



# CX1700X Crane Service Manual

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## SAFETY AND WARNINGS BEFORE YOU BEGIN

WARNING: WHEN INSTALLING THIS GAME, A GROUNDED A.C. RECEPTACLE MUST BE USED. FAILURE TO DO SO COULD RESULT IN INJURY TO YOURSELF OR OTHERS. FAILURE TO USE A GROUNDED RECEPTACLE COULD ALSO CAUSE IMPROPER GAME OPERATION, OR DAMAGE TO THE ELECTRONICS.

**NOTE: THIS GAME IS INTENDED FOR INDOOR USE ONLY.**

DO NOT DEFEAT OR REMOVE THE GROUNDING PRONG ON THE POWER CORD FOR THE SAME REASON AS GIVEN ABOVE. USING AN IMPROPERLY GROUNDED GAME COULD VOID YOUR WARRANTY.

HAVE A QUALIFIED ELECTRICIAN CHECK YOUR A.C. RECEPTACLE TO BE SURE THE GROUND IS FUNCTIONING PROPERLY.

THIS GAME IS DESIGNED TO DISSIPATE STATIC ELECTRICITY THROUGH THE GROUNDING PLANE OF THE GAME. IF THE A.C. GROUND DOES NOT WORK, THE GAME COULD DISCHARGE STATIC ELECTRICITY THROUGH THE GAME CIRCUITRY, WHICH COULD CAUSE DAMAGE.

THE POWER SUPPLY IS NOT VOLTAGE ADJUSTABLE. TO OPERATE THE GAME AT VOLTAGES OTHER THAN THOSE IT WAS DESIGNED FOR. PLEASE CONTACT OUR SERVICE DEPARTMENT FOR VOLTAGE CONVERSION INFORMATION.

### WARNING

DO NOT remove any of the components on the main board (e.g. compact flash and eproms) while the game is powered on. This may cause permanent damage to the parts and the main board. Removing any main board component part while powered on will void the warranty.

ALWAYS REMOVE POWER TO THE GAME, BEFORE ATTEMPTING ANY SERVICE, UNLESS NEEDED FOR SPECIFIC TESTING. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN SERIOUS INJURY TO YOURSELF OR OTHERS.

THIS GAME IS NOT SUITABLE FOR INSTALLATION IN AN AREA WHERE A WATER JET COULD BE USED.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

## AC Power Information

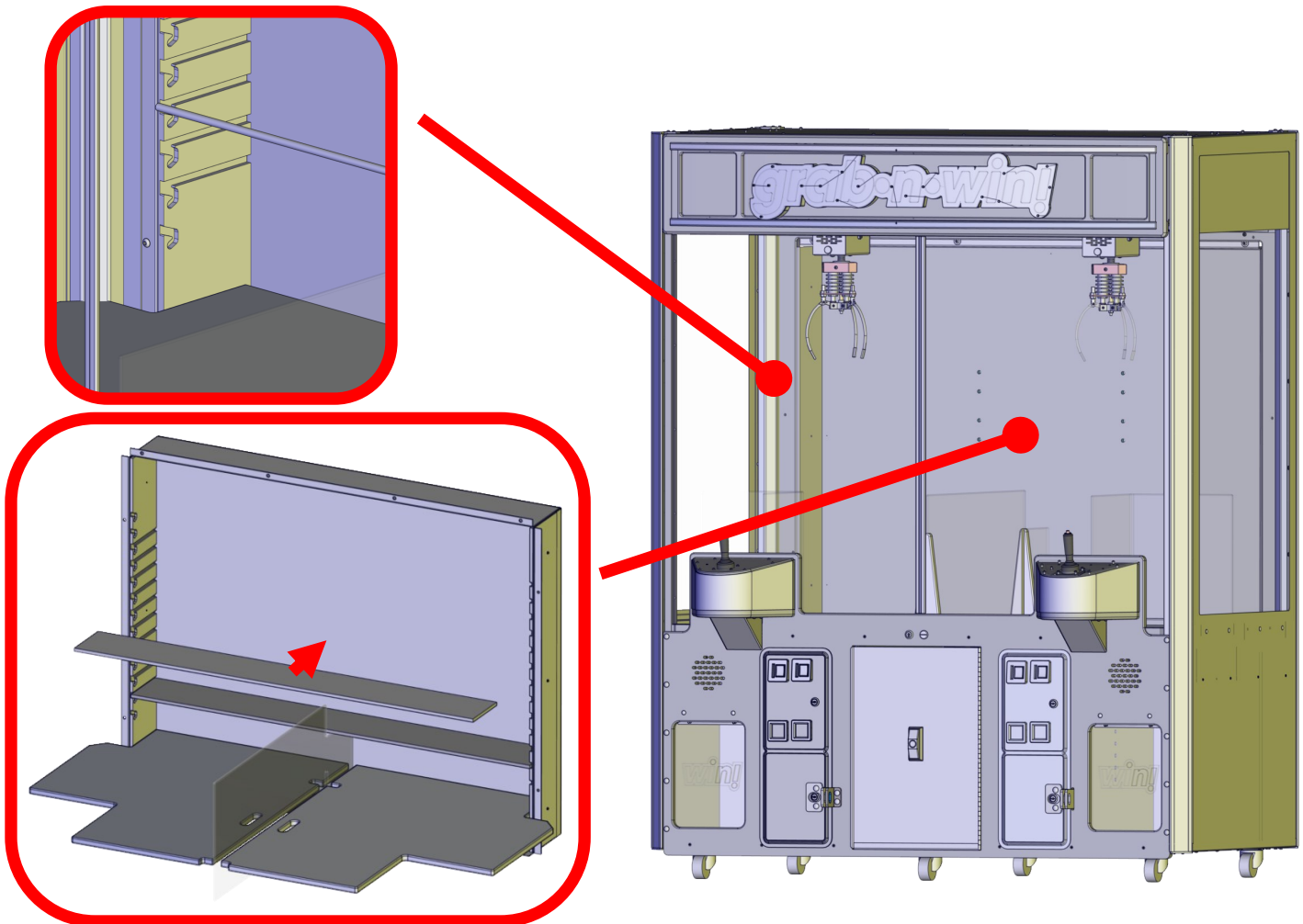
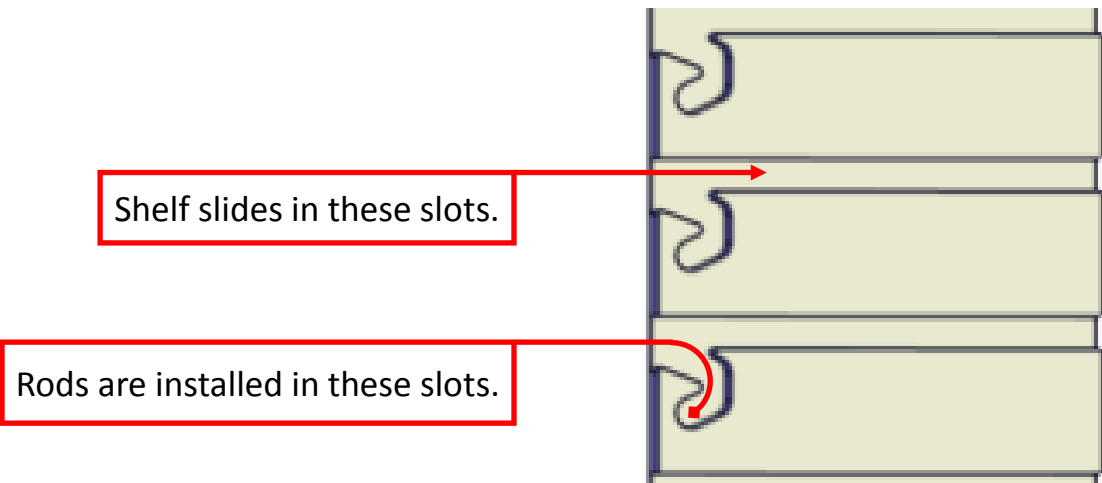
The games main fuse is accessed through the back of the game at the power mod. Above the power cord is a small panel that contains the main fuse.

The value of the fuse for 120 volt users is 10 AMPS at 250Volt type slow blow.

The value of the fuse for 230 users is 5 AMPS at 250Volt type slow blow.

# ASSEMBLY INSTRUCTIONS

- 1) Carefully remove the crane from its packaging.
- 2) Using the supplied keys, unlock the front door of the cabinet and open it.
- 3) Cut all the tie wraps holding the wagon assembly and crane in place.
- 4) To install the glass shelves you first must install the rods. The rods slide in and immediately down into the front slot. Then slide the glass shelf into the slot until it hits the back wall. If you plan on using the two lower slots, you will have to first remove the playfield divider if already installed, then slide the rod and shelf in, and then replace the playfield divider.



## Overview: Theory of Operation “The Basics”

The claw mechanism operates a little differently than our other claws. You will notice that the claw is not as round as it usually is. The reason for this is that the game is holding the prize and not cradling it. By using this method one has better control over the gaming experience.

In order to program the game properly you need to understand how the crane operates. After enough money has been inserted into the game, the player can move the claw until time expires or the button has been pressed. The claw will then descend until the claw hits the prizes. Then the claw will ascend until it returns to the top. The gantry system will then bring the claw back over the prize chute and open the claw. Several of these functions can be tweaked by the owner for a better player experience, more on this later.

The gantry speeds can be changed in programming to adjust ratio of game time to amount of moving or to handle a specific type of prize. A more delicate prize might have a slowed down movement to prevent significant jarring, as an example. If more jarring is needed then speeding up the movement will create a harder stop and therefore might jar the prize loose, if that is intended. Additionally the up and down time of the claw can be adjusted as well.

Once the player positions the claw and presses the button, or runs out of time the claw will descend. Upon touchdown there are a few programming options that will allow one to customize the playing experience based on the type of prizes to be won or the effect desired.

Normally the claw will stop descending when it makes the bottom sensor, but this where you can change things. Dig time programming option refers to the EXTRA time that the claw will continue to descend into the prizes AFTER the down sensor has been made. So if you have a soft prize and you want the claw to descend a bit into the prizes then you can program this for some additional time. Be careful with this setting. If you set it too long then the claw can tip over sideways when something unforgiving has been landed on which making it very difficult to pick up a prize from this position.

Once that time has expired (zero by default) then the system will use the time placed in the Pickup Time. This option will keep the claw closed at the bottom of the crane for this period of time. The next option is Pull Time. This will hold the claw at full strength until this time has expired while returning to the top. It is set to 8 and the count is in 1/8th of a second so the default is 1 second. So the reduced claw strength will occur sometime during the ascent and if properly set causes the prize to just slip out of the grasp of the claw without a noticeable release. It uses the minimum strength of the claw to reduce to, so it is important that this be set to allow the prize to just slip away for the best effect.

After that time expires the claw will continue to ascend until it reaches the top sensor. Once there it will use the Hold Time programming option. This option will pause the claw at the top before it starts to move to the home position. This allows for any rocking motion to be settled down before the crane goes to the home position over the prize chute.

If the prize is of an odd shape or delicate then the use of stop and drop programming option will change the end of the game. Normally the claw will release and let the prize fall into the chute, but if stop and drop has been enabled then the claw will descend before it opens the claw thereby providing a softer, less height, landing for the prize.

## Overview: Theory of Operation: Auto Percent

**How does auto percentaging work?** When the crane is powered on it takes the value stored for “Cost of play” and multiplies this by the value stored for “payout percentage”. Then it takes the value you entered for the cost of prize and divides by the value it previously determined. This tells the crane how many times it must be played before it has enough money in the Virtual bank to pay for the prize. The claw will stay at minimum strength value until the count reaches 0. At this point it now has enough to cover the cost of the prize and will use the maximum strength value until a prize has been won.

**The Virtual Bank and how does it work?** Think of the virtual bank as an imaginary place where the crane can move a percentage of the incoming money into. This amount is determined by what you have entered for the payout percentage and the amount you are charging to play. So let us say you were to charge a dollar to play and want a twenty percent payout. Each time a player inserts a dollar into the crane which would be equal to one credit, twenty cents of that dollar will be stored in the virtual bank. No matter what you decide to charge the player to play the crane it will use your payout percentage to calculate the amount to deduct from the incoming money.

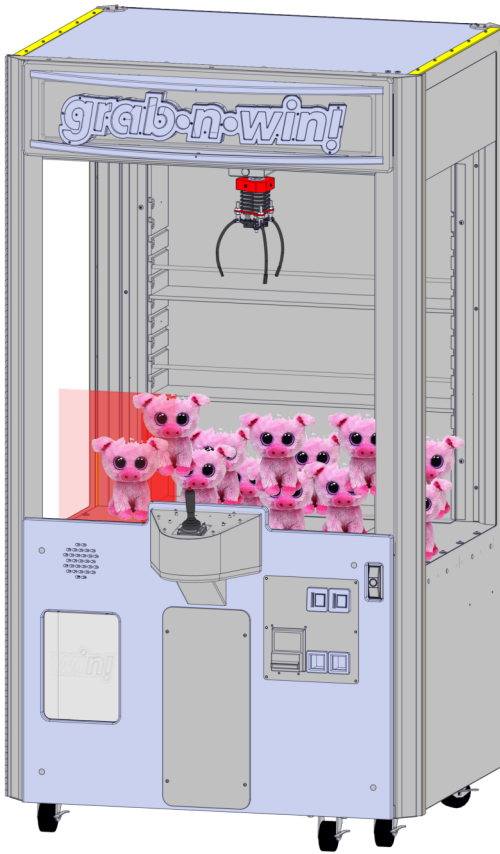
**How does the crane determine when a player should win?** When the crane’s auto percentaging has determined it has enough to pay for the prize it will take the value stored in the payout regulator and increment it. We call this the “P value”. If the P value is a positive number the crane will then use the claw’s maximum strength value until a prize has been paid and then decrement the “P value”. If the P value is a negative number then the crane has already paid out a prize when it wasn’t supposed to so the claw strength will remain at the minimum strength value. If the “P value” is 0 then the game is in balance it will still use minimum strength value for the claw. Every time a game is played the crane will check the current “P value” to determine if it should use minimum or maximum claw strength. The crane’s auto percentaging will still continue to count down regardless of the “P Value” until it has determined it has enough to pay for a prize then it will increment the “P value” again. This process will repeat. To give you an example of how this works if the crane’s P value was at -1 before auto percentaging determined it was time to pay, it would increment -1 to 0 but the game will still keep the claw strength at its minimum setting because now the crane is in balance. If the P value was 0 before auto percentaging determined it was time to pay, then the value would be 1 and the claw strength would switch and use the maximum claw strength setting until the P value returns to 0.

**What is the payout regulator?** The payout regulator is a variable which the software uses to track its current prize balance. This value changes either by each time a prize has been paid out, or when a prize doesn’t payout when due. Depending on the amount of the money currently collected verses prizes won, it can be a positive number, negative number, or simply 0. 0 means the crane is in prize balance. A negative number is how many prizes over paid while a positive number tells you how many prizes to be paid. A negative number could be caused by “hooking”, mechanical issues, or simply wrong software settings.

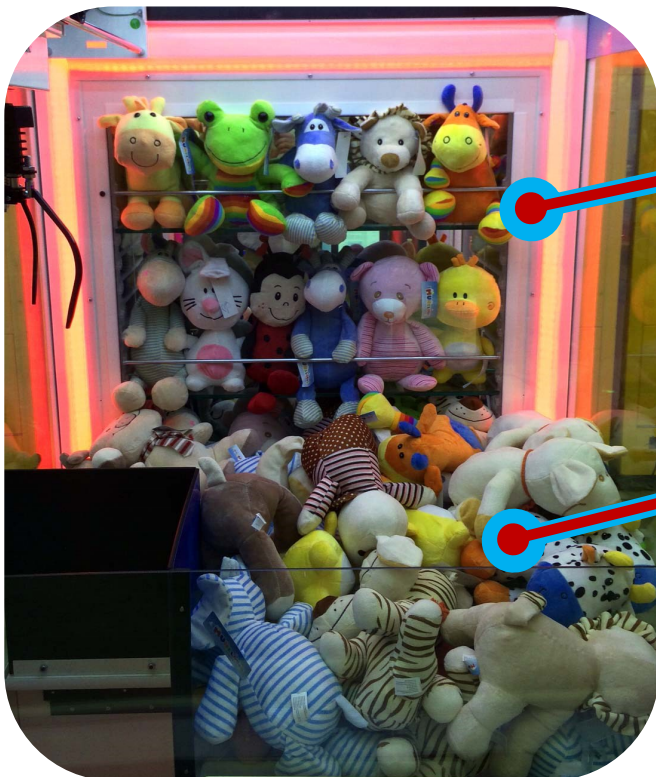
**How do you check the payout percentage?** See the section later in the manual “What is Accounting?”

## How to set the playfield with Plush

A proper playfield should have all of the plush stacked around the same height and should be equal in weight but can be of different shapes and sizes.



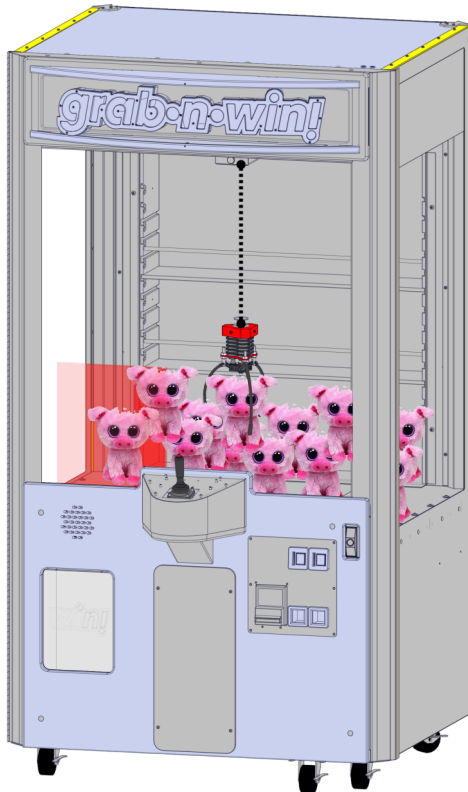
*Stadium stacking will cause the setting of "Pull Time" to drag plush into the prize chute causing undesirable results. There are back shelves to display the plush.*



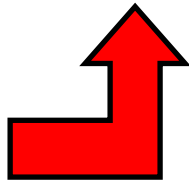
Plush can be displayed nicely using the back shelf.

The plush is stacked around the same height and below the prize chute.

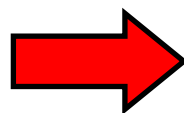
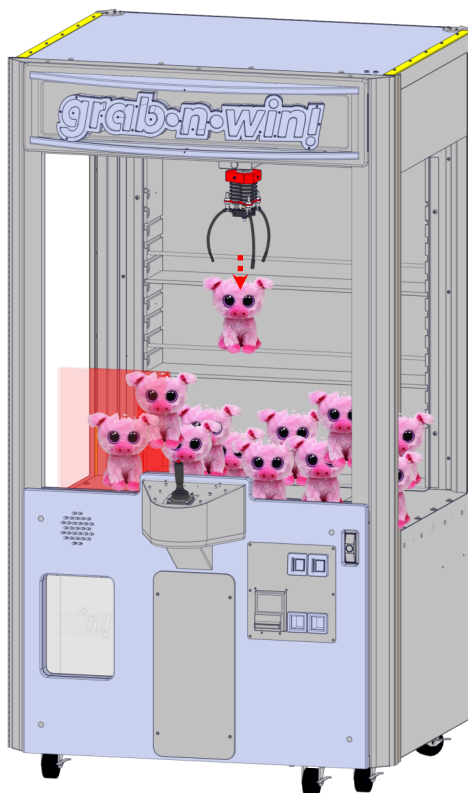
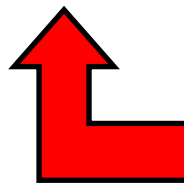
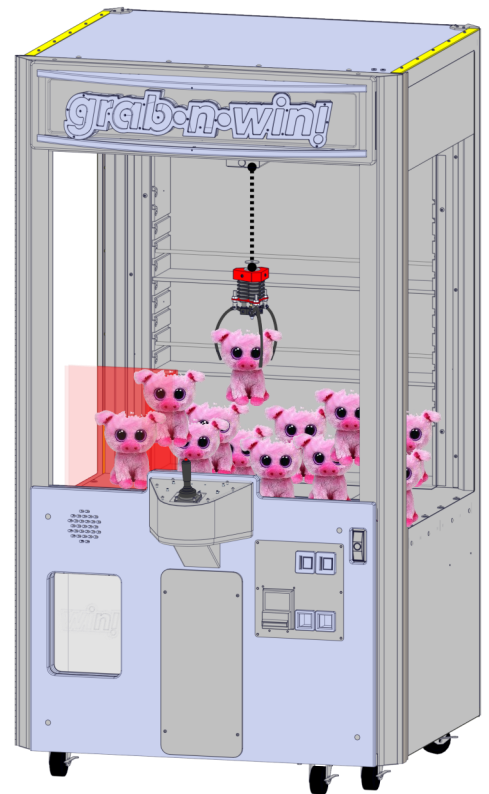
**Pull Time** determines when the claw will go from “full strength” setting to “minimum strength” setting when it is not time to win. The claw strength will be at its maximum settings during the initial grab of the plush. *TIP: It is important that the plush can be grabbed at this point so it should be left at 99.* As the claw ascends to the top the value stored for “Pull Time” is decreased until it reaches 0. At that point the claw changes to minimum claw strength settings and the plush slips away! If pull time is set too long, the claw will be at maximum strength even after it has reached the top and gone over the prize chute.



The claw is at maximum strength and Pull Time timer has started.



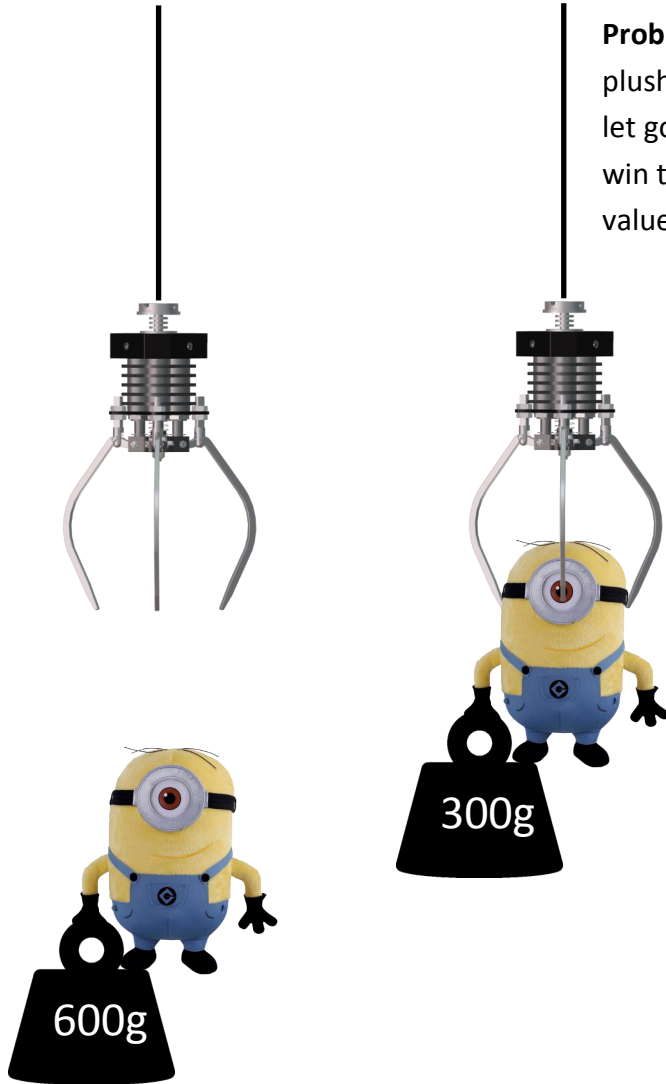
The “Pull Time” timer has expired and the claw strength is changing to minimum strength.



The claw is now at minimum strength and the plush has slipped away.

## What happens to the “P” value when the plush are of different weights?

**Problem:** Minimum strength for the claw is set for 600g plush and not for the 300g plush. The claw is unable to let go of the lighter plush and the player will be able to win this plush with ease. This will cause a negative “P” value and all of the lighter plush to be cleaned out.



The crane will recover over time but players will lose interest if you cannot win!



# How to Program your Crane:

## **\*\* STOP AND READ BEFORE OPERATING \*\***

Your crane can be programmed in two ways. You can use the joystick to change the options or create a configuration file which is stored on the SDCARD. If you decide to program your crane using the configuration file then all joystick programming is disabled and no alterations can be done without a computer. The program button will have no function.

The crane is shipped in Joystick mode.

**If you wish to only use the joystick mode then proceed to the section “JOYSTICK MODE”.**

The configuration file is located on the SDCARD but is named wrong so that the joystick can be used to program your crane. You will need to rename the file to “crane.cfg” without the quotes in order to “lock” down the crane, disable the joystick programming mode, and use the configuration file only.

## Port Command Connection:

Port commands are used to temporary program your crane’s options. They are issued from your computer with the use of a serial terminal program. You can download free terminal software from the internet if you do not have a terminal program installed on your computer. The program “Putty” from [www.putty.org](http://www.putty.org) can be downloaded for free and is a good terminal program to use. You will also need to obtain a serial cable to go between your computer’s serial port and the crane’s serial port. If you computer has no serial ports, the use of a serial to USB device is recommended.

The crane’s serial port is mounted at the front of the crane drawer located inside the crane. Once the serial cable is connected launch your terminal program and configure the software. To configure your software, choose a serial port connection then set the baud rate to 115200, use 8 bits with no parity bit, and 1 stop bit.

Once the connection is established you are ready to issue some commands. Press the “?” key to list all available commands.

## Port Commands

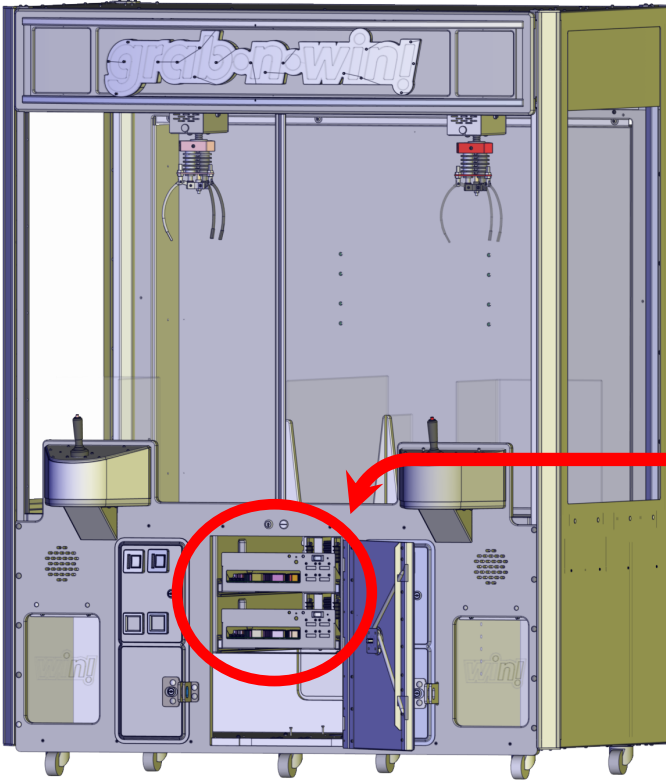
Remember that any changes made through the port commands when using the “crane.cfg” file for the crane’s program options will not be permanent and once power is removed all settings will revert back to what is stored in “crane.cfg” file or previously programmed by the joystick.

Once a connection has been established the follow commands are available for use.

### Command Definition

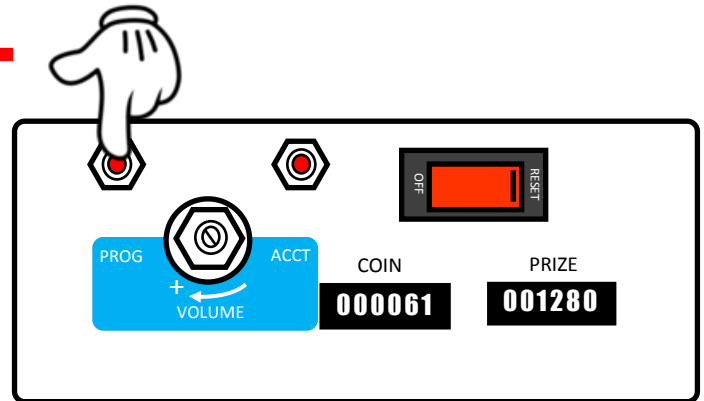
##	Typing any valid programming option number will display its current value.
## ##	Typing any valid programming option number followed by a value will change that option to that value.
df	“Dump Formatted” This command displays the values for all options formatted for easy viewing.
dc	“Dump Card” gives you a cut and paste configuration listing for creating a new crane.cfg file.
tw	“Test Win” which gives you a game where the claw will simulate a win condition.
tl	“Test Lose” gives you a game where the claw will simulate a loss condition.
e	Shows error codes that the crane encountered during operation.
p	Shows current payout statistics.
a ##	Allows you to play an audio file loaded. See “Changing the Audio Sounds of your Crane” for valid numbers.
R12321	Resets the payout statistics stored. It is recommended to preform this command when the prizes are changed out or prize costs have been changed.
s	Gives Raw Sensor Status.
?	Display available commands.

When configuring your crane the use of the above commands can alter the options’ values until the right values are achieved. The use of the commands TL and TW is used to test if you have convincing play for your prizes. See “Atomy of the file “Crane.cfg” - PC Port Commands ” for details on options and their meaning.



# How to Program your Crane:

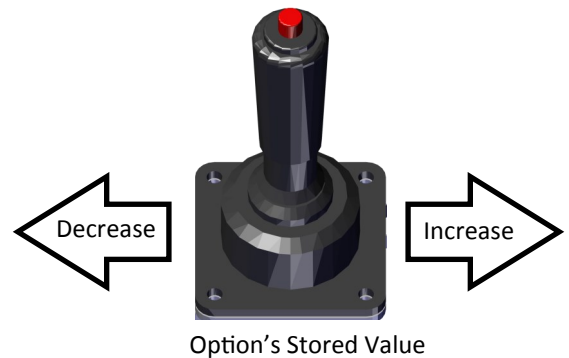
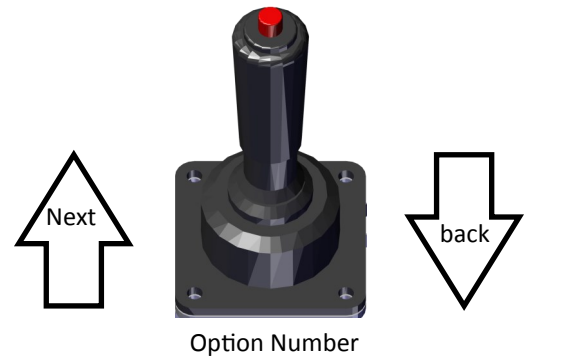
- The crane must be powered on and in attract mode.
- It will not enter programming mode when in play.
- Each side must be programmed.
- The upper drawer is for the left side.
- The lower drawer is for the right side.



Unlock and open the front door to access the control panel drawer and press the “PROG” button. The control panel display will show “PP” in the credits display and “0” in the time display. You must move the joystick forward to enter program mode. The credit display will show a 0. The Time display will show the value stored for option 0.

Moving the joystick forward will advance to the next option while moving the joystick back will revert back to the previous option. Moving the joystick left will decrease the current option’s value and moving the joystick right will increase the current option’s value.

See “Programming Options” for the list of settings their descriptions. When finished, press the red button to save and exit.



**\*\* Note \*\* Only the upper drawer controls the LED colors of the crane.**

## Programming Options

Option	Description
0 "Payout Regulator Reset"	This option will reset the current payout percentage back to 0 and clear the accounting of prizes. It will not reset any options.
1 "Game Cost"	This option tells the crane how much you wish to charge to play in pulses. For example, a setting of 1 would be equivalent to .25¢ while a setting of 2 would be equivalent to .50¢. The maximum value is 99.
2 "Coin 2 Cost"	This option tells the crane how many coin 1 pulses does this pulse give. This line would be the switch with the white/red wire attached to it. This option should be set to 1 unless you are using different coins that have different values. For example if the coin you are using in coin 1 is a quarter and coin line 2 is accepting \$1.00 coins, then this would be set to 4, not 1. If coin line 2 is accepting the same coin as coin line 1, then this would be set to 1. The maximum value is 99.
3 "Prize Cost"	This option is the cost of your plush or the average cost of the plush being used. It is based on the increments of Coin 1. So if you value coin 1 as quarters (.25¢) then a value of 10 would be 10 * .25 which would equal \$2.50. The maximum value is 99.
4 "Payout Percentage"	This defines the payout percentage or how much do you want to give back to the player. Each time the crane is played it will put aside this percentage from the game cost and store it into a virtual bank. This bank will accumulate each time a game is played. The claw will be at the minimum strength until it has collected enough money to cover the "Prize Cost" which it will increase the claw strength until a prize is won. So if the game cost was \$1.00 and the payout percentage is 40 then the game would keep .40¢ of that dollar each time the crane is played.
5 "Minimum Power"	The least amount of power needed to allow the prize to slip through the fingers SLOWLY. This option must be setup properly for the crane to preform at its best. Too low of a setting will allow the prize to just fall through the fingers and look obvious it cannot pick up the prize. Too high of a value and the prize will not be able to fall off the claws when it is not ready to be won.
6 "Attract Time"	This value determines how many minutes between doing attract modes and doing nothing. As an example a value of 3 would be 3 minutes sitting idle then performing its attract mode. The maximum time between attract modes is 90 minutes.
7 "Attract Type"	This value determines which attract mode to preform. A value of 0 would disable attract mode. A value of 1 would only play audio. A value of 2 would be only motion and a value of 3 would do both audio and motion.
8 "Attract Volume"	When set to 0 the attract audio will be lower than when playing the crane. You cannot adjust the lowered attract volume. A setting of 1 disables this feature and plays attract audio and game audio at the same level (adjusted by the volume pot).
9 "Max Power"	This determines the maximum claw strength to use during play. The maximum value for this is 99.
10 "Game Time"	How long should one game last? The default is 20 seconds but can be set from 10 to 60 seconds.
11 "Front Back Speed"	Determines how fast the claw assembly travels in that direction. It is set by percentage of maximum speed. A value of 70 would be 70% of the maximum speed. The value can be 20 to 99 percent.

Option	Description
12 "Left/Right Speed"	Determines how fast the claw assembly travels in that direction. It is set by percentage of maximum speed. A value of 70 would be 70% of the maximum speed. The value can be 20 to 99 percent.
13 "Claw Down Speed"	Determines how fast the claw assembly travels in that direction. It is set by percentage of maximum speed. A value of 70 would be 70% of the maximum speed. The value can be 30 to 99 percent.
14 "Claw Up Speed"	Determines how fast the claw assembly travels in that direction. It is set by percentage of maximum speed. A value of 70 would be 70% of the maximum speed. The value can be 40 to 99 percent.
15 "Dig Time"	This setting allows the claw string to continue to release after making the down switch. This will cause the claw to "dig" into the plush pile. Be careful when setting this too long as it will cause the claw to lay on its side. During pickup time's count down if the claw is laying at the bottom, the claw could release the prize before ascending back to the top ruining the tease! It is set in 1/8 increments so a value of 8 would be 1 second. The maximum value this can be is 16 (2 seconds).
16 "Pickup Time"	This option when a value is set will cause the claw to remain closed at the bottom of the cabinet for this period of time. It is programmed in 1/8 increments so a setting of 8 would be 1 second. The maximum value is 32 (4 seconds)
17 "Top Pause"	When a value is set the crane will pause at the top for this amount of time. It is programmed in 1/8 increments so a value of 8 would be 1 second. The maximum amount of time is 16 (2 seconds).
18 "Stop and Drop"	When a value is set the crane will lower the prize down into the prize chute for this period of time before releasing it into the prize chute. It is programmed in 1/8 increments. The maximum value is 24 or 3 seconds.
19 "Pull Time"	Pull time determines how long to keep the claw closed at maximum power setting as the claw goes up before reverting to minimum claw strength. It is programmed in 1/8 increments and has a maximum value of 32 (4 Seconds). This setting is a major factor in achieving that "Oh I almost had it" factor. Be sure that you give enough time for the claw to return to the top. If the P value is a positive number, the claw stays at maximum power settings.
20 "Home Pause"	When a value is set the claw assembly after dropping the prize in the prize chute will wait for this period before returning to the home position. It is programmed in 1/8 increments and has a maximum value of 32 (4 Seconds).
21 "Discount"	This option allows you to give free games when a certain amount is purchased at once. You can set how many games to give for the discount in option 27. If this option was set to 3 then for every 3 games purchased the player would get whatever the value option 27 has in games in addition to the 3 games purchased.
22 "Play Till You Win"	When enabled, the crane will add one credit each time a game is complete and no prize was won. A setting of 1 enables this option. A setting of 0 disables this option. <b>BE VERY CAREFULL WITH THIS OPTION</b> , if the prize sensor becomes faulty and cannot detect prizes being won, the crane will pay every prize out in the crane.
23 "Game over Delay"	When a value is entered the crane will pause this amount of time after a game is played. It is set in 1/8 increments and can be set from 8 to 32 seconds. The default is 16.

<b>Option</b>	<b>Description</b>
24 "Snap"	When enabled the claw will close (snap) for a second and then open before the game starts. A setting of 1 enables this feature.
25 "Center X Time"	This determines the x axis for the home position. It is set in 1/8 seconds and the default time is 12. The maximum value is 32 (4 seconds).
26 "Center Y Time"	This determines the y axis for the home position. It is set in 1/8 seconds and the default time is 12. The maximum value is 32 (4 seconds).
27 "Games Given"	This option is used in conjunction with option 21 (Discount) and determines how many free games to give when a discount is achieved. The maximum amount of free games you can give is 10.
28 "RED Color 1"	Percentage of power to the Red LEDs for color number 1.
29 "Green Color 1"	Percentage of power to the Green LEDs for color number 1.
30 "Blue Color 1"	Percentage of power to the Blue LEDs for color number 1.
31 "RED Color 2"	Percentage of power to the Red LEDs for color number 2.
32 "Green Color 2"	Percentage of power to the Green LEDs for color number 2.
33 "Blue Color 2"	Percentage of power to the Blue LEDs for color number 2.
34 "RED Color 3"	Percentage of power to the Red LEDs for color number 3.
35 "Green Color 3"	Percentage of power to the Green LEDs for color number 3.
36 "Blue Color 3"	Percentage of power to the Blue LEDs for color number 3.
37 "RED Color 4"	Percentage of power to the Red LEDs for color number 4.
38 "Green Color 4"	Percentage of power to the Green LEDs for color number 4.
39 "Blue Color 4"	Percentage of power to the Blue LEDs for color number 4.
40 "Factory Default"	When set to 1 this option will load factory defaults. It will not reset the current payout.

#### **ERROR CODES:**

- 3 = L/R Motor ; Left and Right movement is not functioning.
- 4 = F/B Motor ; Forward and backwards movement is not functioning.
- 5 = Up ; Claw moving up movement not functioning or up switch not seen.
- 6 = Down ; Claw moving down movement not functioning or down switch not seen.
- 7 = Prize Sensor ; Prize sensor malfunction.
- 8 = SD Card ; Unable to read SDCARD

**If any error codes are generated by the crane it will be displayed when you press the "ACCT" button.**

## Programming the LED's of your crane with the Joystick.

The crane has the ability to display up to four different colors when illuminating the LED's. Each color is displayed for a period of time before displaying the next color. It is not necessary to use all four colors if you do not wish to.

There are three options that need to be set to display a color. They are known as Red Color, Green Color, and Blue Color. Since four colors can be displayed, they are labeled in the options as Red Color 1, Green Color 1, and Blue Color 1 for LED color 1. Red Color 2, Green Color 2, and Blue Color 2 for LED color 2 and so on.

The easiest way to select a color is off the "Basic Color Chart" located on the next page or follow the instructions under "Advance LED Color Settings" to create your own colors. To use a color off the "Basic Color Chart" simply pick a color swatch and remember the values next to the R, G, and B letters.

Open the front crane door and press the "PROG" button. Push the joystick forward until option 28 is displayed on the left display. This is the option "RED Color 1". Push the joystick either left to decrease the value or to the right to increase the value until the number on the right matches the value for "R" in the color Swatch. Now move the joystick forward and the left display will show 29. Push the joystick left and right until the value for G is shown in the right display. Push the joystick forward to change to option 30 displayed on the left display. Move the joystick left and right until the value for B is shown in the right display.

**\*\*NOTE\*\*** If the value for "R", "G", or "B" is 100 you must enter 99 instead since the display is only two digits.

Repeat this for LED colors 2, 3, and 4. If only one color is desired, then set all four LED colors the same. If only two colors are desired, set LED colors 1 and 2 to one color and then set LED colors 3 and 4 to another. If you are only using two colors and want to cycle the colors faster, then set LED color 1 and LED color 3 to one color and then set LED color 2 and 4 to another color.

## Advance LED Color Settings

To create your own colors you need to download or use a online RGB color code chart. The color chart you use should be a 8 bit color chart. The color chart will have a value for R,G,and B from 0 to 255. Since the crane uses a percentage system you will have to convert the values on the chart by dividing the number by 255 and then multiply the result by 100. So if R has a value of 154 you would divide this by 255 which will give you ".6039". Now multiply this by 100 and the result is 60.39. The value you would enter to the crane is 60 ignoring the digits after the decimal point.

For example, if you looked online and find the color light sea green which is R=32, G=178, B=170. Start by dividing the value of R (32) by 255 which is 0.1254 and then multiply by 100 giving you 12.5 or 12. Then take the value of G (178) and divide it by 255 which is 0.6980 and then multiply by 100 giving you 69. Finally take the value of B (170) and divide it by 255 which is .6666 and multiply it by 100 giving you 66. The values you would enter to the crane would be 12 for Red LED color, 69 for Green LED color, and 66 for Blue LED color.

The formula would be *"RGB Color Chart Value / 255 X 100 = Color percentage used by the crane"*.

Basic Color Chart					R = 75 G = 100 B = 0
R = 0 G = 100 B = 75	R = 25 G = 100 B = 75	R = 50 G = 100 B = 75	R = 75 G = 100 B = 75	R = 0 G = 100 B = 50	R = 25 G = 100 B = 50
R = 100 G = 0 B = 75	R = 100 G = 25 B = 75	R = 100 G = 50 B = 75	R = 100 G = 75 B = 75	R = 100 G = 100 B = 75	R = 50 G = 100 B = 50
R = 100 G = 0 B = 50	R = 100 G = 25 B = 50	R = 100 G = 50 B = 50	R = 100 G = 75 B = 50	R = 100 G = 100 B = 50	R = 75 G = 100 B = 50
R = 100 G = 0 B = 25	R = 100 G = 25 B = 25	R = 100 G = 50 B = 25	R = 100 G = 75 B = 25	R = 100 G = 100 B = 25	R = 0 G = 100 B = 25
R = 100 G = 0 B = 0	R = 100 G = 25 B = 0	R = 100 G = 50 B = 0	R = 100 G = 75 B = 0	R = 100 G = 100 B = 0	R = 25 G = 100 B = 25
R = 100 G = 0 B = 100	R = 100 G = 25 B = 100	R = 100 G = 50 B = 100	R = 100 G = 75 B = 100	R = 100 G = 100 B = 100	R = 50 G = 100 B = 25
R = 0 G = 0 B = 100	R = 0 G = 25 B = 100	R = 0 G = 50 B = 100	R = 0 G = 75 B = 100	R = 0 G = 100 B = 100	R = 75 G = 100 B = 25
R = 25 G = 0 B = 100	R = 25 G = 25 B = 100	R = 25 G = 50 B = 100	R = 25 G = 75 B = 100	R = 25 G = 100 B = 100	R = 0 G = 100 B = 0
R = 50 G = 0 B = 100	R = 50 G = 25 B = 100	R = 50 G = 50 B = 100	R = 50 G = 75 B = 100	R = 50 G = 100 B = 100	R = 25 G = 100 B = 0
R = 75 G = 0 B = 100	R = 75 G = 25 B = 100	R = 75 G = 50 B = 100	R = 75 G = 75 B = 100	R = 75 G = 100 B = 100	R = 50 G = 100 B = 0

## Changing the Audio Sounds of your Crane

A new exciting feature of your crane is the ability to customize the sounds and attract music. Located on a removable memory card are nine audio files. These files are known as “WAV” files or “Waveform audio files” which is used by PC and Macintosh computers to produce audio. New audio files can be easily created with your home computer using ready available software.

There are nine files on the memory card and each is played at different times during the operation of the crane. The playback duration of each file is in relation to where they are used during the operation of the crane. If you choose to customize your audio files keep in mind that if you use audio that has a longer playback duration it could be interrupted to play another sound file.

The file format used in your crane is called “WAV” and must be saved in mono format. Stereo WAV files will not play. They must be in 8-bit format and be recorded at 22050HZ (22Khz). They must not contain any playlists or artist information (Extra Chunks) within the file.

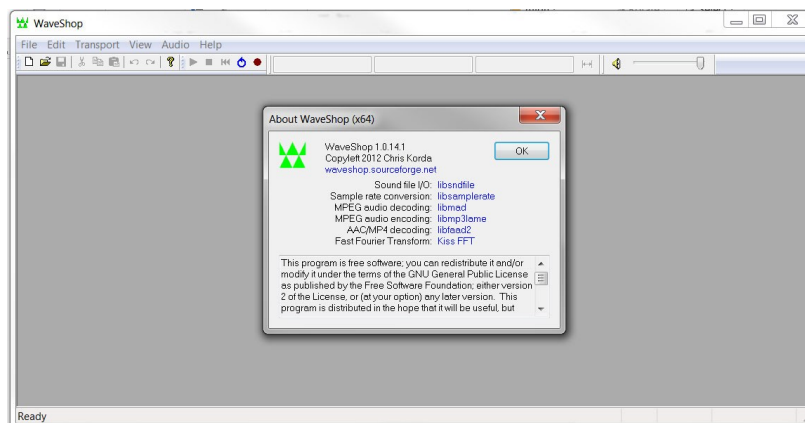
The following is the list of file names with their play duration and when they are used.

- 1) “music.wav” - 12 seconds and it is the music played during game play.
- 2) “win.wav” - 11.5 seconds and it is the sound that is played when a prize is won.
- 3) “lose.wav” - 1.6 seconds and it is the sound when the player did not win a prize.
- 4) “oclaw.wav” - 2.1 seconds and it is the sound that is made when the claw is opened.
- 5) “cclaw.wav” - 1.3 seconds and it is the sound that is made when the claw is closed.
- 6) “coinin.wav” - 1.6 seconds and it is the sound that is made when a coin pulse is detected.
- 7) “dclaw.wav” - .95 seconds and it is played as the claw travels down.
- 8) “attract.wav” - 12 seconds and it is played during the attract mode.
- 9) “ptmusic.wav” - 12 seconds, used only in WET cranes, and is played when the player plays the right side.

We recommend the audio program Wave Shop by SourceFORGE.net.

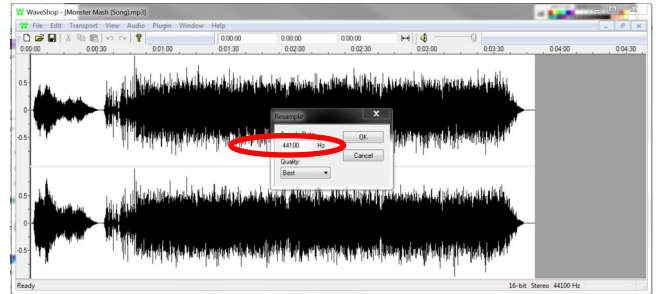
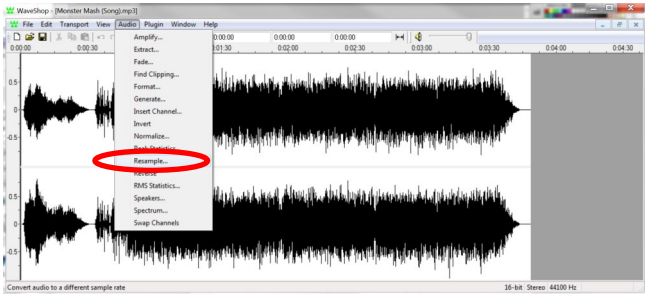
It can be downloaded at:

<http://waveshop.sourceforge.net/download.html>

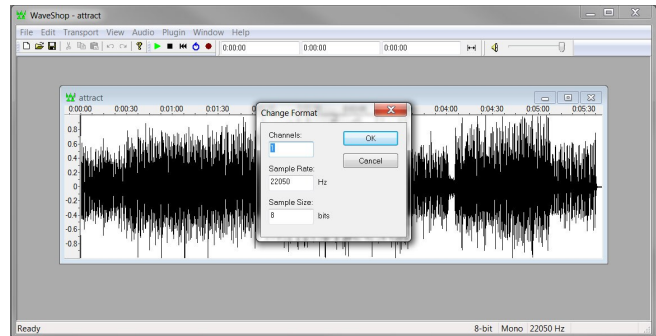
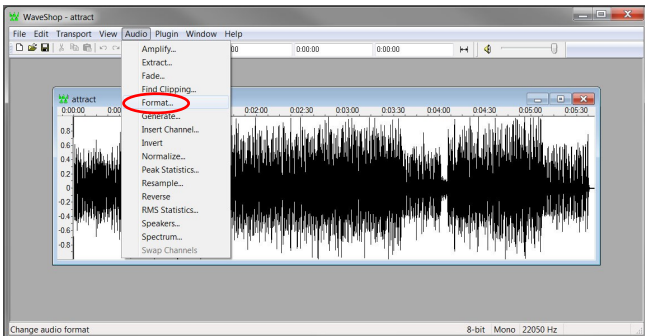


## Converting an Existing Wave File Example using Wave Shop.

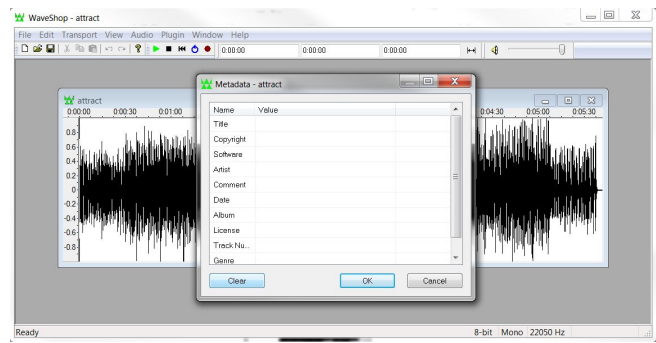
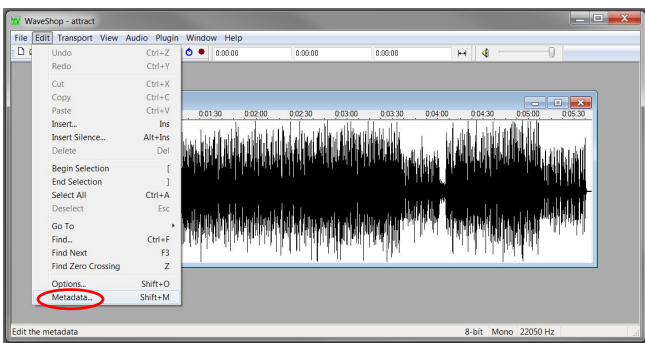
The source of the audio can come from numerous sources like MP3 files, Audio music disks, online, etc... You can even create your own sound using your computer. Once you have created your sound file, you need to ensure the crane will be able to play it. Follow these steps using Wave Shop to convert your audio file.



The first step is to make sure the format of the audio file is in a proper format for the crane to be able to play the audio file. Start Wave shop and load the audio file. Under the pull down “AUDIO” select the command “RESAMPLE”. Change the sample rate to 22050 and click “OK”.

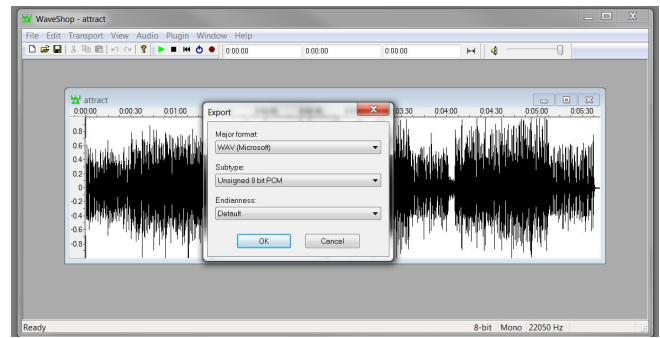
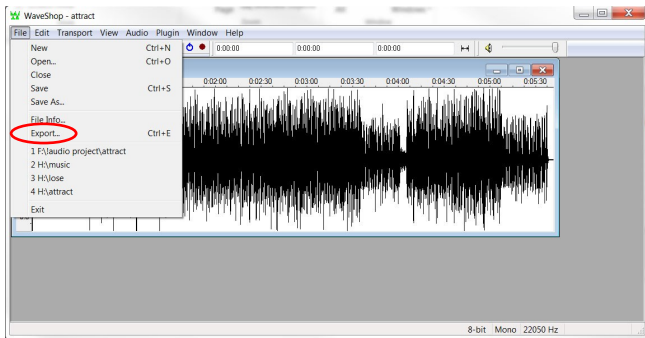


The next step is to left click under the pull down “AUDIO” and select the command “FORMAT”. Change the audio channel to 1, the sample rate will already be at 22050, and change the sample size to 8. Do not use the format command to resample the audio. The results will sound like chipmunks are at work.



The next step is to remove any metadata or extra chunks of information embedded into the audio file. Under the pull down “EDIT” select the command “Metdata..”. When the dialog box appears, click on the “CLEAR” button. This will remove all any extra information like artist, title, etc...

## Converting an Existing Wave File Example using Wave Shop.



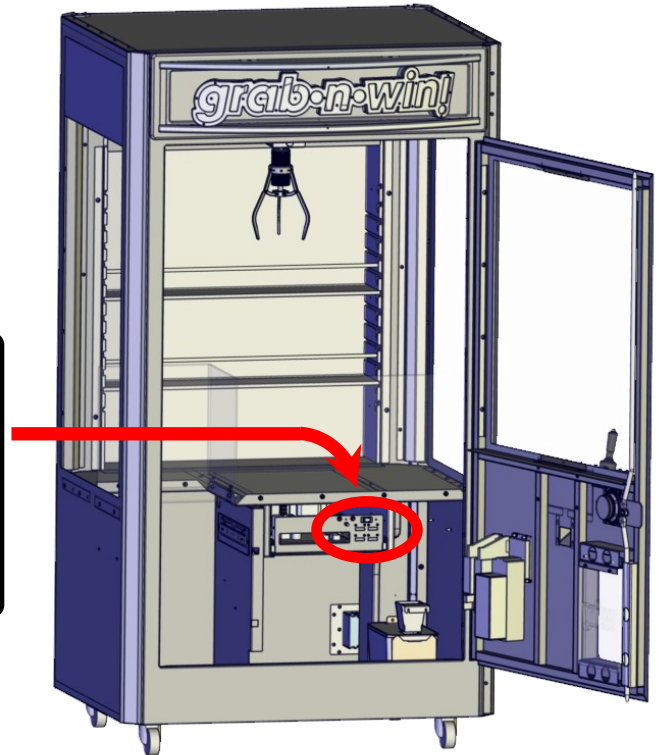
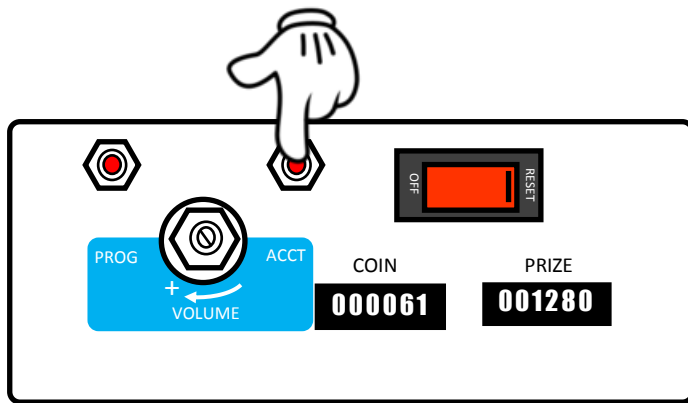
The last step is to save the file. Under the pull down “FILE” select “Export”. Then select Wav (Microsoft) for the format, Unsigned 8 bit PCM for the subtype, and Default for the Endianness.

Some Audio files will be too long to play as music or attract audio. This software allows you to cut and create new audio loops. Using the left mouse button, if you press and hold the left mouse button, you can highlight a section of audio. Under Transport, you can select “loop” and then play. This will allow you to hear your highlighted section only. It will loop back to the beginning of the highlighted audio.

If you press and hold the left mouse button at either the beginning or end of the highlighted section, you can change starting and ending positions. Once you are happy with your selection, under edit, select “copy”. It will appear to do nothing but it has copied the audio to the clipboard. Now under “FILE”, select new, then under “EDIT” select paste. Under “VIEW” select “Zoom in” until you see the wave form again. Now you can save this as your audio loop as a wav file.

# What is Accounting?:

The crane must be powered on and in attract mode. It will not go into accounting mode when in play.



The account mode will show you current if the crane has paid out too many prizes, owes prizes, or owes nothing. A display of P followed by 0 means the crane's payout percentage is in balance and neither owes a prize or has paid out too much. A positive number shown means the crane owes those many prizes. A negative number means the crane has paid prizes when it wasn't supposed to. If this occurs, double check your settings to ensure the claw can release the prize or that none of the prizes are "catching" on the fingers.

To access the accounting mode, open the front door to access the control panel drawer and press the "ACCT" button. If any errors were encountered, it will first display these error codes. Press the red button to continue. The control panel will display a P or p - and then a value or 0. See below for examples.

P-2 means it has paid out two prizes too many.



P 2 means it owes two prizes.



P 0 means all is good.



## Atomy of the file “Crane.cfg” - PC Port Commands

Located on the SDCARD is a file called “crane.bak”. To enable the use of SDCARD programming rename the file to “crane.cfg”. Only the value of each option is on each line of the file. With the first option at the top and the last option at the bottom. If the crane detects the crane.cfg file on power up then the crane will display through the serial port each option with its value and configure itself to it. The options are as follows:

- Line 1:** Payout Reset. The value stored on this line is used when you wish to reset the payout regulator. When the crane is powered on it compares the value stored in its memory to this value. If it is different, then the crane will reset the payout regulator. This is used when you change your prizes, change your prize cost, or change your cost of play.
- Line 2:** Game Cost - How much the game costs to play in pulses. For example a setting of 2 would equal 50 cents while 4 would be \$1 dollar.
- Line 3:** Coin 2 Cost - This option tells the crane how many of coin 1 pulses does this pulse give. This line would be the switch with the white/red wire attached to it. This option should be set to 1 unless you are using different coins that have different values. For example if you value coin 1 line is a quarter and coin line 2 is accepting \$1.00 coins, then this would be set to 4 and not 1. If coin line 2 is accepting the same coin as coin line 1, then this would be set to 1. The maximum value is 99.
- Line 4:** Prize Cost - Cost of the prize in pulses. This option is the cost of your plush or the average cost of the plush being used. It is based on the value of coin 1 pulses. So if you value coin 1 as a quarter (.25¢) then a value of 10 would be  $10 * .25$  which would equal \$2.50. The maximum value is 99.
- Line 5:** Payout Percentage - This defines the payout percentage or how much do you want to give back to the player. Each time the crane is played it will put aside this percentage from the game cost and store it into a virtual bank. This bank will accumulate each time a game is played. The claw will be at the minimum strength until it has collected enough money to cover the “Prize Cost” which it will increase the claw strength until a prize is won. So if the game cost was \$1.00 and the payout percentage is 40 then the game would keep .40¢ of that dollar each time the crane is played.
- Line 6:** Minimum Power - The least amount of power needed to allow the prize to slip through the fingers SLOWLY. This option must be setup properly for the crane to preform at its best. Too low of a setting will allow the prize to just fall through the fingers and look obvious it cannot pick up the prize. Too high of a value and the prize will not be able to fall off the claws when it is not ready to be won.
- Line 7:** Attract Time - This value determines how many minutes between doing attract modes and doing nothing. As an example a value of 3 would be 3 minutes sitting idle then performing its attract mode. The maximum time between attract modes is 90 minutes.
- Line 8:** Attract Type - This value determines which attract mode to preform. A value of 0 would disable attract mode. A value of 1 would only play audio. A value of 2 would be only motion and a value of 3 would do both audio and motion.
- Line 9:** Attract Volume - When set to 0 the attract audio will be lower than when playing the crane. You cannot adjust the lowered attract volume. A setting of 1 disables this feature and plays attract audio and game audio at the same level (adjusted by the volume pot). Line 10:
- Line 10:** Max Power - This determines the maximum claw strength to use during play. The maximum value for this is 99.
- Line 11:** Game Time - How long should one game last? The default is 20 seconds but can be set from 10 to 60 seconds.
- Line 12:** Front Back Speed - Determines how fast the claw assembly travels in that direction. It is set by percentage of maximum speed. A value of 70 would be 70% of the maximum speed. The value can be 20 to 99 percent.
- Line 13:** Left/Right Speed - Determines how fast the claw assembly travels in that direction. It is set by percentage of maximum speed. A value of 70 would be 70% of the maximum speed. The value can be 20 to 99 percent.

## Atomy of the file “Crane.cfg” - PC Port Commands

- Line 14:** Claw Down Speed - Determines how fast the claw assembly travels in that direction. It is set by percentage of maximum speed. A value of 70 would be 70% of the maximum speed. The value can be 30 to 99 percent.
- Line 15:** Claw Up Speed - Determines how fast the claw assembly travels in that direction. It is set by percentage of maximum speed. A value of 70 would be 70% of the maximum speed. The value can be 40 to 99 percent.
- Line 16:** Dig Time - This setting allows the claw string to continue to release after making the down switch. This will cause the claw to “dig” into the plush pile. Be careful when setting this too long as it will cause the claw to lay on its side. During pickup time’s count down if the claw is laying at the bottom, the claw could release the prize before ascending back to the top ruining the tease! It is set in 1/8 increments so a value of 8 would be 1 second. The maximum value this can be is 16.
- Line 17:** Pickup Time - This option when a value is set will cause the claw to remain closed at the bottom of the cabinet for this period of time. It is programmed in 1/8 increments so a setting of 8 would be 1 second. The maximum value is 32.
- Line 18:** Top Pause - When a value is set the crane will pause at the top for this amount of time. It is programmed in 1/8 increments so a value of 8 would be 1 second. The maximum amount of time is 16 (2 seconds).
- Line 19:** Stop and Drop - When a value is set the crane will lower the prize down into the prize chute for this period of time before releasing it into the prize chute. It is programmed in 1/8 increments. The maximum value is 24 or 3 seconds.
- Line 20:** Pull time determines how long to keep the claw closed at maximum power setting as the claw goes up before reverting to minimum claw strength. It is programmed in 1/8 increments and has a maximum value of 32 (4 Seconds). This setting is a major factor in achieving that “Oh I almost had it” factor. Be sure that you give enough time for the claw to return to the top. If the P value is a positive number, the claw stays at maximum power settings.
- Line 21:** Home Pause - When a value is set the claw assembly after dropping the prize in the prize chute will wait for this period before returning to the home position. It is programmed in 1/8 increments and has a maximum value of 32 (4 Seconds).
- Line 22:** Discount - This option allows you to give free games when a certain amount is purchased at once. You can set how many games to give for the discount in option 27. If this option was set to 3 then for every 3 games purchased the player would get whatever the value option 27 has in games in addition to the 3 games purchased.
- Line 23:** Play Till You Win - When enabled, the crane will add one credit each time a game is complete and no prize was won. A setting of 1 enables this option. A setting of 0 disables this option. **BE VERY CAREFULL WITH THIS OPTION**, if the prize sensor becomes faulty and cannot detect prizes being won, the crane will pay every prize out in the crane.
- Line 24:** Game over Delay - When a value is entered the crane will pause this amount of time after a game is played. It is set in 1/8 increments and can be set from 8 to 32 seconds. The default is 16.
- Line 25:** Snap - When enabled the claw will close (snap) for a second and then open before the game starts. A setting of 1 enables this feature.
- Line 26:** Center X Time - This determines the x axis for the home position. It is set in 1/8 seconds and the default time is 12. The maximum value is 32 (4 seconds).
- Line 27:** Center Y Time - This determines the y axis for the home position. It is set in 1/8 seconds and the default time is 12. The maximum value is 32 (4 seconds).
- Line 28:** Games Given - This option is used in conjunction with option 21 (Discount) and determines how many free games to give when a discount is achieved. The maximum amount of free games you can give is 10.

## Atomy of the file “Crane.cfg” - PC Port Commands

**Line 29:** RED Color 1 - Percentage of power to the Red LEDs for color number 1. Maximum value is 100.

**Line 30:** Green Color 1 - Percentage of power to the Green LEDs for color number 1. Maximum value is 100.

**Line 31:** Blue Color 1 - Percentage of power to the Blue LEDs for color number 1. Maximum value is 100.

**Line 32:** RED Color 2 - Percentage of power to the Red LEDs for color number 2. Maximum value is 100.

**Line 33:** Green Color 2 - Percentage of power to the Green LEDs for color number 2. Maximum value is 100.

**Line 34:** Blue Color 2 - Percentage of power to the Blue LEDs for color number 2. Maximum value is 100.

**Line 35:** RED Color 3 - Percentage of power to the Red LEDs for color number 3. Maximum value is 100.

**Line 36:** Green Color 3 - Percentage of power to the Green LEDs for color number 3. Maximum value is 100.

**Line 37:** Blue Color 3 - Percentage of power to the Blue LEDs for color number 3. Maximum value is 100.

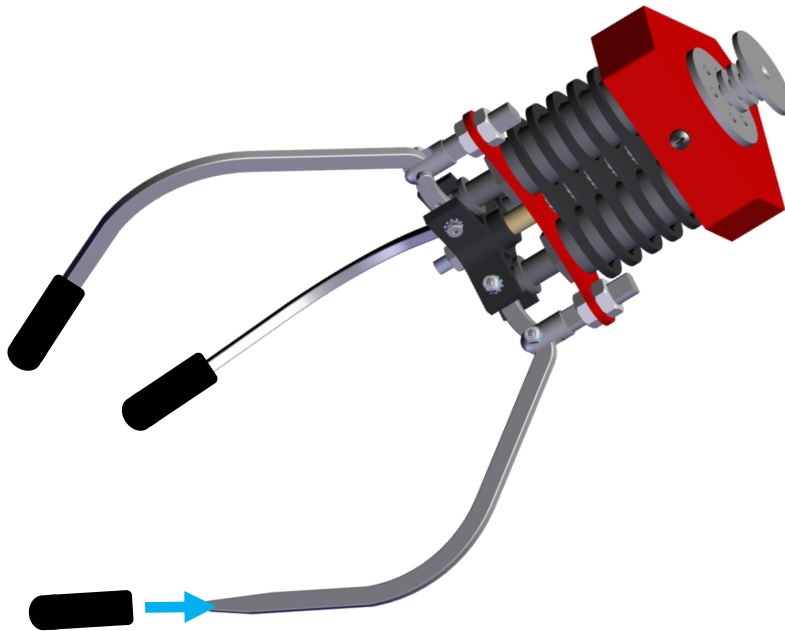
**Line 38:** “RED Color 4 - Percentage of power to the Red LEDs for color number 4. Maximum value is 100.

**Line 39:** “Green Color 4 - Percentage of power to the Green LEDs for color number 4. Maximum value is 100.

**Line 40:** “Blue Color 4 - Percentage of power to the Blue LEDs for color number 4. Maximum value is 100.

## When Silicone Tips are Necessary

Silicone tips should only be applied if it is not possible to pick up prizes at full strength. This can occur if the plush is over stuffed and or of round shape. The claws are designed to grab prizes and not cradle them. If the claw squeezes the prize out from its grip the application of Ultrabake silicone caps are recommended.



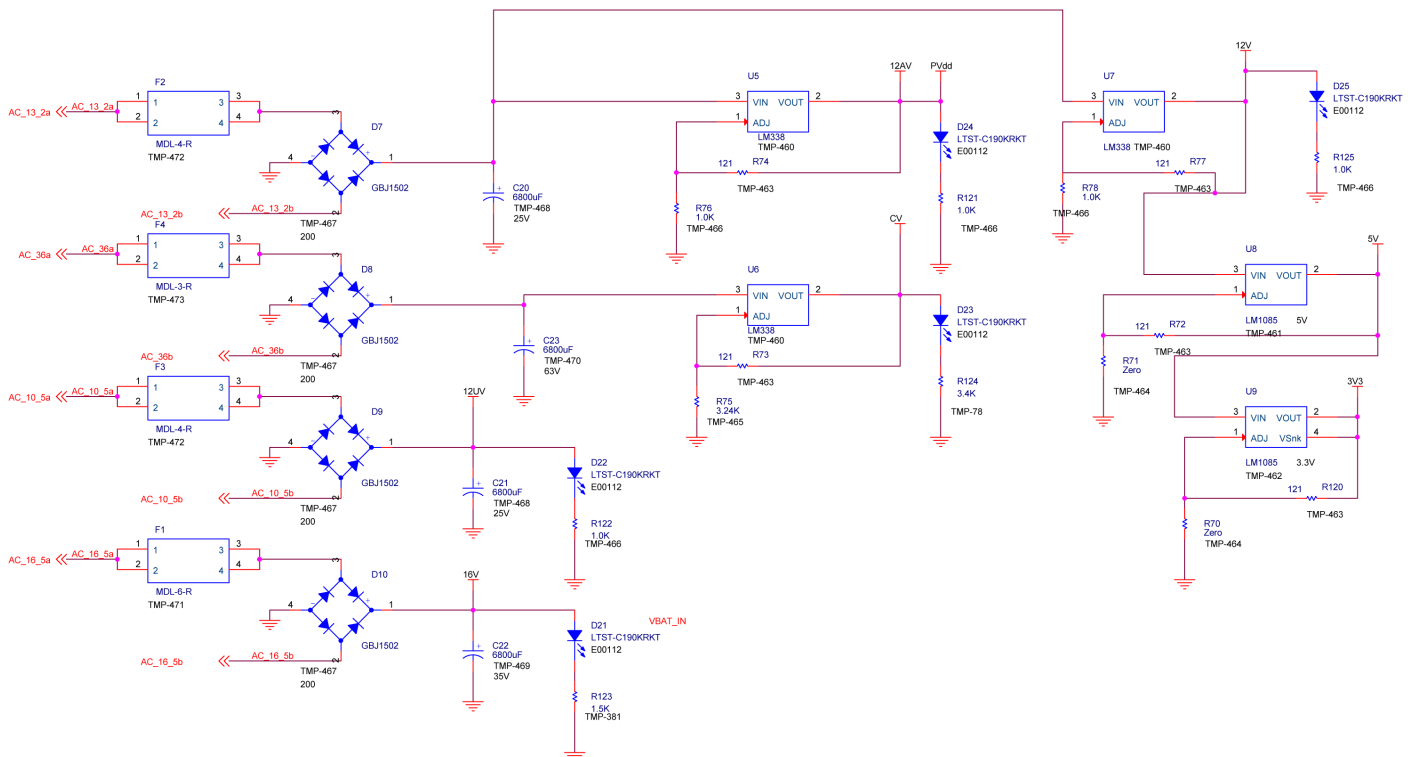
# Crane Revision 7 - PCB Technical Details

## LED indicators:

- D4 - SDCARD's write protect switch status.
- D5 - SDCARD present or not.
- D6 - Power to SDCARD.
- D17 - Central Processor's heart beat.
- D18 - Indicates when it is reading the SDCARD.
- D19 - Indicates when the prize sensor is blocked
- D20 - N/A
- D21 - Indicates that there is 16 volts present from the transformer.
- D22 - Indicates that there is 12 volts present from the transformer.
- D23 - Indicates that U6 is providing voltage for the claw. If off when claw should be closed, check solenoids for failure.
- D24 - Indicates that U5 is providing 12 volts to the audio section.
- D25 - Indicates that U7 is providing 12 volts is present to provide 3.3 and 5 volts DC for logic.

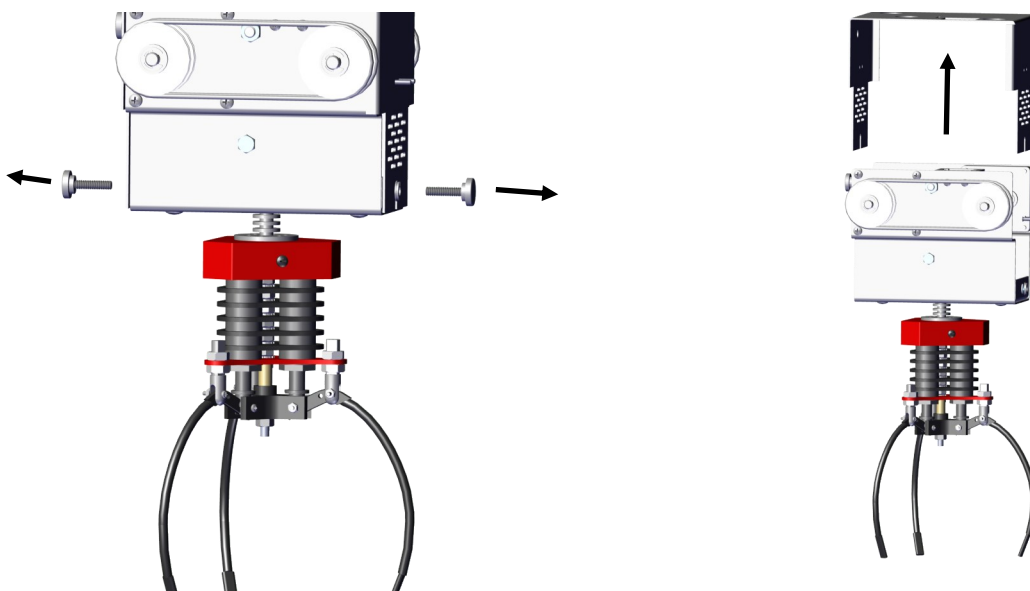
## Test Points for Voltages

- C16 - Positive side has 3.3 volts of DC.
- C17 - Positive side has 5 volts of DC.
- C18 - Positive side has 12 volts of DC.
- C19 - Positive side has 12 volts of DC.

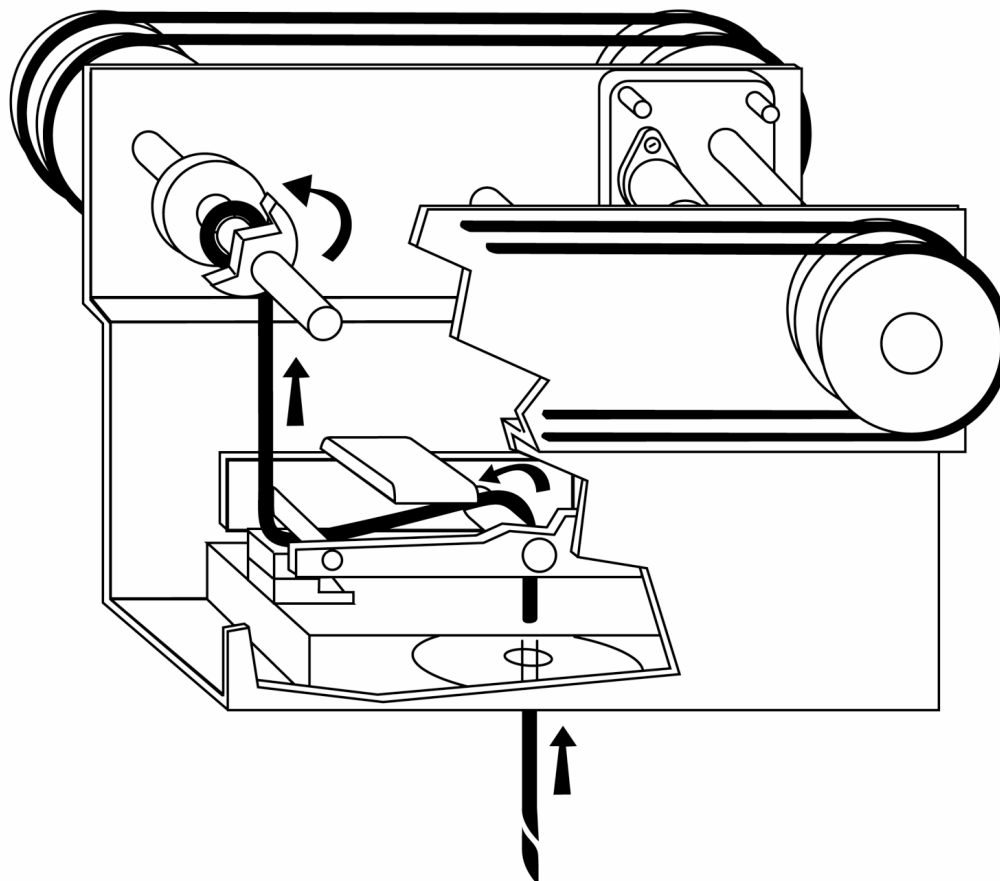


# String Replacement

Remove the side thumb screws on the crane assembly and remove the cover.



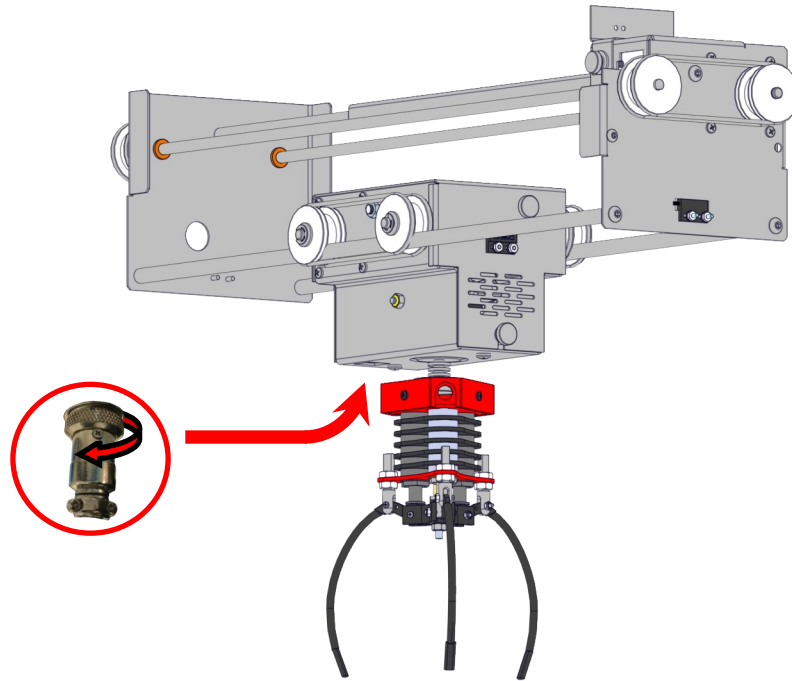
## STRING ROUTING DIAGRAM



# Replacing a solenoid

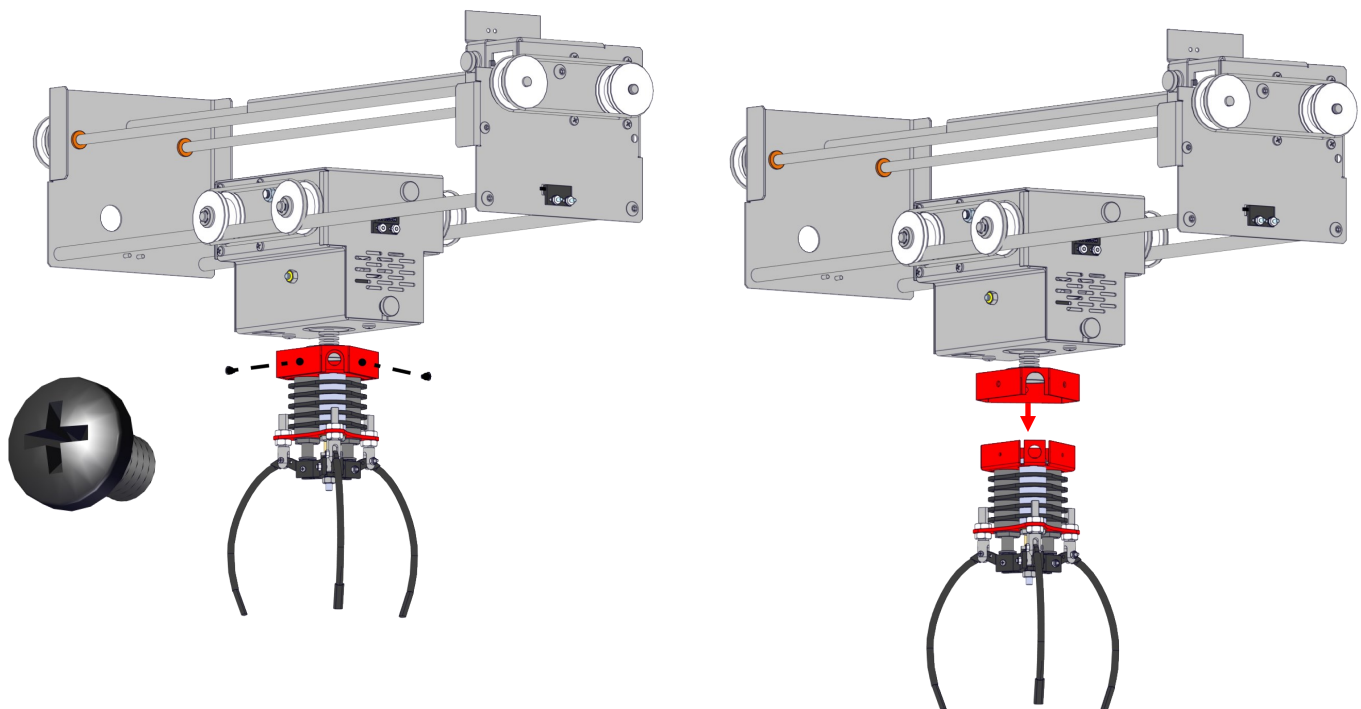
## Step 1:

Disconnect the solenoid wire harness plug by twisting the lock nut clockwise.



## Step 2:

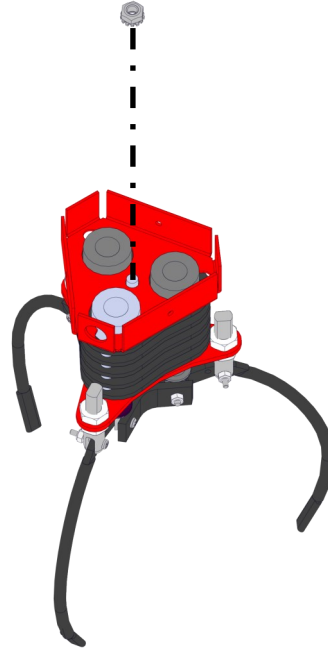
Remove the three Phillips mounting screws that hold the claw assembly to the crane assembly. Remove Claw assembly.



# Replacing a solenoid

## Step 3:

Remove the 7/16 (11mm) nut and washer holding the top chamber holding the wire harness.



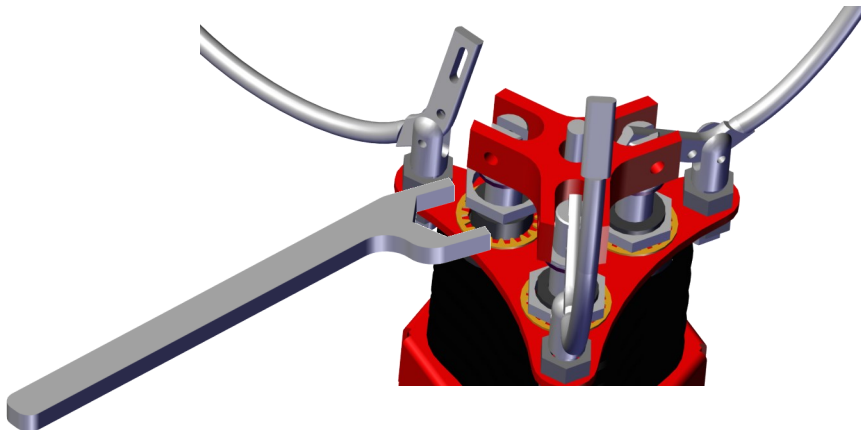
## Step 4:

Remove the screw and nylon nut that holds the claw to the solenoid you wish to replace. Move the claw back out of the way.



## Step 5:

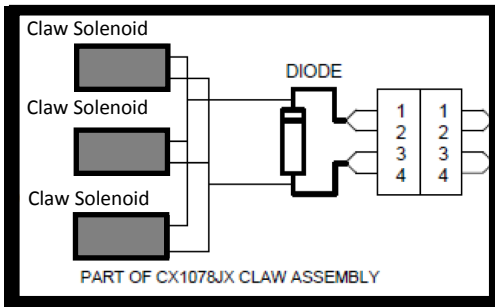
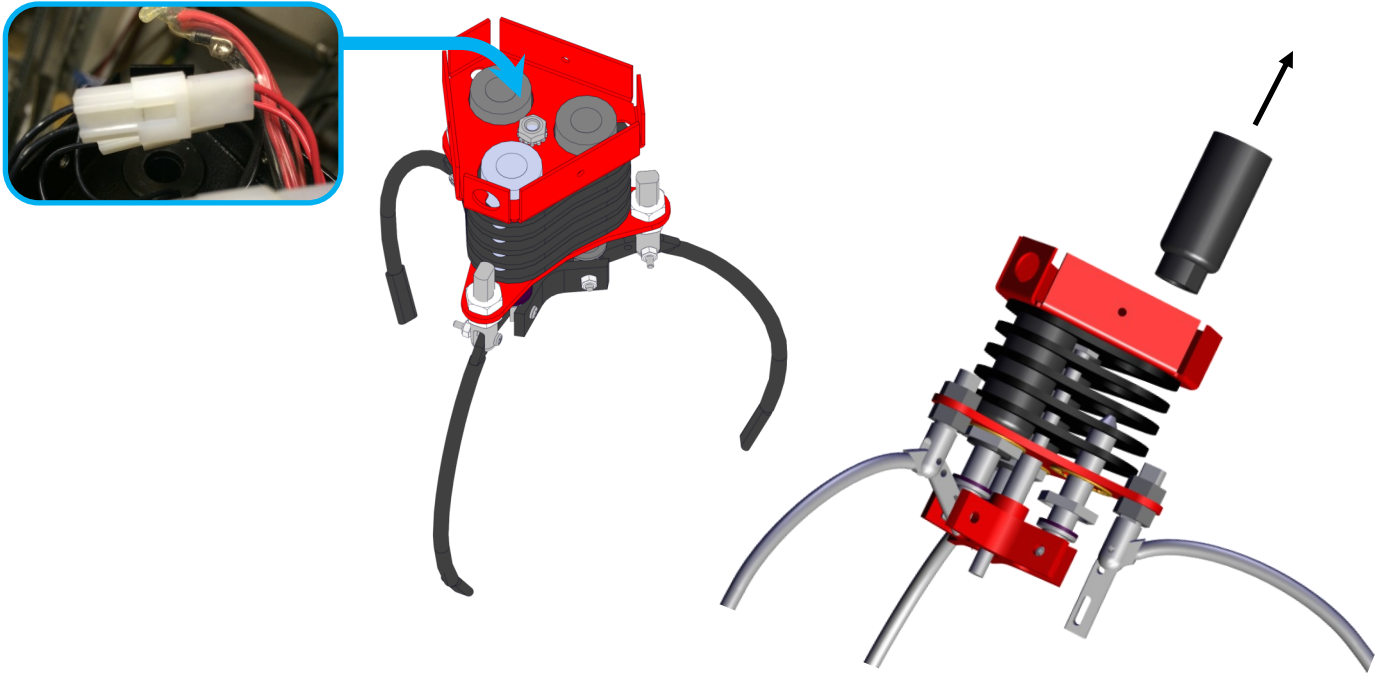
Using the provided wrench remove the nut that holds the solenoid you wish to replace.



# Replacing a solenoid

## Step 4:

Disconnect the solenoid harness connector then slide the solenoid out.

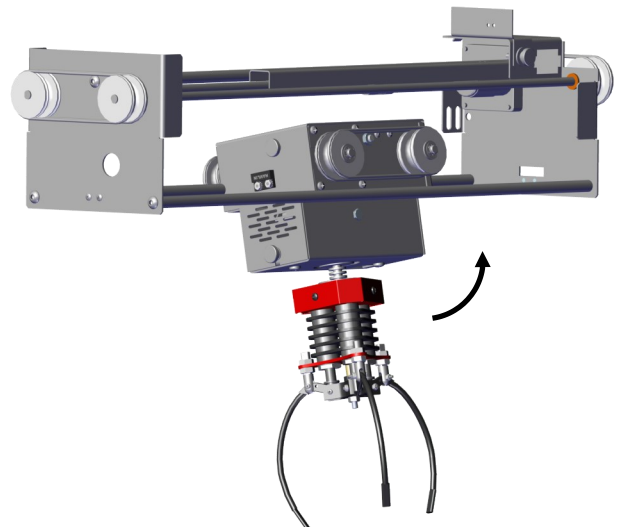


## Testing The Solenoids.

The claw coils measure 18 Ohms each. Wired together in parallel, the resistance across the circular plug is 6 Ohms. Be sure to measure across pins 1&4 and 3&2.

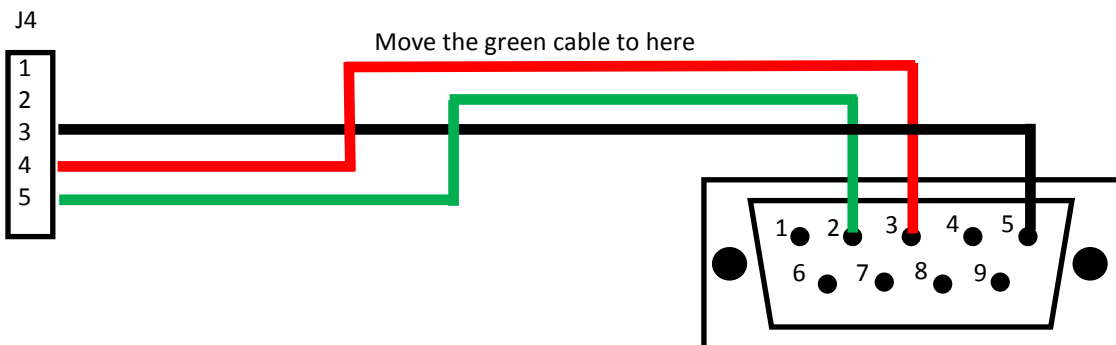
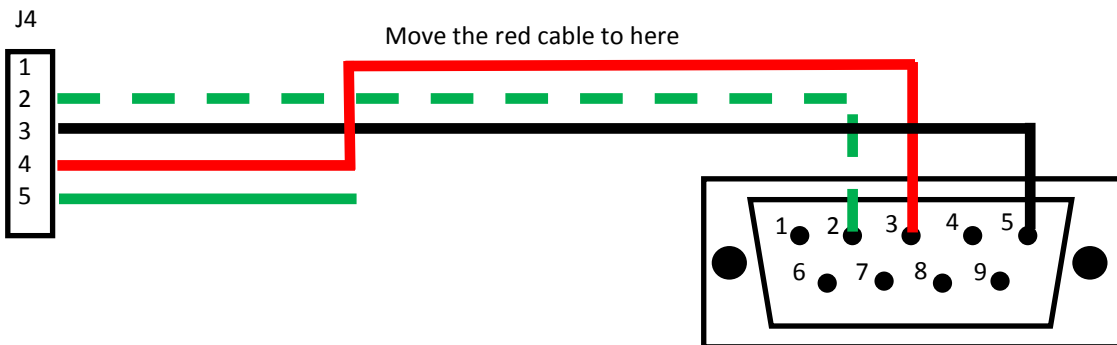
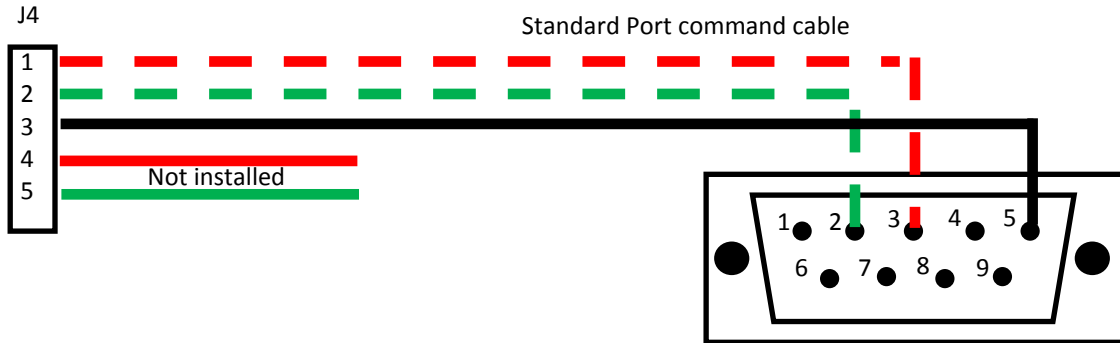
## Removing Crane Assembly

Remove the back thumb screw to release wire harness then lift one side up slightly and slide wagon and crane out.



## How to Create a Firmware Program Cable out of your Port Communication Cable

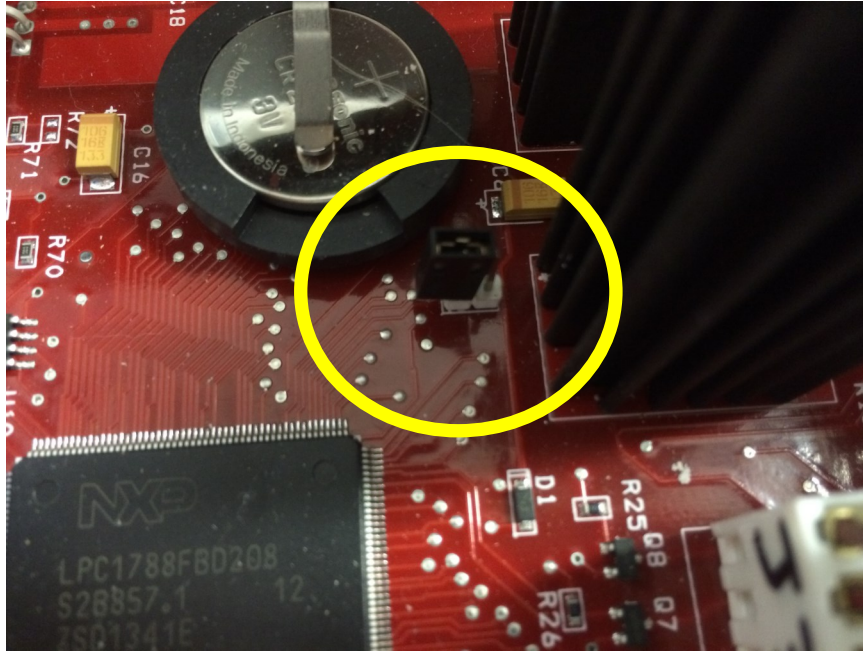
The cable included in the crane's cash box is configured for Command Port communications. You will need to modify this to flash the firmware of the crane. Once modified, it will no longer communicate port commands to the crane! Remove the green stripped wire and move it to the solid green wire connection. Then move the read stripped wire to the solid red wire connection.



## How to flash your firmware

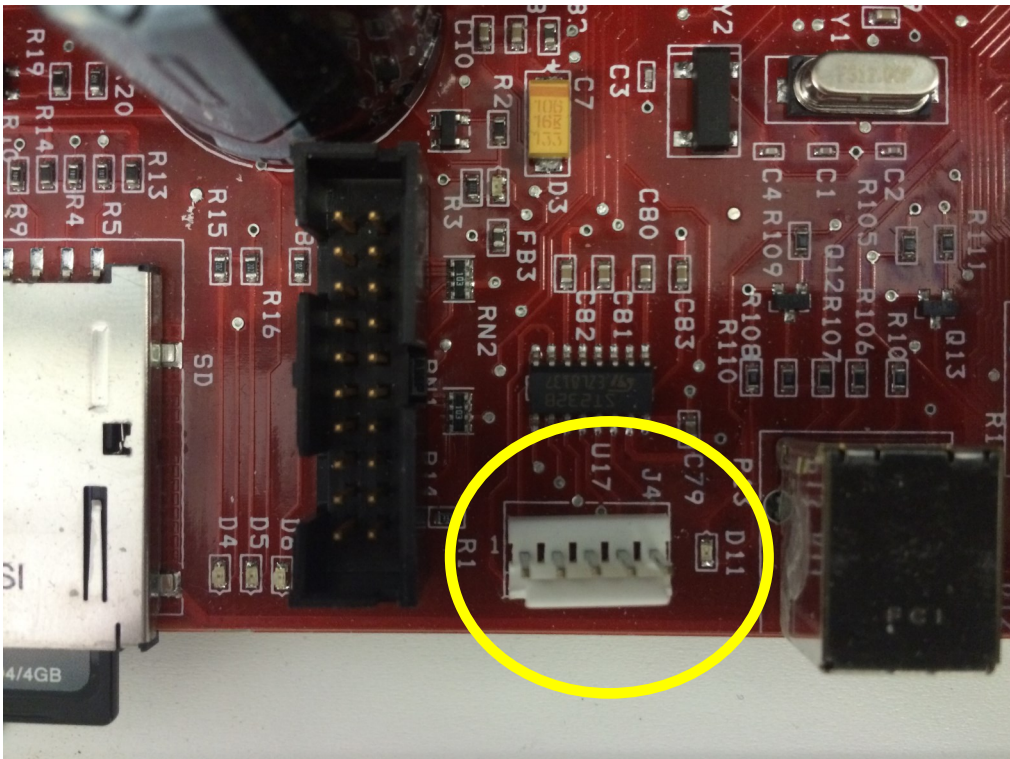
### Step 1:

Power on the crane. Move the jumper next to the battery to short the program pins together. The crane will appear to lock up but it is waiting to be programmed.



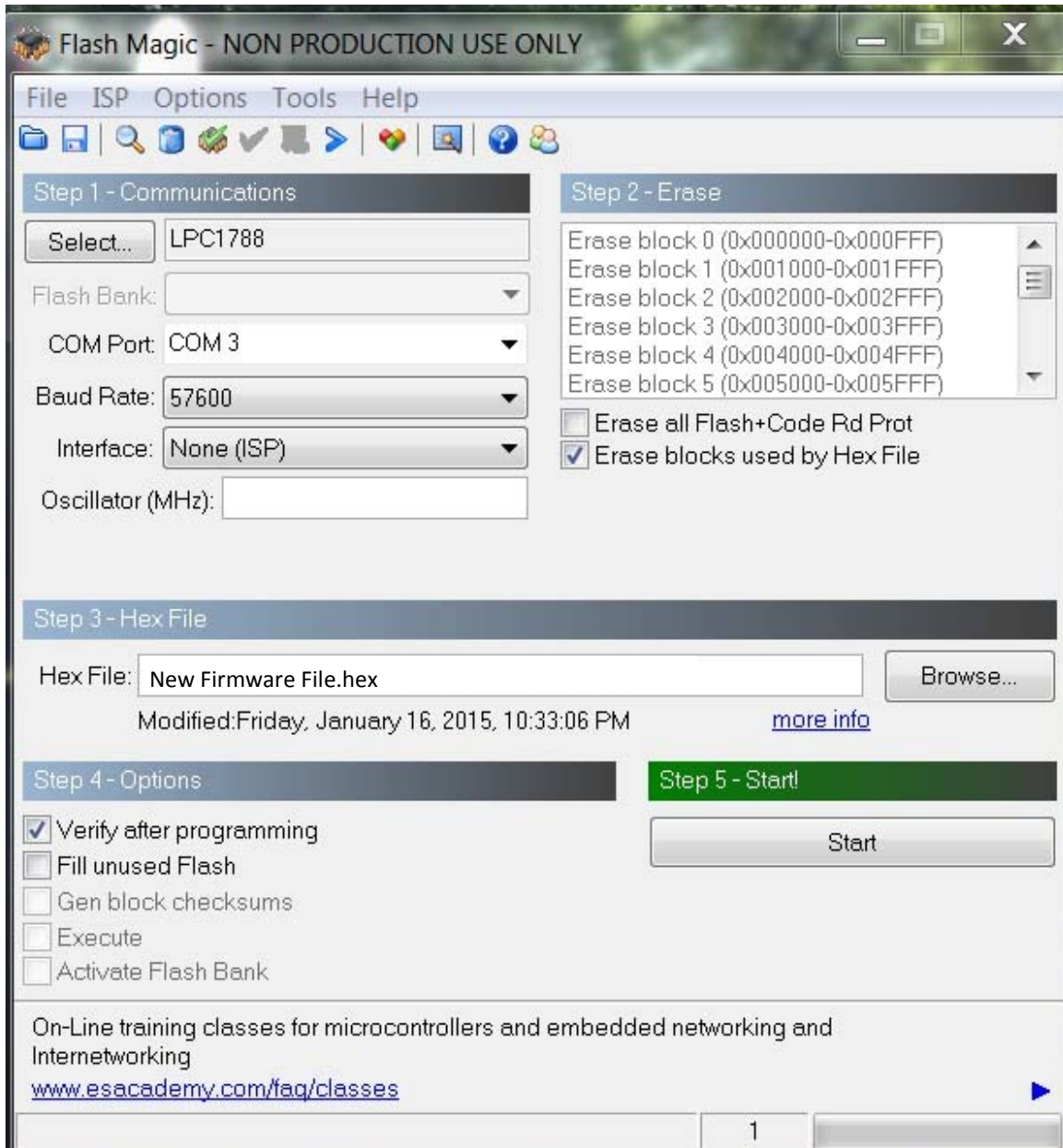
### Step 2:

Plug the Firmware Program Cable (not the Port Communication cable) into J4. See "How to Create a Firmware Program Cable out of your Port Communication Cable" if you do not have a Firmware Program Cable.

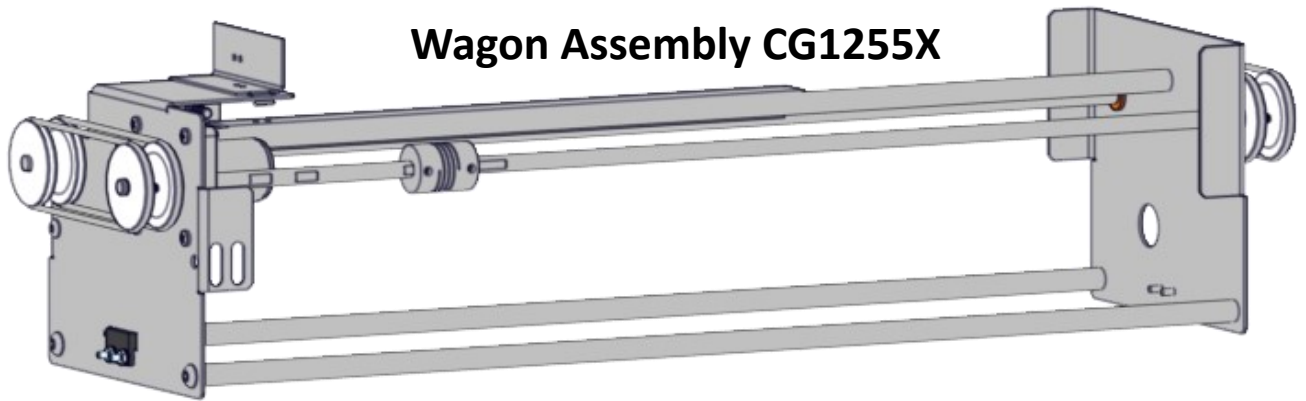


### Step 3:

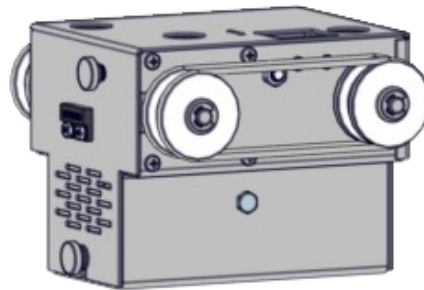
Download the program “flash Magic” and install this to your computer. The website is [www.flashmagictool.com](http://www.flashmagictool.com) to download from. Run the program and select LPC1788 as the processor. Set the Baud rate to 57600. Change the Interface to none. Load the new firmware file. Left Click on “start” and the crane will update to the firmware file. Once the transfer is completed, un-jumper the program jumper and power cycle the crane. Reload all of your settings. See screen shot below.



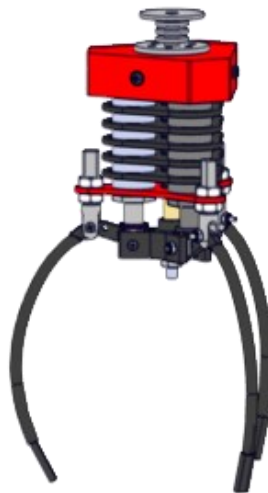
# Break Down of Assemblies



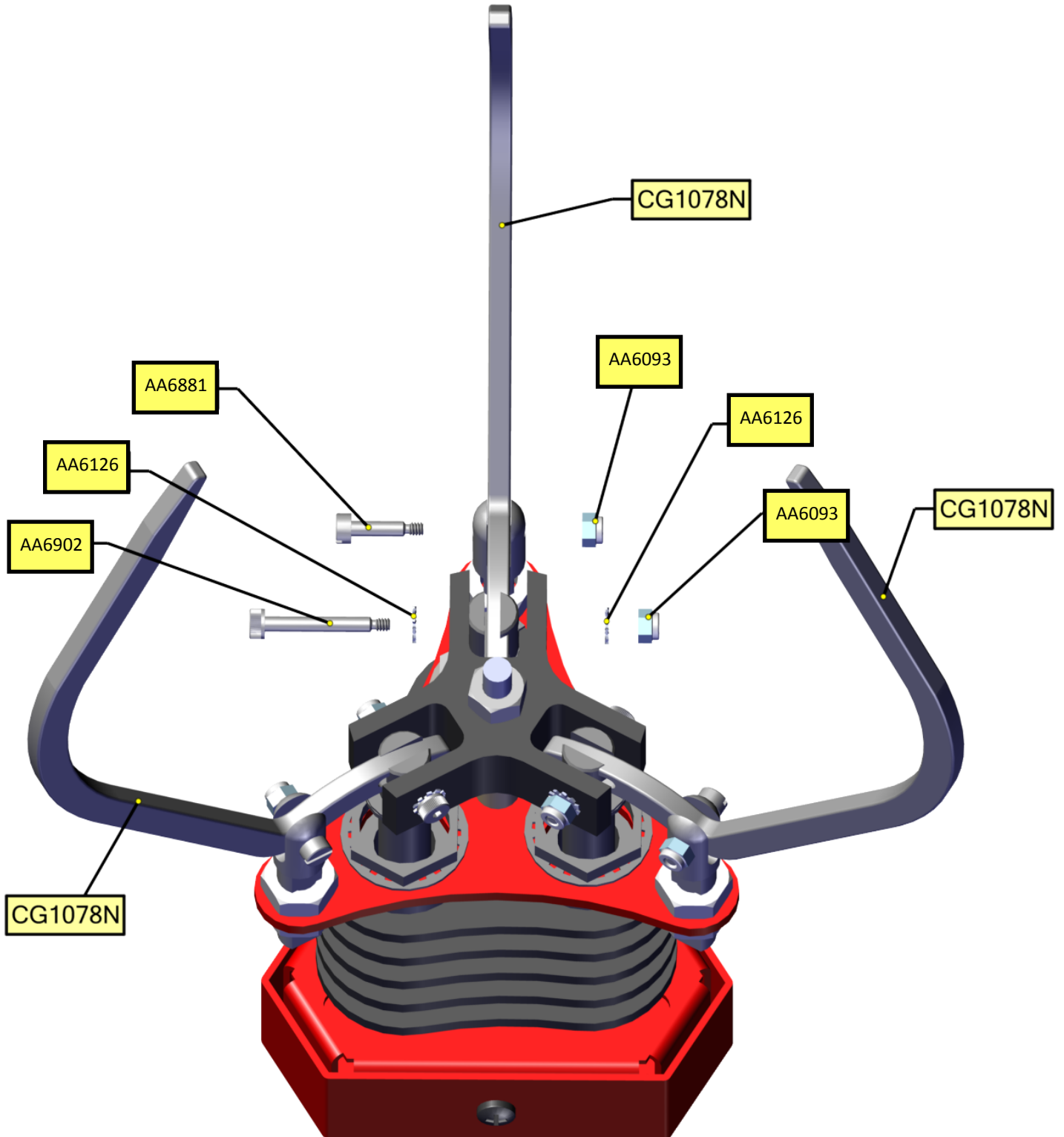
**Crane Assembly CG1261X**



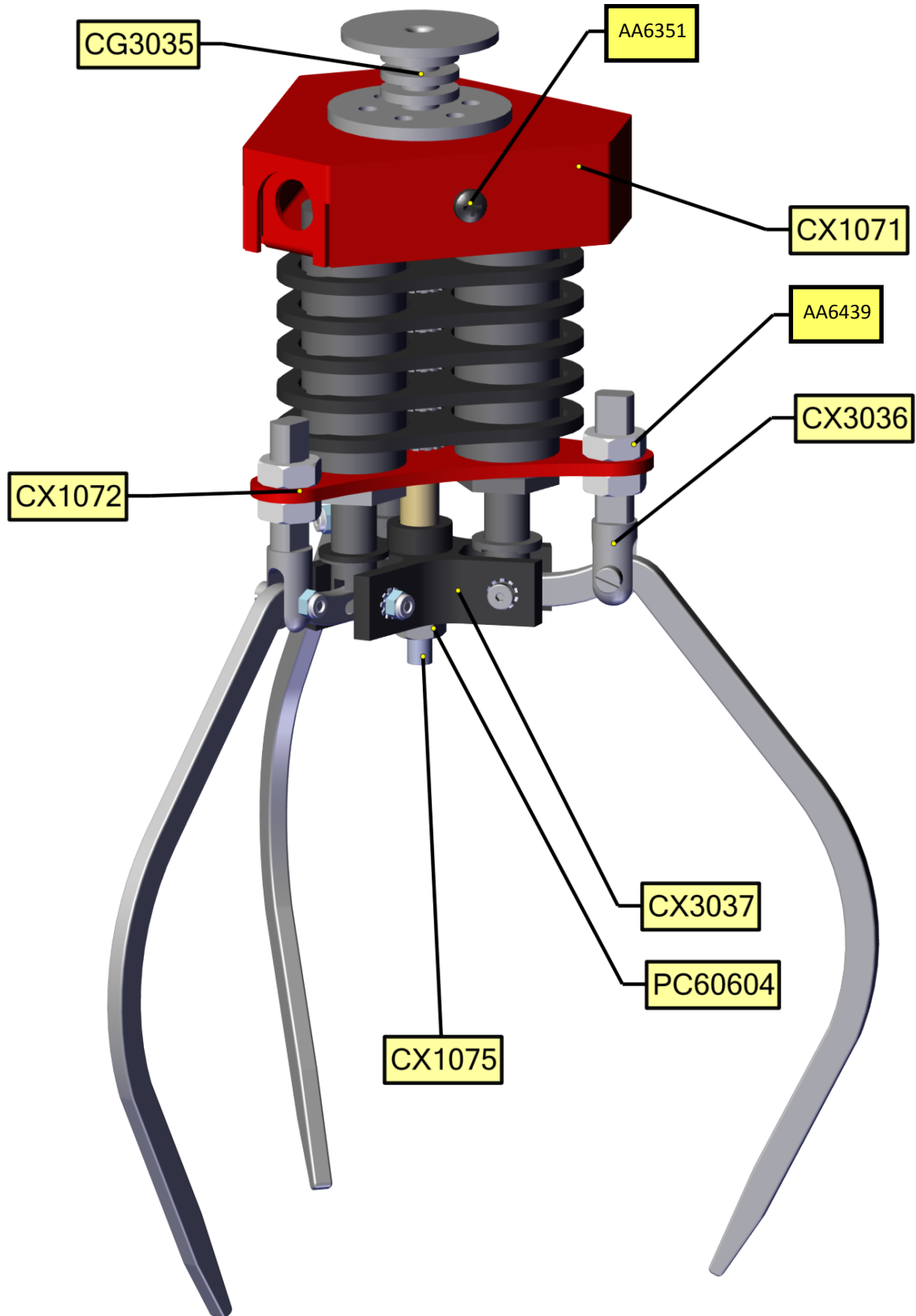
**Claw Assembly CX1078NX**



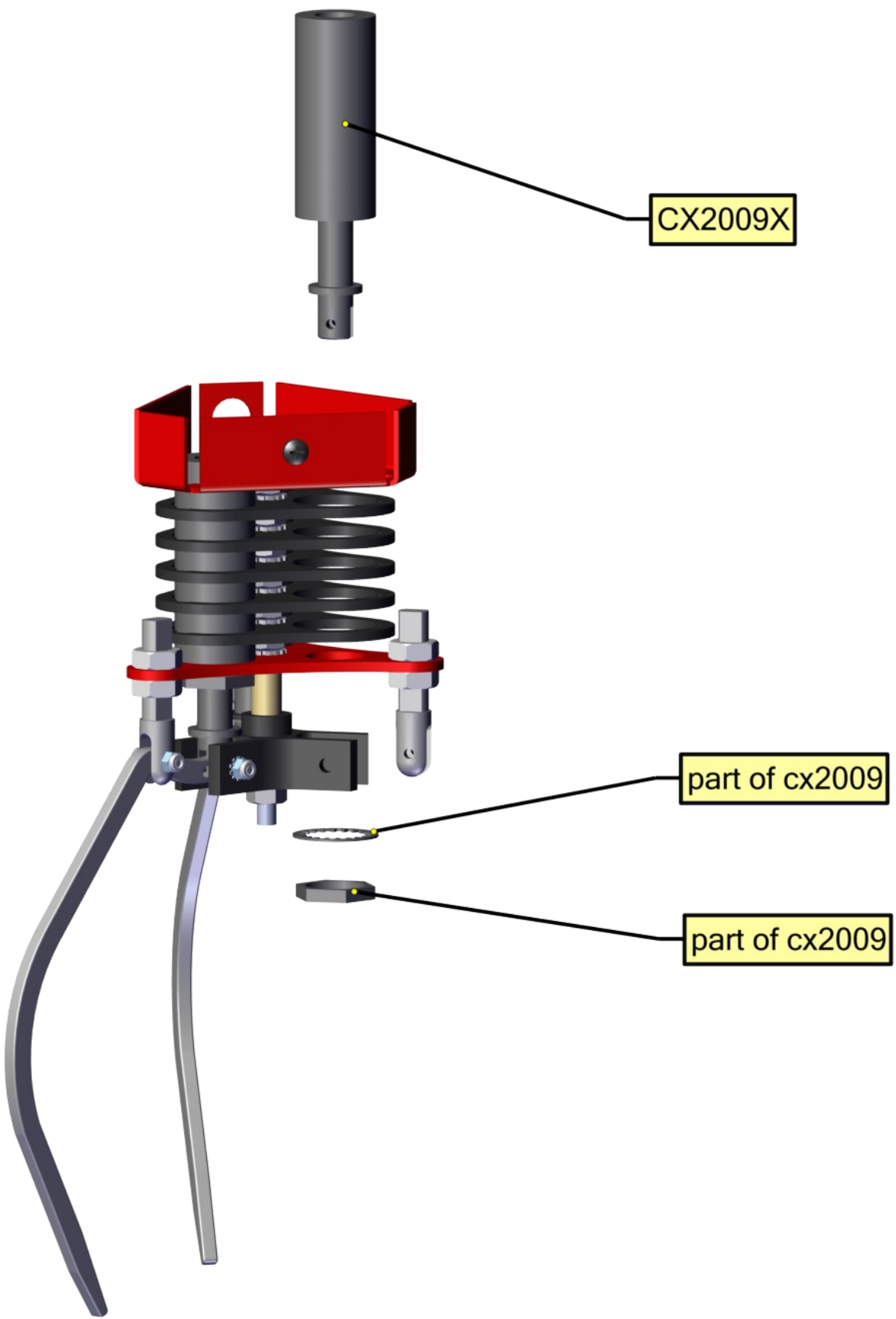
# Claw Assembly CX1078NX



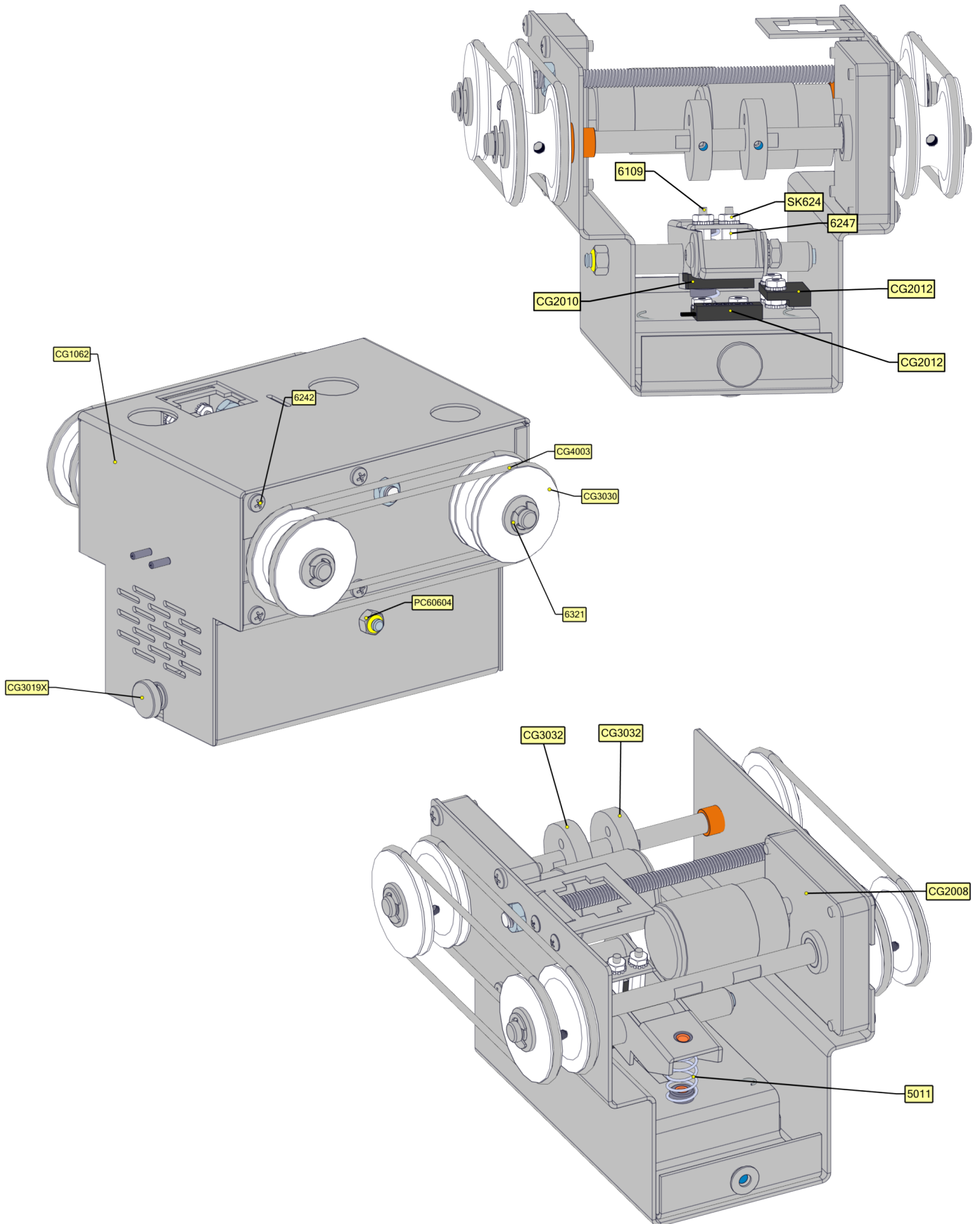
# Claw Assembly CX1078NX



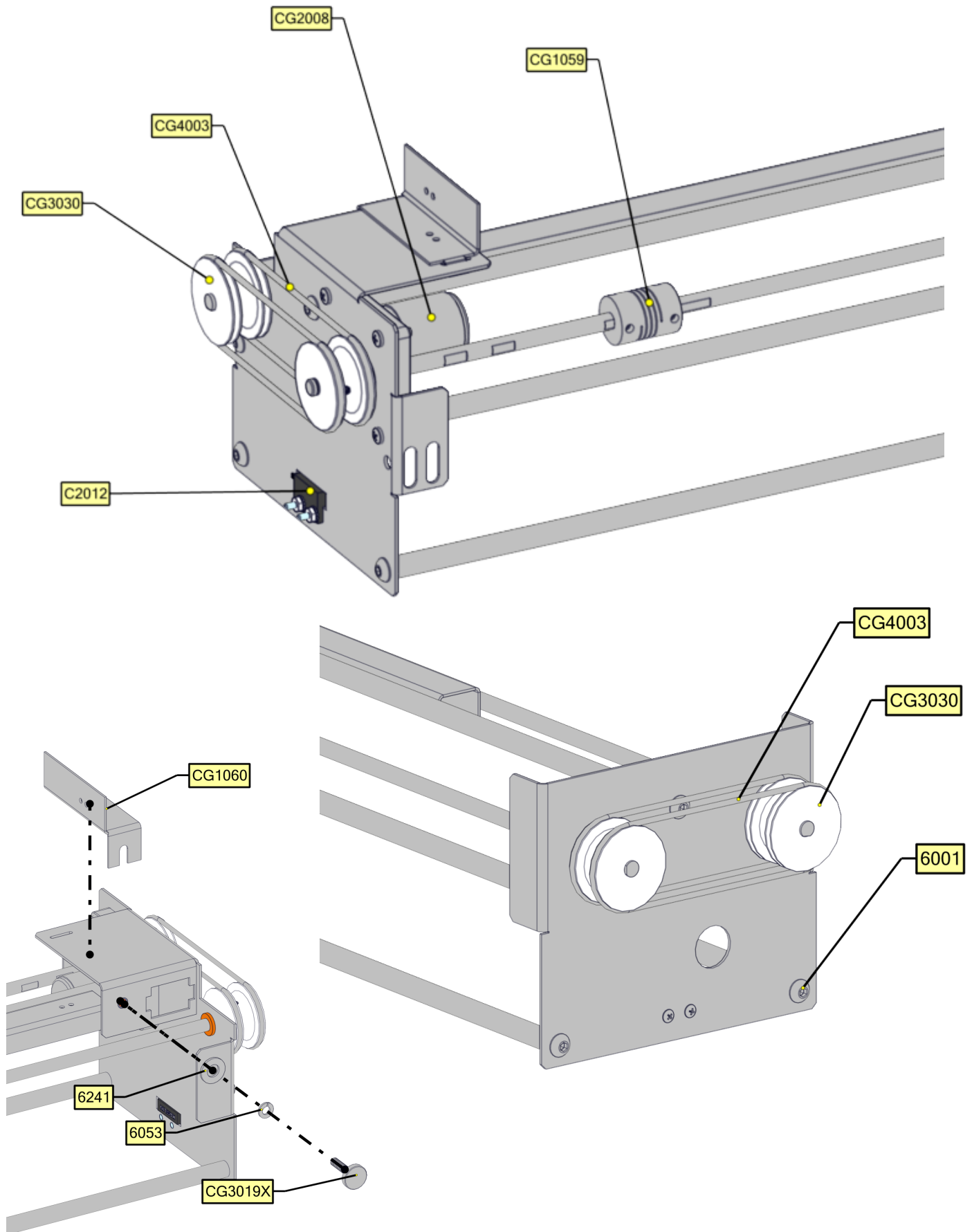
# Claw Assembly CX1078NX



# Crane Assembly CG1261X



# Wagon Assembly CG1255X



# Spare Parts

AA5006	CASH BOX OVER/UNDER	CX2009XASY	(SOLENOID)
AA5101X	ASY MECH HOLDER	CG5014	T HANDLE (LOCK) 8839
E00724BCDX	ASY (RGB 81 LED TAPE STRIP)	CG5015	LOCK (BARREL) 2M8871A R19124
E00788BCX	ASY (WHITE LARGE 42 LED TAPE STR	AR2010	POWER SUPPLY +12VDC 17A (ROHS)
CG2008	MOTOR (5821)	CG2002X	ASY TRANSFORMER (2-51-9813L)
CG2012	SENSOR (FWD,BACK,DOWN) (REQUE	CG2134X	PCBA (MAIN, REV 7)
CG2013	SENSOR (L&R) (REQUEST ROHS -	CX1078NX	ASY (CLAW) ICE GRAB N WIN
CG2053UX	HARNESS (WAGON/CRANE) USE OX/U	E00724BCAX	ASY (RGB 111 LED TAPE STRIP)
CG3019X	THUMB SCREW ASY BLACK (1/4-20)	E00724BCBX	ASY (RGB DUAL 63 LED TAPE STRIP)
CG3030	WHEEL (LARGE)	E00724BCCX	ASY (RGB DUAL 57 LED TAPE STRIP)
CG4003	O-RING (ROHS) (.139-4.52P800-5	E00724CXAX	ASY (RGB 30 LED TAPE STRIP)
CG4004X	STRING CRANE 5/32" DIAMETER	E00724CXCX	ASY (RGB 12 LED TAPE STRIP)
E08005	CAP 2.2UF 20% 50V SR305E225MAA	E00852BCX	ASY (WHITE LARGE WP 54 LED TAPE
CG1066	SPRING (ROHS) (CRANE UP) MASTE	FP2007	SPEAKER (4/4 OHM ROUND) .18
BC2007X	ASY (POWER MOD 4 AMP)	SC5011	SOLENOID SPRING (ROHS) (MASTER
BC2052AX	HARNESS (MAIN/WAGON UPPER)	BC1233LX	Left side prize sensor
BC2232X	PCBA (DISPLAY)	BC1233RX	Right side prize sensor
CC2027	POWER CORD 20 FT. (ROHS) COMPU	CG2010	ACTUATOR (57145 ROHS)
CG1255X	ASY (WAGON) GRAB N WIN VERSION	CG1078N-P001	CLAW GRAB N WIN
CG1261X	ASY (CRANE) GRAB N WIN VERSION		
CG2002X	ASY TRANSFORMER (2-51-9813L)		
CG2014	JOYSTICK W/ BUTTON		



# WARRANTY POLICY

I.C.E. Inc warrants all components in new machines to be free of defects in materials and workmanship for the period listed below:

- 180 days on Main PCB's, Computers & Motors
- 1 year on all LCD monitor panels
- 90 days on all other electronic and mechanical components
- 30 days on all I.C.E. repairs and parts purchases

I.C.E. Inc shall not be obligated to furnish a warranty request under the following conditions:

- Equipment or parts have failed through normal wear and tear
- Equipment has been subjected to unwarranted stress, abuse or neglect
- Equipment has been damaged as a result of arbitrary repair/modification

Products will only be covered under warranty by obtaining an I.C.E. authorized RMA #. To obtain an RMA # please provide I.C.E. tech support with the game serial # or original I.C.E. invoice # and a detailed description of the failure or fault symptoms.

I.C.E. Inc. will assume no liability whatsoever for costs associated with labor or travel time to replace defective parts. All defective warranty covered components will be replaced with new or factory refurbished components equal to OEM specifications.

I.C.E. Inc. will cover domestic UPS ground, or comparable shipping costs during the warranty period. International or expedited shipments are available for an additional charge. To obtain credit defective parts must be returned to I.C.E. Inc, at the customer's expense, within 30 days. After 30 days a 15% re-stocking fee will apply to all returns.

ICE distributors are independent, privately owned and operated. In their judgment, they may sell parts and/or accessories other than those manufactured by I.C.E. Inc. We cannot be responsible for the quality, suitability or safety of any non-I.C.E. part or modification (including labor) that is performed by such a distributor.