

HOW TO TALK WITH CAMAC ON IS-11 WITHOUT A SYSTEM

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1. Look at handbook on p. 117 to see how to use ODT. In the following examples the ODT prompt is @, the rest you type in on terminal plugged in to face of IS-11. Prompt will appear on screen as soon as you power up. To examine or change a location, type location followed by /. To do same for next location, use <LF>. To go back to @, use <CR>. Note that locations increment by 2.
2. Type in the following program starting at an arbitrary (within limits) location, e.g., 1000. Given are the machine codes as you type them in, and the corresponding assembly code for reference.

@1000/ 10011<LF> MOV R0,@R1 ;LOAD FUNTION CODE REGISTER

1002/ 10312<LF> MOV R3,@R2 ;DO WRITE OPERATION

1004/ 05011<LF> CLR @R1 ;CLEAR F-REG. THAT IS, SET TO READ OPER.

1006/ 11204<LF> MOV @R2,R4 ;DO READ OPERATION. STORE RESULT IN R4.

1008/ 00000<CR> HALT

3. Load register R0 with the function code, in octal. For example,

@R0/ 31<LF>

loads F(25), the usual module test function ($25 = 31_8$). This is not necessary for a pure read operation (see below).

4. Load register R1 with the CAMAC base address, BASE. This is currently 164000 and is likely to remain that.

R1/ 164000<LF>

5. Load register R2 with the CAMAC address. Mathematically this is given by

$$\text{CAMAD} = \text{BASE} + 2 \cdot 5 \cdot N + 2 \cdot A$$

where N is the station address of module and A is the subaddress within the module. After you calculate it, remember to convert to octal, or better, do the calculation in octal. Just remember $2^5 = 40_8$. The CAMAC address word is illustrated below and an example given.

CAMAD	1	1	1	0	1	N				A	0
	bit 16		12				6		2		1

Example: N(20)A(11) $20 = 24_8$ $11 = 13_8$

CAMAD	1	1	1	0	1	0	1	0	1	0	0	1	0	1	1	0
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= 165226_8

$$= 164000 + 24(40) + 2(13)$$

6. Load R3 with the word to be written. (Note that this procedure works only for 16-bit data. To write the full 24 bits needs a few more instructions which are not given here.) For example,

R3/ 1765432 <CR>

7. To write, and then read back what you wrote, use GO mode of ODT from location 1000, or wherever you loaded the program above. Then examine R4 for the result.

@1000G

@R4/ your result

You may also examine the location CAMAD (and following locations for a multiple subaddress operation) to see result.

8. For a read-only operation, just execute from the CLR instruction, and examine R4.

@1004G

@R4/ your result.

For a read with $F \neq 0$, load F in BASE and just execute the last instruction.

@164000/ F<CR>

@1006G

@R4 / your result

9. Other useful operations are illustrated below:

@164010/ Dataway clear (C)

@164012/ Dataway initialize (Z)

@164014/ Clear dataway inhibit (I)

@164016/ Set dataway inhibit (I)

Note the IS-11 panel lights give you status of these, plus Q response of module. You need not clear inhibit to talk to a module. The Q response is also indicated as bit 16 of the CAMAC control word, located at $\text{BASE} + 2$ (164002). If you zero this, you turn the Q response off. To see if a module received your request, look at the X light but remember that this is a new feature which is not present in our older equipment.