MEMO

To: CSL, SSL
From: Jim Curry, Peter Deutsch
Subject: BCPL .BR file format

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Location: Palo Alto
Organization: PARC/CSL

File: ERFORMAT
Archive category: BCPL

Word 0 contents:
0 version number (currently 1000)
1 length of file
2 0
3 word # of name table (= #17)
4 0
5 word # of label table
6 0
7 word # of code
8 0
9 word # of chain table
10 0
11 word # of zchain table
12 0
13 word # of zchain table
14 0
15 0
16 0

Number of names
for [descriptor]
  each [initial value name]
  [name string]

Number of labels
for [name number]
  each [FC label]

Number of words of code
  [code word 0]
  [code word 1]
  ...

Number of names
for [FC of first link + #100000 if zchain]
  each

Number of zchains
for [name number]
  each [FC of first zchain link]
  zchain

Word 0 is two bytes of version number, currently 1000 = 2.0. The first (left hand) byte of all .BR files loaded must agree with the version of BLD R.

Words 1 - #16 give the positions of the various tables in the file. Currently these tables are sequential in the file, but the positions must still be given.

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The name must contain an entry for every static; that is, every name defined by 'static [name=value]', by 'let name(...)=', or by 'name'; and every name which appears in an external declaration and is used somewhere in the code.

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File descriptor: | 0 | type 0 local |
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local: 0 => name appears in an external declaration 0 => it does not

z: 0 => name is a normal static 1 => name is a page zero static

type: 0 => undefined in this file (just external) 1 => defined by 'static [name=value]'
  2 => defined by 'let name(...)= (procedure) 3 => defined by name: (label)

4-7 are unused

Initial value: significant only for names of type 1; it contains the value assigned in 'static [name=value]'.

Name string: the BCPL string for the name. First byte = number of characters; last byte = 0 only if the string has even length.

The order of appearance of names in the names table determines the 'number' of the name, used in the label table and the zchain table. The first name is number 1.

The label table contains a two-word entry for each static of type 2 or 3 (procedures and labels; these statics must be initialized to point at entry points in the loaded code). The first word of each entry is the name number, determined by the order of appearance of the names in the name table. The second word is the relative address (in the code) of the location to which the static cell must point (the first word of code is word 0).

The code is just that. It is loaded as-is, except that its chains and zchains are fixed up, as below.

The chain table contains a one-word entry for each static, ordered by name number. There are two flavors of entries in this table, distinguished by bit 0.

If bit 0 = 0, this is a normal chain. Bits 1-15 are the relative code address of the first link. Bits 1-15 of each line in the chain are set to the address at which the static is allocated; bit 0 of each link is left alone (for multiple instruction on the Nova). Bits 1-15 of each link give the relative code address of the next link; a 0 (or #100000) terminates the chain.

If bit 0 = 1, this is a zchain. The static must be a page zero static. Bits 1-15 of the entry are the relative code address of the first link of the chain. Bits 6-15 of each link are set to the address of the static; bits 0-5 are left alone. Bits 0-5 of each link are the backwards offset (1-37) of the next link relative to this one; that is, (addr of this link) = (addr of next link) - (offset of next link). An offset of 0 terminates the chain. If the distance between two references to a page zero static is greater than 37, an entry in the zchain table must be used.

A chain table entry of 0 is ignored.

The zchain table contains a two-word entry for each page zero static for which a zchain in the chain is not sufficient, as above. The first word of each entry is the name number of the static. The second word is interpreted in the same way as a zchain entry in the chain table.