

## CGR-201 Command List

All commands must be terminated with a newline (0x0A)

Command	Command Syntax	Description
Identify	i	Returns an identification string and the firmware revision “*Syscomp CircuitGear MKII VX.X”
<b>Scope</b> Query state	?	Returns the current oscilloscope state machine state. 0 – Idle 1 – Pre-trigger sampling 2 – Waiting for trigger to reset 3 – Armed, waiting for trigger 4 – Triggered, post trigger sampling 5 – Reading data from RAM
<b>Scope</b> Start capture	c	Arms the scope for a capture. When the capture is complete, the scope will return a data stream with the following format: DA <sub>H</sub> A <sub>L</sub> B <sub>H</sub> B <sub>L</sub> A <sub>H</sub> .... The ‘D’ character signifies the start of the data stream. A <sub>H</sub> A <sub>L</sub> are two bytes representing one 16-bit sample value from channel A. B <sub>H</sub> B <sub>L</sub> are two bytes representing one 16-bit sample value from channel B. The data stream is 4096 samples x 2 bytes/sample x 2 channels + 1 bytes long for a total of 16385 bytes. The data bytes are binary coded.
<b>Scope</b> Start strip chart sampling	C	Instructs the scope to start strip chart sampling
<b>Scope</b> Get strip chart sample	F	Request a strip chart sample. Returns ‘s’ if there is no sample ready. Returns 5 bytes: SA <sub>H</sub> A <sub>L</sub> B <sub>H</sub> B <sub>L</sub> The ‘S’ character signifies the start of the strip chart sample. A <sub>H</sub> A <sub>L</sub> are two bytes representing one 16-bit sample value from channel A. B <sub>H</sub> B <sub>L</sub> are two bytes representing one 16-bit sample value from channel B.
<b>Scope</b> Stop strip chart sampling	X	Instructs the scope to stop strip chart sampling

<p><b>Scope</b> Adjust channel Offset</p>	<p>o [A B] XXXX</p>	<p>Changes the DC offset for a scope input channel. A or B is the channel to adjust XXXX is an integer representing the offset from 0 to 4095 The offset integer is calculated as follows:</p> $Offset = 2047 - \left(\frac{V_{offset}}{\frac{Step}{2}}\right)$ <p>Where <math>V_{offset}</math> is the offset voltage. Step is the step size: 0.025 for the high input range, 0.002481 for the low input range.</p>
<p><b>Scope</b> Select timbase</p>	<p>BX</p>	<p>Changes the timebase (sampling rate) X is an ascii character: 0 – 50ns/div to 5µs/div, 40 MHz sampling rate 1 - 10µs/div, 20 MHz sampling rate 2 – 20µs/div, 10MHz sampling rate 3 – 5 MHz sampling rate 4 – 50µs/div, 2.5MHz sampling rate 5 – 100µs/div, 1.25MHz sampling rate 6 – 200µs/div, 625 kHz sampling rate 7 – 500µs/div, 312.5 kHz sampling rate 8 – 1ms/div, 156.25kHz sampling rate 9 – 2ms/div, 78.125kHz sampling rate A – 5ms/div, 39.0625kHz sampling rate B – 10ms/div, 19.53125kHz sampling rate C – 20ms/div, 9.765625kHz sampling rate D – 4.8828125kHz sampling rate E – 50ms/div, 2.44140625kHz sampling rate F – 100ms/div, 1.2207403125kHz sampling rate G – 20ms/sample, strip chart mode H – 50ms/sample, strip chart mode I – 100ms/sample, strip chart mode J – 200ms/sample, strip chart mode K – 500ms/sample, strip chart mode L – 1s/sample, strip chart mode M – 2s/sample, strip chart mode</p>

<b>Scope</b> DC Coupling	D [A B]	Selects DC coupling for channel A or B
<b>Scope</b> AC Coupling	A [A B]	Selects AC coupling for channel A or B
<b>Scope</b> Preamp range control	P [A B a b]	Selects preamp range: A – Channel A high range B – Channel B high range a – Channel A low range b – Channel B low range
<b>Scope</b> Enable auto-triggering	R	Enables auto-triggering
<b>Scope</b> Disable auto-triggering	r	Disables auto-triggering
<b>Scope</b> Set auto-trigger period	a YYYY	Sets the auto-trigger timer. YYYY is an integer. Timer period is YYYY x 32µs
<b>Scope</b> Manual trigger	M	Causes a manual trigger
<b>Scope</b> Set trigger level	T XXXX	Sets the trigger level. XXXX is an integer between 0 and 1024
<b>Scope</b> Rising trigger slope	+	Sets trigger slope to rising
<b>Scope</b> Falling trigger slope	-	Sets trigger slope to falling
<b>Scope</b> Channel A trigger source	S	Select channel A as trigger source
<b>Scope</b> Channel B trigger source	s	Select channel B as trigger source
<b>Scope</b> Select external triggering	Q	Sets external trigger input as trigger source
<b>Scope</b> Disable external triggering	q	Disables external trigger as trigger source

<b>Scope</b> Query trigger frequency	f	Returns a 3-byte number in the format: fXYZ The trigger frequency is given by: Frequency = $(X*65536+Y*256+Z)/2.56$
<b>Digital I/O</b> Set digital output	O XXX	Sets digital output to XXX XXX is a byte corresponding to the output bits
<b>Digital I/O</b> Read digital inputs	N	Returns the digital input state as "IX" Where 'I' is an ascii character X is a byte representing the current state of the digital inputs
<b>Digital I/O</b> Set digital input automatic read period	d YYYY	Sets the sampling period for automatically reading the digital inputs. YYYY is an integer The digital input sampling period is $YYYY \times 32\mu s$ The device will read the digital inputs each sampling period and return them to the host. Warning: fast sampling periods will swamp the host. Set the period to 0 to disable automatic sampling
<b>Digital I/O</b> Set PWM Frequency	G WWWXXXY YYZZZ	Sets the frequency of the PWM output. Same format/resolution as waveform output.
<b>Digital I/O</b> Set PWM Duty Cycle	Y XXX	Sets the PWM duty cycle to $XXX/255 \%$ . Where XXX is 0 to 255.
<b>General</b> Read USB Voltage	V	Reads the current USB voltage being supplied to the CircuitGear. Returns a two-byte 16-bit number in the format VXY where X is the high byte and Y is the low byte. The USB voltage is given by:  Voltage = $6.2*(256*X + Y)/2047$
<b>Waveform Generator</b> Set frequency	WFWWWXX XYYYYZZZ	Set the DDS integer to WFWWWXXYYYYZZZ Each count is 0.04656613Hz
<b>Waveform Generator</b> Set Amplitude	WAYYYY	Set the waveform amplitude to $(YYYY/4095) \times 100\%$

<b>Waveform Generator</b> Set offset	WOYYYY	Adjust the output offset. YYYY is an integer between 0 and 4095 The offset integer YYYY is calculated as follows:  $Offset = 4095 \left( \frac{(3 - V_{Offset})}{6} \right)$ Where <i>Offset</i> is the offset integer YYYY V <sub>Offset</sub> is the output offset in volts
<b>Waveform Generator</b> Select waveform	WWX	Select the output waveform. X is an ascii character: 0 – Sine 1 – Square 2 – Triangle 3 – Sawtooth 4 – Custom 5 – Noise D - Disabled
<b>Waveform Generator</b> Load custom waveform buffer	WCXXXXYYY	Load a custom waveform sample into the device buffer. Each custom waveform is 2047 samples long consisting of 8-bit samples. XXXX is the sample index (0 to 2047) YYY is the sample value (0 to 256)
<b>Waveform Generator</b> Transfer waveform buffer to generator output	Wc	Applies the custom waveform buffer to the waveform generator output.
<b>Waveform Generator</b> Save custom waveform	WX	Saves the current custom waveform to non-volatile memory
<b>Waveform Generator</b> Read current waveform	WR	Reads the current waveform Returns RWS <sub>0</sub> S <sub>1</sub> ...S <sub>255</sub> Where RW are ascii characters S <sub>0</sub> is the first sample (byte) S <sub>255</sub> is the last sample This command returns 258 bytes
<b>Waveform Generator</b> Manual Trigger	WT	Manually triggers the waveform generator

<b>Waveform Generator</b> Select Trigger Mode	WMn	Select Trigger Mode n is an ascii character: 0 – Waveform generator free-running mode 1 – Waveform generator triggered mode
<b>Waveform Generator</b> Select Trigger Source	WSn	Select Trigger Source n is an ascii character: 0 – External Trigger 1 – Manual Trigger
<b>Waveform Generator</b> Select waveform output mode	WVn	Select waveform output mode n is an ascii character: 0 – Waveform generator continuous output mode 1 – Waveform generator tone burst output mode
<b>Waveform Generator</b> Set trigger count	WYa b	Set trigger count command. Parameters a and b make up a 16-bit number which dictates how many waveform or pattern generator cycles are executed in triggered mode.
<b>Waveform Generator</b> Set tone burst on cycles	WZa b	Set tone burst on cycles. Parameters a and b make up a 16-bit number which dictates how many waveform cycles are outputted in tone burst mode.
<b>Waveform Generator</b> Set tone burst off cycles	Wza b	Set tone burst off cycles. Parameters a and b make up a 16-bit number which dictates how many waveform cycles the generator is idle in tone burst mode.