Interface to C.

1. interface to C procedure.

NOTE: external C procedure and external Pascal procedure is treated in the same manner. BEC will reverse the parameter sequence in the C-case.

1.1 Parameter transmission to external C procedure.

Simple value-type attribute
- by name: Transfer address of value (GADDR)
- by value: Transfer value
- default: Transfer value (i.e. as by value)

Simple text attribute
- by name: Transfer address of first char (OADDR)
- by value: Copy string into C-space (malloc) and NUL-terminate. Notext is a one-char string consisting of NUL.
  The copying is done by TXT2C.
  Transfer address of first char (OADDR)
- default: transfer address of first char (OADDR)
  (i.e. as by name)

Simple ref attribute
- by name: Transfer address of first attr. (OADDR)
  NONE is transmitted as address ZERO.
- by value: The attribute part of the object is copied to C-space (i.e. the system head is NOT copied). The address of the copy is transmitted (OADDR).
  NONE is transmitted as address ZERO.
- default: transfer address of first attr. (OADDR)
  (i.e. as by name)

Value-type array
- by name: Transfer address of first elt. (OADDR)
- by value: Copy values into C-space.
  Transfer address of copy (OADDR)
- by default: Transfer address of first elt. (OADDR)
  (i.e. as by value)

text array
- by name: Transfer address of first elt. (OADDR)
  (Note: normally not very useful!!!)
- by value: Copy all strings into C-space, generate a (C) array of pointers and fill in the addresses of the copies. Terminate array with a null pointer (address=zero).
  Transfer address of first pointer.
- by default: Generate a (C) array of pointers, null terminated. Fill in array with address of first char in resp. strings.
  Transfer address of first pointer.
  (i.e. something between value and name)

ref array
- by name: Transfer address of first elt. (OADDR)
  (Note: normally not very useful!!!)

- by value: Copy objects into C-space (without head), generate a (C) array of pointers and fill in the addresses of the copies. Terminate array with a null pointer. Transfer address of first pointer. (Note: more useful than by name, but note that only first-level copying is done).
- by default: Transfer address of first elt. (OADDR) (i.e. as by value)

label or switch: ILLEGAL

(Simula) procedure - to be implemented, currently ILLEGAL

(C) procedure - to be implemented, currently ILLEGAL

1.2 Return value.

The return value presents no problem for simple types.

text procedure:

--- to be elaborated ---

```
text T;
external C procedure p is text procedure p(i); integer i; ;
external C procedure C1 is procedure C1(t); name  t; text t; ;
external C procedure C2 is procedure C2(t); value t; text t; ;
```

(a) t:=p(4);
(b) t:-p(4);
(c) C1(p(4));
(d) C2(p(4));

a: the resulting C-string is copied to 't', using the normal rules of text value assignment (i.e. t.length must be >= the number of chars of the C-string - including the terminating zero)

b: A text object of length "C-string length" is created, filled with the C-string, and a suitable text descriptor is assigned to 't'.

c: The address of the C-string is simply passed back.

d: Create a C-string, copy and pass back address of created string.

2. Procedures passed as parameters to C-procedures.

2.1 Wrapped procedures.

When a procedure is used as parameter to a C-procedure, an enveloping (anonymous) routine (in the S-code sense) is created. The body of the routine contains the a_pro-i_pro sequence for calling the actual procedure. The entry point of this procedure is passed to C.

2.2 Routines.

Only a special kind of procedure may be transferred to C, i.e. such procedures must be declared in a special manner, and restricted in use.