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Neopixel Chase Controller

PN: ece-C-21-004, REv 4-5

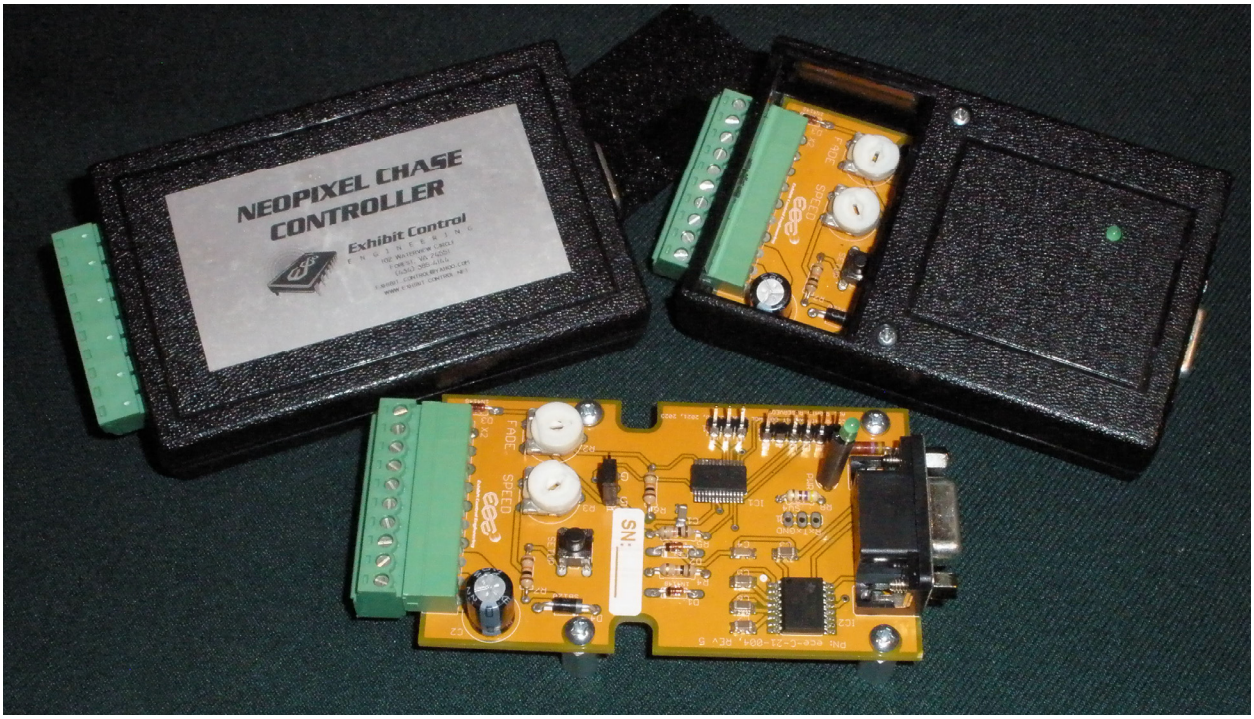


Figure 1

OVERVIEW:

THE NEOPIXEL CHASE CONTROLLER (NCC) IS A GENERAL PURPOSE DEVICE TO PROVIDE CHASE PATTERNS ON NEOPIXEL LED STRIPS (WS2812). ALTHOUGH THE NCC CAN CONTROL AT LEAST 600 LEDS (PROBABLY MORE) IT WILL NOT BE THE LIMITING FACTOR FOR THE TOTAL NUMBER OF CONTROLLED LEDS. THE MAIN CONSIDERATIONS FOR LIMITING THE TOTAL NUMBER OF CONTROLLED LEDS WILL BE THE POWER CONSUMPTION OF THE LED STRIP, COLOR CHANGES FROM ONE END OF THE STRIP TO THE OTHER (DUE TO VOLTAGE DROP ON LONG STRIPS) AND THE LIMITATION OF SPEED DUE TO HAVING TO ADDRESS EVERY LED FOR A SINGLE LED CHANGE. ALTHOUGH WE PROVIDED OUR CONTROLLER WITH A FIRMWARE WITH A LARGE VARIETY OF OPTIONS WE CAN ALSO DEVELOP MORE CUSTOM FIRMWARE FOR YOUR APPLICATION.

WE PROVIDE THE NCC EITHER AS A PCB ON STANDOFFS WHEN IT WILL BE PROTECTED IN THE EXHIBIT ENCLOSURE OR IN A STYLISH PLASTIC ENCLOSURE.

BASIC CHASE PATTERNS

THE NCC IN ITS STANDARD CONFIGURATION HAS FIVE DIFFERENT CHASE PATTERNS THE USER CAN SELECT FROM.

PULSATE PATTERN (PATTERN ZERO "0")

THE FIRST WE CALL THE "PULSATE" PATTERN, DESIGNATED THE ZERO "0" PATTERN. IN THIS MODE ALL OF THE CONTROLLED LEDS WILL GRACEFULLY RAMP UP TO TOTAL COLOR, HOLD IT FOR A CONTROLLED AMOUNT OF TIME AND THEN RAMP BACK DOWN TO THE OFF STATE. HOW QUICKLY THE RAMP TIME TAKES IS DETERMINED BY A POTENTIOMETER, DESIGNATED "FADE". TURNING THIS POT FULLY CLOCKWISE PROVIDES THE LONGEST FADE TIME. THE DURATION OF "OFF" AND "ON" PERIODS IS CONTROLLED BY THE POTENTIOMETER DESIGNATED "SPEED". TURNING THIS POT FULLY CLOCKWISE IS THE SHORTEST DURATION FOR "ON" AND "OFF".

YOU CAN MAKE THE "ON" COLOR ANY RGB VALUE FROM (0,0,0 TO 255,255,255). OBVIOUSLY YOU WON'T REALLY WANT TO USE (0,0,0) AS THAT MAKES ALL LEDS TOTALLY OFF. GENERALLY, WE SUSPECT THE "OFF" VALUE WILL BE OFF. (RGB: 0,0,0) IT IS POSSIBLE TO MAKE IT ANY RGB COLOR AS WELL, BUT THE FADE IS ALWAYS TO LED OFF WHICH MEANS AT THE END OF THE FADE DOWN THE "OFF" COLOR WILL SNAP ON. WE HAVE NOT PERFECTED A CROSS FADE FOR THIS APPLICATION. WE ARE NOT SURE OUR LITTLE CHIP ACTUALLY HAS THE RESOURCES FOR SUCH AN OPERATION.

3-LED CIRCUIT CHASE PATTERN (PATTERN ONE "1")

THIS PATTERN REPLICATES THE CHASE PATTERNS USED IN THE EARLY LED STRIP DAYS WHEN ALL THE LEDS IN THE STRIP WERE A SINGLE COLOR. THESE STRIPS HAD THREE SEPARATE LED CIRCUITS THAT COULD BE CONTROLLED. THAT MEANT YOU COULD TURN EACH CIRCUIT "ON" AND "OFF" IDIVIDUALLY. WHEN YOU TURNED ONE CIRCUIT ON, EVERY THIRD LED IN THE STRIP WOULD TURN ON. BY SEQUENTIALLY TURNING ONE LED ON AND OFF AND THEN DOING THE SAME PROCEDURE TO THE NEXT, YOU CREATED THE ILLUSION THAT THE LEDS WERE MOVING IN ONE DIRECTION. REVERSING THE PROCESS SEEMED TO MAKE THE LEDS MOVE IN THE OPPOSITE DIRECTION.

SO WE FIGURED OUT A PATTERN FOR THE NEOPIXELS TO REPLICATE THIS MOVING ILLUSION. WE ALSO ADDED THE ABILITY TO FADE UP THIS MOVING ILLUSION FROM "OFF" TO THE FINAL COLOR AND RAMP IT BACK DOWN TO "OFF". THIS RAMP PROCESS CAN BE VERY FAST (ALMOST INSTANTANIOUSLY) TO ALMOST FIVE SECONDS BY ADJUSTING THE "FADE" POTENTIOMETER ON THE PCB. HOW FAST THE LEDS APPEAR TO BE MOVING IS CONTROLLED BY THE SPEED POTENIOMETER ON THE PCB. A FULLY CLOCKWISE POT RESULTS IN THE FASTEST. BE AWARE THAT MAKING THIS TIME PERIOD TOO SHORT WILL RESULT IN A "DIMMING EFFECT" RATHER THAN A CHASE EFFECT AND YOU WILL HAVE TO SLOW IT DOWN TO GET THE ILLUSION OF MOVEMENT.

THE DIRECTION OF THE PERCEIVED MOTION CAN BE CHANGED INSTANTANEOUSLY BY USING THE DIRECTION SWITCH. IF THE SWITCH IS TOGGLED DURING A RAMP UP OR DOWN PROCESS, IT WILL NOT EFFECT THE RAMP PROCESS - ONLY THE DIRECTION.

4 LED CHASE PATTERN (PATTERN TWO "2")

THIS PATTERN WAS IMPOSSIBLE WITH THE OLD MONO-COLOR LED STRIPS. IN THIS PATTERN THERE ARE FOUR SEQUENTIAL LEDS "ON" AND THE NEXT FOUR ARE "OFF" DOWN THE ENTIRE STRING. THEN FOR EVERY TIME PERIOD STEP, THE WHOLE EIGHT LED PATTERN SHIFTS ONE LED IN ONE DIRECTION. THIS PATTERN IS A LITTLE LIKE THE 3-CIRCUIT CHASE PATTERN BUT USES FOUR LEDS "ON" INSTEAD OF ONE AND FOUR LEDS "OFF" INSTEAD OF TWO.

THE SPEED OF THIS CHASE PATTERN IS CONTROLLED BY THE "SPEED" POTENIOMETER. TURNING IT FULLY CLOCKWISE WILL RESULT IN THE FASTEST TIME POSSIBLE. LIKE THE 3-CIRCUIT CHASE PATTERN, MAKING THIS TIME PERIOD TOO SHORT (TOO FAST) WILL RESULT IN A "DIMMING EFFECT" RATHER THAN A CHASE EFFECT AND YOU WILL HAVE TO SLOW IT DOWN TO GET THE ILLUSION OF MOVEMENT.

THIS PATTERN ALSO HAS THE ABILITY TO GRACEFULLY FADE "UP" AND "DOWN" THE MOVING LED PERCEPTION. IT CAN BE SET FROM ALMOST INSTANTANEOUS TO APPROXIMATELY FIVE SECONDS. TURNING THIS POT FULLY CLOCKWISE WILL RESULT IN THE SHORTEST FADE TIMES.

THE DIRECTION OF THE PERCEIVED MOTION CAN BE CHANGED INSTANTANEOUSLY BY USING THE DIRECTION SWITCH. IF THE SWITCH IS TOGGLED DURING A RAMP "UP" OR "DOWN" PROCESS, IT WILL NOT EFFECT THE RAMP PROCESS - ONLY THE DIRECTION.

BE ADVISED THAT USING AN "OFF" RGB COLOR OTHER THAN (0,0,0) WHEN ALSO USING A "FADE" PERIOD MIGHT RESULT IN UNWANTED AFFECTS.

RUNWAY CHASE PATTERN (PATTERN THREE "3")

THIS PATTERN WAS ALSO IMPOSSIBLE WITH THE OLD MONO-COLOR LED STRIPS. THIS PATTERN MIGHT BE DESCRIBED AS A GROWING AND SHRINKING TAIL. THIS PATTERN TURNS ON THE FIRST LED IN THE STRIP AND THEN SEQUENTIALLY ADDS THE NEXT ONE FOR EVERY TIME STEP UNTIL THE WHOLE LED STRING IS ILLUMINATED. THEN STARTING WITH THE FIRST LED IT SEQUENTIALLY TURNS EACH ONE OFF UNTIL THE ENTIRE STRIP IS EXSTINGUISHED. WHEN IN THE FAST MODE THIS RESEMBLES AIRSTRIP RUNWAY LIGHTS.

THERE IS NO FADING OF THIS PATTERN AVAILABLE SO THE "FADE" POTENTIOMETER HAS NO EFFECT. THE "SPEED" POTENTIOMETER CONTROLS HOW FAST THE TOTAL SEQUENCE LASTS. TURNING THIS POT FULLY CLOCKWISE RESULTS IN THE FASTEST SEQUENCE POSSIBLE.

THE DIRECTION OF THE RUNWAY PROGRESSION IS CONTROLLED BY THE DIRECTION SWITCH. PLEASE NOTE, HOWEVER, THIS PATTERN MUST COMPLETE ITS TOTAL

SEQUENCE BEFORE IT CAN BE STOPPED OR ITS DIRECTION CHANGED. THIS SHOULD BE CONSIDERED WHEN DETERMINING THE TOTAL NUMBER OF LEDS TO BE CONTROLLED. THE MORE LEDS IN THE STRIP, THE LONGER IT WILL TAKE TO COMPLETE ITS SEQUENCE AND THE SLOWER THE TIME OF THE TOTAL EFFECT.

TRACER ROUND OR INCH WORM CHASE (PATTERN FOUR "4")

THIS PATTERN TOOK US THE LONGEST TO DEVELOP. NOT SURE WHY. IN ANY CASE, USING THE SERIAL CONFIGURATION PROCESS DISCUSSED LATER, YOU CAN SET THE LENGTH OF THE LED SEGMENT TO THREE, FOUR OR FIVE LEDS. THEN FOR THE SELECTED SIZE OF THE LED PACKET, IT STARTS OUT WITH PACKET EMERGING FROM THE END, ONE LED AT A TIME, UNTIL ALL OF THE LEDS ARE VISIBLE. THEN THE SEGMENT PROGRESSES DOWN THE STRIP, ONE LED AT A TIME UNTIL IT REACHES THE END AND THEN DISAPPEARS INTO THE END OF THE STRIP ONE LED AT A TIME. WHEN THIS IS DONE SLOWLY, IT RESEMBLES AN INCH WORM CREEPING DOWN THE LED STRIP. WHEN DONE EXTREMELY FAST, IT RESEMBLES A TRACER ROUND FROM AN AUTOMATIC WEAPON (OR A STAR WARS' X-WING FIGHTER).

THE SPEED IS CONTROLLED BY THE "SPEED" POTENTIOMETER. SETTING IT FULLY CLOCKWISE IS THE FASTEST TRACER ROUND. THERE IS NO FADING ON THIS CHASE PATTERN, SO THE "FADE" POTENTIOMETER IS NOT UTILIZED.

THE DIRECTION OF THIS PATTERN IS CONTROLLED BY THE DIRECTION SWITCH. PLEASE NOTE, HOWEVER, THIS PATTERN MUST COMPLETE ITS TOTAL SEQUENCE BEFORE IT CAN BE STOPPED OR ITS DIRECTION CHANGED. THIS SHOULD BE CONSIDERED WHEN DETERMINING THE TOTAL NUMBER OF LEDS TO BE CONTROLLED. THE MORE LEDS IN THE STRIP, THE LONGER IT WILL TAKE TO COMPLETE ITS SEQUENCE AND THE SLOWER THE TIME OF THE TOTAL EFFECT.

USING THE MANUAL BUTTON TO CHANGE THE CHASE MODE

ONE WAY TO CHANGE THE CHASE PATTERN IS BY USING THE PUSH BUTTON ON THE PCB LABELED "SETUP". IT IS FOUND UNDER THE SLIDING COVER OF THE PLASTIC ENCLOSURE OR AT THE PHOENIX CONNECTOR END OF THE PCB. EACH TIME THE BUTTON IS PRESSED, THE CHASE PATTERN WILL INCREMENT TO THE NEXT CHASE PATTERN. IF THE CHASE PATTERN IS THE TRACER/INCHWORM CHASE, IT WILL ROLL BACK TO THE PULSATE MODE. THIS BUTTON ALLOWS THE USER TO EITHER, TEMPORARILY CHANGE THE CHASE MODE OR TO LOAD IT INTO NON-VOLATILE MEMORY TO BE CALLED UP EVERY POWER UP. PROVIDING A NICE POSITIVE PRESS FOR LESS THAN TWO SECONDS WILL CHANGE THE CHASE MODE TEMPORARILY. HOLDING THE BUTTON FOR LONGER THAN TWO SECONDS WILL ALSO LOAD THIS CONFIGURATION INTO NON-VOLATILE MEMORY. PLEASE NOTE THAT THE RUN SWITCH HAS TO BE OFF AND ANY PATTERN COMPLETELY FINISHED BEFORE THIS BUTTON IS ACTIVE FOR THIS FUNCTION.

SINCE THIS BUTTON HAS TWO OPERATIONS (QUICK PRESS AND A LONGER THAN TWO SECOND HOLD PRESS), YOU CANNOT RAPIDLY CHANGE THE CHASE MODE. YOU NEED TO WAIT APPROXIMATELY THREE SECONDS BETWEEN EACH BUTTON PRESS TO INCREMENT THE CHASE MODE WITHOUT LOADING IT INTO MEMORY. IF YOU DON'T WAIT THE THREE SECONDS THERE IS A CHANCE THAT WHEN YOU PRESS THE BUTTON THE SECOND TIME IT WILL NOT CHANGE THE MODE BUT RATHER SAVE THE PREVIOUS MODE IN NON-VOLATILE MEMORY.

IF YOU ARE CONNECTED TO THE RS232 PORT, YOU WILL GET A CONFIRMATION MESSAGE AS TO THE CURRENT CHASE MODE AND A MESSAGE WHEN YOU CAN INCREMENT IT AGAIN WITHOUT SAVING IT TO MEMORY. IF YOUR INTENTION IS TO SAVE THE NEXT CHASE MODE PRESSED, YOU WILL GET A CONFIRMATION THAT IT HAS BEEN LOADED INTO MEMORY.

CHANGING THE TOTAL CONFIGURATION DATA

THERE ARE A NUMBER OF VARIABLES THAT NEED TO BE SET INTO THE CONFIGURATION DATA. THE VERY FIRST THING IS THE TOTAL NUMBER OF LEDS TO BE CONTROLLED. THE FOLLOWING DATA NEEDS TO BE SPECIFIED AND THE FACTORY LOADED VALUES INDICATE THE CURRENT STATE:

TOTAL NUMBER OF LEDS:	**50**
ON GREEN VALUE:	**128**
ON RED VALUE:	**0**
ON BLUE VALUE:	**0**
OFF GREEN VALUE:	**0**
OFF RED VALUE:	**0**
OFF BLUE VALUE:	**0**
TRACER SEGMENT LENGTH:	**4**
CHASE MODE:	**2**

TO CHANGE THESE VALUES FROM THE FACTORY SETTINGS TO THE CLIENT DESIRED VALUES, YOU WILL NEED TO USE A PC WITH AN RS232 COMM PORT; EITHER AN INTERGAL PC PORT OR AN USB TO RS232 ADAPTER. THE RS232 SPECIFICS ARE:

9600 BAUD
8 DATA BITS
NO PARITY
1 STOP BIT

PLEASE NOTE THAT THE RUN SWITCH HAS TO BE OFF AND ANY PATTERN COMPLETELY FINISHED BEFORE THIS COMMUNICATION PORT IS ACTIVE.

THE NCC COMM PORT IS CONFIGURED AS A DCE SO CONNECTING IT TO A STANDARD PC COMM PORT IS DONE WITH A STRAIGHT THROUGH RS232 CABLE THAT ONLY NEEDS THREE WIRES (TX, RX & GND). YOU CAN USE ANY STANDARD RS232 SERIAL PROGRAM TO COMMUNICATE WITH THE NCC. WHEN DEVELOPING OUR FIRMWARE, WE USED HYPER-TERMINAL AND ECE'S AV TERMINAL COMMANDER, WHICH CAN BE DOWNLOADED, FOR FREE, FROM OUR WEB SITE (www.exhibit-control.net). ONE OF THE REASONS YOU MIGHT CONSIDER USING OUR TERMINAL COMMANDER PROGRAM IS YOU CAN TYPE THE ENTIRE STRING INTO ONE OF THE PRESS COMMANDS AND DOUBLE CHECK IT BEFORE SENDING IT IN ITS ENTIRETY TO THE NCC. IF YOU USE A PROGRAM LIKE HYPER-TERMINAL WHERE THE CHARACTERS ARE SENT, ON THE FLY, AS YOU TYPE, YOU NEED TO BE AWARE THAT THERE IS A TIMEOUT FOR COMPLETING THE STRING INPUT: 15 SECONDS. IF THE TIMEOUT OCURRS DURING THE PROCESS OF TYPING, YOU WILL GET A NOTIFICATION OF THE TIME OUT AND THE FACT NO CONFIGURATION DATA WAS CHANGED. YOU MERELY START OVER TO MAKE THE INTENDED CHANGE. DURING THIS PROCESS, YOU WILL GET THE CURRENT CONFIGURATION INFORMATION AS WELL AS THE UPDATED INFORMATION.

EACH RS232 COMMAND STRING CONSISTS OF SEVEN ASCII CHARACTERS. THE FIRST TWO CHARACTERS WILL IDENTIFY THE DATA YOU WISH TO CHANGE (NOTE THEY ARE ALL CAPS):

- **"LL"** TO CHANGE THE TOTAL NUMBER OF LEDS TO BE CONTROLLED. NORMALLY LESS THAN 300, BUT YOU CAN SPECIFY A VERSION OF THE NCC TO HANDLE LONGER STRIPS.
- **"OG"** TO CHANGE THE "ON" GREEN RGB VALUE. (0-255)
- **"OR"** TO CHANGE THE "ON" RED RGB VALUE. (0-255)
- **"OB"** TO CHANGE THE "ON" BLUE RGB VALUE. (0-255)
- **"FG"** TO CHANGE THE "OFF" GREEN RGB VALUE. (0-255)
- **"FR"** TO CHANGE THE "OFF" RED RGB VALUE. (0-255)
- **"FB"** TO CHANGE THE "OFF" BLUE RGB VALUE. (0-255)
- **"TL"** TO CHANGE THE TRACER LENGTH. (3, 4 OR 5)
- **"CM"** TO CHANGE THE CHASE MODE.
  - **0 – PULSATE**
  - **1 – 3-CIRCUIT LED CHASE**
  - **2 – 4-LED CHASE**
  - **3 – RUNWAY CHASE**
  - **4 – TRACER OR INCHWORM CHASE**

THE NEXT THREE CHARACTERS WILL CONTAIN THE DATA YOU WANT TO USE. YOU NEED TO USE LEADING ZEROS, WHEN APPROPRIATE, TO FILL ALL THREE CHARACTERS. THE RANGES OF VALUES FOR EACH CATEGORY ARE LISTED ABOVE.

THE SIXTH CHARACTER SPECIFIES WHETHER THIS IS A TEMPORARY VALUE OR ONE TO BE SAVED IN NON-VOLATILE MEMORY, I.E. TO ALWAYS BE USED DURING A POWER UP CYCLE. AN "S" CHARACTER WILL SAVE IT INTO MEMORY. A "T" WILL ONLY CHANGE THE VALUE TEMPORARLY FOR THE CURRENT OPERATING SESSION.

THE LAST CHARACTER NEEDS TO BE A CARRIAGE RETURN <CR> (HEX VALUE 0x0D). IN HYPER-TERMINAL THIS IS THE CHARACTER SENT WHEN YOU PRESS THE "ENTER" KEY.

HERE ARE SOME EXAMPLE STRING COMMANDS AND WHAT THEY ACCOMPLISH:

1. **"LL099T"<CR>** TEMPORARILY CHANGES NUMBER OF CONTROLLED LEDS TO 99.

2. **"LL150S"<CR>** MEMORIZES THE CHANGE OF NUMBER OF LEDS TO 150.

3. **"OG128T"<CR>** TEMPORARILY CHANGES "ON" GREEN VALUE TO 128. CHANGE THE "G" IN THIS STRING TO "R" FOR THE "ON" RED VALUE OR TO "B" FOR THE "ON" BLUE VALUE. CHANGE THE THREE-DIGIT NUMBER AS REQUIRED. CHANGE THE "T" CHARACTER TO "S" TO SAVE IN MEMORY.

4. **"FG000S"<CR>** CHANGES AND MEMORIZES "OFF" GREEN VALUE TO ZERO. CHANGE THE "G" IN THIS STRING TO "R" FOR THE "OFF" RED VALUE OR TO "B" FOR THE "OFF" BLUE VALUE. CHANGE THE THREE-DIGIT NUMBER AS REQUIRED. CHANGE THE "S" CHARACTER TO "T"

	TO MAKE THIS A TEMPORARY (NOT STORED IN MEMORY) VALUE.
5. "TL005T"<CR>	**TEMPORARILY CHANGES THE TRACER/INCH WORM LENGTH TO FIVE. CHANGE THE "T" IN THIS STRING TO "S" TO SAVE THE CHANGED VALUE IN MEMORY.**
6. "CM004T"<CR>	**TEMPORARILY CHANGES THE CHASE MODE TO FOUR (TRACER/INCH WORM). CHANGE THE "T" IN THIS STRING TO "S" TO SAVE THE CHANGED VALUE IN MEMORY.**

SOME FINAL CONSIDERATIONS

SEE THE LAST PAGE FOR A DRAWING OF THE TYPICAL WIRING CONFIGURATION.

IF YOU ARE MAKING AJUSTMENTS TO A CHASE PATTERN THAT UTILIZES BOTH A "SPEED" ADJUSTMENT AND A "FADE" ADJUSTMENT, MAKE THE SPEED ADJUSTMENT FIRST. THE "FADE" EFFECT CAN BE AFFECTED BY CHANGES IN THE CHASE SPEED.

SOME THINGS ONE SHOULD CONSIDER WHEN SETTING THE NUMBER OF CONTROLLED LEDS. THE FIRST CONSIDERATION SHOULD BE THE POWER NEEDED. POWER IS NOT ONLY AFFECTED BY THE NUMBER OF LEDS BUT ALSO THE "ON' AND "OFF" COLORS FOR THE CHASE. THE BRIGHTEST - WHITE (RGB: 255,255,255) - WILL DRAW THE MAXIMUM AMOUNT OF CURRENT. BRINGING THESE VALUES DOWN OR LIMITING THE COLOR TO A SINGLE, PRIMARY COLOR (THAT IS: TWO OF THE THREE RGB VALUES WILL BE ZERO) WILL DRASTICALLY REDUCE THE MAXIMUM CURRENT REQUIRED.

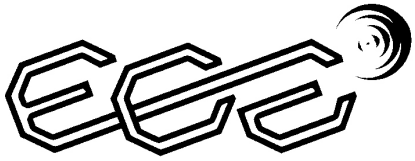
AS MENTIONED BEFORE, LARGE NUMBERS OF CONTROLLED LEDS WILL REDUCE THE MAXIMUM SPEED ACHIEVABLE IN ANY GIVEN CHASE PATTERN.

WHEN DESIGNING YOUR LED EXHIBIT WITH LARGE NUMBERS OF CONTROLLED LEDS, REMEMBER THAT THE VOLTAGE AVAILABLE TO THE LEDS FURTHEST FROM THE CONTROLLER WILL BE SIGNIFICANTLY LESS THAN THOSE CLOSEST TO THE CONTROLLER. THIS MAY RESULT IN COLOR OR BRIGHTNESS VARIATIONS FOR THE LEDS AT ONE END VERSUS THE OTHER. A WAY TO REDUCE THIS PROBLEM IS TO PROVIDE POWER TO BOTH ENDS OF THE LED STRIP. (WARNING: DO NOT PROVIDE NEOPIXEL COMMUNICATION CONNECTION TO THIS FAR END POWER CONNECTION. THIS WILL ELIMINATE COMMUNICATIONS TO THE LED STRIP.) IF THE LED STRIP IS REALLY LONG, YOU SHOULD CONSIDER PROVIDING POWER VIA JUMPER WIRES FROM THE POWER SUPPLY TO INTERMEDIARY CONNECTIONS ALONG THE STRIP. EACH OF THESE SHOULD HAVE A "HOME RUN" BACK TO THE POWER SUPPLY. THIS WILL AMILORATE THE POWER VOLTAGE DROP ALONG THE LED STRIP.

IF THE AMOUNT OF CURRENT DRAW THROUGH THE CONTROLLED LEDS IS GREATER THAN SIX AMPS, CONSIDER CONNECTING THE LED STRIP POWER CONNECTIONS DIRECTLY TO THE POWER SUPPLY BUS AS OPPOSED TO GOING THROUGH THE CHASE CONTROLLER PHOENNIX CONNECTOR. SEE WIRING DIAGRAM ON THE LAST PAGE.

Conclusion:

THE NEOPIXEL CHASE CONTROLLER WAS DESIGNED TO PROVIDE A LOT OF FLEXIBILY FOR EXHIBIT DESIGNERS TO USE NEOPIXEL LED STRIPS IN THEIR EXHIBITS. BUT, WE REALIZE WE HAVEN'T COVERED EVERY CONCEIABLE PATTERN. THERE ARE A NUMBER OF ACCOMMODATIONS WE COULD MAKE TO THE BASIC CONTROLLER. FOR INSTANCE, IF YOU WANTED A DIFFERENT NUMBER THAN FOUR LEDS "ON" AND FOUR LEDS "OFF" FROM THE FOUR LED CHASE PATTERN, WE COULD ACCOMMODATE THAT IN CUSTOM FIRMWARE. DO YOU WANT MORE LEDS IN THE TRACER/INC WORM PATTERN? ONCE AGAIN WE COULD PROVIDE CUSTOM FIRMWARE. THE ONE THING WE CANNOT GET AROUND IS THE PROBLEM OF HAVING TO ADDRESSING EVERY LED FOR EVERY CHANGE TO A SINGLE LED AND THE TIME CONSUMPTION OF THIS PROCESS. HOWEVER, THERE ARE SOME TRICKS THAT WE COULD ENVOKE TO GET AROUND THIS LIMITATION. FOR EXAMPLE, IF YOU WANTED A VERY FAST TRACER ROUND ON A VERY LONG LED STRIP, WE COULD USE A NUMBER OF CONTROLLER CIRCUITS – EACH ONE ONLY CONTROLLING SAY 50 LEDS – BUT CONTROL THEM SO THEY LOOKED SEQUENTIAL WHEN OBSERVING THE ENTIRE STRIP. IT WOULD BE VERY FAST OVER THE ENTIRE LENGTH OF THE COMBINED LED STRIPS. IF OUR STANDARD NEOPIXEL CONTROLLER IS NOT CAPABLE OF PRODUCING YOUR DESIRED EFFECT, CALL US TO DISCUSS IF A CUSTOM OPTION IS POSSIBLE.



NEOPIXEL CHASE CONTROLLER
PN: ece-C-21-004, REv 4-5

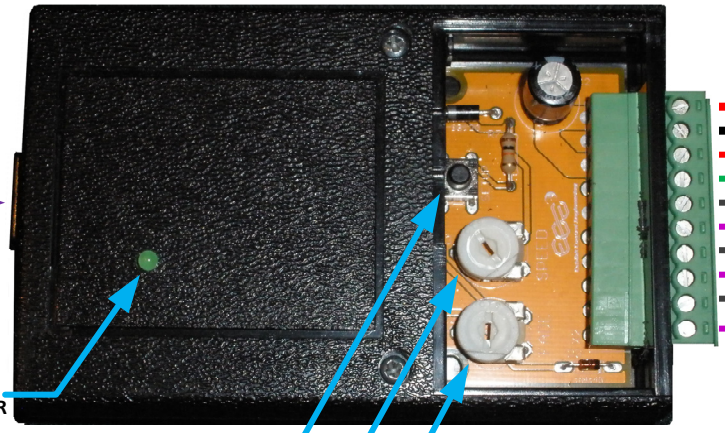
COMM SPECIFICS:

BAUD:	9600
NO OF BITS:	8
PARITY:	NONE
STOP BITS:	1

WIRED AS DCE:
USE WITH A STRAIGHT THRU CABLE WHEN CONNECTING TO A PC COMM PORT.

TX PIN:	2
RX PIN:	3
GND PIN:	5

COMM



LED PWR INDICATOR

MANUAL CHASE MODE CHANGE BUTTON

CHASE SPEED ADJUST POTENTIOMETER

FADE TIME ADJUST POTENTIOMETER

OPTIONAL INPUT; NORMALLY NOT CONNECTED.

5.O vdc PWR SUPPLY

NOTE:
IF NEOPIXEL LOAD IS GREATER THAN 6 AMPS CONSIDER JUMPERS STRAIGHT TO THE POWER SUPPLY.
SEE DOTTED LINES

NEOPIXEL STRIP

NOTE:
THE DIRECTION OF ARROWS PRINTED ON THE STRIPS. MUST POINT AWAY FROM THE CONTROLLER.

ON

RUN SWITCH

ON

DIRECTION SWITCH

AVAILABLE CHASE PATTERNS

0. PULSATE: ALL LEDS SYNCHRONOUSLY FADE UP TO BRIGHTEST AND BACK DOWN TO OFF.
1. 3-LED CHASE PATTERN (TRADITIONAL): EVERY THIRD LED IS ON AND ITS POSITION INCREMENTS IN THE DIRECTION SELECTED EVERY TIME PERIOD. DIRECTION DETERMINED BY DIR SW.
2. FOUR LED ON/OFF CHASE: FOUR SEQUENTIAL LEDS ARE ON AND THE NEXT SEQUENTIAL FOUR ARE OFF. THE PATTERN MOVES BY ONE LED EVERY TIME PERIOD. DIRECTION DETERMINED BY DIR SW.
3. RUNWAY TRACE: EACH LED INCREMENTALLY TURNS ON (A GROWING TAIL) UNTIL ALL ARE ON AND THEN INCREMENTALLY TURNS OFF UNTIL ALL OFF. DIRECTION DETERMINED BY DIR SW.
4. TRACER ROUND OR INCH WORM (DEPENDING ON SPEED): THE LENGTH OF THIS SEGMENT PATTERN CAN EITHER BE 3, 4 OR 5 LEDS. THE PATTERN TRAVELS THE ENTIRE LENGTH OF THE LED STRIP. DIRECTION DETERMINED BY DIR SW.

THE FOLLOWING CONFIGURATION VARIABLES CAN BE SET UP VIA SERIAL STRINGS OVER RS232

1. THE NUMBER OF LEDS ON THE CONTROLLED STRIP.
2. THE "ON" COLOR BY SETTING GREEN, RED AND BLUE TO VALUES BETWEEN ZERO AND 255. FACTORY SETTINGS: 128,0,0
3. THE "OFF" COLOR BY SETTING GREEN, RED AND BLUE TO VALUES BETWEEN ZERO AND 255. FACTORY SETTINGS: 0,0,0
4. THE NUMBER OF LEDS IN THE TRACER/INCH WORM CHASE PATTERN TO 3, 4 OR 5. FACTORY SETTING: 4
5. THE CHASE PATTERN: ZERO TO FOUR. FACTORY SETTING: 2

ALL OF THESE SETTINGS CAN EITHER BE MADE FOR TEMPORARY USE OR SAVED IN NON-VOLATILE MEMORY.

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LEGEND:
- GND
- 5 vdc
- NEOPIXEL SIGNAL
- LOW VOLTAGE SIGNAL
- RS232 CABLE 3-WIRE

REV	DATE	DESCRIPTION	APPROVED

Exhibit Control ENGINEERING

CLIENT: ECE

PROJECT: NEOPIXEL CHASE CONTROLLER

ITEM: WIRING DIAGRAM

DATE	DRAWN	CHECKED
5/5/23	FGP	

JOB NO.: R&D

SHEET: 1.0

FILE NAME: NEOPIXEL CHASE CONTROLLER.vsd