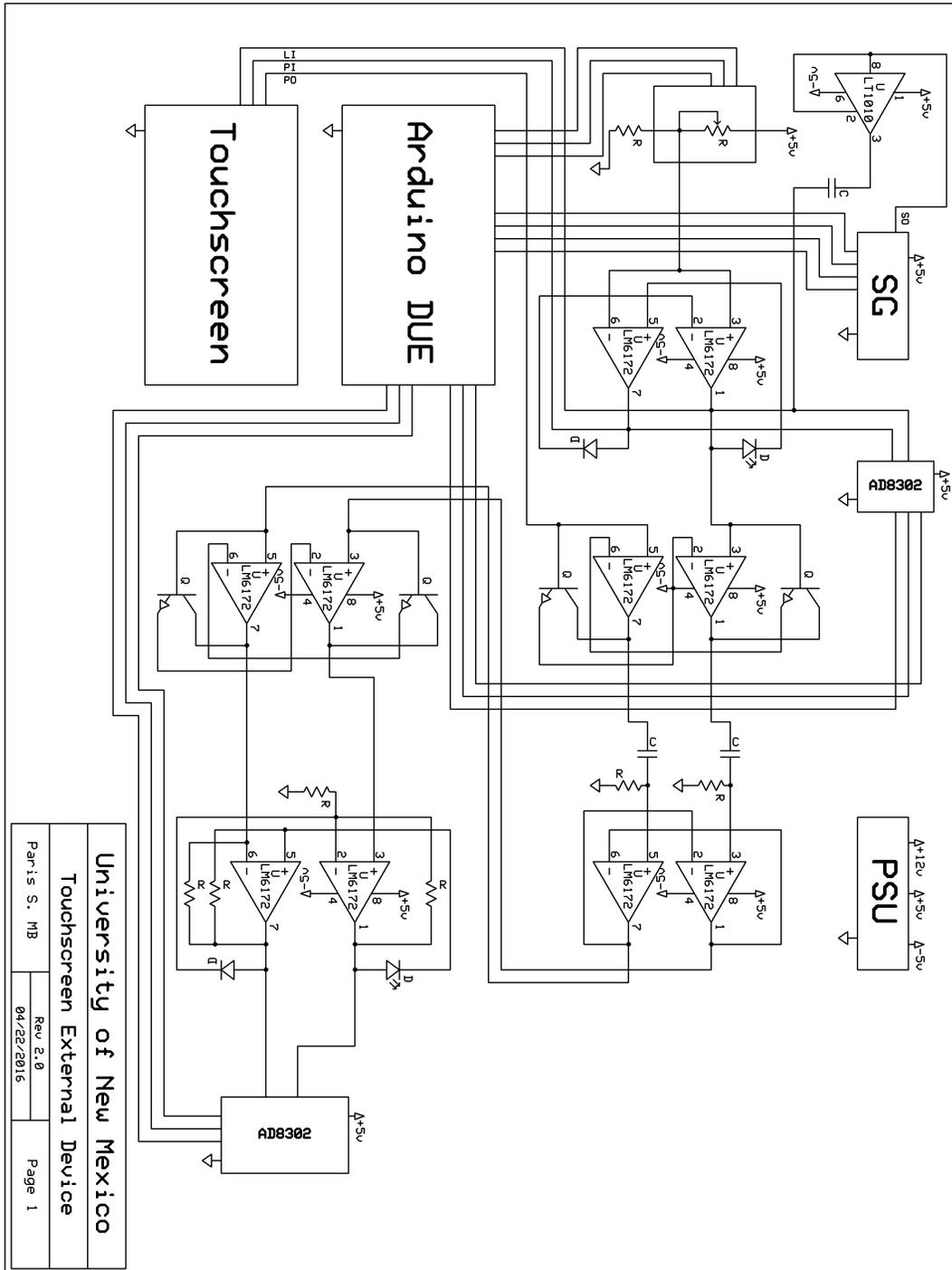


Device Revision v. 3.0 - Holographic Optical Light Cavity

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Device Circuit Diagram:



July 15th, 2016:

As the device is so currently designed, the proper way to understand the correct photodiode interconnection, is that the moment that is the light emitting diode output to the touchscreen as a singular alternating current with direct current bias is to balance this with the bridged stage to stage photodiode interconnection for the impedance matching and balance of light emitting diode output to photodiode reception within the feedback loop.

There is an additional reason for this, which is that it is the only way to balance the bias point such that the common and parallel current of light emitting diode is balanced from what is to be considered as a base, to the collector of the photodiode. This common pathway therefore balances emitter to collector with base to collector. As a consequence the impedance matching is related to the current to voltage characteristic internal to both the external device circuitry and within the touchscreen.

It has been realized during the design process that the reason for the log decibel 10 fold diminishment of overtones sequentially is due to the decay constant of the resistance of the 200 Kilohertz (and therefore 10 fold relation into the fundamental frequency) with resistance of 1.5 Mega Ohm, and capacitance of approximately 3.28 Pico Farad within the touchscreen. This indicates the linear slope of the diminishment of overtone frequencies sequentially and is a result of nonlinearity introduced by the exponential component of the forcing and damping; despite the fact these do not alter the phase to phase nor amplitude to amplitude relationship of the continuous sinusoidal like wave.

The exponential diminishment in this sense only accounts for the intermediate vertical shifting of the sinusoid as it is introduced, and for the sake of continual intermediate measurements across all frequencies merely introduces a skew in the spectrum; which as a result of the exponential diminishment is incompatible with the external device circuitry. As a consequence of the parallelism between the photodiode and light emitting diode and their serial to parallel freedom within the touchscreen, there exists an evolution of the light field as transverse in at least one component, which is that of one decay constant per 10 measurements of 10 repetitions upon a common signal.

This is the same decay constant as that of the transient exponential dependence of the filter that is the touchscreen, and is simply the indication of an evanescent wave.

As for the sake of the modeling of the function; although it is indeed true that it is not exclusively a simple harmonic oscillator for the design is that of an interiorly moving wave in the forward direction of time, it is also true that the system is modeled by the simple harmonic oscillator, with a scaling constant so earlier defined for the series used to reconstruct the shape of the influence of touch as obscuration in the domain.

The additional linear relationship which is the rate to rate proportionally would make this a hyperbolic canternary (cosine) function if it were not for the rate proportional reduction in the quadratic equation. This extra linear relationship is comoving.

The comoving relationship of the proportion is seamless with the parabolic relationship of the feedback loop from photodiode reception and light emitting diode output as the base; yet the linear relationship although admitting that is a linear relationship 'above' or 'within' the local relationship of the parabolic curve only remains mathematically; and not within the photonic field. The photonic field in this instance for the sake of the linear relationship parallelizes and makes independent and indistinguishable the base to collector and emitter to collector relationship. The light field becomes independent on send and receive and yet they are merely related by their common obstruction.

In a deep sense, therefore, the light field under feedback is common between send and receive under obsuration; but otherwise 'empty' of interior relationship of weight without a touch or other object. This is related to but not the exclusive reason that touches can be seen without a shadowing effect.

One thing that has been questioned is the nature of active feedback with respect to the instance of anharmonic functions. As it has so been identified the anharmonic functions provide an elliptical basis of positive gain for which the obsuration is self reinforcing; a necessary pre-requisite for the reception of a multiplicity of segregated principle components of a normal distribution nature simultaneously. Although the modern implementation of the device is expected to respect similar properties to that of a given prior device where eccentricity was observed, it may not be the case, as it appears to be true instead that the direct current and alternating current covary upon a common scaling; something which may prohibit the send and receive of the priorly undesirable anharmonic sinusoidal like signals.

This property however is a common increase and decrease in the slope (however one positive and one negative) of send and receive, and therefore of the intersection point of the send output linear gain with the overall parabolically established feedback. It is no doubt that the curve under multiple traversals of the crossover operational amplifier design 'folds' this parabolic curve as a return map, and as a consequence of the increasing and decreasing slopes of the two of input and output, the second or 'even' dip in the return map will reach a lower extremity below the general parabolic curve.

Although this is true, it appears that at most it has two intersection points, and not a full crossing. This would represent one instability and one stability, and as a consequence there are no secondary frequencies other than those for the sake of the photodiode channel. What should be tested is the variance of the photodiode input with respect to the photodiode output with the oscilloscope with the new design. The question that needs to be asked is as to if there is any degree of freedom so expressed in relation to the phase of the individual signals or their amplitudes. If it remains as true that only this component is observable (and as none is accrued with the light emitting diode) then there must be a separation of the forcing from the damping within across the photodiode junction. This is purely safe for analysis, for the output in relation to the input of light emitting diode faithfully represents the series to reconstruct through comparable pathways the information for the image of press information; despite the fact that it does not represent a fully independent degree of freedom.

If it is possible that there is a non-elliptic regime for all such potentiometer tunings of covariant scaling among the direct current component and alternating current component (and therefore without elliptical quality) then it is possible this may be used to one's advantage. It is determined from the circuit and therefore predicted that no such elliptical nature is observable, as a consequence of the dipping point of the fourth order (and in turn for every return map self enfolding of the parabolic relationship) polynomial merely touching the linear curve of intersection as a consequence of the covariant scaling of the linear gain relationship in slope of the gain; as it contributes to the parabolic feedback relationship for each number of traversals around the crossover configuration.

The covariant scaling however can be utilized to approximate the intermediate behavior of the multiple touches if the series replicates the coefficients of the elliptical functions, and this can be used with a multiplicity of interstitial orders of frequencies to move interior to the natural and sequential development of a natural numbered sequence. This is possible because intermediate to the measurement process there is time afforded for frequency-frequency admixtures that coexist by the slow decay constant of the exponential order of the transient and the touchscreen. These interstitial frequencies in the series used for the process of measurement are only so admissible for the number of revolutions within 10 measurements for each frequency to decay and yet represent transitions between alternative eigenstates.

It has been postulated that three presses may be determinable; as two such presses have been so determined before; with their superposition. As a consequence this 'extra' information of both absence (as indicated by an circular normal distribution within the cavity space) and the superposition through the appropriate algorithm may be used to distinguish through time (yet possible through the interior frequency transition within the temporal decay constant) to determine the 'prior' two presses, for whenever they are introduced. *Of course it is possible to measure a multiplicity of presses through superposition laws of Gaussians a priori in software through time; but the device it is believed will be capable of rendering a multiplicity of presses within one measurement series as a consequence of its 'holographic' properties; and this must be tested.*

Therefore, the process must measure up and down in the frequency range at each such frequency for a limit of four such retracings of ascent and descent in the frequency space at each such center frequency in the series. These are analogous to raising and lowering operators, and order must be established for the sake of reconstruction of the image with depth information; depth information which is recomposed by information 'interior' to the simple linear decomposition.

Finally, as a consequence of the introduction of the final negative light gyrator under negative impedance at the terminus of the circuit, it is possible that the device characteristics will entirely change. What will not change is the topology of the earlier configuration so tested with the new photodiode and light emitting diode feedback loop in the initial stage. This however admits the frequency admixture with freely independent relationships between transitional states, and hence a new analysis.

As a consequence of the negative impedance matching electromagnetic light gyrator being pursued as the final stage the impedance is matched by three inverting crossovers, and as this is an odd number; for the sake of the prior stages the logarithmic differential is a negative term under feedback and separates the harmonic functions from one another with respect to the original feedback stage. This uncrosses the linear to linear relationship through the prior terms, and it is weighted appropriately within tolerances of device parameters and component mismatch.

As a consequence for the negative impedance the linear proportionality upon the parabolic feedback is drawn back upon the path of the return map and parabolic relationship and forms an independent relationship for any such fundamental overtone of the circuit. In this sense the final stage it is predicted forms an independent relationship between the alternative frequencies of the stages. This is important for the transitional states between the overtones of the area of analysis.

Not only is this true, but the different layers additionally decouple the input from the output and are reflectionless from end to end, and it is not only true that the intermediate stages possess independent relationships for frequency that is adequate for reception, but so too are frequencies comparatively from end to end for each independent frequency. Although it is true these remain as independent relationships for the collection of frequencies and there is no nonlinearity, the geometric series that is the elliptical functions can be used to similarly weight the transitional states for the sake of comparative equivalence of the overtones to reconstruct the depth information with a multiplicity of presses.

It was believed that at most three or five presses could be reconstructed, although the prior statement would lead one to believe that the depth information is indefinite. This is not true, for we are limited by resolution of maximal fundamental overtone and gradation. There are however at least nearly 200 unique decompositions of the overtones, yet as it remains by the decay constant only around 100 are decomposable before information slowly becomes randomized. Besides this point, if we were to go too far into depth, we would lose the ability to read depth information, for too many measurements would come between the permanence that is other presses. Therefore, there should be a modest limitation on the number of reducible press information inherent to the design.

Although the negative impedance stage apparently removes 'crossover distortion' this is not true, and it is more adequate to express that it reveals 'low frequency overtones'. Thus the algorithm must be written with an appellation to the low frequencies in the series through reduction from higher frequencies and back to lower frequencies. It is not known as of yet how to write this algorithm for a reliable implementation; and it must be tested through the process of what is known. It is possible additionally that there are multiple potential realizations of the same analytical approach.

Finally, the design appears as is to function the best it could, for the property of harmonics being preserved individually and relationally is superior to elliptical tones.

There are a few final design issues to make note of before pursuing the wiring and finalization of the assembly, and a hypothesis to make for the sake of a prediction that is testable. The device should show an indication of its properties with an individual prediction of a property that is secondary to other considerations, but a primary test as to if it may be finally working and if the holographic principle is realizable.

For now, all properties of the touchscreen have been implemented, as a consequence of the parallel and series indistinguishability of the impedance relationship for parallel and series configurations upon all overtones. The 18 Pico Farad capacitors are ideal for the design as they impedance match the capacitance of the parallel capacitance of the interior of the crystals, which then act as an entire series configuration of inductance and capacitance, and therefore are 'on' frequency for the operational frequency.

Secondarily, the aspect that is the accuracy of the measurement is for the sake of the decay constants a ratio of 10 by 10 as one part in one hundred, or one percent of diminishment for the sake of comparability between prior and later measurements, and therefore 1 percent of hidden information. However, as a consequence of the accuracy being squared for the sake of the area, this aspect of 10 is drawn to its cube for three dimensions with depth, and only half this much for the departure above or below geometric overtones through the series, and hence the device is accurate to plus or minus five parts per thousand, and the signals are only as accurate as in principle 10 parts per hundred, which forms a signal to noise ratio of 200:1, for the sake of the 10 fold decay constant and 20 sequential measurements. This places certain restrictions on the manifold measurement process and the number of presses distinguishable.

As for the sake of the elliptical overtones, the sequence of frequency overtones are the ratios of the exponential diminishment in the series of the coefficients of the weight of the frequencies to interpolate depth information in the harmonic series and under comparative weight. The design limitation is therefore weighted by the decay of the transient of 1:10 as the same limitation on depth. As a consequence of at most two (20/10) by two (200:100) parallel readings are possible with full fidelity; but there is no way to channel this frequency sequence properly to pass forward as a given sequence.

The external device circuitry should pass each frequency (as well as a multiplicity of frequencies which are persistent; which has been illustrated for the sake of persistence through superposition) sequentially and simultaneously without distortion by the properties of the decomposition of the feedback loop by the positive and negative impedance light gyrators, however what is not known is the manner in which this will alter active 'on' frequency measurements. These measurements are admixtures within the external device circuitry, hence what must be determined is as to if they will alter the process of measurement by the phase and gain measurement devices at either end.

Hence, the following hypothesis is formed:

“As a consequence of the reflectionless configuration of the touchscreen and external device circuitry; frequency admixtures are not expected to alter measurement.”

As for this final hypothesis, it is testable by the reduction of measurement comparatively for the final to first stages with a series of two sequential frequencies that are persistent. If the coexistence of two frequencies alters the measurement comparatively to one exclusive frequency, then it is true that without a touch it is so indicated that the phase and gain measurement is not separable for the sake of frequencies. This property is desired in the former tense of altering measurement with sequential frequencies, but for the sake of single frequencies, with the presence of a touch these should remain in a regular manner and remain to reduce to a single touch.

If comparatively frequencies were to alter measurement in an incommensurate manner, then depth information would not be established between all frequencies. Hence there should be a strict relation of independence of two frequencies for the latter form of coexistence of frequencies, with a geometric dependence for amplitude and phase relationships. The dependence should be a pure prefactor of a numerator of one less than the denominator, with an asymptotic form of unity.

These two relationships although similar must be distinguished for the sake of measurement.

For the sake of the isolation of persistent frequencies so reflectionlessly between the two sides of the device comparatively to their presence not so altering the process of measurement at single frequencies. The coefficients should remain pure ratios and not unity minus a ratio, a property owing due in part to properties of the modes. This is true as the high pass filter introduces two ninety degree phase shifts for a total accumulation through feedback of one hundred eighty degrees, and with three inversions in the crossover stages there exists another (but separable) 180 phase shift. This means that signals that are reflectionlessly within the feedback loop prior to and post to measurement are 360 degrees out of phase - or zero degrees - comparatively to two separable 180 degree phase evolutions of opposite sense along the commensurate rail of photodiode signal and light emitting diode signal during the process of measurement.

As a consequence the two signals reflectionlessly pass by the signal generator signal so specified into and out of the touchscreen by zero phase discrepancy, while signals that are under feedback are isolated from the measurement process (with the exception of their coexistence within the screen and external device circuitry feedback loop) by two entirely out of phase 180 degree revolutions, for self interference and null effect on measurement. This is the aspect which is common to either rail. And, for the sake of active impedance relationships, these represent a complete mirroring of signal to signal. As a consequence the measurement is capable of measuring each frequency purely and separably in relation to the signal generator under feedback and the presence of a transient and persistent alternative frequency, without the active auxiliary frequency altering the measurement except by pure geometric interference between alternative modes. This is ideal for reconstructing depth information by interference of touches.

Finally, this property if present indicates the device is truly a hologram; for transitional states and pure states are persistent and distinguishable by the process of measurement.

July 22nd, 2016:

It has been identified that the current design interconnection topology of the circuit at the beginning of these notes is indeed the correct implementation of circuit topology for the sake of the input and output of a common nature so meeting the condition of the transistor like interpretation.

As for later stages, it is expected that at most, the reciprocation with the end negative impedance stage may expand the amplitude ratio by at most a factor of two, and that the phase will similarly expand in range by a factor of two, due to the removal of the forcing to response condition; and the independence of the two waves under a mirroring.

It is not necessarily true that this limitation prohibits the reconstruction of normal distributions because the amplitude and phase evolution are independent of a dependence on forcing and response through phase and amplitude evolution. Thus even in its current design it is broadband impedance matched.

Reasoning ahead to the final design, the difference is to be found in the fact that the current design leaves open the condition of closure of the impedance relationship on the return pathway through the circuit, into a forward and backward relationship of impedance mirroring that is electromagnetically reciprocal, and yet does not embody the relationship of separable cycling of an impedance fixing nature.

As a consequence despite the fact that phase and amplitude are correlated between input and output signals, and the impedance matching condition of the initial light emitting diode and photodiode stage in the external device circuitry is proper, it cannot terminate in a pure seamless passthrough; hence in a topological sense it is limited to purely circular evolution, for which the amplitude and phase are regularized to fit in finite similar domains of extension.

This provision comes into place because the logarithmic differential maps back to the other side of a series; for which the condition of the light field is that it is not orientable but expanding and contracting. For this reason it is expected that the new design implementation will double the accuracy and resolution of the device; and potentially the number of addressable touches.

With the new equipment the transparency that is the superposition between multiple overtones is represented as transitions that are qualifiable as singular complex coefficients. These are prone to the same separation of coordinates that makes the device possible in the first place; yet they are of x and y projections in the space; as elliptical spaces for which further reconstruction of images are possible.

The mathematics of this is the product and not the divisor of two overtones; but at perpendicular relationships. These transitions and their perpendicularity would not be insured without that which is the remainder of the properties of the new device and its auxiliary stages for which the formation is brought equivalently back to a point.

The basic and essential difference between the devices is the path of the light. The current version of the device admits light to be a displacement upon separable backward and forward light waves, and this is the essential difference, but as one is moving backward, it is a point to point like relationship for which for the full holographic principle we require a balancing of the point to a circular to a toroidal like impedance relationship for the establishment of the full mathematical expansion.

It is possible this newer design will re-introduce the elliptic functions, however there remains a forward and backward element of the external device circuitry stages that should admit a balancing of input and output with a terminus that is a one way mirror for either contact for the photodiode output and input upon a common limitation interior to the device which is necessary for signal isolation and comparativeness through the series.

The final negative impedance stage should definitely match the rotational property of the free sinusoidal waves upon mutual constraint. While it is true that the rotational property is free; only so much amplitude and phase departure with touches is expected, for the sake of the linear polarization of the oscillator. This limits the touch resolution, but now for the future device, as it is a full extra factor of two, it should reliably saturate the space for individual presses; as well as for the expansion of the series throughout the disc for the broadband properties of frequencies comparatively and individually.

What is not known is the manner in which the x and y projections as perpendicular two dimensional oscillations will therefore be separable. This limitation would present itself as a lack of information; yet as for combinations of frequencies as transitions; these do mimic as projections the two variances of the oscillation, and they are indeed elliptical. They should not be path length equivalent to rate of motion; which is the condition of the nonlinear elliptical functions; but should instead remain combinations of regular x and y circularly polarized oscillations of pure complex imaginary exponential nature.

Within the spatial these remain as both harmonic, and residual of intermediate relationships between the purely circular overtones of the space, at odd admixtures of frequencies for the two perpendicular directions; and admit expansion within the space without the artifact that would be an odd combination of frequencies and the attempt at obtaining depth information with odd frequencies for admixtures of left and right handed circularly polarized waves as admixtures of fundamental frequencies.

This admits an expansion that can increase resolution by a summation of each lower off diagonal diagonal, and should with the correct choices at their individual frequencies act as that of additional depth information. All that need be done is to comparatively subtract the phases and replace the frequency with a summation and utilize that product of the two radial eigenbasis functions in perpendicular directions. The device should ensure phase and amplitude orientability through the additional stages, and the device through software should be capable of this nature of expansion of the basis.

Although difficult, there is a simple property of the simple harmonic oscillator for this.

July 25th, 2016:

As a consequence of the passive and active properties and elements of the device; the impedance relationship is of constant resistance, capacitance, and inductance simultaneously; independent of frequency or temporal constraint.

July 26th, 2016:

The single thing that must be tested with the new device is as to if the frequencies passed from the frequency generator separably excite differential modes. The manner in which to test this is to move from one frequency to another as higher, and then back to the lower frequency with a press. If the amplitude and phase information change for the comparative quality of the prior frequency of lower magnitude other than a pure 180 degree phase rotation, then extra information has been demonstrated.

This should have no bearing on the decay of an exponential variety for the sake of transitive properties of the sinusoid, as a consequence of the fact that it is measured again at the same inherent driving magnitude, and the frequencies remain independently impedance matched. Indeed, this impedance matching is the other side of a similar relationship to that of the interference between sequential frequencies; without which unbiased and linear comparative difference and interference would have no foundation for comparison nor interpretative validity in a linear framework.

As a consequence in a latter and more complete design the capacity to resolve three or more presses; or even that of the residual of two, also is capable of confirmation of the hypothesis that the device is truly working as a hologram; in at least the capacity to store information in the optical and photonic field of the acrylic disc.

The manner in which to comparatively incorporate the transitional information; is as a proportion of diminishment or excitement of the various strengths of the modes; with appropriate phase adjusted information for the diagonal linear modes. This is the direct artifact of the deconstructive and constructive interference between the modes; and the adherence to a strict orthogonality condition among these twenty modes, although other implementations of the relationships may be envisaged which may be more elegant.

Before a program, one thing must be tested, which is that of the comparative prior to later signals. Two things come from this; which is that the progression must reduce to pure order information; and all frequencies of driving and of the persistent frequency information of the screen must remain independent. These two relations must be tested yet they are incompatible unless they simultaneously exist as properties of the device.

This is enough for the perfect fit of theory with design, and would prove that as far as concerns the optical setup and electromagnetic circuit design; the implementation is one to one with the limitations of the device and theory; and thus is a complete instance of what is possible with the current configuration. As well as determining the range of application of the device; this will indicate any limitations of or for future designs.

July 30th, 2016:

As it is known for the manner in which the AD8302 comparatively measures phase and gain, any given constructive or deconstructive interference should show up as a mild, yet noticeable and measurable phase and amplitude 'shift'. This is an indication of 'active' interference of any two such frequencies and their geometric properties within the disc.

It should be possible to utilize this information, for the manner in which phases and gains are measured does in fact follow a 'known' pattern of the process of measurement. In addition, the persistency of frequencies through the process of measurement indicate that with the prior existence of a persistent frequency (higher or lower), that when a new frequency is passed, it should show a residual of the content of the alternative earlier frequency(ies) through the persistence of the press information and light field content.

As a consequence the frequencies must embody at least two testable properties:

- 1.) The reconstruction of a single press of Gaussian like nature from the information of a sequential or non-sequential series of frequencies with admixtures and residual information so measured must be reconstructable. This property is required for the determination of the information and reliability of the reconstruction of a single press at the most general given foundational level. In other words, if single presses are identifiable with the occurrence that is additional information then it proves by contradiction (a lacking of reconstruction) that the implementation of the algorithm is correct. Nevertheless this additional information must remain distinguishable.
- 2.) Two presses must be possible to reconstruct. This is required as it represents the preservation and distinguishability of a multiplicity of Gaussian or normal distributions within the cavity, and is a property that is extensible to a limit. The identification and separability of multiple presses, stands as direct indication that individual frequencies on the level of individual measurements are within a static state of preservation, and that on the level of comparative qualities of measurement that each is uniquely representative of information on the touch screen surface, for all given individual frequencies and in general for the collection of all such frequencies with equivalence.

The hypothesis and expectation for the new device that must be proven is the following:

Hypothesis: *"What must be illustrated is that the information content of additional frequency admixtures - and not only on frequency information - have properties of persistence, independence, and are equivalently balanced for individual and mutual basis elements as on diagonal and on frequency information; as co-determined."*

Once this has been determined: either by the reconstruction of one and two presses; or by validation of the frequency offset due to interference effects; the property of the holography can be confirmed for the device. It is reasoned that the older device by the aforementioned properties is not capable of reconstructing more than one normal distribution. As for the newer revision of the device this is all that must be observed.

August 25th, 2016:

As a consequence of the potential for uncorrelated information of a secondary press to cross correlate or decorrelate latter information and hence normalized distributions; the question arises that for the sake of press information as to if discernibility is established for a latter and a former press. Independence implies separably correlated means of press detection. This device embodies a similar property as to the prior device because the impedance matching condition of the transistor-independent property of preservation is a result of the separable parallel and series matching condition with impedance mirroring in the final, intermediate, and first stage. These mirror the relation of the impedance matching across the photodiode and light emitting diode as a form of mutual impedance freedom of dependence from the electromagnetic field.

This provides us with a clue that it is in fact the case that the information for persistent frequency information (as embodied in both the touchscreen and external device circuitry under parallel and series or base to emitter and emitter to collector) is preserved in relation seamlessly in relation to that of the cyclic and ohmic impedance matching and mirroring. The mere fact that the lateral current and voltage shift in the amplitude domain is seamless and affords a factor of two for local and global frequency properties implies it freely admits that two such presses are seamlessly passable without exception unless the relation is prohibited by geometric considerations.

Press separability implies the separation of light and shadow within the areal region of the touchscreen and affords distinguishability of distributions within the region through obscuration upon the region in relation to a multiplicity of press information. As we know there is no prohibition within the relation of the mathematical and field analytic extrapolation and expression for the discernment of two presses or more.

While the prior device embodied a dynamic solution of elliptic functions with a linear path upon a curved space; the impedance matching condition was inverted and the linear path did not encompass the curved space. The modern implementation and the latter differ in the relation that both possess the property of a linear relation of measure; yet the former is expanded and the other contracted into a line within a curved space.

This ultimately amounts to a question as to that of the precision and nuance that is the elimination of one such series from another such series, and admits a level upon a level; as the relationship reduces to linear and therefore unitary relationships for transitional and mode states. Therefore the impedance relationship with that of the electromagnetic field possesses freedom for not only transitional states and geometric modes but also for obscuration and revelation unto and of definite numbers of areal press subdivision.

As a consequence of the separability and correlation of the distribution; via the contradiction that would be inseparability under backward application of means of distinguishability of correlation implies that a latter correlation without a former correlation is not prohibited in combination with a latter. Therefore the expectation and prediction is that the device will indeed remain as demonstrably an optical hologram.

September 10th, 2016:

The new (v. 3.0) device has been built and wired up fully; and is apparently fully working for a few essential reasons:

- 1.) The measurement is within ranges of ± 0 degrees on phase and near unity (1.0) for amplitude for both AD8302 with a departure around these measures of approximately 10% or as much as 15%, indicating that the full device is in reciprocity.
- 2.) Phase and amplitude apparently depart by a minor measure with the press and its given motion, although a singular press image has yet to be taken. The departure indicates independence of forcing from driving to minor departures.
- 3.) Connections were all tested and the arrangement (as well as the negative light gyrator did not impact the reliability of the baseline) appears to pass either way through such processes. Each connection was confirmed and checked as reliable.

On the oscilloscope with a varying frequency the differential frequencies appeared to be reproducible and varying in phase offset; although this does not appear to be a property or attribute of forcing and driving as this does not appear to play a role.

As well on the oscilloscope for light emitting diode input and photodiode input both frequencies appeared to be sinusoidal and in an x-y plot they were at the lowest frequency a complete ring, and at higher frequencies it would oscillate as if in a globe like domain.

The chaos did not appear to manifest whatsoever as a consequence of tuning the potentiometer, and yet there appeared to be patterns of a differential nature in the globular like nature of the oscillating tones.

A full characterization will require greater work; as will programming for frequency admixture information and unitary basis elements. A press was not visualized, however results so far seem similar to that of the v. 2.0 device, with a few exceptions.

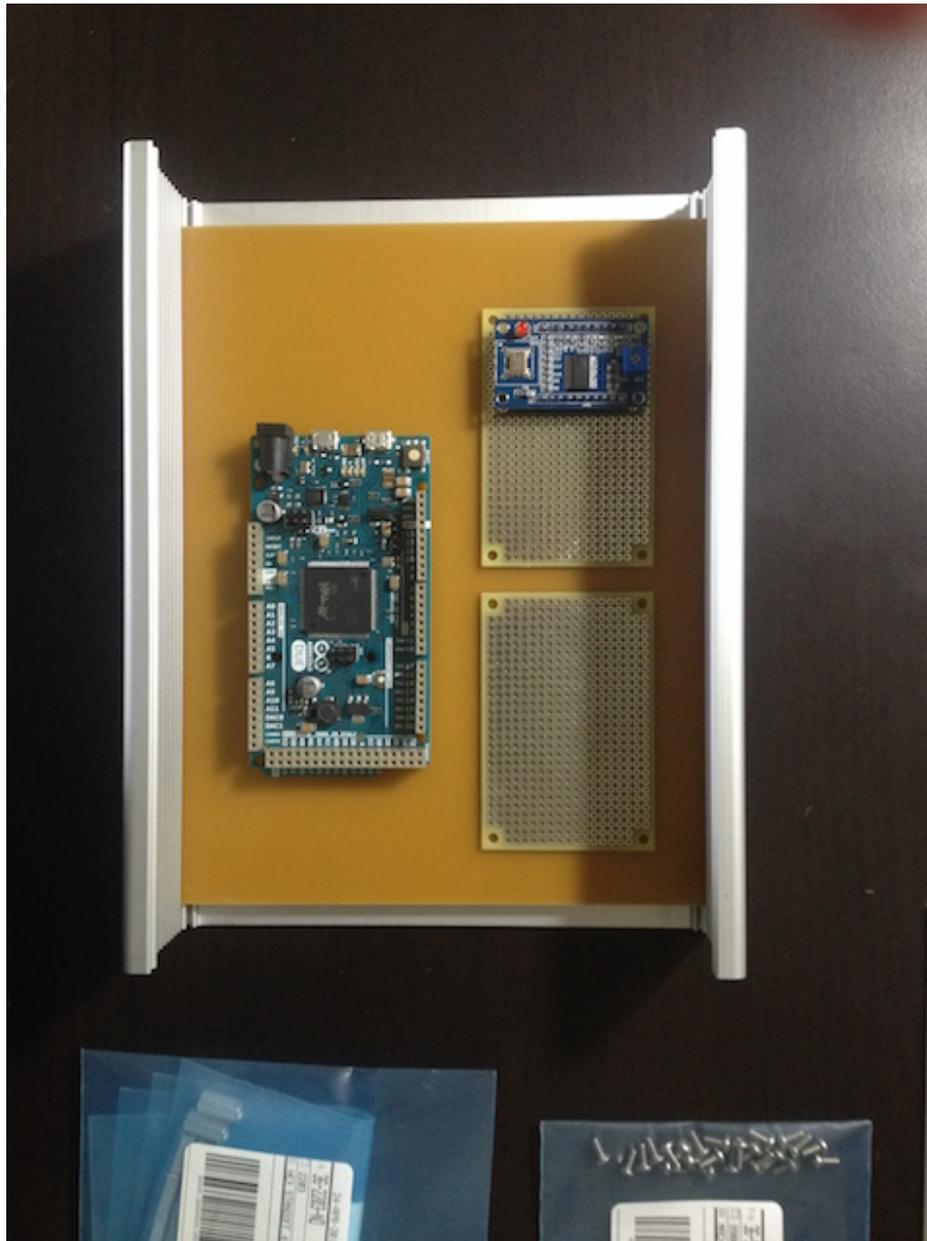
These are that the x-y plot illustrates depth as if warped around the two dimensional extension of the signal and also that frequencies exhibited no eccentricity whatsoever.

As for an instantaneous plot of the two signals; it appeared as if the photodiode signal was hovering just outside the domain of the light emitting diode signal domain in amplitude and encompassing space; yet when the samples were increased it appeared that the signal was intermediate and stable as a sinusoid.

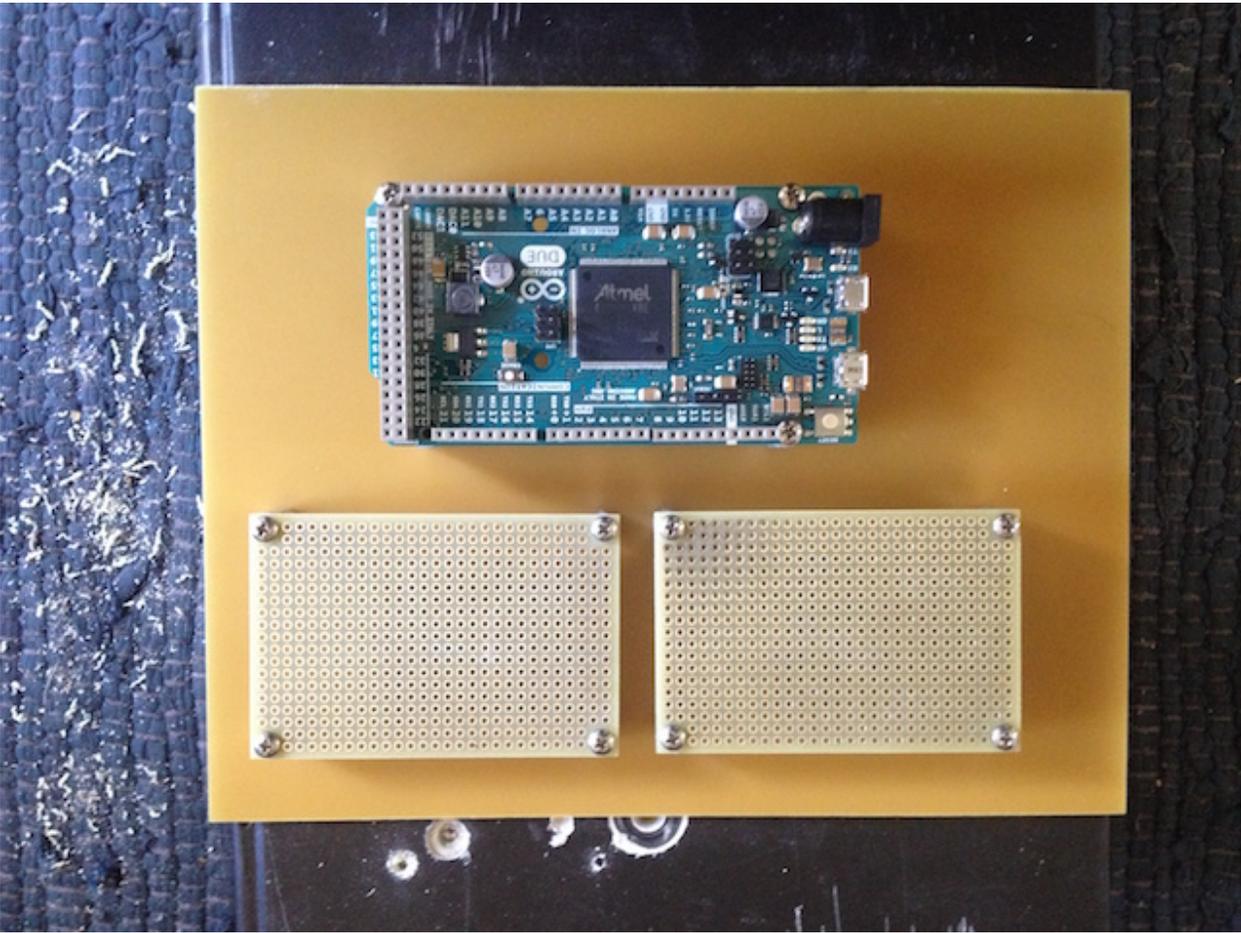
Now that this step has been taken it is true that full characterization will have to be undertaken and programming for the discernment of two presses. At this point the ability to acquire two presses with raw information alone is not known, however it is believed that it will require to separable series to draw full confirmation of two presses.

September 11th, 2016:

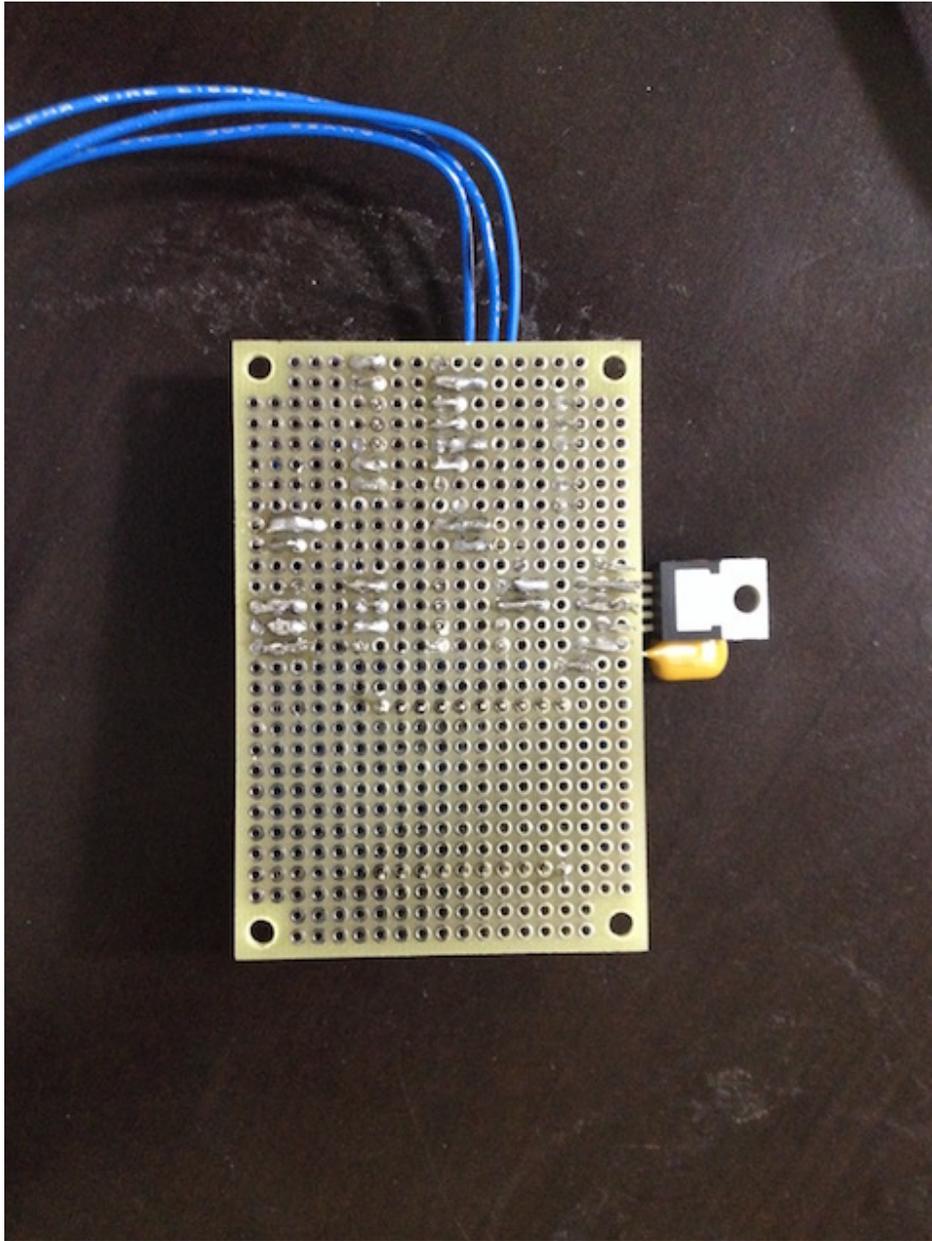
Some images from the construction phase are as follows (there are nine):

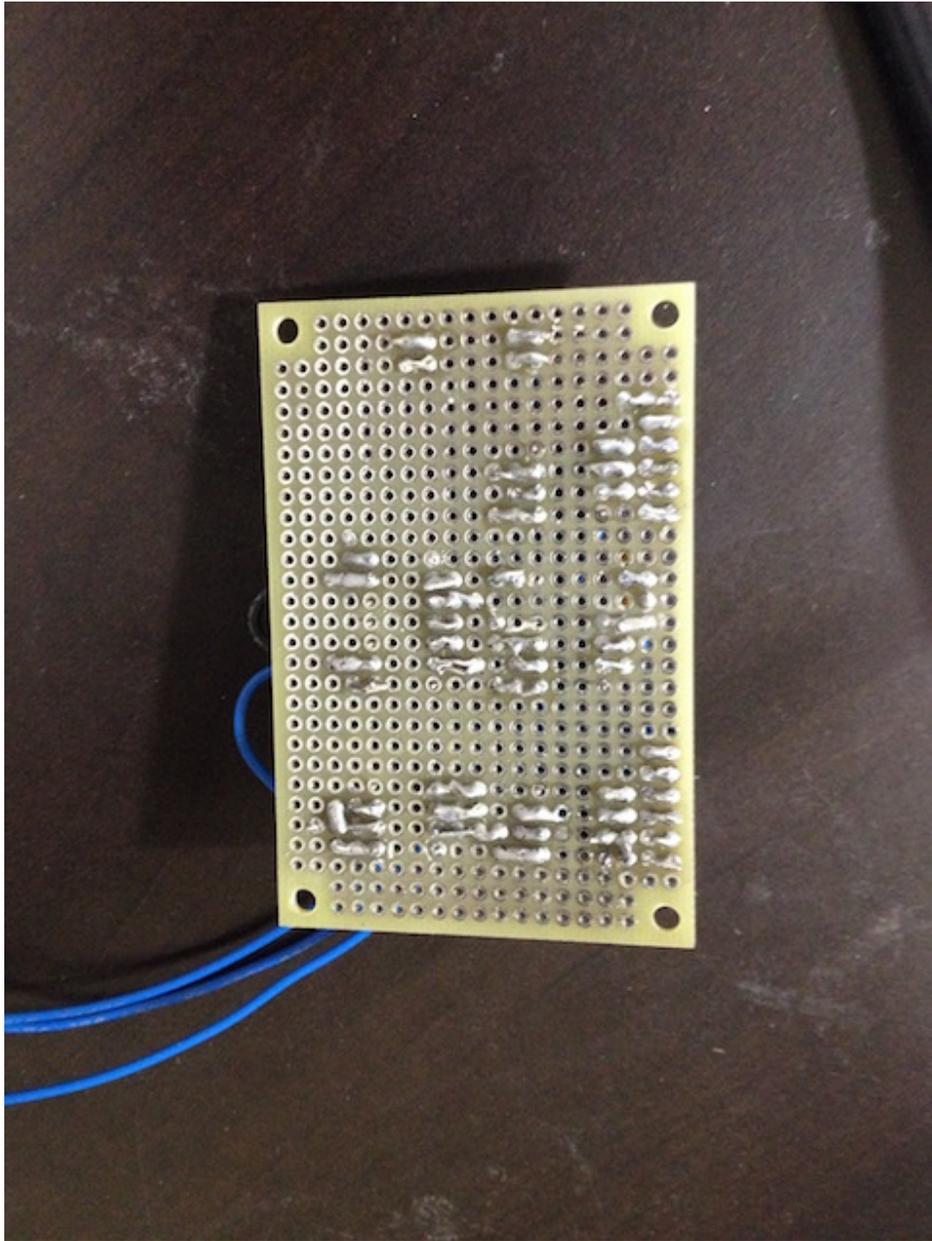


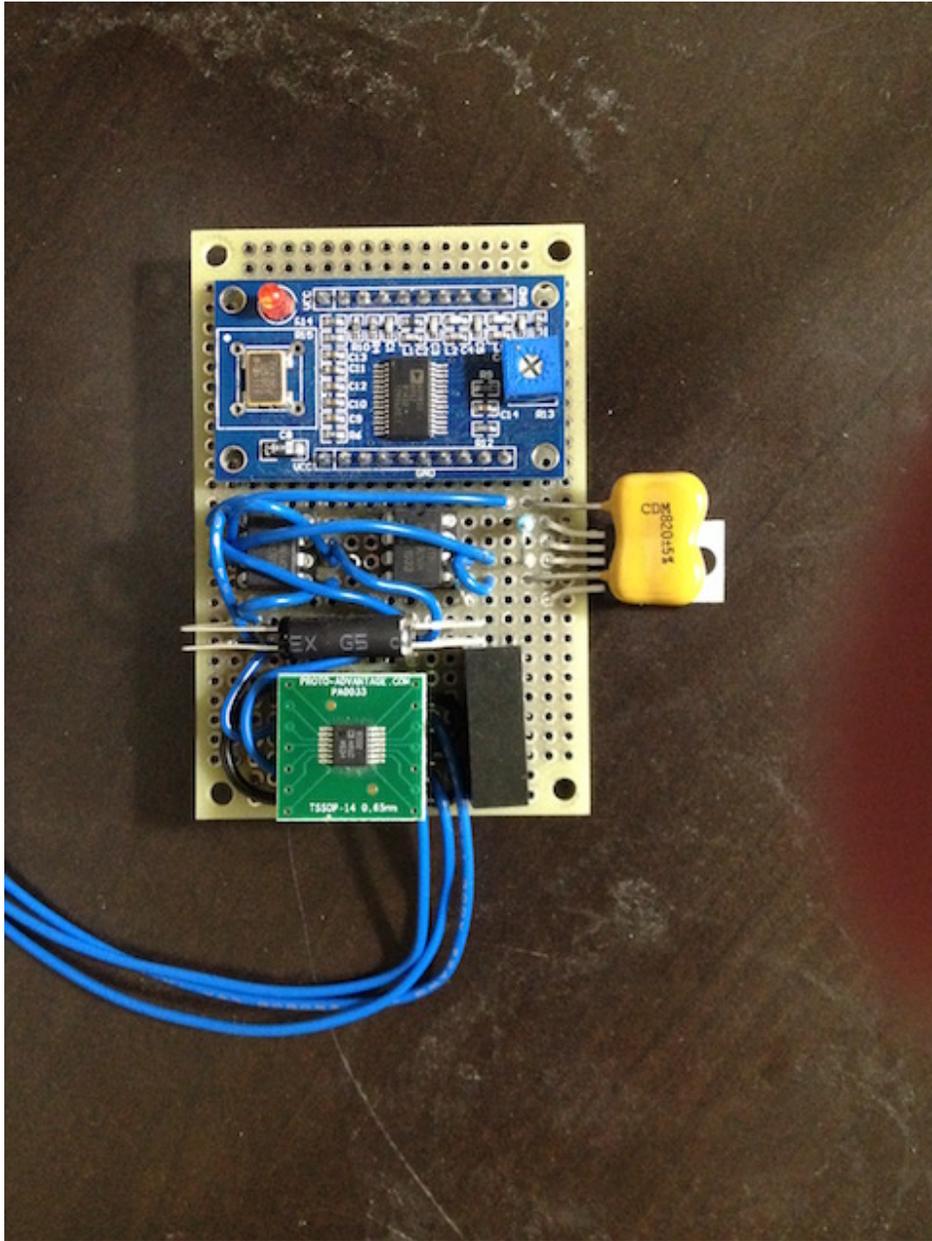


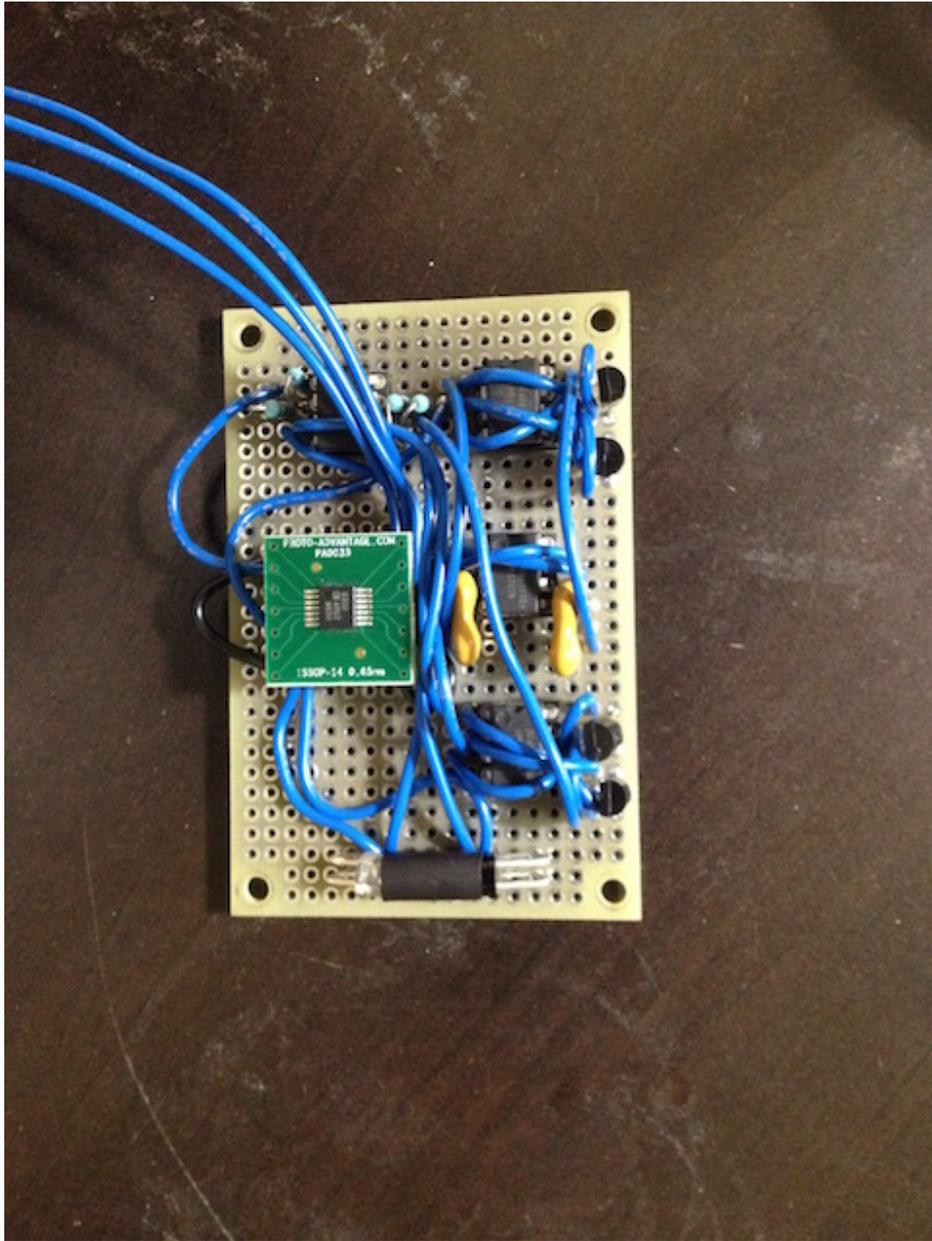


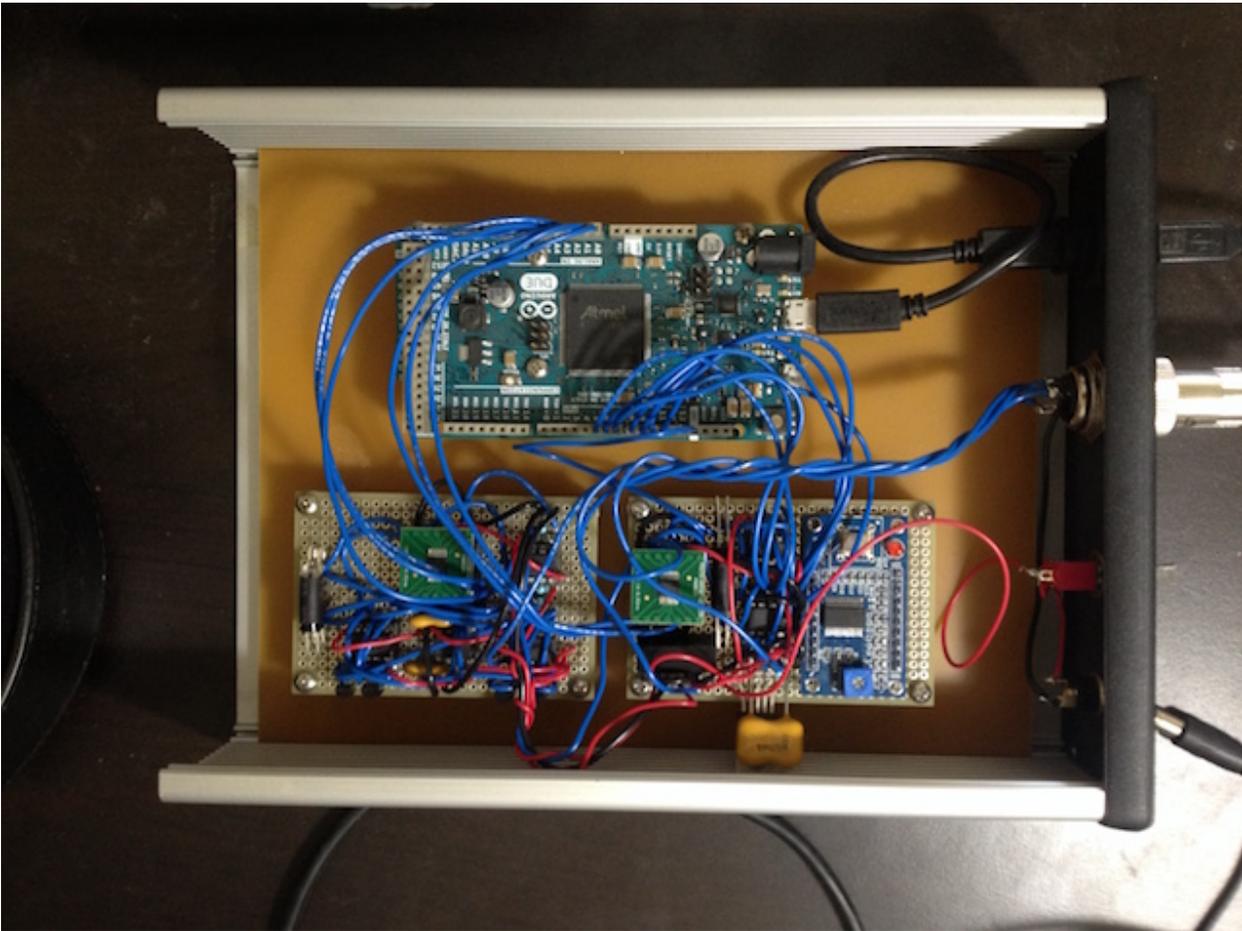












September 16th, 2016:

Before the device is fully characterized there are some questions to be addressed, such as to what questions need to be asked as to those that would confirm that the device is wired up properly. Additionally, the question needs to be asked as to external properties as separately as to how one can confirm if multiple presses can or are determinable. It may not remain that the device is identifiably *not* a hologram if they are *not* mutually determinable; for it may remain a single correlated normalized distribution that is detectable as an attribute and nevertheless a hologram.

The difference to be found here is the essential difference between the properties due to hardware and software; as well as inherent properties of the design implementation and that of the software implementation. It does however remain that mutual presses are identifiable under *timing* as was confirmed for the prior (v. 2.0) version of the device. As a consequence an algorithm *can* be implemented to detect multiple presses *unless* they are simultaneous in time. This forms the difference between an active and a passive hologram.

The device is an open, reflectionless, system, when connected to the externalized device circuitry. If the device is properly designed then there exists a testable indication that it is working; as one side of the combination that is software and hardware. This is not merely about software so much per se, but rather exclusively of hardware for current questions that would indicate the path of full characterization. On the other side there needs to be simultaneous distinguishability of multiple presses through the hardware with software that is designed one layer below that of the effective properties of the hardware; so as to answer: "*Is holography an inherent property of the device?*"

As it appears so far there is a third preliminary indication that the device is indeed working; which is that the orbit on the oscilloscope appears to be an intermediary state of a higher dimensional space embedded in a lower (2 dimensional) space on the oscilloscope screen in x-y display. However as to the properties of the scope and for what is a dimensional reduction; it is not a valid assumption to build upon without knowledge of the properties of the oscilloscope and that of its capabilities.

This, however, alludes to a testable property of the *reflectionlessness* and *simultaneous distinguishability* of press information for the device. One way to test the property of reflectionlessness at the least is to test across the photodiode and the light emitting diode comparatively to either of these two alternative leads and identify a commonality and a difference in their spectra and response. As for their evolution of phase and amplitude differences this is a test of simultaneous distinguishability if spectra differ.

Hence these tests of attributes are the next proper step to take; for they confirm that the hardware is indeed working; and that it is indeed a hologram for the sake of the expectation to be found in the existence of the property of simultaneity within the electromagnetic light field established and with the property of distinguishability of the effect of two presses within the spectra and its evolution comparatively to one.

For, if the device illustrates a difference in the spectra between one and two presses; then it is indeed true that the device distinguishes two presses in the spectra. This test is possible for two reasons; which are that the press information is *persistent* and forcing and damping are *balanced*; assuming it is working properly. This is one to one as a test with the properties so desired of the device and as it was explicitly designed.

As for the photodiode channel to channel comparative to the light emitting diode across channels; gain for amplitude and phase differences with press(es) should illustrate a comparative difference if and only if it is true that these are distinguishable for one or two such presses. The expectation is that the amplitude ratios of the spectra if two presses are distinguishable (and in addition in relation to one) then there will be a geometric difference with the presence of additional information if the device is working properly. This *difference* is enough to determine if it is indeed impedance free.

As for simultaneity to be tested, the information must also appear correlated in the sense of a commonality in the gain and phase differences and variances as *common* for one or two presses within the departure of either as expressed as a variance in the same direction with one press or two under the guidance of similar responses to *direction* on the touchscreen; however as they remain of different natures of degree. Then; it is determined that the scope is capable of representation of true holographic information of a signal to signal like nature; and it is additionally indeed true that the nature of the electromagnetic *field* has expanded by a dimension and the impedance has become free.

These means; however primitive, are as simple as it is to test the device for the property of these two natures. There remains no other test; but an additional property is defined which is that of the variance as being within bounds set by the decay of the persistence; as within a 'window' of time. This property so identified is the property of the optical light chamber to at least *contain one* moment of time; and with two persistent mutually discernible and correlated normalized distributions, an *interval*.

If these things remain true then it is indeed a holographic implementation; as it is both representative of a higher dimensional from a lower dimensional realm as a *principle*, but it is also additionally the fact that it contains information of a higher dimensional nature that remains as *independent* of the lower dimensional realm as representable *with discernment* of two simultaneous series. These mere facts mean that it *contains* information that is an extrapolation of more primitive and independent elements; and, it embodies this in that individual subsidiary components and active light field evolution do not obscure the discernment of separable press information *through* the boundary.

If this is true, then the nature of the field notion of light is in a sense fully transitive and yet also non-transitive. This nature of separation and recombination is then also an indication of hardware *form* meeting hardware *function* and the unique capacity of identity with its properties. If all of this is true, then the device is in a sense a new element of electronics by way of its properties; as in one sense a manifold dimensional universal gate with holographic memory, and discernment of press information from transitional state information with memory store, retrieve, process, and erasure.

September 17th, 2016:

As for the device characteristics it is not necessarily true that the wiring being correct is indicated by the holographic properties; since two presses may not be distinguishable without a software implementation. Nevertheless as it may remain as a hologram without two presses needing to be distinguished as this is not the only determination. Multiple press reception is however an indication of the correct operation of the device.

As a consequence there are two different and separable aspects of the device that are the final two to be questioned; one of holographic nature and one of electronic design and component configuration. This is the deciding factor for conventional technology.

These are:

A.) The first test is one of the wiring, and it is demonstrably true that if the device operates as expected (with dual or multiple press identification) it is indeed wired up correctly. As a consequence, the wiring is confirmable for the sake of the design; but not as to the holographic nature a priori, and these two tests stand on opposite sides of a common relation of theory meets practice. Without testing the wiring (for which a second overview of the circuitry was done) it is improbable that the device will operate as was to be expected from earlier design considerations. However, the correct wiring would indicate newer properties of the device, one of which appears to be so as the dual floating ground and inseparable condition of impedance matching for either alternating current. This is a true indication that the device is working as intended; for it is independent entirely of the ohmic regime, under separable conditions on input and output to and from the touchscreen. Given the principle of electromagnetic reciprocity is instanced by the device under connection; and these properties of ohmic and cyclic independence of impedance they imply that currently the wiring is entirely as designed.

B.) The information content of the device if so exemplified by software implementation does indeed make it provable as a hologram if it is true that a multiplicity of presses are distinguishable without boundary but with interior domain without shadow or interference effects. This would imply that the device is interference free and operational as a hologram for the established aspects of design that went into determining the correct future device design. For, the preliminary properties of the former device are compatible with & independent from the later design because the latter device is feedback and impedance relationship free. In consideration of this, the design is met; but as for the first test, the second (and as to its holographic property) are determined as enabled; for it illustrates both independence from the ohmic regime and separable conditions on impedance for input and output to and from the light cavity.

The deciding factor as to if it is an active hologram capable of being implemented with conventional technology is if multiple presses are determinable with software. This indicates it is truly a holographic light chamber. The determining factor is if mutual determined and correlated normalized distributions over an interval of touch are simultaneously determinable; this proves that an event had occurred in the past.

September 21st, 2016:

The device was tested further with the scope. As it appears because the photodiode output and light emitting diode input are a full 180 degrees out of phase that the device is indeed forward biased; for the additional reason that cathode is at a higher bias.

It was also noticed that the crossing point of the sinusoids in the time domain with phase offset of variable apportionment was always located at (0,0) in the time and amplitude (voltage) domain. This was with the photodiode input and photodiode output; so the timing is correlated at (0,0) volts direct current.

Additionally, the photodiode input to output illustrated a signal strength of at least 800 mV with 50 dB signal to noise strength. As for the light emitting diode input and photodiode input, the 50 ohm resistance of the connecting leads reduced the signal strength to a mere 2-20 mV, indicating that this 'bridged' connection was reducing signal reception and transmission.

Signals seemed to only very marginally change with interaction upon the screen. However, after a full four measurements the signal had decayed from prior frequencies by a substantial (60%) portion downstream sequentially, with a press. This may indicate there are intricacies present that may make it difficult to depend on the persistence of the light chamber to detect interference effects with different modes.

However, in principle the device is working and wired up as designed, which is good evidence that it is probable that if this nature of device is possible with conventional technology; then the system is prepared for test application, and other alternatives can be excluded, for the sake of confirmability of the multiple presses with software to determine the holographic nature of the device by distinguishability.

It has been determined that geometric interference effects from different modes will manifest as a single complex number and geometric wave with phase offset and amplitude offset between these modes by a simple process of counting. So far all measurements (unless the device is powered off save the micro controller) are within margins as described previously and illustrate a 10-15% departure in ADC conversion.

As for the program to be written, it should remain as a simple process of decomposition of the properties of raising and lowering operators, and modular arithmetic. If it takes four decay constants for the prior measurement to be established as a reduced amplitude by obscuration and phase difference then this explains why it took two sequential comparative measurements to produce images through rendering and software programming in Python out to three separate diagonal combinations.

It is hoped that single measurements can be utilized to produce image information, and it appears to be already confirmed that the 'ground state' is quite securely renderable and acquirable as a consequence of the fact that most measurements lie within ranges. If single measurement sequences are possible some pre-computation may be helpful.

September 24th, 2016

The passivity that is the later stages in the latter device is a free later condition for the impedance to electromagnetic field condition in relation to the prior electromagnetic design (v. 2.0) in relation to the final design (v 3.0) and therefore in relation from the prior device as predictive of the later and final design within the philosophy of electromagnetism and conventional circuit theory and physically known electromagnetic components.

The passive relation logically by presumption and reason of design built into the prior optical transistor analyzer design as it relates to the later optical holographic light cavity is an open relationship as a consequence of the empty relation of the later impedance freedom principle as it relates to the photodiode input and output as bridged across stages or in parallel with the touchscreen; hence for the later design it was predictive that this design element would not change from one design to the next.

This is where theory meets practice; and where electronics design becomes predictive. It is in a sense that the circuit design of the later device under the guidance of the aforementioned principles is free in relation to prior design relationships. This is also an instance of reverse hardware compatibility when interpreted correctly.

Therefore, there exists a point within the theory of electromagnetic circuit design in general which is empty between any two different complimentary designs. It is implied by the alternative limit of electromagnetic design, which is the approach by way of extrapolation of known circuit component properties into current and voltage relationships. This separates the logical properties of either device implementation under the guidance of theory utilized to implement circuit theory, and joins the implementation of their physical circuit implementation. This is exclusive to the earlier and later design; under example of prior and later design when the principle of current mirroring and voltage matching are implemented; for then impedance and electromagnetic wave properties become independent.

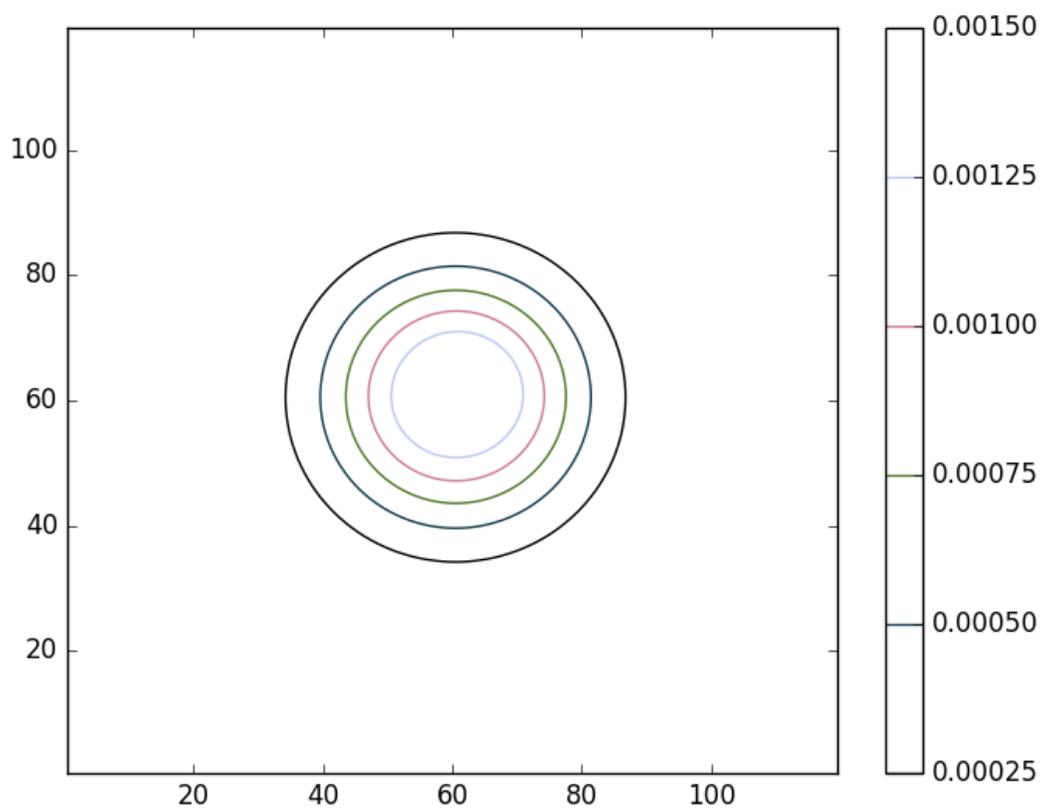
The properties of the later device are decidable from the initial device in this implementation by linearization of collector to emitter and base to emitter. Therefore, the principle of matching and mirroring is seamless and predictive of the later design; under consideration that this property is preserved from the earlier design to the later design; despite the fact there are additional components. This is the result of following the implication of the principle of current mirroring and voltage matching; which results in nothing more than an electromagnetic wave and impedance freedom; the conditions under which the designs must remain independent.

Hence, mutual virtual implementation of electromagnetic designs is possible from an earlier design to a later design predictively and theoretically, for there exists an empty difference and an independent commonality to and for both design implementations; this is met in the current design implementation to the fullest capacity of it's design. It is possible that this principle of device design and extrapolation holds in general.

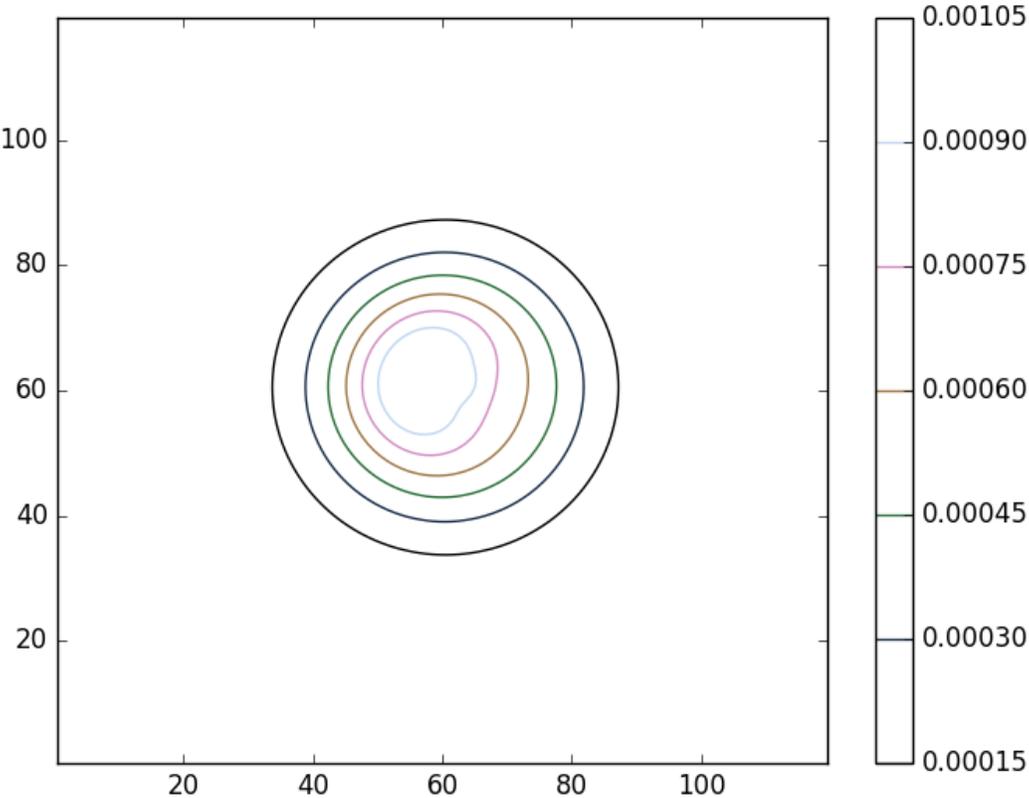
September 28th, 2016:

Images from a test run of image acquisition were obtained through a process of calibration; which differed ever so slightly from the prior device; in that the ranges differed on amplitudes and I had the amplitude ratio and phase difference reversed for consideration of the current equipment.

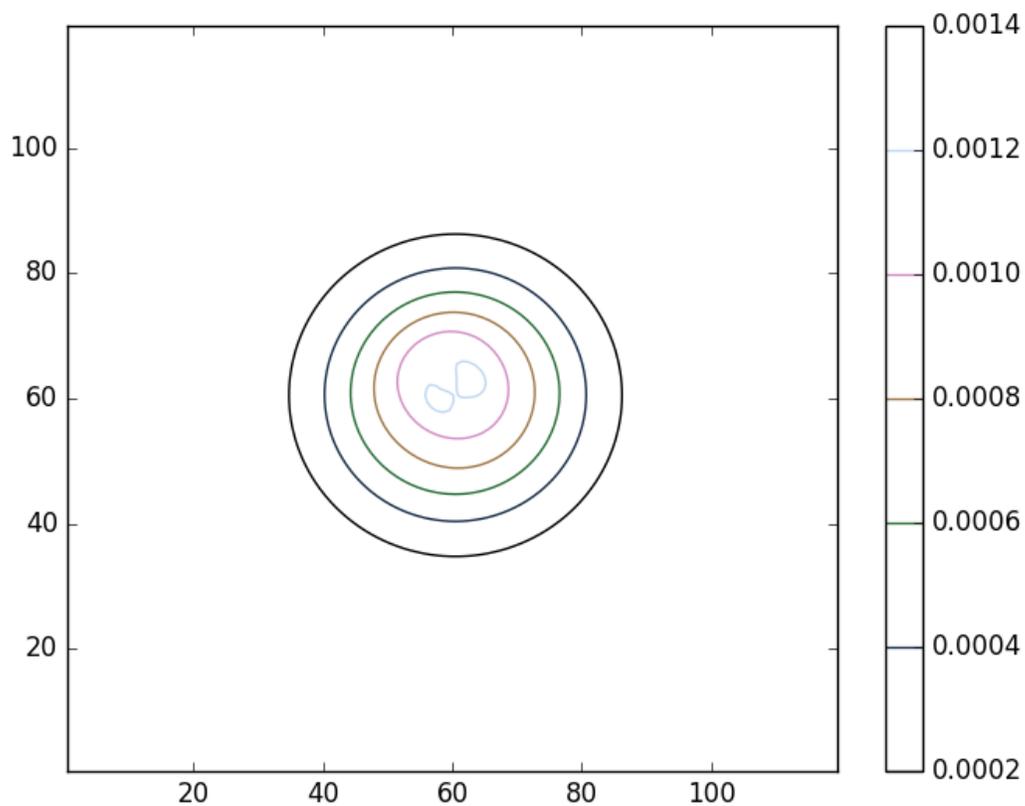
The baseline image was as follows:



The single press measurement result was as follows:



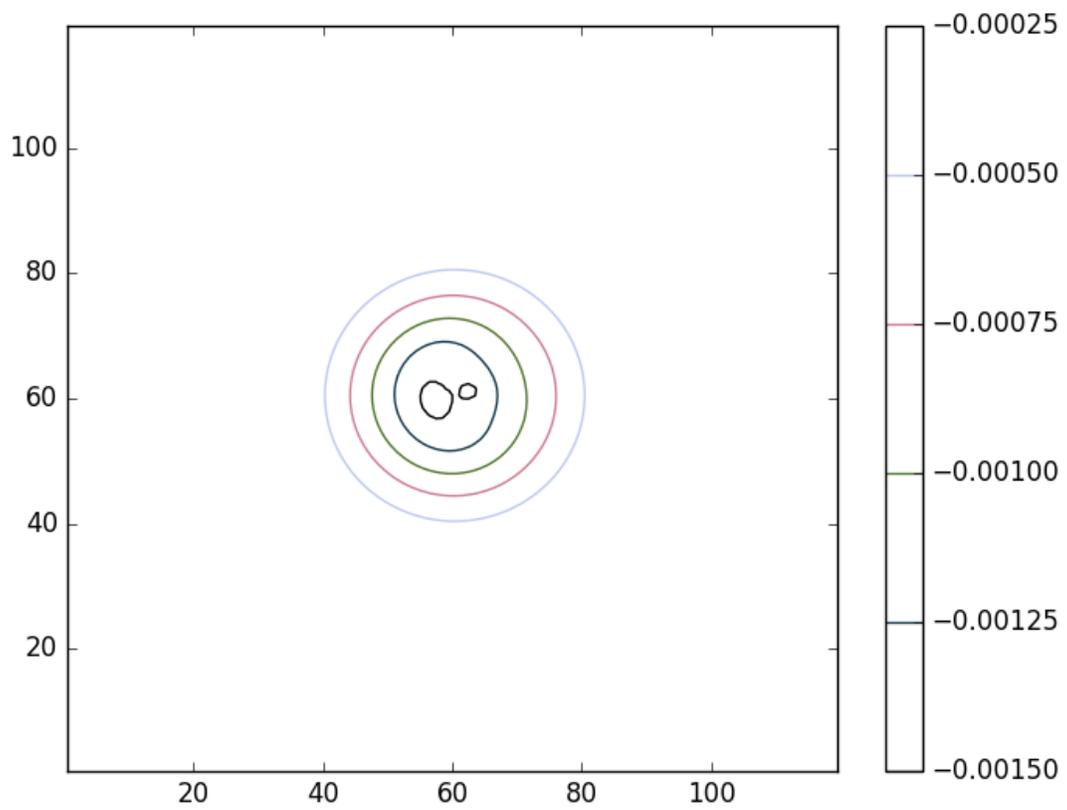
Two presses were measured with the result of:

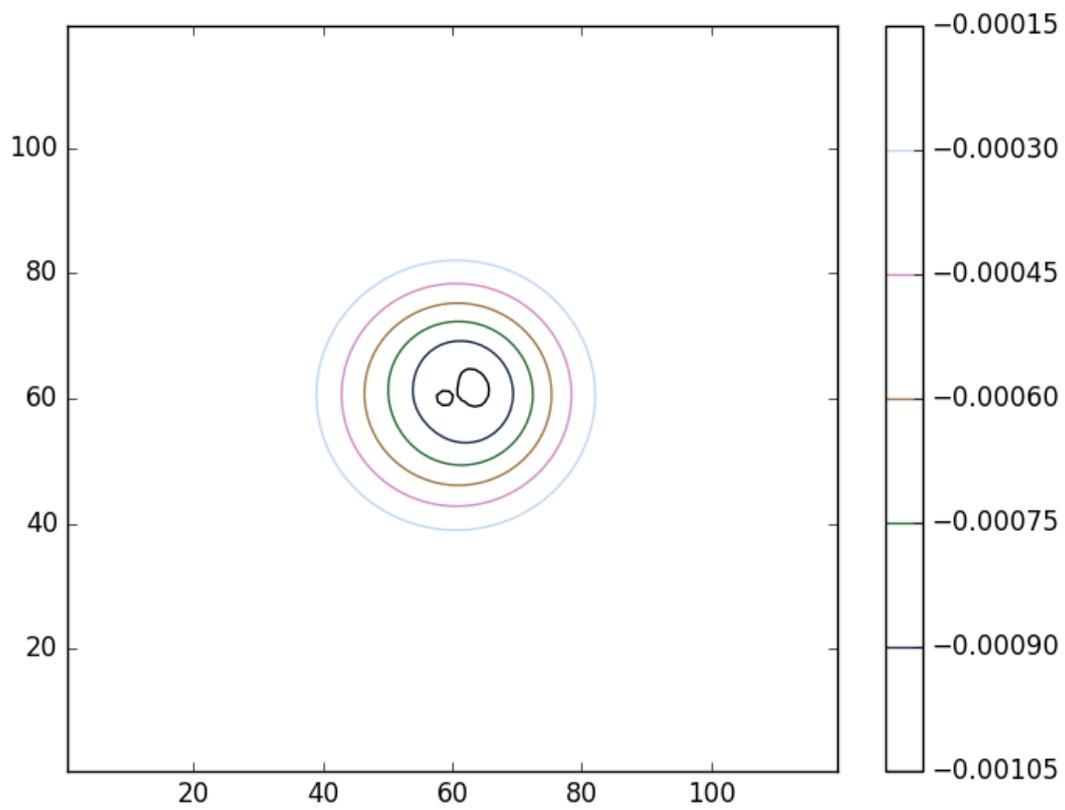


After these trials it was noticed that in waving a hand around and over the device that it was possible to witness the motions of the sweeping around of the distribution in response to this motion; and not of touch.

I am currently unsure of what property of the device this indicates; yet as testing for now is complete (however one needs an adaptive algorithm with the unitary basis), it will be investigated later. This is a new and interesting property of the device in action.

Additional images were as follows:





October 2nd, 2016:

As a consequence of the residual of the touch press upon the screen as so discernible for two such presses and consequentially because of this attribute without the unitary off diagonal basis frequency elements as so read and measured; it is true and provable that this is an optical hologram and is fully operational; as well as wired up correctly.

The device appears to operate through such central on frequency processing for two reasons; which are that there exists the attribute of persistence through which the frequencies are 'contained' within their temporal extension and as well the attribute of the geometric series property of their 'normalization' produces the residual of information with the capacity beyond that expected by the variational principle.

These indications suggest that the device could benefit from going further into frequency decomposition of the image information; and indeed it is also true that an adaptive algorithm may be of benefit to implement; but these considerations are not necessary for the decomposition of two singular presses; for the series is involute.

However, this would very likely dramatically improve resolution of touch press information; for there are current limitations for the software implementation. This software may be potentially easy to implement, however it remains that currently the device, its hardware, its software, and its properties as theorized are operational.

It is something of a miracle that this is possible with conventional technology of simplistic design; however it is compatible with microwave engineering theory, for the sake of its property to express the attributes of the electromagnetic field for the sake of the relation between impedance and electromagnetic properties via a line like analysis.

A great deal of that which was written of this device in the process of innovation has by now proven to be true, and it is important that this work is understood within several layers. As it appears, the only exclusive remaining question is how to implement an algebraic relationship for the voltage division of the potentiometer and the resistor and that of the frequency admixtures under persistence. In this sense these are two controls.

It has also been determined that as a consequence of an additional property under testing; that of with or without a lamp on that the hand in motioned clockwise or counterclockwise above the touchscreen element in producing a revolution under animation of the interpretative information content of the field; appearing as a rotation of the same nature of either such revolution implicates this is more appropriately labeled a "*Light Gyroscope*," or to be understood as a "*Spacetime Compass*."

It is not understood as of yet how to proceed further with the software programming of the device, and current considerations to conclusions are perhaps sufficient to settle upon; however it is at the least desired to increase image fidelity by a certain factor through adaptive means, and this algorithm may indeed be possible. It is my belief that the project need no go no further than this final step; as it is demonstrably enough.