

### A.2.2 Variable Storage at Runtime.

There are 3 cases where the user needs information on how variables are stored at runtime:

- a. Global variables - declared in the main program block.
- b. Local variables - declared in an inner block.
- c. Parameters and returned values. - passed to and from procedures and functions.

These individual cases are discussed below and an example of how to use this information may be found in Appendix 4.

#### Global variables

Global variables are allocated from the top of the runtime stack downwards e.g. if the runtime stack is at  $\$B000$  and the main program variables are:

```
VAR    i : INTEGER;  
       ch : CHAR;  
       x : REAL;
```

then:

i (which occupies 2 bytes - see the previous section) will be stored at locations  $\$B000-2$  and  $\$B000-1$  i.e. at  $\$AFFE$  and  $\$AFFD$ .

ch (1 byte) will be stored at location  $\$AFFE-1$  i.e. at  $\$AFFD$ .

x (4 bytes) will be placed at  $\$AFF9$ ,  $\$AFFA$ ,  $\$AFFB$  and  $\$AFFC$ .

#### Local variables

Local variables cannot be accessed via the stack very easily (so, instead, the IX register is set up at the beginning of each inner block so that (IX-4) points to the start of the block's local variables e.g.

```
PROCEDURE test;  
VAR    i, j : INTEGER;
```

then:

i (integer - so 2 bytes) will be placed at IX-4-2 and IX-4-1 i.e. IX-6 and IX-5.

j will be placed at IX-8 and IX-7.

#### Parameters and returned values