- 1> If dos is running, add a new disk type device immediatly.
- 2> If dos is not yet running, save information for later use by the system.

FUNCTION

This routine makes sure that your disk device (or a device that wants to be treated as if it was a disk...) will be entered into the system. If the dos is already up and running, then it will be entered immediatly. If the dos has not yet been run then the data will be recorded, and the dos will get it later.

We try and boot off of each device in turn, based on priority. Floppies have a hard-coded priority.

There is only one additional piece of magic done by AddBootNode. If there is no executable code specified in the deviceNode structure (e.g. dn_SegList, dn_Handler, and dn_Task are all null) then the standard dos file handler is used for your device.

Documentation note: a "task" as used here is a dos-task, not an exec-task. A dos-task, in the strictest sense, is the address of an exec-style message port. In general, it is a pointer to a process's pr_MsgPort field (e.g. a constant number of bytes after an exec task).

Autoboot from an expansion card before DOS is running requires the card's ConfigDev structure.

Pass a NULL ConfigDev pointer to create a non-bootable node.

INPUTS

bootPri -- a BYTE quantity with the boot priority for this disk.

This priority is only for which disks should be looked at: the actual disk booted from will be the first disk with a valid boot block. If no disk is found then the "bootme" hand will come up and the bootstrap code will wait for a floppy to be inserted. Recommend priority assignments are:

- +5 -- unit zero for the floppy disk. The floppy should always be highest priority to allow the user to abort out of a hard disk boot.
- 0 -- the run of the mill hard disk
- 5 -- a "network" disk (local disks should take priority).
- 128 -- don't even bother to boot from this device.

flags -- additional flag bits for the call:

ADNF_STARTPROC (bit 0) -- start a handler process immediately. Normally the process is started only when the device node is first referenced. This bit is meaningless if you have already specified a handler process (non-null dn_Task).

deviceNode -- a legal DOS device node, properly initialized.

Typically this will be the result of a MakeDosNode(). Special cases may require a custom-built device node.

configDev -- a valid board's ConfigDev structure. This is required for autoboot before DOS is running and if left NULL will result in an non-bootable node.

RESULTS

ok - non-zero everything went ok, zero if we ran out of memory or some other weirdness happened.

NOTE

This function eliminates the need to manually Enqueue a BOOTNODE onto an expansion.library list. Be sure V36 expansion.library is available before calling this function!

SEE ALSO

AddDosNode

1.3 expansion.library/AddConfigDev

NAME

AddConfigDev - add a new ConfigDev structure to the system

SYNOPSIS

```
AddConfigDev( configDev )
              A0
```

FUNCTION

(Not typically called by user code)

This routine adds the specified ConfigDev structure to the list of Configuration Devices in the system.

INPUTS

configDev - a valid ConfigDev structure.

RESULTS

EXCEPTIONS

SEE ALSO

RemConfigDev

BUGS

1.4 expansion.library/AddDosNode

NAME

AddDosNode -- mount a disk to the system

SYNOPSIS

```
ok = AddDosNode( bootPri, flags, deviceNode )
D0                D0          D1      A0
```

```
BOOL AddDosNode( BYTE,ULONG,struct DeviceNode *);
```

FUNCTION

This is the old (pre V36) function that works just like AddBootNode(). It should only be used if you *MUST* work in a 1.3 system and you don't need to autoboot.

RESULTS

ok - non-zero everything went ok, zero if we ran out of memory or some other weirdness happened.

EXAMPLE

```
/* enter a bootable disk into the system. Start a file handler
** process immediately.
```

```
*/  
if( AddDosNode( 0, ADNF_STARTPROC, MakeDosNode( paramPacket ) ) )  
    ...AddDosNode ok...
```

BUGS

Before V36 Kickstart, no function existed to add BOOTNODES. If an older expansion.library is in use, driver code will need to manually construct a BootNode and Enqueue() it to eb_Mountlist. If you have a V36 or better expansion.library, your code should use AddBootNode().

SEE ALSO

MakeDosNode, AddBootNode

1.5 expansion.library/AllocConfigDev

NAME

AllocConfigDev - allocate a ConfigDev structure

SYNOPSIS

```
configDev = AllocConfigDev()  
D0
```

FUNCTION

This routine returns the address of a ConfigDev structure. It is provided so new fields can be added to the structure without breaking old, existing code. The structure is cleared when it is returned to the user.

INPUTS

RESULTS

configDev - either a valid ConfigDev structure or NULL.

EXCEPTIONS

SEE ALSO

FreeConfigDev

BUGS

1.6 expansion.library/AllocExpansionMem

NAME

AllocExpansionMem - allocate expansion memory

SYNOPSIS

```
startSlot = AllocExpansionMem( numSlots, slotOffset )  
D0                                D0          D1
```

FUNCTION

(Not typically called by user code)

This function allocates numslots of expansion space (each slot is E_SLOTSIZE bytes). It returns the slot number of the start of the expansion memory. The EC_MEMADDR macro may be used to convert this to a memory address.

Boards that fit the expansion architecture have alignment rules. Normally a board must be on a binary boundary of its size. Four and Eight megabyte boards have special rules. User defined boards might have other special rules.

If AllocExpansionMem() succeeds, the startSlot will satisfy the following equation:

$$(\text{startSlot} - \text{slotOffset}) \text{ MOD } \text{slotAlign} = 0$$

INPUTS

numSlots - the number of slots required.
slotOffset - an offset from that boundary for startSlot.

RESULTS

startSlot - the slot number that was allocated, or -1 for error.

EXAMPLES

```
AllocExpansionMem( 2, 0 )
```

Tries to allocate 2 slots on a two slot boundary.

```
AllocExpansionMem( 64, 32 )
```

This is the allocation rule for 4 meg boards. It allocates 4 megabytes (64 slots) on an odd 2 meg boundary.

EXCEPTIONS

SEE ALSO

FreeExpansionMem

BUGS

1.7 expansion.library/ConfigBoard

NAME

ConfigBoard - configure a board

SYNOPSIS

```
error = ConfigBoard( board, configDev )  
D0                A0    A1
```

FUNCTION

This routine configures an expansion board. The board will generally live at E_EXPANSIONBASE, but the base is passed as a parameter to allow future compatibility. The configDev parameter must be a valid configDev that

has already had ReadExpansionRom() called on it.

ConfigBoard will allocate expansion memory and place the board at its new address. It will update configDev accordingly. If there is not enough expansion memory for this board then an error will be returned.

INPUTS

board - the current address that the expansion board is responding.
configDev - an initialized ConfigDev structure, returned by AllocConfigDev.

RESULTS

error - non-zero if there was a problem configuring this board (Can return EE_OK or EE_NOEXPANSION)

SEE ALSO

FreeConfigDev

1.8 expansion.library/FindConfigDev

NAME

FindConfigDev - find a matching ConfigDev entry

SYNOPSIS

```
configDev = FindConfigDev( oldConfigDev, manufacturer, product )
D0                A0                D0                D1
```

FUNCTION

This routine searches the list of existing ConfigDev structures in the system and looks for one that has the specified manufacturer and product codes.

If the oldConfigDev is NULL the the search is from the start of the list of configuration devices. If it is not null then it searches from the first configuration device entry AFTER oldConfigDev.

A code of -1 is treated as a wildcard -- e.g. it matches any manufacturer (or product)

INPUTS

oldConfigDev - a valid ConfigDev structure, or NULL to start from the start of the list.
manufacturer - the manufacturer code being searched for, or -1 to ignore manufacturer numbers.
product - the product code being searched for, or -1 to ignore product numbers.

RESULTS

configDev - the next ConfigDev entry that matches the manufacturer and product codes, or NULL if there are no more matches.

EXCEPTIONS

EXAMPLES

```
/* to find all configdevs of the proper type */
struct ConfigDev *cd = NULL;

while( cd = FindConfigDev( cd, MANUFACTURER, PRODUCT ) ) {
    /* do something with the returned ConfigDev */
}
```

SEE ALSO

BUGS

1.9 expansion.library/FreeConfigDev

NAME

FreeConfigDev - free a ConfigDev structure

SYNOPSIS

```
FreeConfigDev( configDev )
                A0
```

FUNCTION

This routine frees a ConfigDev structure as returned by AllocConfigDev.

INPUTS

configDev - a valid ConfigDev structure.

RESULTS

EXCEPTIONS

SEE ALSO

AllocConfigDev

BUGS

1.10 expansion.library/FreeExpansionMem

NAME

FreeExpansionMem - allocate standard device expansion memory

SYNOPSIS

```
FreeExpansionMem( startSlot, numSlots )
                  D0          D1
```

FUNCTION

(Not typically called by user code)

This function allocates numslots of expansion space (each slot

is E_SLOTSIZE bytes). It is the inverse function of AllocExpansionMem().

INPUTS

startSlot - the slot number that was allocated, or -1 for error.
numSlots - the number of slots to be freed.

RESULTS

EXAMPLES

EXCEPTIONS

If the caller tries to free a slot that is already in the free list, FreeExpansionMem will Alert() (e.g. crash the system).

SEE ALSO

AllocExpansionMem

BUGS

1.11 expansion.library/GetCurrentBinding

NAME

GetCurrentBinding - sets static board configuration area

SYNOPSIS

```
actual = GetCurrentBinding( currentBinding, size )
                        A0                D0:16
```

FUNCTION

This function writes the contents of the "currentBinding" structure out of a private place. It may be set via SetCurrentBinding(). This is really a kludge, but it is the only way to pass extra arguments to a newly configured device.

A CurrentBinding structure has the name of the currently loaded file, the product string that was associated with this driver, and a pointer to the head of a singly linked list of ConfigDev structures (linked through the cd_NextCD field).

Many devices may not need this information; they have hard coded into themselves their manufacture number. It is recommended that you at least check that you can deal with the product code in the linked ConfigDev structures.

INPUTS

currentBinding - a pointer to a CurrentBinding structure

size - The size of the user's binddriver structure.
Do not pass in less than sizeof(struct CurrentBinding).

RESULTS

actual - the true size of a CurrentBinding structure is returned.

SEE ALSO

GetCurrentBinding

1.12 expansion.library/MakeDosNode

NAME

MakeDosNode -- construct dos data structures that a disk needs

SYNOPSIS

```
deviceNode = MakeDosNode( parameterPkt )
D0          A0
```

```
struct DeviceNode * MakeDosNode( void * );
```

FUNCTION

This routine manufactures the data structures needed to enter a dos disk device into the system. This consists of a DeviceNode, a FileSysStartupMsg, a disk environment vector, and up to two bcpl strings. See the libraries/dosextens.h and libraries/filehandler.h include files for more information.

MakeDosNode will allocate all the memory it needs, and then link the various structure together. It will make sure all the structures are long-word aligned (as required by the DOS). It then returns the information to the user so he can change anything else that needs changing. Typically he will then call AddDosNode() to enter the new device into the dos tables.

INPUTS

parameterPkt - a longword array containing all the information needed to initialize the data structures. Normally I would have provided a structure for this, but the variable length of the packet caused problems. The two strings are null terminated strings, like all other exec strings.

longword	description
-----	-----
0	string with dos handler name
1	string with exec device name
2	unit number (for OpenDevice)
3	flags (for OpenDevice)
4	# of longwords in rest of enviroment
5-n	file handler environment (see libraries/filehandler.h)

RESULTS

deviceNode - pointer to initialize device node structure, or null if there was not enough memory. You may need to change certain fields before passing the DeviceNode to AddDosNode().

EXAMPLES

```
/* set up a 3.5" amiga format floppy drive for unit 1 */
```

```

char execName[] = "trackdisk.device";
char dosName[] = "df1";

ULONG parmPkt[] = {
    (ULONG) dosName,
    (ULONG) execName,
    1,                /* unit number */
    0,                /* OpenDevice flags */

    /* here is the environment block */
    16,              /* table upper bound */
    512>>2,         /* # longwords in a block */
    0,              /* sector origin -- unused */
    2,              /* number of surfaces */
    1,              /* secs per logical block -- leave as 1 */
    11,            /* blocks per track */
    2,              /* reserved blocks -- 2 boot blocks */
    0,              /* ?? -- unused */
    0,              /* interleave */
    0,              /* lower cylinder */
    79,            /* upper cylinder */
    5,              /* number of buffers */
    MEMF_CHIP,     /* type of memory for buffers */
    (~0 >> 1),     /* largest transfer size (largest signed #) */
    ~1,            /* addmask */
    0,              /* boot priority */
    0x444f5300,    /* dostype: 'DOS\0' */
};

struct Device Node *node, *MakeDosNode();

node = MakeDosNode( parmPkt );

```

SEE ALSO

AddDosNode, libraries/dosexten.h, libraries/filehandler.h

1.13 expansion.library/ObtainConfigBinding

NAME

ObtainConfigBinding - try to get permission to bind drivers

SYNOPSIS

```
ObtainConfigBinding()
```

FUNCTION

ObtainConfigBinding gives permission to bind drivers to ConfigDev structures. It exists so two drivers at once do not try and own the same ConfigDev structure. This call will block until it is safe proceed.

It is crucially important that people lock out others before loading new drivers. Much of the data that is used to configure things is statically kept, and others need

to be kept from using it.

This call is built directly on Exec SignalSemaphore code (e.g. ObtainSemaphore).

INPUTS

RESULTS

EXCEPTIONS

SEE ALSO

ReleaseConfigBinding()

BUGS

1.14 expansion.library/ReadExpansionByte

NAME

ReadExpansionByte - read a byte nybble by nybble.

SYNOPSIS

```
byte = ReadExpansionByte( board, offset )
D0          A0          D0
```

FUNCTION

(Not typically called by user code)

ReadExpansionByte reads a byte from a new-style expansion board. These boards have their readable data organized as a series of nybbles in memory. This routine reads two nybbles and returns the byte value.

In general, this routine will only be called by ReadExpansionRom.

The offset is a byte offset, as if into a ExpansionRom structure. The actual memory address read will be four times larger. The macros EROFFSET and ECOFFSET are provided to help get these offsets from C.

INPUTS

board - a pointer to the base of a new style expansion board.
offset - a logical offset from the board base

RESULTS

byte - a byte of data from the expansion board.

EXAMPLES

```
byte = ReadExpansionByte( cd->BoardAddr, EROFFSET( er_Type ) );
ints = ReadExpansionByte( cd->BoardAddr, ECOFFSET( ec_Interrupt ) );
```

SEE ALSO

WriteExpansionByte, ReadExpansionRom

1.15 expansion.library/ReadExpansionRom

NAME

ReadExpansionRom - read a boards configuration rom space

SYNOPSIS

```
error = ReadExpansionRom( board, configDev )
D0                A0    A1
```

FUNCTION

(Not typically called by user code)

ReadExpansionRom reads a the rom portion of an expansion device in to cd_Rom portion of a ConfigDev structure. This routine knows how to detect whether or not there is actually a board there,

In addition, the Rom portion of a new style expansion board is encoded in ones-complement format (except for the first two nybbles -- the er_Type field). ReadExpansionRom knows about this and un-complements the appropriate fields.

INPUTS

board - a pointer to the base of a new style expansion board.
configDev - the ConfigDev structure that will be read in.
offset - a logical offset from the configdev base

RESULTS

error - If the board address does not contain a valid new style expansion board, then error will be non-zero.

EXAMPLES

```
configDev = AllocConfigDev();
if( ! configDev ) panic();

error = ReadExpansionBoard( board, configDev );
if( ! error ) {
    configDev->cd_BoardAddr = board;
    ConfigBoard( configDev );
}
```

SEE ALSO

ReadExpansionByte, WriteExpansionByte

1.16 expansion.library/ReleaseConfigBinding

NAME

ReleaseConfigBinding - allow others to bind to drivers

SYNOPSIS

```
ReleaseConfigBinding()
```

FUNCTION

This call should be used when you are done binding drivers to ConfigDev entries. It releases the SignalSemaphore; this allows others to bind their drivers to ConfigDev structures.

SEE ALSO

ObtainConfigBinding()

1.17 expansion.library/RemConfigDev

NAME

RemConfigDev - remove a ConfigDev structure from the system

SYNOPSIS

```
RemConfigDev( configDev )
              A0
```

FUNCTION

(Not typically called by user code)

This routine removes the specified ConfigDev structure from the list of Configuration Devices in the system.

INPUTS

configDev - a valid ConfigDev structure.

RESULTS

EXCEPTIONS

SEE ALSO

AddConfigDev

BUGS

1.18 expansion.library/SetCurrentBinding

NAME

SetCurrentBinding - sets static board configuration area

SYNOPSIS

```
SetCurrentBinding( currentBinding, size )
                  A0                D0:16
```

FUNCTION

This function records the contents of the "currentBinding" structure in a private place. It may be read via GetCurrentBinding(). This is really a kludge, but it is the only way to pass extra arguments to a newly configured device.

A CurrentBinding structure has the name of the currently

loaded file, the product string that was associated with this driver, and a pointer to the head of a singly linked list of ConfigDev structures (linked through the cd_NextCD field).

Many devices may not need this information; they have hard coded into themselves their manufacture number. It is recommended that you at least check that you can deal with the product code in the linked ConfigDev structures.

INPUTS

currentBinding - a pointer to a CurrentBinding structure

size - The size of the user's binddriver structure. No more than this much data will be copied. If size is less than the library's idea a CurrentBinding size, then the library's structure will be null padded.

SEE ALSO

GetCurrentBinding

1.19 expansion.library/WriteExpansionByte

NAME

WriteExpansionByte - write a byte nybble by nybble.

SYNOPSIS

```
WriteExpansionByte( board, offset, byte )
                   A0      D0      D1
```

FUNCTION

(Not typically called by user code)

WriteExpansionByte writes a byte to a new-style expansion board. These boards have their writeable data organized as a series of nybbles in memory. This routine writes two nybbles in a very careful manner to work with all types of new expansion boards.

To make certain types of board less expensive, an expansion board's write registers may be organized as either a byte-wide or nybble-wide register. If it is nybble-wide then it must latch the less significant nybble until the more significant nybble is written. This allows the following algorithm to work with either type of board:

```
write the low order nybble to bits D15-D12 of
byte (offset*4)+2
```

```
write the entire byte to bits D15-D8 of
byte (offset*4)
```

The offset is a byte offset into a ExpansionRom structure. The actual memory address read will be four times larger. The macros EROFFSET and ECOFFSET are provided to help get

these offsets from C.

INPUTS

board - a pointer to the base of a new style expansion board.
offset - a logical offset from the configdev base
byte - the byte of data to be written to the expansion board.

EXAMPLES

```
WriteExpansionByte( cd->BoardAddr, ECOFFSET( ec_Shutup ), 0 );  
WriteExpansionByte( cd->BoardAddr, ECOFFSET( ec_Interrupt ), 1 );
```

SEE ALSO

ReadExpansionByte, ReadExpansionRom
