

## ENIAC Simulator Configuration Notation Reference

### Initiating Unit

#### Terminals

- Cin**: Selective clear input ( $1 \leq n \leq 6$ )
- Con**: Selective clear output ( $1 \leq n \leq 6$ )
- Ri**: Reader input
- Ro**: Reader output
- Rl**: Reader interlock
- Pi**: Printer/punch input
- Po**: Printer/punch output
- Pl**: Printer/punch interlock
- Io**: Initiating pulse output

#### Buttons

- c**: Initial clear
- i**: Initiating pulse
- r**: Reader start switch

#### Examples

1. Press the initiating pulse button: **b i**
2. Plug a program jumper from the initiating pulse output of the initiating unit to program trunk 1, line 2: **p i.Io 1-2**

#### Notes

1. Although the clear, reader, printer, and initiate mnemonics are shown as upper case here and on most of the original diagrams, either upper or lower case are accepted by the simulator.
2. The terminals for **Rs** and **Is** are not implemented as these are assumed connected to the hand-held control unit.
3. The Start, Stop, and Door Shut switches are not implemented.

### Cycling Unit

#### Switch

- op**: Cycling unit operating mode: 1a (1 add), 1p (1 pulse), or co (continuous)

#### Button

- p**: 1 pulse & 1 add time button

#### Examples

1. Set the cycling unit to 1 add mode: **s cy.op 1a**
2. Single step in 1a or 1p modes: **b p**

#### Notes

1. The PA, Ext, 1A, and Cont terminals are unimplemented.
2. The heater switch is unimplemented.
3. The oscilloscope and oscilloscope input switch are unimplemented.
4. Values for the operation switch may be specified in either upper or lower case.

## Constant Transmitter

### Terminals

- o: Digit output terminal
- ni: Program input terminals ( $1 \leq n \leq 30$ )
- no: Program output terminals ( $1 \leq n \leq 30$ )

### Switches

- sn: Constant selector ( $1 \leq n \leq 30$ ): A1, Ar, Alr, ..., K1, Kr, Klr
- j1, jr:
- k1, kr: PM set: P or M
- jn, kn: Constant set ( $1 \leq n \leq 10$ ): 0–9

## Printer

### Switches

- n–m: Coupling ( $1 \leq n \leq 8$ ,  $m = n + 1$ ): 0 or C
- n: Printing ( $1 \leq n \leq 16$ ): 0 or P

## Accumulator

### Terminals

- $\alpha$ – $\epsilon$ : Input data terminals
- A: Additive output data terminal
- S: Subtractive output data terminal
- ni: Program input terminal ( $1 \leq n \leq 12$ )
- no: Program output terminal ( $5 \leq n \leq 12$ )
- Isn: Accumulator interconnect terminals ( $s \in \{1, r\}$ ,  $n \in \{1, 2\}$ )
- 1b: Special notation for a load block on interconnects

### Switches

- opn: Operation select ( $1 \leq n \leq 12$ ):  $\alpha$ – $\epsilon$ , 0, A, AS, or S
- rpn: Repeat ( $5 \leq n \leq 12$ ): 1–9
- ccn: Clear correct ( $1 \leq n \leq 12$ ): 0 or C
- sf: Significant figures: 0–10
- sc: Selective clear: 0 or SC

### Examples

1. Plug jumper from data trunk 3 to the gamma input on accumulator 12: p 3 a12. $\gamma$
2. Set program 5 on accumulator 9 to output additively: s a9.op5 A
3. Set accumulator 2 program 7 repeat to 4: s a2.rp7 4

### Notes

1. Carry clear and selective clear switch settings may be specified in either upper or lower case.
2. The input data terminals and input operation switch settings may be specified with either a Unicode Greek letter, the lower case spelled-out name of the Greek letter, or the corresponding lower case Roman letter.

## High Speed Multiplier

### Terminals

- lhppI:
- lhppII:
- rhppI:
- rhppII: Partial product data terminals
- R $\alpha$ -R $\epsilon$ : Multiplier accumulator program pulse outputs
- D $\alpha$ -D $\epsilon$ : Multiplicand accumulator program pulse outputs
- A, S, AS:
- AC, SC, ASC: Product disposal terminals
- RS, DS, F: Internal operating terminals
- ni: Program input terminals ( $1 \leq n \leq 24$ )
- no: Program output terminals ( $1 \leq n \leq 24$ )

### Switches

- ieraccn: Multiplier accumulator receive switch ( $1 \leq n \leq 24$ ):  $\alpha$ - $\epsilon$  or 0
- icandaccn: Multiplicand accumulator receive switch ( $1 \leq n \leq 24$ ):  $\alpha$ - $\epsilon$  or 0
- sf $n$ : Significant figures switch ( $1 \leq n \leq 24$ ): 0, 2-10
- placen: Multiplier places switch ( $1 \leq n \leq 24$ ): 2-10
- prod $n$ : Product disposal switch ( $1 \leq n \leq 24$ ): A, S, AS, 0, AC, SC, or ASC
- iercl $n$ : Multiplier accumulator clear switch ( $1 \leq n \leq 24$ ): 0 or C
- icandcl $n$ : Multiplicand accumulator clear switch ( $1 \leq n \leq 24$ ): 0 or C

### Typical Multiplier Setup

Multiplier	Multiplicand	LHPP	RHPP
p m.R $\alpha$ 9-1	p m.D $\alpha$ 9-2	p 9-4 a11.2i	p m.A 9-3
p 9-1 a9.1i	p 9-2 a10.1i	p m.F 9-6	p 9-3 a13.3i
p m.RS 9-4	p m.DS 9-5	p 9-6 a11.1i	p 9-5 a13.2i
p 9-4 a9.6i	p 9-5 a10.6i	p 7 a11. $\beta$	p 9-6 a13.1i
p a9.S 7	p a10.S 6	p a11.A 6	p 6 a13. $\beta$
s m.ieracc1 $\alpha$	s m.icandacc1 $\alpha$	p m.lhppI 8	p m.rhppI 9
s m.iercl1 C	s micandcl1 C	p 8 a11. $\alpha$	p 9 a13. $\alpha$
s a9.op1 $\alpha$	s a10.op1 $\alpha$	s a11.op1 A	s a13.op1 $\beta$
s a9.op6 S	s a10.op6 S	s a11.cc1 C	s a13.op2 $\beta$
s a9.rp6 1	s a10.rp6 1	s a11.op2 $\beta$	s a13.op3 A
		s m.sf1 8	
		s m.place1 2	
		s m.prod1 A	

## Divider & Square Rooter

### Terminals

- ni*: Program input terminals ( $1 \leq n \leq 8$ )
- no*: Program output terminals ( $1 \leq n \leq 8$ )
- n1*: Program interlock terminals ( $1 \leq n \leq 8$ )
- ans*: Digit answer output terminal

### Adapters (specified as switches)

- da*: Divider adapter set: A, B, or C
- ra*: Square Rooter adapter set: A, B, or C

### Switches

- nrn*: Numerator accumulator receive ( $1 \leq n \leq 8$ ):  $\alpha$ ,  $\beta$ , or 0
- ncn*: Numerator accumulator clear ( $1 \leq n \leq 8$ ): 0 or C
- drn*: Denominator-square-root accumulator receive ( $1 \leq n \leq 8$ ):  $\alpha$ ,  $\beta$ , or 0
- dcn*: Denominator-square-root accumulator clear ( $1 \leq n \leq 8$ ): 0 or C
- pln*: Places ( $1 \leq n \leq 8$ ): D4, D7–10, S4, or S7–10
- ron*: Round-off ( $1 \leq n \leq 8$ ): R0 or NR0
- ann*: Answer disposal ( $1 \leq n \leq 8$ ): 1–4, or OFF
- iln*: Interlock ( $1 \leq n \leq 8$ ): I or NI

### Basic Setup

Divider	Square Rooter
p d.ans 8	p d.ans 8
p 8 a2. $\alpha$	p 8 a2. $\alpha$
p 8 a5. $\gamma$	p 8 a5. $\gamma$
p a5.A 9	p a5.A 9
p a5.S 9	p a5.S 9
p a3.A 9	p a3.A 9
p a7.A 9	p a7.A 9
p 9 a3. $\gamma$	p 9 a3. $\gamma$
p 9 ad.s.1.1	p 9 ad.s.1.1
p ad.s.1.1 a7. $\alpha$	p ad.s.1.1 a7. $\alpha$
s d.nr1 $\alpha$	s d.nr1 $\alpha$
s d.nc1 C	s d.nc1 C
s d.dr1 $\alpha$	s d.dr1 0
s d.dc1 C	s d.dc1 0
s d.pl1 D10	s d.pl1 R8
s d.ro1 R0	s d.ro1 R0
s d.an1 1	s d.an1 4
s d.il1 NI	s d.il1 NI
s d.da A	s d.ra A

### Notes

1. Only 10-digit numerators, denominators, and radicands are supported.
2. Accumulator 2 is assumed for the quotient, Accumulator 3 for the numerator or radicand, Accumulator 5 for the denominator or square root, and Accumulator 7 for the shift accumulator.

## Function Tables

### Terminals

- arg**: Argument input terminal
- A, B**: Function output terminals
- NC, C**: Argument reception NC and C program pulse output terminals
- ni**: Program input terminals ( $1 \leq n \leq 11$ )
- no**: Program output terminals ( $1 \leq n \leq 11$ )

### Switches

- opn**: Operation ( $1 \leq n \leq 11$ ): A-2, A-1, ..., A+2, S-2, ..., S+2
- cln**: Argument reception ( $1 \leq n \leq 11$ ): 0, C, or NC
- rpn**: Operation repeat ( $1 \leq n \leq 11$ ): 1-9
- mpmn**: Master PM switch ( $1 \leq n \leq 2$ ): P or M
- AnC**:
- BnC**: Constant digit ( $1 \leq n \leq 4$ ): 0-9, PM1, or PM2
- AnD**:
- BnD**: Digit delete ( $1 \leq n \leq 4$ ): 0 or D
- AnS**:
- BnS**: Subtract pulse ( $4 \leq n \leq 10$ ): 0 or S
- RArLd**:
- RBrLd**: Switch panel digit ( $-2 \leq r \leq 101, 1 \leq d \leq 6$ ): 0-9
- RArS**:
- RBrS**: Switch panel sign ( $-2 \leq r \leq 101$ ): P or M

## Master Programmer

### Terminals

- ndi**: Decade direct input ( $1 \leq n \leq 20$ )
- Adi-Kdi**: Stepper direct input
- Ai-Ki**: Stepper input
- AcDi-KcDi**: Stepper clear input
- Ano-Kno**: Stepper output ( $1 \leq n \leq 6$ )

### Switches

- an**: Decade associator switch ( $n \in \{2, 4, 8, 10, 12, 14, 18, 20\}$ ): A-K
- dnsm**: Decade switch ( $1 \leq n \leq 20, 1 \leq m \leq 6$ ): 0-9
- cA-cK**: Stepper clear: 1-6

## Adapters

### Types

- dp**: Digit program pulse, e.g. **ad.dp.1.11** for sign
- s**: Shift, < 0 left, > 0 right
- d**: Deleter, e.g. **ad.d.1.7** for xxxxxxxxxxxx  $\rightarrow$  xxxxxxxx000
- sd**: Special digit (used in A.G. Chapter 7)