NAME

be – BigMAC Fast Ethernet device driver

SYNOPSIS

```
#include <sys/bmac.h>
#include <sys/be.h>
#include <sys/qec.h>
#include <sys/dlpi.h>
```

DESCRIPTION

The 10/100 Mbit/s Fast Ethernet driver is a multi-threaded, loadable, clonable, STREAMS hardware device driver supporting the connectionless Data Link Provider Interface, **dlpi**(7P), over 10/100 Mbit/s 802.30 controller in the SBus Fast Ethernet card. There is no software limitation on the number of Fast Ethernet cards supported by the driver. The **be** driver provides basic support for the BigMAC hardware. Functions include chip initialization, frame transmit and receive, multicast and promiscuous support, and error recovery and reporting.

The cloning character-special device **/dev/be** is used to access the 10/100 Mbit/s device installed within the system.

be and DLPI

The **be** driver is a "style 2" Data Link Service provider; an explicit **DL_ATTACH_REQ** message by the user is required to associate the opened Stream with a particular device (**ppa**). The **ppa** ID is interpreted as an **unsigned long** and indicates the corresponding device instance (unit) number. An error (**DL_ERROR_ACK**) is returned by the driver if the **ppa** field value does not correspond to a valid device instance number for this system (see **prtconf**(1M)).

All **M_PROTO** and **M_PCPROTO** type messages are interpreted as **DLPI** primitives.

The device is initialized on first attach and de-initialized (stopped) on last detach.

The values returned by the driver in the **DL_INFO_ACK** primitive in response to the **DL_INFO_REQ** from the user are as follows:

- The max SDU (Service Data Unit) is **1500** (**ETHERMTU**).
- The min SDU (Service Data Unit) is **0**.
- The **dlsap** address length is **8**. The physical address component is 6 bytes followed immediately by a 2-byte **sap** component within the **DLSAP** address.
- The MAC type is **DL_ETHER**.
- The **sap** length value is **–2**, which means the physical address component is followed immediately by a 2-byte **sap** component within the **DLSAP** address.
- The service mode is **DL_CLDLS**.
- No optional quality of service (QOS) support is included at present so the QOS fields are **0**.
- The provider style is **DL_STYLE2**.
- The version is **DL_VERSION_2**.

- The broadcast address value is Ethernet/IEEE broadcast address (**0xFFFFFFFF**).

When in the **DL_ATTACHED** state, the user must send a **DL_BIND_REQ** to associate a particular SAP (Service Access Point) with the Stream. The **be** driver interprets the **sap** field within the **DL_BIND_REQ** as an Ethernet "type"; therefore, valid values for the **sap** field are in the [**0-0xFFFF**] range. Only one Ethernet type can be bound to the Stream at any time.

10/100 Mbit/s algorithm for auto-selection is to be determined.

If the user selects a **sap** with a value of **0**, the receiver will be in 802.3 mode. All frames received from the media having a "type" field in the range [**0-1500**] are assumed to be 802.3 frames and are routed up all open Streams which are bound to **sap** value **0**. If more than one Stream is in "802.3 mode" then the frame will be duplicated and routed up multiple Streams as **DL_UNITDATA_IND** messages.

In transmission, the driver checks the **sap** field of the **DL_BIND_REQ** if the **sap** value is **0**, and if the destination type field is in the range [**0-1500**]. If either is true, the driver computes the length of the message, not including initial **M_PROTO** mblk (message block), of all subsequent **DL_UNITDATA_REQ** messages and transmits 802.3 frames that have this value in the MAC frame header length field.

The driver also supports raw **M_DATA** mode. When the user sends a **DLIOCRAW ioctl**, the particular Stream is put in raw mode. A complete frame along with a proper ether header is expected as part of the data.

The **be** driver **DLSAP** address format consists of the 6-byte physical (Ethernet) address component followed immediately by the 2-byte **sap** (type) component producing an 8-byte **DLSAP** address. Applications should *not* hardcode to this particular implementation-specific **DLSAP** address format but use information returned by the **DL_INFO_ACK** primitive to compose and decompose **DLSAP** addresses. The **sap** length, full **DLSAP** length, and **sap**/physical ordering are included within the **DL_INFO_ACK**. The physical address length can be computed by subtracting the **sap** length from the full **DLSAP** address length or by issuing the **DL_PHYS_ADDR_REQ** to obtain the current physical address associated with the Stream.

When in the **DL_BOUND** state, the user may transmit frames on the Fast Ethernet by sending **DL_UNITDATA_REQ** messages to the **be** driver. The **be** driver routes received Fast Ethernet frames as **DL_UNITDATA_IND** messages up all the open and bound Streams that have **sap** matching the Fast Ethernet type. Received Fast Ethernet frames are duplicated and routed up multiple open Streams if necessary. The **DLSAP** address contained within the **DL_UNITDATA_REQ** and **DL_UNITDATA_IND** messages consists of both the **sap** (type) and physical (Fast Ethernet) components.

be Primitives

In addition to the mandatory connectionless **DLPI** message set the driver additionally supports the following primitives.

The **DL_ENABMULTI_REQ** and **DL_DISABMULTI_REQ** primitives enable/disable reception of individual multicast group addresses. A set of multicast addresses may be iteratively created and modified on a per-stream basis with these primitives. These primitives

are accepted by the driver in any state following **DL_ATTACHED**.

The **DL_PROMISCON_REQ** and **DL_PROMISCOFF_REQ** primitives with the **DL_PROMISC_PHYS** flag set in the **dl_level** field enables/disables reception of all ("promiscuous mode") frames on the media including frames generated by the local host. When used with the **DL_PROMISC_SAP** flag set this enables/disables reception of all **sap** (Fast Ethernet type) values. When used with the **DL_PROMISC_MULTI** flag set this enables/disables reception of all multicast group addresses. The effect of each is always on a per-stream basis and independent of the other **sap** and physical level configurations on this Stream or other Streams.

The **DL_PHYS_ADDR_REQ** primitive return the 6-octet Fast Ethernet address currently associated (attached) to the Stream in the **DL_PHYS_ADDR_ACK** primitive. This primitive is valid only in states following a successful **DL_ATTACH_REQ**.

The **DL_SET_PHYS_ADDR_REQ** primitive changes the 6-octet Fast Ethernet address currently associated (attached) to this Stream. The owner of the process which originally opened this Stream must be superuser or **EPERM** is returned in the **DL_ERROR_ACK**. This primitive is destructive in that it affects all other current and future Streams attached to this device. An **M_ERROR** is sent up all other Streams attached to this device when this primitive on this Stream is successful. Once changed, all Streams subsequently opened and attached to this device will obtain this new physical address. Once changed, the physical address will remain so until this primitive is used to change the physical address again or the system is rebooted, whichever comes first.

FILES

/dev/be **be** special character device.

SEE ALSO

prtconf(1M), **dlpi**(7P), **ie**(7D), **le**(7D), **qe**(7D)