CP/M File Control Block

The File Control Block is a 36-byte data structure (33 bytes in CP/M 1). It is laid out as follows:

```
DR F1 F2 F3 F4 F5 F6 F7 F8 T1 T2 T3 EX S1 S2 RC  .FILENAMETYP...
AL AL AL AL AL AL AL AL AL AL AL AL AL AL AL AL  ................
CR R0 R1 R2                                      ....
```

The bytes in it have the following meanings:

```
FCB+00h DR - Drive. 0 for default, 1-16 for A-P. In DOSPLUS,
             bit 7 can be set to indicate that the operation should work with
             subdirectories rather than files.

FCB+01h Fn - Filename, 7-bit ASCII. The top bits of the filename bytes
             (usually referred to as F1' to F8') have the following
             meanings:
               F1'-F4' - User-defined attributes. Any program can use
                         them in any way it likes. The filename in the
                         disc directory has the corresponding bits set.
               F5'-F8' - Interface attributes. They modify the
                         behaviour of various BDOS functions or
                         indicate error conditions. In the directory
                         these bits are always zero.
FCB+09h Tn - Filetype, 7-bit ASCII. T1' to T3' have the following
             meanings:
               T1' - Read-Only.
               T2' - System (hidden). System files in user 0 can be
                     opened from other user areas.
               T3' - Archive. Set if the file has not been changed
                     since it was last copied.
FCB+0Ch EX - Set this to 0 when opening a file and then leave it to
            CP/M. You can rewind a file by setting EX, RC, S2 and CR to 0.
FCB+0Dh S1 - Reserved.
FCB+0Eh S2 - Reserved.
FCB+0Fh RC - Set this to 0 when opening a file and then leave it to
            CP/M.
FCB+10h AL - Image of the second half of the directory entry,
             containing the file's allocation (which disc blocks it
             owns).
FCB+20h CR - Current record within extent. It is usually best to set
             this to 0 immediately after a file has been opened and
             then ignore it.
FCB+21h Rn - Random access record number (not CP/M 1). A 16-bit
             value in CP/M 2 (with R2 used for overflow); an 18-bit
             value in CP/M 3.
```

If you are writing an emulator at BDOS level, you need to be aware of how CP/M uses the bytes EX, S2, and CR. Some programs (such as the Digital Research linker, LINK.COM) manipulate these bytes to perform "seek" operations in files without using the random-access calls.

```
CR = current record,   ie (file pointer % 16384)  / 128
EX = current extent,   ie (file pointer % 524288) / 16384
S2 = extent high byte, ie (file pointer / 524288). The CP/M Plus source
    code refers to this use of the S2 byte as 'module number'.
```

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