locate square 3:4. This is at the <u>address</u> 0820.

But how do we get 0820 from the numbers 3:4?
The process is quite simple. If you multiply the
(Y-1) coordinate times the number of possible
horizontal elements in the matrix, you will arrive
at the low order of the address of the row corresponding
to Y. This address is added to the base address, or
beginning address, of the matrix. Using our example,
the Y coordinate of 4 minus 1 is 3. Then, 3 x 10 (the
number of possible horizontal elements) is equal to
30 decimal which is in turn equal to 1E hex. Notice that
the fourth row of the board matrix begins at location
081E. This address is equal to the base address of
the board at 0800 + 1E hex, the number we just arrived at.

Now, simply add the value of the X coordinate minus
one to 081E and you have the address of the correct
"square" in memory! In the example, 3 is the X coordinate.
Then, (3-1) + 081E = 0820 which is the address of the
square 3:4 on our board.

Any size matrix may be treated in the same way.
In fact, your VIP display may be thought of as a large
64 x 32 (or 64 x 64 as for VIP-FLOP) matrix. The
subroutine in the Chip-8 interpreter that determines
where display patterns go in memory when you program a
DXYN instruction, uses the same technique described