

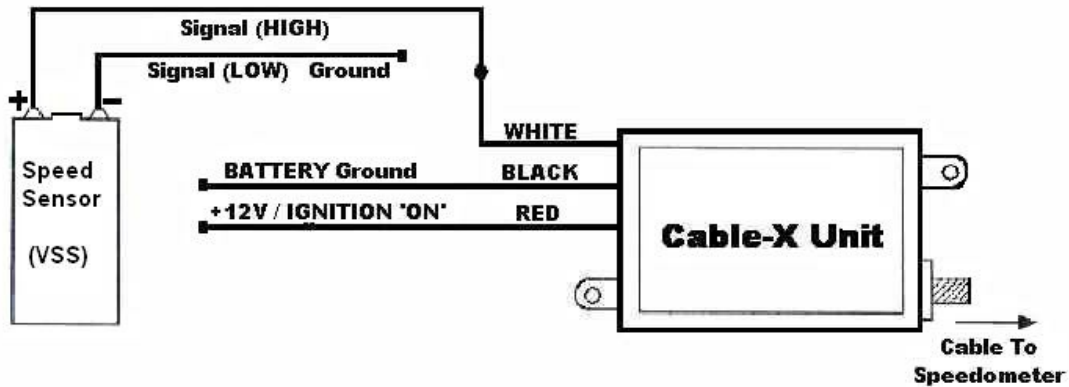


Cable-X-3012 Installation Instructions

[Printer version - click here \(no pictures\)](#)

Cable-X Wiring Diagram:

1. Connect the RED wire (through a 5 AMP fuse) to the engine side of the ignition switch (+12v 'hot' when the key is 'on').
2. Connect the BLACK wire to battery ground.
3. Connect the WHITE wire to the signal wire.



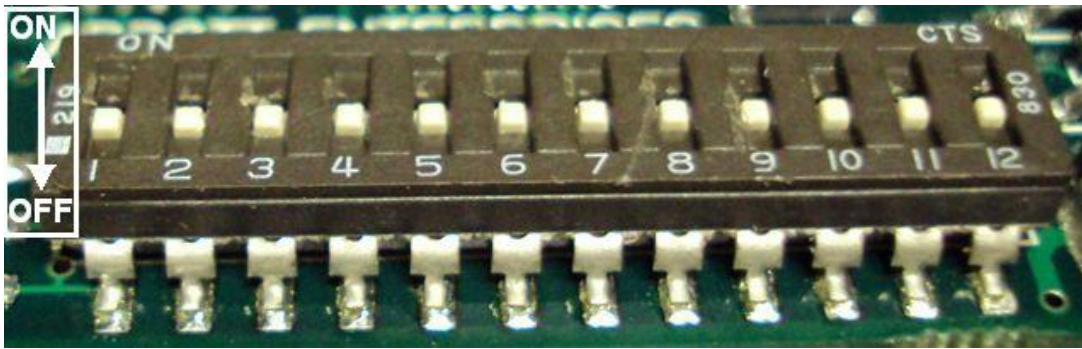
Field Test Procedures:

1. Remove / turn off power.
2. Remove the Cable-X cover / lid.

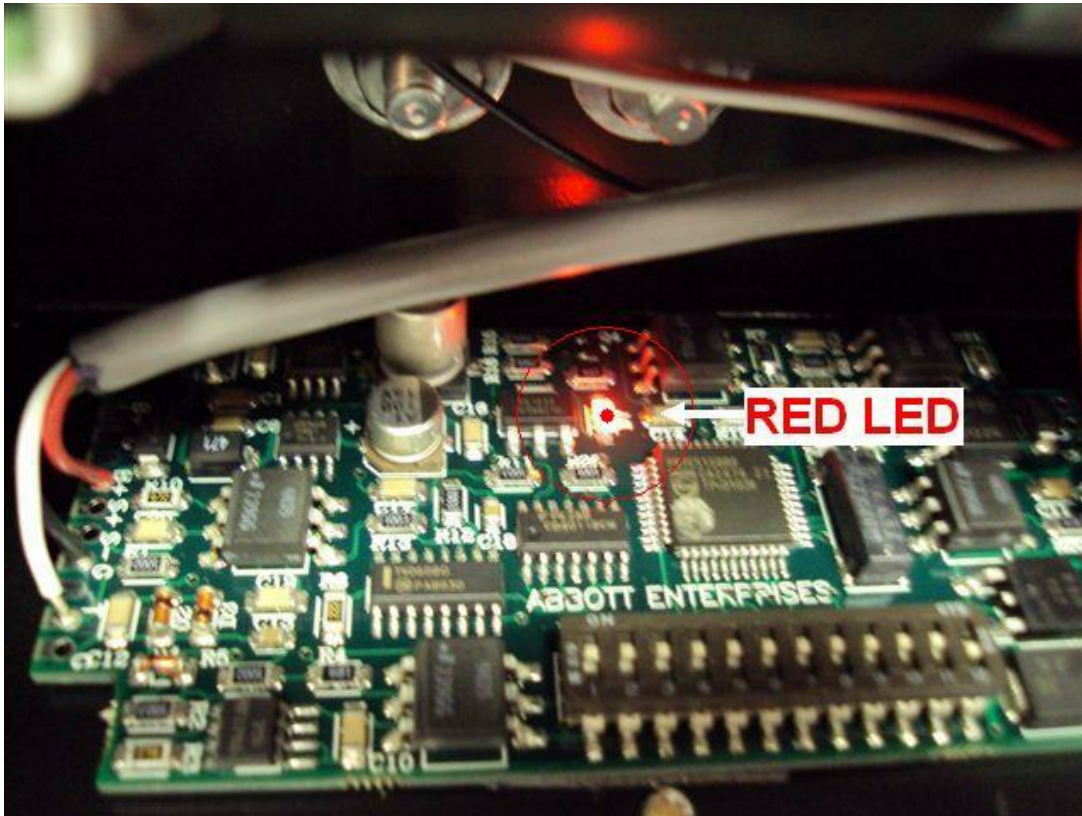


(Here is an inside view of the Cable-X with the lid removed.)

3. Write down the existing switch settings for possible future use.
4. Set all dip switches to the open (off) position.



5. Apply power. The "LED" must blink only once when the power is applied. (The circuitry will only go into the self test mode if switches #1 through #11 are open (off) before the power is applied.)



6. Close (turn on) switches #1 through #11 in order, beginning with #1. The "LED" will blink once after each switch is closed (turned on).
7. After switch #11 is closed, the speedometer will run at a speed of 16 mph for 20 seconds. The vehicle odometer will advance slightly less than 0.1 miles. The "LED" will be on 'steady' during this part of the test.
8. After the speedometer stops, the "LED" will blink on and off.
9. If all steps listed are completed successfully, then the Cable-X, and the cable connected to the speedometer, are functioning properly. If the Cable-X, after calibrating the switches, does not work, there is either a 'signal' problem or the switches are incorrectly set.
10. You are now ready to calculate the specific pulses per mile for the Cable-X programming.

Calculating your Pulses Per Mile:

Please note: A speed signal from the VSS is the *preferred* signal source, but the computer output will operate the Cable-X and speedometer.

Connected to the VSS:

To program the Cable-X's dip switches for a particular vehicle, the following formula applies:

$$\text{(teeth on transmission exciter gear) X (rear axle ratio) X (revolutions per mile of your tires)}$$

- Teeth on transmission exciter gear: This would refer to the number of teeth or pulses the transmission would count out per revolution of the drive shaft. Most GMs with automatic transmissions output 40 pulses per revolution. High performance transmissions, like in Trans Ams, Camaros and Corvettes that have '6-speeds', usually have a 17 pulse per revolution output.

- The rear axle ratio. You will need to know your rear axle ratio for accurate calibration. The ratio of 3.73 will be used in the example.
- Revolutions per mile of the tires. If you do not know the revs per mile of the tires, it can be calculated. Measure from the ground up to the center of the axle, multiply this by 2. This gives you the height of the tire with the weight of the vehicle on it. Multiply this total by 3.14 (Pi). This gives you the circumference. Divide the number of inches in a mile (63360) by the circumference of the tire to find the revs per mile.
 - Example:
 - 14.5 inches from the ground to center of axle X2 = 29 inches tall.
29 times 3.14 = 91.06
63360 (inches per mile) divided by 91.06 (circumference) = 695.8 revs per mile

Now that you've gathered relevant information, you can calculate the pulses per mile of the vehicle.

- The above information will be used for calculations in this example.

Example:

40 (teeth on exciter) X 3.73 (rear axle ratio) X 695.8 (revs per mile of tire) = 103813 pulses per mile.

Look up the nearest program setting in the calibration chart. The nearest setting 103800 and will be used for calibration.

The switch setting for that pulse per mile setting is: 1 0 1 0 1 1 0 1 0 0 0 0 .

Switches 1, 3, 5, 6, & 8 will be closed ('on').

Signal Generator:

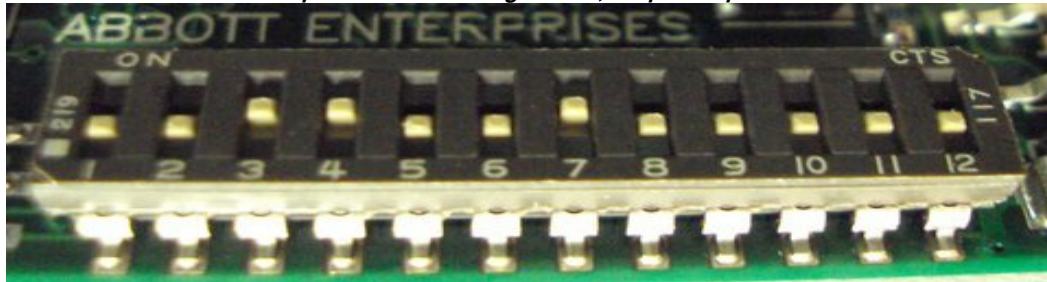
If you are using a signal generator (sending unit) instead of a VSS sensor, use the pulses per revolution X 1000 for a good starting point. For example: An 8 pulse signal generator X 1000 = 8000 pulses per mile. The setting for 8000 ppm (7950 is the closest setting) is: 0 0 0 0 1 1 0 1 0 0 1 0. Switches 5, 6, 8, & 11 will be closed.

ECM or Computer Speed Output:

If you are using the ECM speed output, the pulses are usually 4000 pulses per mile. The setting for 4000 ppm (4050 is the closest setting) is: 0 0 0 0 0 1 1 0 1 0 1 0. Switches 6, 7, 9, & 11 will be closed.

- The above two signal sources may have to be recalibrated up or down to obtain speedometer accuracy due to rear axle ratios and tire sizes that vary from stock.

Example of switch settings for 30,000 pulses per mile:



This example shows switches 3, 4, & 7 in the closed (on) position.
The setting in the chart below would appear like: 0 0 1 1 0 0 1 0 0 0
("1" represents switch is "on" or "closed", "0" represents switch is "off" or "open")

The calibration chart below shows the switch settings for switches 1-9, & 11 and will be used in calibrating the Cable-X to the vehicle. Switches 10 & 12 are *not* displayed in this chart.

- Switch 10 has a specific function as a pulse divider, by a factor of 10, and is only used in extremely high pulse rate situations. Switch #10 will *never* be turned 'on' with a 30-slot model Cable-X.
- Switch 12 is an inline signal amplifier and is only used when you have a 3-wire speed sensor (hall effect type) or an extremely weak signal.

More technical information to come..... Let us know if you have questions:

[Need Technical Help? Email: info@atrol.com](mailto:info@atrol.com)

Switch Settings

#1 #2 #3 #4 #5 #6 #7 #8 #9 #11 (Pulses/Mile)

0	0	0	0	0	0	0	0	0	1	150
0	0	0	0	0	0	0	0	1	0	300
0	0	0	0	0	0	0	0	1	1	450
0	0	0	0	0	0	0	1	0	0	600
0	0	0	0	0	0	0	1	0	1	750
0	0	0	0	0	0	0	1	1	0	900
0	0	0	0	0	0	0	1	1	1	1050
0	0	0	0	0	0	1	0	0	0	1200
0	0	0	0	0	0	1	0	0	1	1350
0	0	0	0	0	0	1	0	1	0	1500
0	0	0	0	0	0	1	0	1	1	1650
0	0	0	0	0	0	1	1	0	0	1800
0	0	0	0	0	0	1	1	0	1	1950
0	0	0	0	0	0	1	1	1	0	2100
0	0	0	0	0	0	1	1	1	1	2250
0	0	0	0	0	1	0	0	0	0	2400
0	0	0	0	0	1	0	0	0	1	2550
0	0	0	0	0	1	0	0	1	0	2700
0	0	0	0	0	1	0	0	1	1	2850
0	0	0	0	0	1	0	1	0	0	3000
0	0	0	0	0	1	0	1	0	1	3150
0	0	0	0	0	1	0	1	1	0	3300
0	0	0	0	0	1	0	1	1	1	3450
0	0	0	0	0	1	1	0	0	0	3600
0	0	0	0	0	1	1	0	0	1	3750
0	0	0	0	0	1	1	0	1	0	3900
0	0	0	0	0	1	1	0	1	1	4050
0	0	0	0	0	1	1	1	0	0	4200
0	0	0	0	0	1	1	1	0	1	4350
0	0	0	0	0	1	1	1	1	0	4500
0	0	0	0	0	1	1	1	1	1	4650
0	0	0	0	1	0	0	0	0	0	4800
0	0	0	0	1	0	0	0	0	1	4950
0	0	0	0	1	0	0	0	1	0	5100
0	0	0	0	1	0	0	0	1	1	5250
0	0	0	0	1	0	0	1	0	0	5400
0	0	0	0	1	0	0	1	0	1	5550
0	0	0	0	1	0	0	1	1	0	5700
0	0	0	0	1	0	0	1	1	1	5850
0	0	0	0	1	0	1	0	0	0	6000
0	0	0	0	1	0	1	0	0	1	6150

#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
0	0	0	0	1	0	1	0	1	0	6300
0	0	0	0	1	0	1	0	1	1	6450
0	0	0	0	1	0	1	1	0	0	6600
0	0	0	0	1	0	1	1	0	1	6750
0	0	0	0	1	0	1	1	1	0	6900
0	0	0	0	1	0	1	1	1	1	7050
0	0	0	0	1	1	0	0	0	0	7200
0	0	0	0	1	1	0	0	0	1	7350
0	0	0	0	1	1	0	0	1	0	7500
0	0	0	0	1	1	0	0	1	1	7650
0	0	0	0	1	1	0	1	0	0	7800
0	0	0	0	1	1	0	1	0	1	7950
0	0	0	0	1	1	0	1	1	0	8100
0	0	0	0	1	1	0	1	1	1	8250
0	0	0	0	1	1	1	0	0	0	8400
0	0	0	0	1	1	1	0	0	1	8550
0	0	0	0	1	1	1	0	1	0	8700
0	0	0	0	1	1	1	0	1	1	8850
0	0	0	0	1	1	1	1	0	0	9000
0	0	0	0	1	1	1	1	0	1	9150
0	0	0	0	1	1	1	1	1	0	9300
0	0	0	0	1	1	1	1	1	1	9450
0	0	0	1	0	0	0	0	0	0	9600
0	0	0	1	0	0	0	0	0	1	9750
0	0	0	1	0	0	0	0	1	0	9900
0	0	0	1	0	0	0	0	1	1	10050
0	0	0	1	0	0	0	1	0	0	10200
0	0	0	1	0	0	0	1	0	1	10350

0	0	0	1	0	0	0	1	1	0	10500
0	0	0	1	0	0	0	1	1	1	10650
0	0	0	1	0	0	1	0	0	0	10800
0	0	0	1	0	0	1	0	0	1	10950
0	0	0	1	0	0	1	0	1	0	11100
0	0	0	1	0	0	1	0	1	1	11250
0	0	0	1	0	0	1	1	0	0	11400
0	0	0	1	0	0	1	1	0	1	11550
0	0	0	1	0	0	1	1	1	0	11700
0	0	0	1	0	0	1	1	1	1	11850
0	0	0	1	0	1	0	0	0	0	12000
0	0	0	1	0	1	0	0	0	1	12150
0	0	0	1	0	1	0	0	1	0	12300
0	0	0	1	0	1	0	0	1	1	12450
0	0	0	1	0	1	0	1	0	0	12600
0	0	0	1	0	1	0	1	0	1	12750
0	0	0	1	0	1	0	1	1	0	12900
0	0	0	1	0	1	0	1	1	1	13050
0	0	0	1	0	1	1	0	0	0	13200
0	0	0	1	0	1	1	0	0	1	13350
0	0	0	1	0	1	1	0	1	0	13500
0	0	0	1	0	1	1	0	1	1	13650
0	0	0	1	0	1	1	1	0	0	13800
0	0	0	1	0	1	1	1	0	1	13950

#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
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0	0	0	1	0	1	1	1	1	0	14100
0	0	0	1	0	1	1	1	1	1	14250
0	0	0	1	1	0	0	0	0	0	14400
0	0	0	1	1	0	0	0	0	1	14550
0	0	0	1	1	0	0	0	1	0	14700
0	0	0	1	1	0	0	0	1	1	14850
0	0	0	1	1	0	0	1	0	0	15000
0	0	0	1	1	0	0	1	0	1	15150
0	0	0	1	1	0	0	1	1	0	15300
0	0	0	1	1	0	0	1	1	1	15450
0	0	0	1	1	0	1	0	0	0	15600
0	0	0	1	1	0	1	0	0	1	15750
0	0	0	1	1	0	1	0	1	0	15900
0	0	0	1	1	0	1	0	1	1	16050
0	0	0	1	1	0	1	1	0	0	16200
0	0	0	1	1	0	1	1	0	1	16350
0	0	0	1	1	0	1	1	1	0	16500
0	0	0	1	1	0	1	1	1	1	16650
0	0	0	1	1	1	0	0	0	0	16800
0	0	0	1	1	1	0	0	0	1	16950
0	0	0	1	1	1	0	0	1	0	17100
0	0	0	1	1	1	0	0	1	1	17250
0	0	0	1	1	1	0	1	0	0	17400
0	0	0	1	1	1	0	1	0	1	17550
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0	0	0	1	1	1	1	0	1	0	18300
0	0	0	1	1	1	1	0	1	1	18450
0	0	0	1	1	1	1	1	1	0	18600
0	0	0	1	1	1	1	1	0	1	18750
0	0	0	1	1	1	1	1	1	0	18900
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0	0	1	0	0	0	0	0	1	0	19500
0	0	1	0	0	0	0	0	1	1	19650
0	0	1	0	0	0	0	1	0	0	19800
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0	0	1	0	0	0	1	0	0	1	20550
0	0	1	0	0	0	1	0	1	0	20700
0	0	1	0	0	0	1	0	1	1	20850

0	0	1	0	0	0	1	1	0	0	21000
0	0	1	0	0	0	1	1	0	1	21150
0	0	1	0	0	0	1	1	1	0	21300
0	0	1	0	0	0	1	1	1	1	21450
0	0	1	0	0	1	0	0	0	0	21600
0	0	1	0	0	1	0	0	0	1	21750

#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
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0	0	1	0	0	1	0	0	1	0	21900
0	0	1	0	0	1	0	0	1	1	22050
0	0	1	0	0	1	0	1	0	0	22200
0	0	1	0	0	1	0	1	0	1	22350
0	0	1	0	0	1	0	1	1	0	22500
0	0	1	0	0	1	0	1	1	1	22650
0	0	1	0	0	1	1	0	0	0	22800
0	0	1	0	0	1	1	0	0	1	22950
0	0	1	0	0	1	1	0	1	0	23100
0	0	1	0	0	1	1	0	1	1	23250
0	0	1	0	0	1	1	1	0	0	23400
0	0	1	0	0	1	1	1	1	0	23550
0	0	1	0	0	1	1	1	1	0	23700
0	0	1	0	0	1	1	1	1	1	23850
0	0	1	0	1	0	0	0	0	0	24000
0	0	1	0	1	0	0	0	0	1	24150
0	0	1	0	1	0	0	0	1	0	24300
0	0	1	0	1	0	0	0	1	1	24450
0	0	1	0	1	0	0	1	0	0	24600
0	0	1	0	1	0	0	1	0	1	24750
0	0	1	0	1	0	0	1	1	0	24900
0	0	1	0	1	0	0	1	1	1	25050
0	0	1	0	1	0	1	0	0	0	25200
0	0	1	0	1	0	1	0	0	1	25350
0	0	1	0	1	0	1	0	1	0	25500
0	0	1	0	1	0	1	0	1	1	25650
0	0	1	0	1	0	1	1	0	0	25800
0	0	1	0	1	0	1	1	1	0	25950
0	0	1	0	1	0	1	1	1	0	26100
0	0	1	0	1	0	1	1	1	1	26250
0	0	1	0	1	1	0	0	0	0	26400
0	0	1	0	1	1	0	0	0	1	26550
0	0	1	0	1	1	0	0	1	0	26700
0	0	1	0	1	1	0	0	1	1	26850
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0	0	1	0	1	1	0	1	1	0	27300
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0	0	1	1	0	0	0	0	0	0	28800
0	0	1	1	0	0	0	0	0	1	28950
0	0	1	1	0	0	0	0	1	0	29100
0	0	1	1	0	0	0	0	1	1	29250
0	0	1	1	0	0	0	1	0	0	29400
0	0	1	1	0	0	0	1	0	1	29550

#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
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0	0	1	1	0	0	0	1	1	0	29700
0	0	1	1	0	0	0	1	1	1	29850
0	0	1	1	0	0	1	0	0	0	30000
0	0	1	1	0	0	1	0	0	1	30150
0	0	1	1	0	0	1	0	1	0	30300
0	0	1	1	0	0	1	0	1	1	30450
0	0	1	1	0	0	1	1	0	0	30600
0	0	1	1	0	0	1	1	0	1	30750

0	0	1	1	0	0	1	1	1	0	30900
0	0	1	1	0	0	1	1	1	1	31050
0	0	1	1	0	1	0	0	0	0	31200
0	0	1	1	0	1	0	0	0	1	31350
0	0	1	1	0	1	0	0	1	0	31500
0	0	1	1	0	1	0	0	1	1	31650
0	0	1	1	0	1	0	1	0	0	31800
0	0	1	1	0	1	0	1	0	1	31950
0	0	1	1	0	1	0	1	1	0	32100
0	0	1	1	0	1	0	1	1	1	32250
0	0	1	1	0	1	1	0	0	0	32400
0	0	1	1	0	1	1	0	0	1	32550
0	0	1	1	0	1	1	0	1	0	32700
0	0	1	1	0	1	1	0	1	1	32850
0	0	1	1	0	1	1	1	0	0	33000
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0	0	1	1	1	0	0	0	1	0	33900
0	0	1	1	1	0	0	0	1	1	34050
0	0	1	1	1	0	0	1	0	0	34200
0	0	1	1	1	0	0	1	0	1	34350
0	0	1	1	1	0	0	1	1	0	34500
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0	0	1	1	1	0	1	0	1	0	35100
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0	0	1	1	1	1	0	0	0	0	36000
0	0	1	1	1	1	0	0	0	1	36150
0	0	1	1	1	1	0	0	1	0	36300
0	0	1	1	1	1	0	0	1	1	36450
0	0	1	1	1	1	0	1	0	0	36600
0	0	1	1	1	1	0	1	0	1	36750
0	0	1	1	1	1	0	1	1	0	36900
0	0	1	1	1	1	0	1	1	1	37050
0	0	1	1	1	1	1	0	0	0	37200
0	0	1	1	1	1	1	0	0	1	37350

#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
0	0	1	1	1	1	1	0	1	0	37500
0	0	1	1	1	1	1	0	1	1	37650
0	0	1	1	1	1	1	1	0	0	37800
0	0	1	1	1	1	1	1	0	1	37950
0	0	1	1	1	1	1	1	1	0	38100
0	0	1	1	1	1	1	1	1	1	38250
0	1	0	0	0	0	0	0	0	0	38400
0	1	0	0	0	0	0	0	0	1	38550
0	1	0	0	0	0	0	0	1	0	38700
0	1	0	0	0	0	0	0	1	1	38850
0	1	0	0	0	0	0	1	0	0	39000
0	1	0	0	0	0	0	1	0	1	39150
0	1	0	0	0	0	0	1	1	0	39300
0	1	0	0	0	0	0	1	1	1	39450
0	1	0	0	0	0	1	0	0	0	39600
0	1	0	0	0	0	1	0	0	1	39750
0	1	0	0	0	0	1	0	1	0	39900
0	1	0	0	0	0	1	0	1	1	40050
0	1	0	0	0	0	1	1	0	0	40200
0	1	0	0	0	0	1	1	0	1	40350
0	1	0	0	0	0	1	1	1	0	40500
0	1	0	0	0	0	1	1	1	1	40650
0	1	0	0	0	1	0	0	0	0	40800
0	1	0	0	0	1	0	0	0	1	40950
0	1	0	0	0	1	0	0	1	0	41100

0	1	0	0	0	1	0	0	1	1	41250
0	1	0	0	0	1	0	1	0	0	41400
0	1	0	0	0	1	0	1	0	1	41550
0	1	0	0	0	1	0	1	1	0	41700
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0	1	0	0	0	1	1	0	0	0	42000
0	1	0	0	0	1	1	0	0	1	42150
0	1	0	0	0	1	1	0	1	0	42300
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0	1	0	0	0	1	1	1	0	1	42750
0	1	0	0	0	1	1	1	1	0	42900
0	1	0	0	0	1	1	1	1	1	43050
0	1	0	0	1	0	0	0	0	0	43200
0	1	0	0	1	0	0	0	0	1	43350
0	1	0	0	1	0	0	0	1	0	43500
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0	1	0	0	1	0	0	1	0	0	43800
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0	1	0	0	1	0	0	1	1	0	44100
0	1	0	0	1	0	0	1	1	1	44250
0	1	0	0	1	0	1	0	0	0	44400
0	1	0	0	1	0	1	0	0	1	44550
0	1	0	0	1	0	1	0	1	0	44700
0	1	0	0	1	0	1	0	1	1	44850
0	1	0	0	1	0	1	1	0	0	45000
0	1	0	0	1	0	1	1	0	1	45150

#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
0	1	0	0	1	0	1	1	1	0	45300
0	1	0	0	1	0	1	1	1	1	45450
0	1	0	0	1	1	0	0	0	0	45600
0	1	0	0	1	1	0	0	0	1	45750
0	1	0	0	1	1	0	0	1	0	45900
0	1	0	0	1	1	0	0	1	1	46050
0	1	0	0	1	1	0	1	0	0	46200
0	1	0	0	1	1	0	1	0	1	46350
0	1	0	0	1	1	0	1	1	0	46500
0	1	0	0	1	1	0	1	1	1	46650
0	1	0	0	1	1	1	0	0	0	46800
0	1	0	0	1	1	1	0	0	1	46950
0	1	0	0	1	1	1	0	1	0	47100
0	1	0	0	1	1	1	0	1	1	47250
0	1	0	0	1	1	1	1	0	0	47400
0	1	0	0	1	1	1	1	0	1	47550
0	1	0	0	1	1	1	1	1	0	47700
0	1	0	0	1	1	1	1	1	1	47850
0	1	0	1	0	0	0	0	0	0	48000
0	1	0	1	0	0	0	0	0	1	48150
0	1	0	1	0	0	0	0	1	0	48300
0	1	0	1	0	0	0	0	1	1	48450
0	1	0	1	0	0	0	1	0	0	48600
0	1	0	1	0	0	0	1	0	1	48750
0	1	0	1	0	0	0	1	1	0	48900
0	1	0	1	0	0	0	1	1	1	49050
0	1	0	1	0	0	1	0	0	0	49200
0	1	0	1	0	0	1	0	0	1	49350
0	1	0	1	0	0	1	0	1	0	49500
0	1	0	1	0	0	1	0	1	1	49650
0	1	0	1	0	0	1	1	0	0	49800
0	1	0	1	0	0	1	1	0	1	49950
0	1	0	1	0	0	1	1	1	0	50100
0	1	0	1	0	0	1	1	1	1	50250
0	1	0	1	0	1	0	0	0	0	50400
0	1	0	1	0	1	0	0	0	1	50550
0	1	0	1	0	1	0	0	1	0	50700
0	1	0	1	0	1	0	0	1	1	50850
0	1	0	1	0	1	0	1	0	0	51000
0	1	0	1	0	1	0	1	0	1	51150
0	1	0	1	0	1	0	1	1	0	51300
0	1	0	1	0	1	0	1	1	1	51450

0	1	0	1	0	1	1	0	0	0	51600
0	1	0	1	0	1	1	0	0	1	51750
0	1	0	1	0	1	1	0	1	0	51900
0	1	0	1	0	1	1	0	1	1	52050
0	1	0	1	0	1	1	1	0	0	52200
0	1	0	1	0	1	1	1	0	1	52350
0	1	0	1	0	1	1	1	1	0	52500
0	1	0	1	0	1	1	1	1	1	52650
0	1	0	1	1	0	0	0	0	0	52800
0	1	0	1	1	0	0	0	0	1	52950

#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
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0	1	0	1	1	0	0	0	1	0	53100
0	1	0	1	1	0	0	0	1	1	53250
0	1	0	1	1	0	0	1	0	0	53400
0	1	0	1	1	0	0	1	0	1	53550
0	1	0	1	1	0	0	1	1	0	53700
0	1	0	1	1	0	0	1	1	1	53850
0	1	0	1	1	0	1	0	0	0	54000
0	1	0	1	1	0	1	0	0	1	54150
0	1	0	1	1	0	1	0	1	0	54300
0	1	0	1	1	0	1	0	1	1	54450
0	1	0	1	1	0	1	1	0	0	54600
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0	1	0	1	1	0	1	1	1	0	54900
0	1	0	1	1	0	1	1	1	1	55050
0	1	0	1	1	1	0	0	0	0	55200
0	1	0	1	1	1	0	0	0	1	55350
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0	1	0	1	1	1	0	0	1	1	55650
0	1	0	1	1	1	0	1	0	0	55800
0	1	0	1	1	1	0	1	0	1	55950
0	1	0	1	1	1	0	1	1	0	56100
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0	1	0	1	1	1	1	0	0	0	56400
0	1	0	1	1	1	1	1	0	0	56550
0	1	0	1	1	1	1	0	1	0	56700
0	1	0	1	1	1	1	0	1	1	56850
0	1	0	1	1	1	1	1	0	0	57000
0	1	0	1	1	1	1	1	0	1	57150
0	1	0	1	1	1	1	1	1	0	57300
0	1	0	1	1	1	1	1	1	1	57450
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0	1	1	0	0	0	0	0	0	1	57750
0	1	1	0	0	0	0	0	1	0	57900
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0	1	1	0	0	0	0	1	0	1	58350
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0	1	1	0	0	0	1	0	0	0	58800
0	1	1	0	0	0	1	0	0	1	58950
0	1	1	0	0	0	1	0	1	0	59100
0	1	1	0	0	0	1	0	1	1	59250
0	1	1	0	0	0	1	1	0	0	59400
0	1	1	0	0	0	1	1	0	1	59550
0	1	1	0	0	0	1	1	1	0	59700
0	1	1	0	0	0	1	1	1	1	59850
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0	1	1	0	0	1	0	0	0	1	60150
0	1	1	0	0	1	0	0	1	0	60300
0	1	1	0	0	1	0	0	1	1	60450
0	1	1	0	0	1	0	1	0	0	60600
0	1	1	0	0	1	0	1	0	1	60750

#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
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0	1	1	0	0	1	0	1	1	0	60900
0	1	1	0	0	1	0	1	1	1	61050

0	1	1	0	0	1	1	0	0	0	61200
0	1	1	0	0	1	1	0	0	1	61350
0	1	1	0	0	1	1	0	1	0	61500
0	1	1	0	0	1	1	0	1	1	61650
0	1	1	0	0	1	1	1	0	0	61800
0	1	1	0	0	1	1	1	0	1	61950
0	1	1	0	0	1	1	1	1	0	62100
0	1	1	0	0	1	1	1	1	1	62250
0	1	1	0	1	0	0	0	0	0	62400
0	1	1	0	1	0	0	0	0	1	62550
0	1	1	0	1	0	0	0	1	0	62700
0	1	1	0	1	0	0	0	1	1	62850
0	1	1	0	1	0	0	1	0	0	63000
0	1	1	0	1	0	0	1	0	1	63150
0	1	1	0	1	0	0	1	1	0	63300
0	1	1	0	1	0	0	1	1	1	63450
0	1	1	0	1	0	1	0	0	0	63600
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0	1	1	0	1	0	1	0	1	0	63900
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0	1	1	0	1	0	1	1	0	0	64200
0	1	1	0	1	0	1	1	0	1	64350
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0	1	1	0	1	0	1	1	1	1	64650
0	1	1	0	1	1	0	0	0	0	64800
0	1	1	0	1	1	0	0	0	1	64950
0	1	1	0	1	1	0	0	1	0	65100
0	1	1	0	1	1	0	0	1	1	65250
0	1	1	0	1	1	0	1	0	0	65400
0	1	1	0	1	1	0	1	0	1	65550
0	1	1	0	1	1	0	1	1	0	65700
0	1	1	0	1	1	0	1	1	1	65850
0	1	1	0	1	1	1	0	0	0	66000
0	1	1	0	1	1	1	0	0	1	66150
0	1	1	0	1	1	1	0	1	0	66300
0	1	1	0	1	1	1	0	1	1	66450
0	1	1	0	1	1	1	1	0	0	66600
0	1	1	0	1	1	1	1	0	1	66750
0	1	1	0	1	1	1	1	1	0	66900
0	1	1	0	1	1	1	1	1	1	67050
0	1	1	1	0	0	0	0	0	0	67200
0	1	1	1	0	0	0	0	0	1	67350
0	1	1	1	0	0	0	0	1	0	67500
0	1	1	1	0	0	0	0	1	1	67650
0	1	1	1	0	0	0	1	0	0	67800
0	1	1	1	0	0	0	1	0	1	67950
0	1	1	1	0	0	0	1	1	0	68100
0	1	1	1	0	0	0	1	1	1	68250
0	1	1	1	0	0	1	0	0	0	68400
0	1	1	1	0	0	1	0	0	1	68550

#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
0	1	1	1	0	0	1	0	1	0	68700
0	1	1	1	0	0	1	0	1	1	68850
0	1	1	1	0	0	1	1	0	0	69000
0	1	1	1	0	0	1	1	0	1	69150
0	1	1	1	0	0	1	1	1	0	69300
0	1	1	1	0	0	1	1	1	1	69450
0	1	1	1	0	1	0	0	0	0	69600
0	1	1	1	0	1	0	0	0	1	69750
0	1	1	1	0	1	0	0	1	0	69900
0	1	1	1	0	1	0	0	1	1	70050
0	1	1	1	0	1	0	1	0	0	70200
0	1	1	1	0	1	0	1	0	1	70350
0	1	1	1	0	1	0	1	1	0	70500
0	1	1	1	0	1	0	1	1	1	70650
0	1	1	1	0	1	1	0	0	0	70800
0	1	1	1	0	1	1	0	0	1	70950
0	1	1	1	0	1	1	0	1	0	71100
0	1	1	1	0	1	1	0	1	1	71250

0	1	1	1	0	1	1	1	0	0	71400
0	1	1	1	0	1	1	1	0	1	71550
0	1	1	1	0	1	1	1	1	0	71700
0	1	1	1	0	1	1	1	1	1	71850
0	1	1	1	1	0	0	0	0	0	72000
0	1	1	1	1	0	0	0	0	1	72150
0	1	1	1	1	0	0	0	1	0	72300
0	1	1	1	1	0	0	0	1	1	72450
0	1	1	1	1	0	0	1	0	0	72600
0	1	1	1	1	0	0	1	0	1	72750
0	1	1	1	1	0	0	1	1	0	72900
0	1	1	1	1	0	0	1	1	1	73050
0	1	1	1	1	0	1	0	0	0	73200
0	1	1	1	1	0	1	0	0	1	73350
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0	1	1	1	1	0	1	0	1	1	73650
0	1	1	1	1	0	1	1	0	0	73800
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0	1	1	1	1	0	1	1	1	0	74100
0	1	1	1	1	0	1	1	1	1	74250
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0	1	1	1	1	1	0	0	1	0	74700
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0	1	1	1	1	1	0	1	0	0	75000
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0	1	1	1	1	1	0	1	1	0	75300
0	1	1	1	1	1	0	1	1	1	75450
0	1	1	1	1	1	1	0	0	0	75600
0	1	1	1	1	1	1	0	0	1	75750
0	1	1	1	1	1	1	0	1	0	75900
0	1	1	1	1	1	1	0	1	1	76050
0	1	1	1	1	1	1	1	0	0	76200
0	1	1	1	1	1	1	1	0	1	76350

#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
0	1	1	1	1	1	1	1	1	0	76500
0	1	1	1	1	1	1	1	1	1	76650
1	0	0	0	0	0	0	0	0	0	76800
1	0	0	0	0	0	0	0	0	1	76950
1	0	0	0	0	0	0	0	0	1	77100
1	0	0	0	0	0	0	0	0	1	77250
1	0	0	0	0	0	0	0	1	0	77400
1	0	0	0	0	0	0	0	1	0	77550
1	0	0	0	0	0	0	0	1	1	77700
1	0	0	0	0	0	0	0	1	1	77850
1	0	0	0	0	0	1	0	0	0	78000
1	0	0	0	0	0	1	0	0	1	78150
1	0	0	0	0	0	1	0	1	0	78300
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1	0	0	0	0	0	1	1	0	1	78750
1	0	0	0	0	0	1	1	1	0	78900
1	0	0	0	0	0	1	1	1	1	79050
1	0	0	0	0	1	0	0	0	0	79200
1	0	0	0	0	1	0	0	0	1	79350
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1	0	0	0	0	1	0	1	1	0	80100
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1	0	0	0	0	1	1	1	1	0	81300
1	0	0	0	0	1	1	1	1	1	81450

1	0	0	0	1	0	0	0	0	0	81600
1	0	0	0	1	0	0	0	0	1	81750
1	0	0	0	1	0	0	0	1	0	81900
1	0	0	0	1	0	0	0	1	1	82050
1	0	0	0	1	0	0	1	0	0	82200
1	0	0	0	1	0	0	1	0	1	82350
1	0	0	0	1	0	0	1	1	0	82500
1	0	0	0	1	0	0	1	1	1	82650
1	0	0	0	1	0	1	0	0	0	82800
1	0	0	0	1	0	1	0	0	1	82950
1	0	0	0	1	0	1	0	1	0	83100
1	0	0	0	1	0	1	0	1	1	83250
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1	0	0	0	1	0	1	1	0	1	83550
1	0	0	0	1	0	1	1	1	0	83700
1	0	0	0	1	0	1	1	1	1	83850
1	0	0	0	1	1	0	0	0	0	84000
1	0	0	0	1	1	0	0	0	1	84150

#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
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1	0	0	0	1	1	0	0	1	0	84300
1	0	0	0	1	1	0	0	1	1	84450
1	0	0	0	1	1	0	1	0	0	84600
1	0	0	0	1	1	0	1	0	1	84750
1	0	0	0	1	1	0	1	1	0	84900
1	0	0	0	1	1	0	1	1	1	85050
1	0	0	0	1	1	1	0	0	0	85200
1	0	0	0	1	1	1	0	0	1	85350
1	0	0	0	1	1	1	0	1	0	85500
1	0	0	0	1	1	1	0	1	1	85650
1	0	0	0	1	1	1	1	0	0	85800
1	0	0	0	1	1	1	1	0	1	85950
1	0	0	0	1	1	1	1	1	0	86100
1	0	0	0	1	1	1	1	1	1	86250
1	0	0	1	0	0	0	0	0	0	86400
1	0	0	1	0	0	0	0	0	1	86550
1	0	0	1	0	0	0	0	1	0	86700
1	0	0	1	0	0	0	0	1	1	86850
1	0	0	1	0	0	0	1	0	0	87000
1	0	0	1	0	0	0	1	0	1	87150
1	0	0	1	0	0	0	1	1	0	87300
1	0	0	1	0	0	0	1	1	1	87450
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1	0	0	1	0	0	1	0	1	1	88050
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1	0	0	1	0	1	1	1	1	1	91050
1	0	0	1	1	0	0	0	0	0	91200
1	0	0	1	1	0	0	0	0	1	91350
1	0	0	1	1	0	0	0	1	0	91500
1	0	0	1	1	0	0	0	1	1	91650

1	0	0	1	1	0	0	1	0	0	91800
1	0	0	1	1	0	0	1	0	1	91950

#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
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1	0	0	1	1	0	0	1	1	1	92250
1	0	0	1	1	0	1	0	0	0	92400
1	0	0	1	1	0	1	0	0	1	92550
1	0	0	1	1	0	1	0	1	0	92700
1	0	0	1	1	0	1	0	1	1	92850
1	0	0	1	1	0	1	1	1	0	93000
1	0	0	1	1	0	1	1	0	1	93150
1	0	0	1	1	0	1	1	1	0	93300
1	0	0	1	1	0	1	1	1	1	93450
1	0	0	1	1	1	0	0	0	0	93600
1	0	0	1	1	1	0	0	0	1	93750
1	0	0	1	1	1	0	0	1	0	93900
1	0	0	1	1	1	0	0	1	1	94050
1	0	0	1	1	1	0	1	0	0	94200
1	0	0	1	1	1	0	1	0	1	94350
1	0	0	1	1	1	0	1	1	0	94500
1	0	0	1	1	1	0	1	1	1	94650
1	0	0	1	1	1	1	0	0	0	94800
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1	0	0	1	1	1	1	0	1	0	95100
1	0	0	1	1	1	1	0	1	1	95250
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1	0	0	1	1	1	1	1	0	1	95550
1	0	0	1	1	1	1	1	1	0	95700
1	0	0	1	1	1	1	1	1	1	95850
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1	0	1	0	0	0	0	0	0	1	96150
1	0	1	0	0	0	0	0	1	0	96300
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1	0	1	0	0	0	1	0	0	1	97350
1	0	1	0	0	0	1	0	1	0	97500
1	0	1	0	0	0	1	0	1	1	97650
1	0	1	0	0	0	1	1	0	0	97800
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1	0	1	0	0	0	1	1	1	0	98100
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1	0	1	0	0	1	0	0	1	0	98700
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1	0	1	0	0	1	0	1	0	0	99000
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1	0	1	0	0	1	0	1	1	0	99300
1	0	1	0	0	1	0	1	1	1	99450
1	0	1	0	0	1	1	0	0	0	99600
1	0	1	0	0	1	1	0	0	1	99750

#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
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1	0	1	0	0	1	1	0	1	1	100050
1	0	1	0	0	1	1	1	0	0	100200
1	0	1	0	0	1	1	1	0	1	100350
1	0	1	0	0	1	1	1	1	0	100500
1	0	1	0	0	1	1	1	1	1	100650
1	0	1	0	1	0	0	0	0	0	100800
1	0	1	0	1	0	0	0	0	1	100950
1	0	1	0	1	0	0	0	1	0	101100
1	0	1	0	1	0	0	0	1	1	101250

1	0	1	0	1	0	0	1	0	0	101400
1	0	1	0	1	0	0	1	0	1	101550
1	0	1	0	1	0	0	1	1	0	101700
1	0	1	0	1	0	0	1	1	1	101850
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1	0	1	0	1	0	1	0	0	1	102150
1	0	1	0	1	0	1	0	1	0	102300
1	0	1	0	1	0	1	0	1	1	102450
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1	0	1	0	1	0	1	1	1	0	102900
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1	0	1	0	1	1	0	0	0	0	103200
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1	0	1	1	0	0	0	0	0	0	105600
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1	0	1	1	0	0	1	0	0	0	106800
1	0	1	1	0	0	1	0	0	1	106950
1	0	1	1	0	0	1	0	1	0	107100
1	0	1	1	0	0	1	0	1	1	107250
1	0	1	1	0	0	1	1	0	0	107400
1	0	1	1	0	0	1	1	0	1	107550

#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
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1	0	1	1	0	0	1	1	1	1	107850
1	0	1	1	0	1	0	0	0	0	108000
1	0	1	1	0	1	0	0	0	1	108150
1	0	1	1	0	1	0	0	1	0	108300
1	0	1	1	0	1	0	0	1	1	108450
1	0	1	1	0	1	0	1	0	0	108600
1	0	1	1	0	1	0	1	0	1	108750
1	0	1	1	0	1	0	1	1	0	108900
1	0	1	1	0	1	0	1	1	1	109050
1	0	1	1	0	1	1	0	0	0	109200
1	0	1	1	0	1	1	0	0	1	109350
1	0	1	1	0	1	1	0	1	0	109500
1	0	1	1	0	1	1	0	1	1	109650
1	0	1	1	0	1	1	1	0	0	109800
1	0	1	1	0	1	1	1	0	1	109950
1	0	1	1	0	1	1	1	1	0	110100
1	0	1	1	0	1	1	1	1	1	110250
1	0	1	1	1	0	0	0	0	0	110400
1	0	1	1	1	0	0	0	0	1	110550
1	0	1	1	1	0	0	0	1	0	110700
1	0	1	1	1	0	0	0	1	1	110850
1	0	1	1	1	0	0	1	0	0	111000
1	0	1	1	1	0	0	1	0	1	111150
1	0	1	1	1	0	0	1	1	0	111300
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1	0	1	1	1	1	0	0	1	0	113100
1	0	1	1	1	1	0	0	1	1	113250
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1	0	1	1	1	1	0	1	1	0	113700
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1	0	1	1	1	1	1	0	0	0	114000
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1	0	1	1	1	1	1	0	1	0	114300
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1	0	1	1	1	1	1	1	0	0	114600
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1	0	1	1	1	1	1	1	1	0	114900
1	0	1	1	1	1	1	1	1	1	115050
1	1	0	0	0	0	0	0	0	0	115200
1	1	0	0	0	0	0	0	0	1	115350

#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
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1	1	0	0	0	0	0	1	1	0	116100
1	1	0	0	0	0	0	1	1	1	116250
1	1	0	0	0	0	1	0	0	0	116400
1	1	0	0	0	0	1	0	0	1	116550
1	1	0	0	0	0	1	0	1	0	116700
1	1	0	0	0	0	1	0	1	1	116850
1	1	0	0	0	0	1	1	0	0	117000
1	1	0	0	0	0	1	1	0	1	117150
1	1	0	0	0	0	1	1	1	0	117300
1	1	0	0	0	0	1	1	1	1	117450
1	1	0	0	0	1	0	0	0	0	117600
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1	1	0	0	0	1	0	0	1	0	117900
1	1	0	0	0	1	0	0	1	1	118050
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1	1	0	0	0	1	0	1	0	1	118350
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1	1	0	0	1	1	0	0	1	1	122850
1	1	0	0	1	1	0	1	0	0	123000
1	1	0	0	1	1	0	1	0	1	123150

#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
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1	1	0	0	1	1	1	1	0	1	124350
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1	1	0	1	0	0	0	0	0	0	124800
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1	1	0	1	0	0	0	0	1	1	125250
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1	1	0	1	0	0	0	1	1	0	125700
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1	1	0	1	0	0	1	0	0	0	126000
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1	1	0	1	0	0	1	1	1	1	127050
1	1	0	1	0	1	0	0	0	0	127200
1	1	0	1	0	1	0	0	0	1	127350
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1	1	0	1	1	0	0	1	0	0	130200
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#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
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1	1	0	1	1	1	1	1	1	1	134250
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1	1	1	0	0	0	0	0	0	1	134550
1	1	1	0	0	0	0	0	1	0	134700
1	1	1	0	0	0	0	0	1	1	134850
1	1	1	0	0	0	0	1	0	0	135000
1	1	1	0	0	0	0	1	0	1	135150
1	1	1	0	0	0	0	1	1	0	135300
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1	1	1	0	0	0	1	0	0	0	135600
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1	1	1	0	0	0	1	0	1	1	136050
1	1	1	0	0	0	1	1	0	0	136200
1	1	1	0	0	0	1	1	0	1	136350
1	1	1	0	0	0	1	1	1	0	136500
1	1	1	0	0	0	1	1	1	1	136650
1	1	1	0	0	1	0	0	0	0	136800
1	1	1	0	0	1	0	0	0	1	136950
1	1	1	0	0	1	0	0	1	0	137100
1	1	1	0	0	1	0	0	1	1	137250
1	1	1	0	0	1	0	1	0	0	137400
1	1	1	0	0	1	0	1	0	1	137550
1	1	1	0	0	1	0	1	1	0	137700
1	1	1	0	0	1	0	1	1	1	137850
1	1	1	0	0	1	1	0	0	0	138000
1	1	1	0	0	1	1	0	0	1	138150
1	1	1	0	0	1	1	0	1	0	138300
1	1	1	0	0	1	1	0	1	1	138450
1	1	1	0	0	1	1	1	0	0	138600
1	1	1	0	0	1	1	1	0	1	138750

#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
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1	1	1	0	0	1	1	1	1	1	139050
1	1	1	0	1	0	0	0	0	0	139200
1	1	1	0	1	0	0	0	0	1	139350
1	1	1	0	1	0	0	0	1	0	139500
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1	1	1	0	1	0	0	1	0	0	139800
1	1	1	0	1	0	0	1	0	1	139950
1	1	1	0	1	0	0	1	1	0	140100
1	1	1	0	1	0	0	1	1	1	140250
1	1	1	0	1	0	1	0	0	0	140400
1	1	1	0	1	0	1	0	0	1	140550
1	1	1	0	1	0	1	0	1	0	140700
1	1	1	0	1	0	1	0	1	1	140850
1	1	1	0	1	0	1	1	0	0	141000
1	1	1	0	1	0	1	1	0	1	141150
1	1	1	0	1	0	1	1	1	0	141300
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1	1	1	0	1	1	0	0	1	0	141900	
1	1	1	0	1	1	0	0	1	1	142050	
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1	1	1	0	1	1	0	1	0	1	142350	
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1	1	1	0	1	1	0	1	1	1	142650	
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1	1	1	0	1	1	1	0	0	1	142950	
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1	1	1	1	0	0	0	0	0	0	144000	
1	1	1	1	0	0	0	0	0	0	144150	
1	1	1	1	0	0	0	0	0	1	0	144300
1	1	1	1	0	0	0	0	0	1	1	144450
1	1	1	1	0	0	0	1	0	0	144600	
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1	1	1	1	0	0	1	0	0	0	145200	
1	1	1	1	0	0	1	0	0	1	145350	
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1	1	1	1	0	0	1	0	1	1	145650	
1	1	1	1	0	0	1	1	0	0	145800	
1	1	1	1	0	0	1	1	0	1	145950	
1	1	1	1	0	0	1	1	1	0	146100	
1	1	1	1	0	0	1	1	1	1	146250	
1	1	1	1	0	1	0	0	0	0	146400	
1	1	1	1	0	1	0	0	0	1	146550	

#1	#2	#3	#4	#5	#6	#7	#8	#9	#11	(Pulses/Mile)
1	1	1	1	0	1	0	0	1	0	146700
1	1	1	1	0	1	0	0	1	1	146850
1	1	1	1	0	1	0	1	0	0	147000
1	1	1	1	0	1	0	1	0	1	147150
1	1	1	1	0	1	0	1	1	0	147300
1	1	1	1	0	1	0	1	1	1	147450
1	1	1	1	0	1	1	0	0	0	147600
1	1	1	1	0	1	1	0	0	1	147750
1	1	1	1	0	1	1	0	1	0	147900
1	1	1	1	0	1	1	0	1	1	148050
1	1	1	1	0	1	1	1	0	0	148200
1	1	1	1	0	1	1	1	0	1	148350
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1	1	1	1	0	1	1	1	1	1	148650
1	1	1	1	1	0	0	0	0	0	148800
1	1	1	1	1	0	0	0	0	0	148950
1	1	1	1	1	0	0	0	1	0	149100
1	1	1	1	1	0	0	0	1	1	149250
1	1	1	1	1	0	0	1	0	0	149400
1	1	1	1	1	0	0	1	0	1	149550
1	1	1	1	1	0	0	1	1	0	149700
1	1	1	1	1	0	0	1	1	1	149850
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1	1	1	1	1	1	0	1	0	1	151950
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1	1	1	1	1	1	1	1	1	1	153450

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