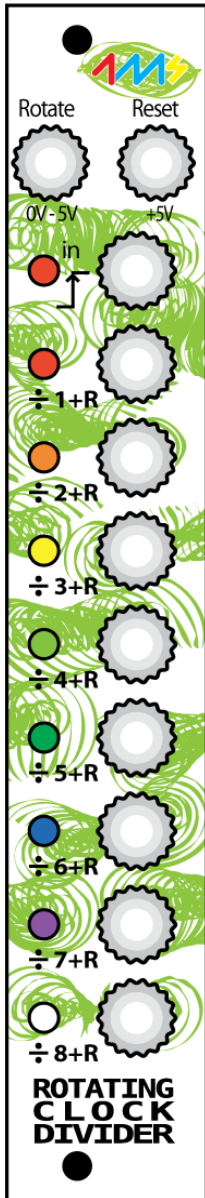


# Rotating Clock Divider

Eurorack Module User Manual v1.0.1  
*4ms Pedals*



## Features

- Divide-by-1 to Divide-by-64, on 8 output jacks
- CV Rotate jack to shift divide-by amount for each jack
- CV Reset to reset/re-sync all jacks
- Jumpers or optional break-out panel:
  - Select auto-reset (maximum 256 clocks)
  - Select maximum divide-by amount (8/16/32/64)
- UART header
  - Connects to Optional MIDI breakout panel
  - Arduino-compatible
- ISP header
  - Connects to in-circuit programmer such as AVR ISP MKII for reprogramming code
- Maximum input frequency 3kHz
- 4 H.P. Eurorack module
- 60mA typical power draw, 75mA max.

## Jacks

- Clock Input (5V to 15V clock, rising edge triggered)
- CV Rotate (0V to +5V input)
- CV Reset (5V to 15V trigger)
- Divided Clock Outputs (8 jacks):
  - Divide-by (1+R)
  - Divide-by (2+R)
  - Divide-by (3+R)
  - Divide-by (4+R)
  - Divide-by (5+R)
  - Divide-by (6+R)
  - Divide-by (7+R)
  - Divide-by (8+R)

...where R is the CV Rotation (0 to 63)



## CV Rotation

By applying a CV signal to the CV Rotate jack, the clock divisions will rotate throughout the output jacks (see table 2). For example, if you apply just over 1.0V, Jack 1+R/Red will go from Divide-by-1 to Divide-by-2, and Jack 2+R/Orange will become Divide-by-3... up to Jack 8+R/White which will wrap ("rotate") around to become Divide-by-1. Applying more CV to the Rotate Jack will continue the rotation: next Jack 1 becomes Divide-by-3, then Divide-by-4, then Divide-by-5, until it's Divide-by-8 at the maximum input CV. Some non-linearities exist in the CV response, especially in the upper extreme.

## CV Reset

Applying a CV of 5V or greater to the CV Reset jack will cause all the divide counters to reset. Counting will begin back at 1. Often a lower/slower output on the RCD is patched directly into the CV Reset jack.

## Auto Reset

Jumpers 5 and 6 select the Auto-reset point, which causes the divide counters to reset after a certain number of clock pulses. Note that divide-by amounts which are evenly divisible by the reset amount are not affected: e.g. with an auto-reset of 16, divide-by outputs of 2, 4, 8, 16, etc are not changed.

Also, note that the CV Reset is independant of the Auto-reset. For example, Jack 7+R could be patched into the CV Reset with jumpers 3, 4, and 5 in. This would cause a reset every 7 clocks, plus an additional reset every 16 clocks.

There are too many combinations of Auto-reset and Max divide amounts to show all combinations!

**Example: Auto-reset of 16 (Jumper 5 in, no Jumper 6), with Max Divide-by of 8 (Jumpers 3&4)**

IN:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
3			X			X			X			X			X				X			X			X			X			X	
5					X					X					X						X					X					X	
7							X							X										X						X		

## Rotation Tables

**Table 2: Divide-by amounts at each jack, with max divide-by amount set to 8 (Jumper 3 in, Jumper 4 in):**

Jacks	Voltage at CV Rotate Jack							
	<1.0 V	1.00V - 1.65V	1.65V - 2.30V	2.30V - 2.95V	2.95V- 3.60V	3.60 V- 4.30 V	4.30V- 5.10V	>5.1V
1+R/Red	1	2	3	4	5	6	7	8
2+R/Orange	2	3	4	5	6	7	8	1
3+R/Yellow	3	4	5	6	7	8	1	2
4+R/Lt Green	4	5	6	7	8	1	2	3
5+R/Green	5	6	7	8	1	2	3	4
6+R/Blue	6	7	8	1	2	3	4	5
7+R/Violet	7	8	1	2	3	4	5	6
8+R/White	8	1	2	3	4	5	6	7

**Table 3: Divide-by amounts at each jack, with max divide-by amount set to 16 (Jumper 3 in, no Jumper 4):**

Jacks	Voltage at CV Rotate Jack															
	< 0.67V	0.67V - 1.00V	1.00V - 1.33V	1.33V - 1.67V	1.67V - 2.00V	2.00V - 2.33V	2.33V - 2.67V	2.67V - 3.00V	3.00V - 3.33V	3.33V - 3.67V	3.67V - 4.00V	4.00V - 4.33V	4.33V - 4.67V	4.67V - 5.10V	5.10V - 5.80V	> 5.80V
1+R/Red	9	10	11	12	13	14	15	16	1	2	3	4	5	6	7	8
2+R/Orange	10	11	12	13	14	15	16	1	2	3	4	5	6	7	8	9
3+R/Yellow	11	12	13	14	15	16	1	2	3	4	5	6	7	8	9	10
4+R/Lt Green	12	13	14	15	16	1	2	3	4	5	6	7	8	9	10	11
5+R/Green	13	14	15	16	1	2	3	4	5	6	7	8	9	10	11	12
6+R/Blue	14	15	16	1	2	3	4	5	6	7	8	9	10	11	12	13
7+R/Violet	15	16	1	2	3	4	5	6	7	8	9	10	11	12	13	14
8+R/White	16	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

**Table 4: Divide-by amounts at each jack, with max divide-by amount set to 32 (no Jumper 3, Jumper 4 in):**

Jacks	Voltage at CV Rotate Jack															
	<0.5 V	- 0.68V	- 0.86V	- 1.04V	- 1.22V	- 1.38V	- 1.54V	- 1.70V	- 1.86V	- 2.02V	- 2.18V	- 2.36V	- 2.52V	- 2.68V	- 2.82V	- 3.00V
1+R/Red	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
2+R/Orange	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	1
3+R/Yellow	19	20	21	22	23	24	25	26	27	28	29	30	31	32	1	2
4+R/Lt Green	20	21	22	23	24	25	26	27	28	29	30	31	32	1	2	3
5+R/Green	21	22	23	24	25	26	27	28	29	30	31	32	1	2	3	4
6+R/Blue	22	23	24	25	26	27	28	29	30	31	32	1	2	3	4	5
7+R/Violet	23	24	25	26	27	28	29	30	31	32	1	2	3	4	5	6
8+R/White	24	25	26	27	28	29	30	31	32	1	2	3	4	5	6	7

(con't)	- 3.18 V	- 3.34V	- 3.50V	- 3.68V	- 3.82V	- 4.00V	- 4.18V	- 4.36V	- 4.54V	- 4.72V	- 4.94V	- 5.17V	- 5.43V	- 5.80V	- 6.52V	> 6.52V
1+R/Red	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
2+R/Orange	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
3+R/Yellow	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	1
4+R/Lt Green	19	20	21	22	23	24	25	26	27	28	29	30	31	32	1	2
5+R/Green	20	21	22	23	24	25	26	27	28	29	30	31	32	1	2	3
6+R/Blue	21	22	23	24	25	26	27	28	29	30	31	32	1	2	3	4
7+R/Violet	22	23	24	25	26	27	28	29	30	31	32	1	2	3	4	5
8+R/White	23	24	25	26	27	28	29	30	31	32	1	2	3	4	5	6

**Table 5: Divide-by amounts at each jack, with max divide-by amount set to 64 (no Jumper 3, no Jumper 4):**

Jacks	Voltage at CV Rotate Jack															
	<0.5 V	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1+R/Red	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
2+R/Orange	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
3+R/Yellow	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
4+R/Lt Green	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
5+R/Green	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52
6+R/Blue	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
7+R/Violet	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
8+R/White	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55

(con't)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	>
	3.1 8V	3.34V	3.50V	3.68V	3.82V	4.00V	4.18V	4.36V	4.54V	4.72V	4.94V	5.17V	5.43V	5.80V	6.52V	6.52V
1+R/Red	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
2+R/Orange	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	1
3+R/Yellow	51	52	53	54	55	56	57	58	59	60	61	62	63	64	1	2
4+R/Lt Green	52	53	54	55	56	57	58	59	60	61	62	63	64	1	2	3
5+R/Green	53	54	55	56	57	58	59	60	61	62	63	64	1	2	3	4
6+R/Blue	54	55	56	57	58	59	60	61	62	63	64	1	2	3	4	5
7+R/Violet	55	56	57	58	59	60	61	62	63	64	1	2	3	4	5	6
8+R/White	56	57	58	59	60	61	62	63	64	1	2	3	4	5	6	7