



# Guide to the Edward Feustel collection on the Rice University Computer Project

**Creator:** Edward Feustel

**Dates:** 1958-1989

**Extent:** 4.8 linear feet, 11 manuscript boxes, 1 half manuscript box

**Collection number:** X4736.2008

**Catalog number:** 102733972

**Collection processed by:** Paul McJones and CHM volunteers

**Finding aid prepared by:** Sara Chabino Lott

## **Abstract**

The Edward Feustel collection on the Rice University Computer Project (formerly Rice Institute) contains material collected by Feustel while he was employed at Rice University and Prime Computer. The collection spans 1958 to 1989, with some undated material. The material from Rice University documents the Rice University Computer Project, which produced the R1 computer, in full operation from 1961 to 1971. The R1 material includes documentation for R1 hardware and software, source code listings, status reports, and technical papers. The collection also includes some design documents and source codes listings for the R2, which was a planned follow-on to the R1, but whose construction was never completed. Also included are Prime Computer manuals.

## Administrative Information

### Access Restrictions

The collection is open for research.

### Publication Rights

The Computer History Museum (CHM) can only claim physical ownership of the collection. Copyright restrictions may apply and users are responsible for satisfying any claims of the copyright holder. Requests for copying and permission to publish, quote, or reproduce any portion of the Computer History Museum's collection must be obtained jointly from both the copyright holder (if applicable) and the Computer History Museum as owner of the material.

### Languages

The collection is entirely in English.

### Preferred Citation

[Identification of Item], [Date], Edward Feustel collection on the Rice University Computer Project, Lot X4736.2008, Box [#], Folder [#], Catalog [#], Computer History Museum.

### Immediate Source of Acquisition

Gift of Edward A. Feustel, 2008.

### Repository

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Mountain View, CA 94043  
USA  
650-810-1010  
[research@computerhistory.org](mailto:research@computerhistory.org)  
[www.computerhistory.org](http://www.computerhistory.org)

### Biographical/Historical Note

Edward A. Feustel was born in Fort Wayne, Indiana in 1940. He graduated from MIT in 1964 with simultaneous bachelor of science and master of science degrees in electrical engineering. He then earned a master of arts in 1965 and a PhD in 1967 from Princeton University in electrical engineering, after which he became a research fellow at the California Institute of Technology. Feustel began working at Rice University in 1968 where he participated in the Rice University Computer Project with responsibility for software design and emulation of the R2 computer. Feustel became a tenured associate professor of electrical engineering and computer science at Rice before leaving in 1979. From 1979 to 1992 Feustel worked at Prime Computer where he was a principal technical consultant. After leaving Prime in 1992, Feustel joined the

Institute for Defense Analyses (IDA) as a member of its research staff until 2000. After IDA, Feustel served as an adjunct faculty member at the Institute for Security Technology Studies (ISTS) from 2000 to 2007 and adjunct professor of computer science at Dartmouth College from 2007 until his retirement in 2012. Throughout his career Feustel published numerous papers on non-parametric detection and computer architecture. Feustel currently resides in Plainfield, New Hampshire.

The Rice University Computer Project (then Rice Institute) was established in 1957 with a grant from the Atomic Energy Commission and an initial contribution from the Shell Development Company. It was led by Dr. Martin Graham, formerly of Brookhaven National Laboratory, with a small technical staff. A large vacuum tube computer known as the R1 was constructed with several innovative features designed to facilitate scientific computation. The internal word length was 56 bits, and the initial memory had 8K words implemented with Radechon cathode ray tubes. 24K words of magnetic core memory were added in 1964. The Radechon tube memory had a word length of 63 bits, which provided 7 bits for a pioneering implementation of a Hamming code error correcting system in the memory interface circuits. Indirect addressing was implemented as well as a feature dedicating two bits of the 56 bit words as tag bits, which could be used in various ways to identify certain data elements, such as an aid in addressing arrays. Console switches could be set to enable program trapping based on selected values of the tag bits which in turn could control program behavior or facilitate program debugging.

Operating system software including an assembler and a compiler was developed by J. K. Iliffe, who joined the project from England in 1958.

The computer was in operation from 1961 through 1971. Its use by science and engineering departments resulted in the publication of more than 60 technical papers. It was one of the most successful of all large vacuum tube computers because of its innovations and usefulness in producing scientific results and providing experience for graduate students in hardware and software design.

Iliffe returned to England and developed the data tag concept much further in a new architecture called the Basic Language Machine. He returned to the Rice Project in 1968 to join in specifying the architecture of a new computer based on the Basic Language Machine, to be constructed at Rice as a follow-on to the R1. The new machine was called the R2 and construction was nearly 90% complete in 1976 when it was abandoned for lack of support.

### **Scope and Content of the Collection**

The Edward Feustel collection on the Rice University Computer Project is arranged into two series. Series 1, "Rice University Computer Project materials," contains documents that Feustel gathered when he left Rice University. The records in Series 1 span 1958 to 1970. There are early documents for the R1 hardware and software, written while the hardware was being designed in the late 1950s. There are also hardware and software manuals used throughout the 1960s. There are source code listings for the operating system, assembler and compilers, and

libraries. Also included are status reports from 1967 and 1970 that provide an overview of the R1 computer and how it was used for research at Rice University. Finally, there is a set of technical reports and drafts of papers written about the R1. There is also a set of design documents and source code listings for the R2, a follow-on to the R1 that was not completed. Series 2, "Prime Computer manuals," contains hardware and software manuals for Prime Computer products, as well as a few non-Prime Computer manuals.

### **Arrangement**

The collection is arranged into 2 series:

Series 1, Rice University Computer Project materials, 1958-1971

Series 2, Prime Computer manuals, 1974-1989

### **Indexing Terms**

Feustel, Edward A.

Prime Computer, Inc -- Handbooks and manuals

R1 computer

Rice University. Department of Computer Science

### **Related Collections at CHM**

Graham, Martin H. oral history, 2011-11-15, Lot X6332.2012, catalog number 102746199.

<http://www.computerhistory.org/collections/catalog/102746199>.

### **Related Collections at Other Repositories**

Rice Institute Computer Project records, UA 87, Woodson Research Center, Fondren Library, Rice University. <http://search.library.rice.edu/collections/WRC/finding-aids/university-archives/computer-project-records>.

Graham, Martin oral history. Interview #131 for the Center for the History of Electrical Engineering, The Institute of Electrical and Electronics Engineering, Inc. [http://ethw.org/Oral-History:Martin\\_Graham](http://ethw.org/Oral-History:Martin_Graham).

	<u>Catalog Number</u>	<u>Title</u>	<u>Date</u>
<b>Folder List</b>			
<b>Rice University Computer Project materials</b>			
<b>Box 01</b>	102726203	Rice Computer III	1967-09
<b>Box 01</b>	102726204	Rice University Computer Project : final technical report	1970-06-19
<b>Box 01</b>	102726205	Reprints, preprints, papers, and theses prepared with the aid of the Rice Computer : September 1960 - September 1964 and September 1964 - June 1970	1970-06-19
<b>Box 01</b>	102726206	The last 200 pages of R1	1971-05-24
<b>Box 01</b>	102726207	Portraits of Rice Computer Project personnel	ca. 1965
<b>Box 01</b>	102726208	Operating notes	ca. 1961
<b>Box 01</b>	102726209	A manual for the Rice Institute Computer	1958-09-01
<b>Box 01</b>	102726210	Rice Institute Computer Project programming memoranda	ca. 1959
<b>Box 01</b>	102726212	Notes on the Genie compiler for the Rice University Computer	1964-01
<b>Box 02</b>	102726213	Rice University Computer : basic machine operation	1962-01
<b>Box 02</b>	102726214	Rice University Computer : SPIREL system and assembly system	1964-04
<b>Box 02</b>	102726215	Programming systems : PLACER, assembly language, Genie, SPIREL, library, magnetic tape (Programming Staff copy, with annotations)	1968-07
<b>Box 03</b>	102726216	Programming systems : PLACER, assembly language, Genie, SPIREL, library, magnetic tape	1968-07
<b>Box 03</b>	102726217	The use of the Genie system in numerical calculation	1961

	<u>Catalog Number</u>	<u>Title</u>	<u>Date</u>
<b>Rice University Computer Project materials</b>			
<b>Box 03</b>	102726218	A dynamic storage allocation scheme	1962-10
<b>Box 03</b>	102726219	The role of addressing in programming systems, and Continuous evaluation	1964
<b>Box 03</b>	102726220	Use of dynamically allocatable labelled memory blocks in programming systems	1965-10
<b>Box 03</b>	102726221	Storage organization in programming systems	ca. 1967
<b>Box 03</b>	102726222	Storage organization in programming systems	1968-10
<b>Box 03</b>	102726223	Elements of BLM	1968-11-07
<b>Box 03</b>	102726224	Store management techniques	1969-01-23
<b>Box 04</b>	102726225	SPIREL operating system design notes and program listing	ca. 1968
<b>Box 04</b>	102726226	AP1 assembler design notes and program listing	ca. 1968
<b>Box 04</b>	102726227	PLACER design notes and program listing	ca. 1965
<b>Box 04</b>	102726228	AP1 macros and back-translator design notes and program listing	ca. 1965
<b>Box 05</b>	102726229	Genie design notes and program listing	ca. 1967
<b>Box 05</b>	102726230	Math subroutine design notes and program listings	ca. 1965
<b>Box 05</b>	102726231	Library - real and complex scalar design notes and program listings	undated
<b>Box 06</b>	102726232	Library - real matrix design notes and program listings	undated
<b>Box 06</b>	102726233	Library - complex matrix design notes and program listings	undated

	<u>Catalog Number</u>	<u>Title</u>	<u>Date</u>
<b>Rice University Computer Project materials</b>			
<b>Box 06</b>	102726234	Library - software design notes and program listings	undated
<b>Box 06</b>	102726235	Library - I/O design notes and program listings	undated
<b>Box 06</b>	102726236	Magnetic tape system design notes and program listing	undated
<b>Box 07</b>	102726237	MIDOL language definition and program listing	ca. 1968
<b>Box 07</b>	102726238	ALGOL compiler program listing	undated
<b>Box 07</b>	102726239	Design notes and program listing for implementation of Euler programming language (Niklaus Wirth)	ca. 1969
<b>Box 08</b>	102726240	Rice Computer-2 general specifications	ca. 1970
<b>Box 08</b>	102726241	An assembler for simulation of the new Rice Computer : AP1/R2	1969-04-23
<b>Box 08</b>	102726242	Assembler for simulation of the new Rice Computer : AP1/R2	1969-06
<b>Box 08</b>	102726243	R2 functions	undated
<b>Box 08</b>	102726244	The R2-PDP-11 interface to the programmer	1971-03-27
<b>Box 08</b>	102726245	Preliminary notes on the disk drive and controller	1971-07-01
<b>Box 08</b>	102726246	Miscellaneous notes for bringing up the R2	ca. 1971
<b>Box 08</b>	102726247	How to use the new syntax analyzer	undated
<b>Box 08</b>	102726248	R2 simulator design notes and program listing	ca. 1969
<b>Box 08</b>	102726249	AP1/R2 VERSION R1 program listing	ca. 1969

	<u>Catalog Number</u>	<u>Title</u>	<u>Date</u>
<b>Rice University Computer Project materials</b>			
<b>Box 08</b>	102726250	R2 files program listing	ca. 1970
<b>Box 08</b>	102726251	R2 OS program listing	1969-08-24
<b>Prime Computer manuals</b>			
<b>Box 09</b>	102703285	Software Tools Subsystem tutorial - User's guide	1985-05
<b>Box 09</b>	102703286	Software Tools Subsystem - User's guide - 2nd edition	1980-04
<b>Box 09</b>	102703287	PRIME confidential documents	1981 - 1982
<b>Box 09</b>	102703288	Data Dictionary background	1981-11-05
<b>Box 09</b>	102703289	Introduction to PL/P	1982-01-07
<b>Box 09</b>	102703290	EPF functional specification	1983-04-31
<b>Box 09</b>	102703291	P-400 Process Exchange and new protocols	1976-03-29
<b>Box 09</b>	102703292	I/O at Prime today	1981-11-05
<b>Box 09</b>	102703293	User's guide to magnetic tapes for information interchange	1982-04-01
<b>Box 09</b>	102703294	PDR3059 - The PMA programmer's guide - PR1ME - Preliminary documentation release	1977-11
<b>Box 09</b>	102703295	PR1ME computer - The Assembly Language programmer's guide	1979
<b>Box 10</b>	102703296	CPL user's guide - DOC4302-190P -Revision 19.0	1982
<b>Box 10</b>	102703297	Prime PL/I	1981-10-05
<b>Box 10</b>	102703299	CPL user's guide - DOC4302-190P - Revision 19.0	1982
<b>Box 10</b>	102703300	Prime - Instruction sets guide	1987
<b>Box 10</b>	102703301	Prime - Assembly language - Programmer's guide	1989



	<u>Catalog Number</u>	<u>Title</u>	<u>Date</u>
		<b>Prime Computer manuals</b>	
<b>Box 11</b>	102703302	PRIME Common LISP - Language reference manual	1987
<b>Box 11</b>	102703303	DOC9473-1PA - System architecture - Reference guide - Revision 19.4	1985
<b>Box 11</b>	102703304	DOC9474-1PA - Instruction sets guide - Revision 19.4	1985
<b>Box 11</b>	102703305	Modula-2 - Programmer's guide	1985-11-07
<b>Box 12</b>	102703306	DOC 7534-2LA - C user's guide - Release 19.4	1986-01
<b>Box 12</b>	102703307	Prime - System architecture - Reference guide	1987
<b>Box 12</b>	102703308	Memorandum	1974-07-10