

# Semiconductor Testing at UNIVAC

Laboratories and Records from Larry Bolton

## INTRODUCTION

Mr. Bolton received a set of component test records from Don Johnson some of which he scanned into a Printable Document File, [SemiTestRecord.pdf](#). Larry also provided images of several test equipment setups, circa 1957. The images are shown below along with people identifications. The test record file was sent to a few retirees who had had interactions with the testing during their careers. Feedback from those retirees are also copied hereunder.

Don Johnson was reluctant to give the test records away, thus they were returned to him after the scanning. Someday we hope to get them to the Charles Babbage Institute.

## Contents<sup>1</sup>

INTRODUCTION.....	1
SUMMARY OF THE RECORDS.....	1
IMAGES.....	2
COMMENTS FROM REVIEWERS.....	6
January 23, 2020 at 8:44 AM Lowell wrote: .....	6
January 23, 2020 at 11:08 AM Larry wrote:.....	7
January 23, 2020 at 11:28 PM Ralph Kerler wrote:.....	7
Jan 24, 2020, at 8:15 AM, Lowell wrote: .....	7
January 24, 2020 at 8:46 AM Mike Svendsen wrote: .....	8
EPILOGUE.....	8

*Edited with Microsoft Word, 18 April 2020*

## SUMMARY OF THE RECORDS

### **UNIVAC SEMICONDUCTOR TEST RECORD: Approx. 1957 to 1962**

The company set up a component test and evaluation lab for the purpose of determining which products met Univac military application requirements and were acceptable for use in Univac equipment. The lab itself was located originally in Plant 3, then Plant 1, Plant 2, and finally in Plant 8 where it was shut down in 1992. {Editor's note: See <http://vipclubmn.org/TwinCities.html> for plant discussions.} Originally, each request for test was entered on a log sheet. The log sheets were saved by Donald D. Johnson who headed the component test and evaluation lab for 35 years.

Early requests were logged on an Engineering File (EF1059) semiconductor test form. About 1957, it was decided that a different numbering system was to be used. Thus, began the PX72000 series of test numbers. Few of the date entries show a year. After reviewing all the test records and consulting with Don Johnson, it appears the following date ranges are applicable:

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<sup>1</sup> Click on a section title for a quick scroll thereto.

Established in 1980

**PX72000-1000 thru 1480:** These tests were originally entered on the EF1059 form. They may have been initiated prior to 1957. Those EF1059 tests still in process in 1957 were assigned a PX72000 series number and re-entered on the new record form after its use had begun. This is the reason these are not the lowest test numbers but may be the earliest tests. These tests span the years 1957 and 1958 for completion.

**PX72000-11 to 540:** These mark the beginning of the PX72000 series of formal test numbers. The tests numbered 11 to 999 also cover the years 1957 and 1958. How and why some appear to overlap timewise with the PX72000-1000 series is not clear.

**PX72000-545 to 999:** 1958

**PX72000-1481 to 1644:** 1958 continued

**PX72000-1650 to 2354:** 1959

**PX72000-2355 to 2953:** 1960

**PX72000-2957 to 3490:** 1961

**PX72000-3494 to 3606:** thru April 1962 at which point this log was no longer used.

The PX72000 series of formal report numbers continued to be used well into the 1990's. The reports were all formal reports, including a summary of results or conclusion and having a supervisor or manager signoff.

The following suppliers had components tested: Amperex (note test 29 requested by J. L. Hill), Bendix, Clevite, CBS, Delco, Fairchild, Federal, Gahagan, General Electric, General Instrument, General Transistor, Hoffman, Hughes, IRC, Motorola (comment on PX 1084, transistor cost would have been \$350 for 10 samples), Ohmite, Pacific Semiconductor, Philco, RCA, Radio Receptor, Raytheon, Rheem, Semcor, Sperry, Sprague, Sylvania, Texas Instruments, T. P., Transitron, Tung Sol, Western Electric, and Westinghouse. There are also final sheets for miscellaneous other suppliers.

## IMAGES<sup>2</sup>



#12340: Fabricating in Test Laboratory - Plant 3 (Don Ellings, Don Gabrielson, Dick Scanlon, and Pete Skaar)

<sup>2</sup> Image numbers can be referenced in the database at the Lawshe Memorial Museum.



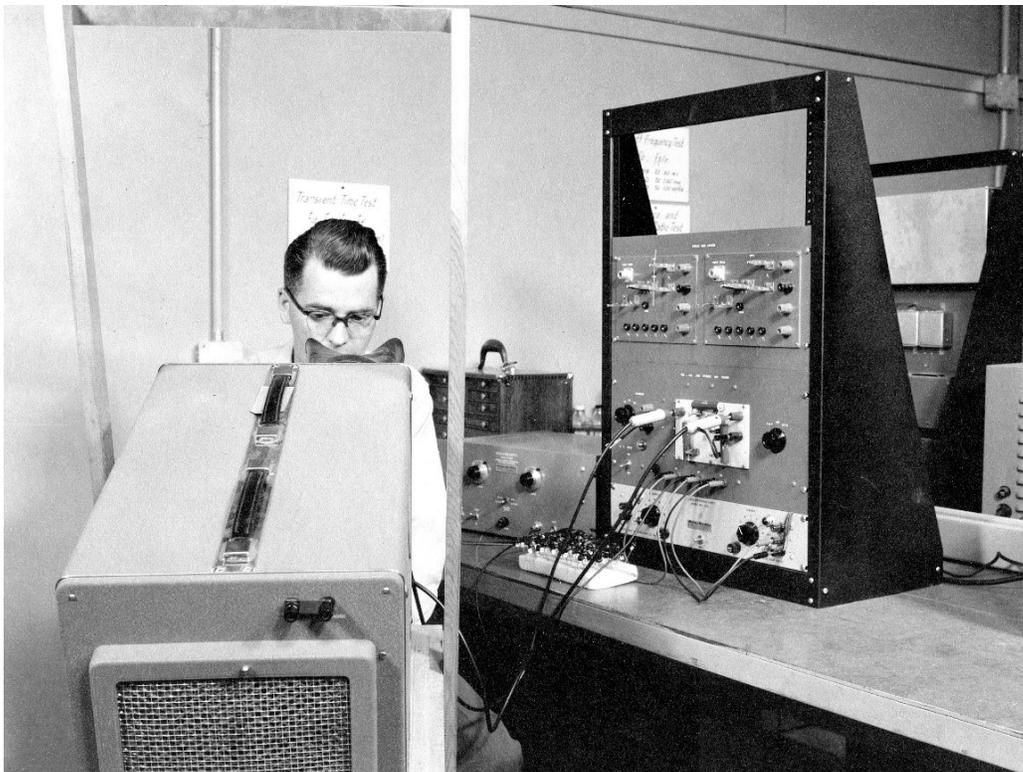
#12342: Evaluation Engineers - Test Laboratory - Plant 3 (Paul Welshinger, Bob Kissling, Al Nieters, and Norb Ewald.) {Editor's Note: Paul, Al, Norb, Bob Keenan and Lowell played in the Sperry golf league at Highland in the 80s.}



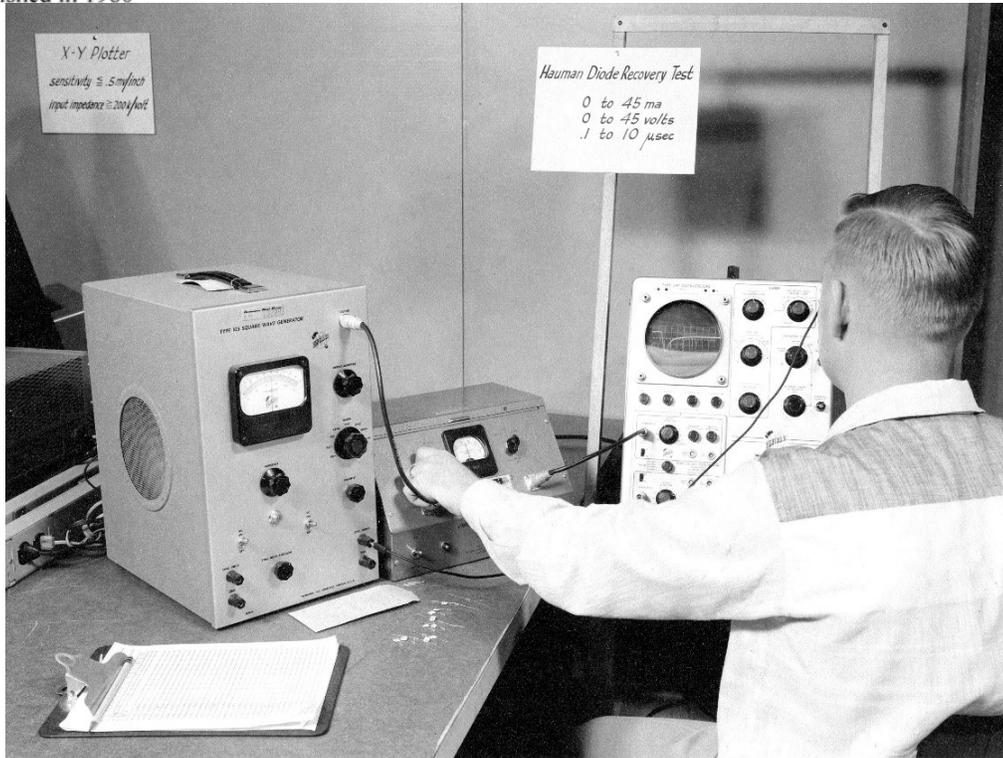
#12344: Drum Testing in Environmental Area - Test Laboratory - Plant 3 (? , Bob White)



#12353: Cutoff Frequency Test - Evaluation Laboratory (John Schoeberl)



#12354: Transient Time Test - Evaluation Laboratory (Gordy Hoel)



#12355: Diode Recovery Test - Evaluation Laboratory (Don Johnson)



#12356: X-Y Plotter - Evaluation Laboratory (Leonard Sobieac (sp))



#12359: Temperature Controlled Evaluation Laboratory

## COMMENTS FROM REVIEWERS

January 23, 2020 at 8:44 AM [Lowell](#) wrote:

Larry: I find the test logs to be quite interesting - not from the testing of components but from the names of the people requesting tests. Even though the sheets just used initials versus full first names; I recognize and had/have met: Bob Fischer, Curt Christensen, Don Anderson, Don Zander, Duane Sandstrom, Jack Hill, Ken Dalager, Ken Hoglund, Lee Grandberg, Mike Svendsen, Phil Pearsall, Ralph Jensen, Ralph Kerler, Rollie Arndt, and R. A. (Bob) Erickson. I am somewhat embarrassed in that I am not sure if I've ever met Don Johnson.

There are several other names that I don't recognize or didn't know, i.e. Deeb, Oines, Englund, Bissonette, R. H. Ness, H. N. Frazier, Goodrich, and C. A. Johnson. I knew an Arnie Ness from the environmental test area and Arne Ness from the Field Service organizations, could the R of the R. H. be a poorly written A? Was C. A. Johnson possibly Clarence?

And components from 32 companies! Including a few that I'd never heard of.

The test records really reflect the 'behind the scenes' engineering that took place in the development and manufacturing of reliable equipment.

Cheers! *LABenson*

January 23, 2020 at 11:08 AM Larry wrote:

Other names are: Ed Deeb, Dave Oines. There is an Arnie Ness who worked in the environmental test lab. I don't know if R. H. Ness was the same person, maybe a relative.

Larry

January 23, 2020 at 11:28 PM Ralph Kerler wrote:

Brings back great memories. Clearly remember both the EF 1059 and PX 72000 Test Request forms. Fun to see all the coworkers' names listed starting with Bob Erickson. Played volleyball with Don Zander who was one of the best players in the league. Remember Ken Hoglund whom I traveled with including an overnight with my wife Vera at her home in Park Ridge IL. Remember we sometimes took trains rather than flights in the 50's. I fondly remember Lee Granberg who I think was a computer designer who worked with the early semiconductors.

We all worked with Don Johnson for many years who was part of the test group that had to develop their own component testing equipment. With new technology the users had to do their own thing. John Schoberl who's mentioned and Dave Kirkwood who came later, each designed very sophisticated large Scale Integration (LSI) test equipment as the semiconductors became increasingly complex.

I started in Sept 1956 and I saw Mike Svendsen's name who I think started in 1959. Played softball with Mike and went with him on some historic vendor evaluation trips to Silicon Valley suppliers. Does anyone remember Gold Street bar in San Francisco where we managed to enjoy several liquid refreshments?

I remember most of the people shown on the test requests but not all. Maybe it's just getting old, but I have positive memories of most.

What I especially remember is being asked as a new EE grad to start testing the early diodes and transistors since most of the engineers at Univac in 1956 when I started were vacuum tube oriented. Only a few were involved in the original semiconductor designs. It was an incredible opportunity to be a part of the evolution of semiconductors from diodes and transistors to very large-scale integration (LSI). I was lucky in that I managed to meet all of the most important industry people who drove these original germanium transistors and point contact diodes and made the transition to silicon which laid the ground work for the rapid integration which is still going on today.

Ralph

Jan 24, 2020, at 8:15 AM, Lowell wrote:

Ralph: Thanks for your feedback! BTW, Lee Granberg recently passed away. His obit will be in the next VIP Club newsletter.

You are correct that the data in the paper belonged to UNIVAC/Sperry, versus Don, the individual who kept the data. Since the sheets weren't marked as Company Private nor as a government 'classified' level; we should be able to post on our web site. These are great examples of the detail engineering that took place for the development of reliable systems. To reminisce more, look at <http://vipclubmn.org/Components.html#Motley>.

Established in 1980

January 24, 2020 at 8:46 AM Mike Svendsen wrote:

Thanks to all of you for your research and memories. Mike Svendsen

**EPILOGUE**

Larry Bolton's 41-year career as a component engineer interacted with dozens and dozens of projects and programs. He has been a major contributor to our Legacy initiative with cataloguing and photographing artifacts, <http://vipclubmn.org/Artifacts.html#PCcards>. And, he was the stimulus for the <http://vipclubmn.org/Components.html> chapter. By subsection counting within our 60 chapters, Larry contributed more 'articles' than any other writer. His career is part of our IT Legacy Anthology, <http://vipclubmn.org/People1.html#Bolton>.

Editor Lowell Benson's 33-year career summary touched on a wide variety of projects, programs, and teams. His part of the Anthology, <http://vipclubmn.org/People1.html#Benson>.

Thanks to Ralph for this photo and roles that individuals had on this Plant 5 components test team.

**MSI Test System**

February 1970



Chuck Beltz – Principal Engineer, cost; Ben Peterson – Development Engineer, thermal environment system; Bob Nelson – Senior Engineer, scheduling; John Sanden – Engineering Specialist, thermal system; Marv Burns – Technician B, cable wiring; Ed Genereau – Engineering Aide, test head; **Ralph Kerler – Manager**; John Gould – Development Engineer, programming; Dick Marchifava – Technician A, card assembly and test fixtures; Glenn Youngquist – Engineering Specialist, check out; Rob Christiansen – Technician A, card assembly; Mike Farrell, Technician A, card layout, programming; Jim Gengler, Technician A, card assembly; Joe Clysdale – Technician A, partitioning, wire tabs; Tom Szenay – Technician A, card wire-wrap; Al Norlander – Technician A, card wire-wrap; Bob Ginsky – Technician A, thermal system; Hal Rogers – Technician A, chassis wire-wrap, cable organization; Walt Makos; Dave Kirkwood – Development Engineer; and John Schoeberl – Engineering Specialist, ACMET II.