

Competitive Product Analysis: its effects on CE

Monitoring the progress of the TV industry keeps RCA in the forefront of the competition.

Abstract: *Competitive Product Analysis is a small group in the Consumer Electronics Engineering Department whose function is to provide meaningful information on how RCA TV design compares with the rest of the industry. The group also acts as an engineering design aid in evaluating RCA performance during the design cycle. This paper provides some insight into the duties and analytical procedures of the Competitive Product Analysis group and into other involved areas of Consumer Electronics.*

Competitive Product Analysis is an organization that has close ties with Engineering, Product Planning, Cost Analysis, Manufacturing and Reliability. It serves as a tool to aid RCA Consumer Electronics (CE) in designing and building the best television on the market. The television industry is a very competitive business. Every year it becomes increasingly more important to design a more competitive, cost-effective receiver with improved performance without sacrificing manufacturability, reliability or safety. As each year's design cycle progresses, Competitive Product Analysis serves as Consumer Electronics' eyes on the world, searching for and evaluating new ideas brought to the television industry by its competitors.

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RCA versus the competition

One of the main duties of Competitive Product Analysis is to coordinate an "RCA vs. the Competition" report. A decision is made through the Competitive Analysis Committee (which is composed of members from various parts of the Consumer Electronics organization) as to which competitor or competitor's receivers should be evaluated. The decision could be based upon cursory observations of performance, cost-effectiveness, component count or just the competitor's reputation or advertising policy. Once the decision has been made, Competitive Product Analysis orders and expedites procurement of the required television receivers for analysis.

Upon arrival, the television receivers are measured for performance. Many standard tests such as transient analysis, color edge distortion, ac input power, audio power and distortion, high voltage regulation, raster distortions and many others are performed and the results stored in a computer for future reference. This affords CE quick and easy access to competitive performance information when additional product comparisons are required. With the aid of a Tektronix Digital Processing Oscilloscope, processed oscilloscope waveforms can be stored in the computer's memory, thus recording the characteristics of the receiver under test.

Along with the performance evaluation, circuit evaluation is an important part of

the study. By examining circuit configurations, IC partitioning and various component parts count, the effectiveness of the manufacturer's performance/cost tradeoffs can be compared. Also, circuit ideas which appear to be clever can be further analyzed and evaluated for their merit.

Another important part of a complete competitive product analysis is a detailed cost estimate of the instrument. Here, the television under evaluation is delivered to Cost Analysis where it is disassembled and completely costed out. Since there is no way to really know another manufacturer's actual expenses in manufacturing a receiver, the analysis is performed as if the particular chassis design was being built by RCA. With this in mind, the cost of the components are designated to be RCA costs for similar parts with RCA sourcing. The results do not necessarily yield the competitor's actual cost, but serve as useful comparisons to the cost effectiveness of an RCA design. The cost study is partitioned into various circuits such as the tuner, IF, chroma, luminance, audio, power and deflection. In this way, a cost comparison can be made circuit by circuit. When major differences are found, further investigation is needed to determine the reasoning behind that design approach.

While the time consuming cost analysis is being carried out, an identical television receiver is sent to Manufacturing and Reliability for their comments. The Manufacturing group examines the



Fig. 1. Competitive Analysis computer-aided test setup.

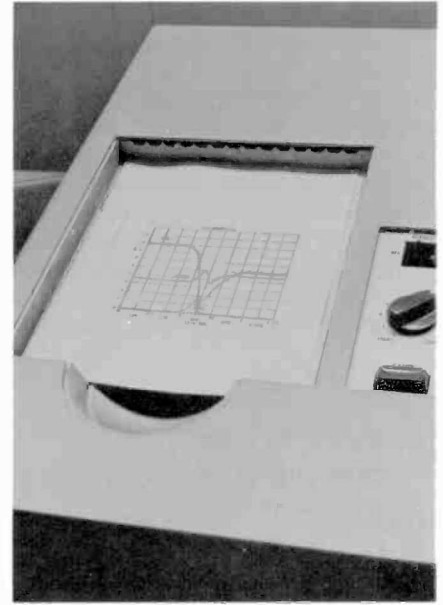


Fig. 3. Typical hard copy printout of measurement waveforms.



Fig. 2. The digital processing oscilloscope with PDP 11/34 computer.



Fig. 4. CRT graphics terminal displaying averaged color transition waveforms.

product under evaluation for any new and effective assembly techniques. Primary emphasis is directed towards circuit board assembly. The components are examined for ease of automatic component insertion and solderability. The receiver is graded on chassis and instrument assembly. The Reliability group also has its turn at evaluating the competitive receiver in its area of expertise. The results could indicate problem areas of the competition or RCA which could require some attention.

With such a detailed comparison of "RCA vs. the Competition," the differences in features, performance, cost,

manufacturability and reliability are spelled out. This information is useful in determining what areas of TV design need more attention.

Analysis of specific items

Full competitive evaluations are not the only assignments for Competitive Product Analysis. There are times when the complete chassis is not of particular interest. Instead, there may be a specific circuit which requires attention. The interest may be in the tuning system, remote control

circuitry, signal processing circuitry or the power and deflection area. No matter what area is slated for analysis, the first step is the same: the set must be obtained for evaluation. If the circuit is new, the next step is familiarization with the design. Always, a performance evaluation of the area of interest is required. Often, if a specific type of design expertise is required, such as with tuners, aid is enlisted from the ranks of Design Engineering. From there, the analysis can go in one of two directions. The design engineer can perform all necessary tests and report the results. The other option allows the design engineer to

share his knowledge and suggest useful tests and methods for completing the evaluation. Upon completion of the testing, all interested parties have access to the performance information. Usually, innovative circuits are not only examined for performance, but also for cost. If this is the case, the circuitry along with all available schematics and explanations are sent to Cost Analysis for its inputs. Such feedback could indicate potential areas for a more cost-effective design in RCA products.

Analysis in the market place

Frequently, it is advisable to examine RCA's posture in the market place. Whether the new RCA introductions are top-of-the-line or leader product, it is helpful to observe how they stack up against the available competition. This type of evaluation is what the consumer might actually see if faced with all the competition in one room. This analysis does not employ expensive test equipment, but rather only the trained eyes of the observers. Such an evaluation can be handled in two ways. The sets can be left in their out-of-the-box condition or each instrument can be adjusted according to factory specifications for optimum performance. In most cases, the latter is preferable. With all instruments operating simultaneously and displaying the same video signals, the observers can obtain a very good indication of the performance differences between the sets. A variety of test signals can offer some indication of each set's performance under most types of signal conditions. Also, the observers can get a feel for the different features offered on various receivers and the accessibility of the customer controls. This type of evaluation will quickly let one know which television receivers just do not measure up.

Often, such an evaluation is performed in the design stages so any indicated design changes can be implemented to help ensure a competitive edge.

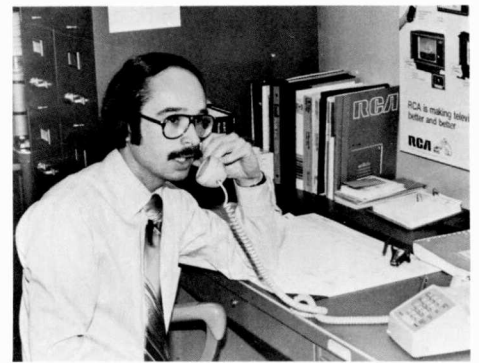
Schematic analysis

Not all tasks of Competitive Product Analysis deal with the actual competitive product. Much of the efforts are devoted to information gathering. Efforts are constantly directed towards obtaining the most recent schematics available on any television receiver which might be of interest. These include not only schematics of U.S. and Japanese sets sold in the United States, but also domestic Japanese and European schematics. Many times new circuit ideas will be tried out in the foreign country before being introduced to the United States.

Besides the constant hunt for schematics, it is important to keep on top of new innovative product introductions. These are important because they do have some effect on where the schematic hunts are focused. Not only is Engineering interested in knowing what new ideas are brought to the television industry, but also in determining if any manufacturer has introduced a new idea. This is a different type of research for Competitive Product Analysis. Competitive schematics are searched to determine if someone else has already implemented a new idea. Advanced circuit diagrams might indicate the presence of some type of hidden problem not previously foreseen, thus eliminating a potential future factory problem.

Analysis for design

Competitive Product Analysis is also used as an aid in the design cycle of RCA television receivers. With the use of the Digital Processing Oscilloscope and the PDP 11/34 computer for automatic



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testing, many samples of various design iterations can be measured quickly and the results stored in memory for future evaluation. Also, statistical analysis can be performed on the stored data to yield some indication of design deviations, thus helping to optimize some design parameters.

At this time, there are several automatic tests typically performed in the design cycle. The system is expanding continuously to offer more design aids to the engineering group.

Conclusion

Competitive Product Analysis does have an effect on CE. There are many television manufacturers with many good ideas. Each day, it becomes increasingly critical to monitor the progress of the rest of the industry to support our intentions of equaling or surpassing the competition.