

Boston Museum adds Muse to exhibits

By Paul Schindler

It's already at the Smithsonian in Washington, and now it's a big draw at the Boston Museum of Science. It's not exactly artificial intelligence, but it makes music, up to 14 billion different combinations. It is an electronic music composer-player created by two MIT professors, Edward Fredkin and Marvin Minsky.

"It" is the Muse — without question the first commercial musical computer designed for the consumer market. Its creation was an outgrowth of Minsky's and Fredkin's work on artificial intelligence. The pair wanted to put "the highest form of technology to use, just for fun." In addition, they stated, "The technology inside this little triangular box is the best available. The Muse offers one the capability of being musically creative while not necessarily being a trained musician."

Fredkin described the invention process a bit differently to his class in "Understanding and Solving Problems" (formerly course number 6.802, now 6.48). In teaching students to work with digital logic, he had noted that, until one reaches a high level of sophistication, there is not much reward for the student. One can make a clock, or a light counter, or a divider, but none of those really do

much after being created.

Fredkin and Minsky hit upon the idea of combining a clock with the building blocks of digital logic (and, or, nor, nand and counter circuits, in the IC format) to create a device which, under guidance, would compose and perform music. This way, the student gets a result he can actually sense and control. It fulfills the creative desire, and gives a more tangible goal to early work with digital logic.

At least for the first term 6.804 class, the idea seemed to be a roaring success. Fredkin took the class through general problem solving until nearly the end of the term. Then he introduced the class to digital logic, in conjunction with a digital logic board, which enabled all the members of the class to build a primitive Muse. Fredkin was heartened by the accelerated learning which took place.

The basic idea of the Muse is fairly simple. Two clocks are used to create on-off (square wave) pulses. This is the same wave form generally used by the Moog synthesizer, which results in the vaguely familiar sound which the Muse creates. These pulses are then divided into musical tones (on the basis of certain fairly exact mathematical relationships), using a binary counter as the guide.

The binary counter serves as a kind of coder, such that when a "one" is counted, the division circuits are set to play a "C"; "two" equals "D"; "three" equals "E", and so on. The number sequence appearing in the coder is determined by a longer counter circuit, controlled by operator available switches. A second clock is used to control the rhythm. Add a volume control and a pitch con-

trol (the latter varies the main clock frequency), and you have a Muse. But it's no use trying to build your own: separate purchase of the IC's and counters would cost much more than buying an already-assembled Muse.

The current Muse exhibit at the Museum is not visitor-operable. Apparently there are fears of damage to the device. Right now, it is playing a piece that will not repeat itself for years to come. The exhibit also features a Muse accessory, the "Light Show" which, unlike many music-to-light accessories, is actually exactly related to the notes being played at the time by the Muse. It makes a rather spectacular display.

In addition to the exhibit, the Muse has now been appended to a Museum program of educational demonstrations for young students, on the topic of music. The Muse wraps up the program, to the delight of many grade-school youngsters in attendance. Under Director Rod Mansfield, the Muse will demonstrate "a practical application of a binary computer system in the synthesis of musical sequences" as Museum publicity puts it. The kids will probably just call it a lot of fun.

Museum Director Bradford Washburn expressed delight at

the Muse's presence in the museum. A firm believer in "firing up people while they are young," Washburn stands convinced that unless you capture a child's imagination and inspire his creativity by the time he is eight, it will be lost forever.

At least one eight-year-old showed imagination and flair during the press demonstration. That was Michael Fredkin, the Professor's engaging son, who composed the first piece of music for the Muse, now known as *Michael's Tune*, described by his proud father as "the best piece of Muse music written so far." Michael composed it on a Muse predecessor, a black box of his father's which was left around the house. Fredkin heard the tune and liked it. It is now the first tune most people play on their Muse since it is immortalized in the instruction book.

The exhibition was donated to the museum by Triadex, Inc., and Selame Design Associates of

Newton. Fredkin is Chairman and Chief Scientist of the XYZ Corporation, while Minsky is a director of Triadex. (XYZ is the parent company of Triadex). Although Fredkin has been in business ventures before, the invention of the Muse was not a case of businessman and scientist co-operating. The pair are both standouts in the field of artificial intelligence. Of special note is the fact that Fredkin is one of the few full professors at the Institute (he received his appointment this last June) who does not hold any degree.

The actual product design of the Muse, as well as the design of the corporate symbol for Triadex, fell to Joseph Selame and W. Grant Hodsdon of Selame Design. The corporate symbol, a graphic interpretation of a robot's head, is incorporated into the exhibit and conveys the inter-relationship between human reasoning and the computer process.

"November Actions: A Documentary," first broadcast on WTBS in November of 1969, garnered a Major Armstrong Award for excellence in news programming.

As part of the station's tenth anniversary celebration, the program will be re-broadcast this Wednesday evening at 7 pm on WTBS.

Nominations Committee of the GA will be holding hearings tonight and Thursday night of this week for openings on key faculty/student committees. If you're interested, show up in room W20-400 at 7:00 pm.

OVERLAND INDIA
Expedition leaves London mid-June crossing Turkey, Iran, Khybar Pass, Afghanistan, Pakistan, Kashmir, Taj Mahal to Khutmandu.
\$545
ENCOUNTER OVERLAND
1414 E. 59th St.
Chicago, Illinois 60637

PREGNANT?
Need Help?
For assistance in obtaining a legal abortion immediately in New York City at minimal cost.
Call:
CHICAGO (312) 922-0777
PHILA. (215) 878-5800
MIAMI (305) 754-5471
ATLANTA (404) 524-4781
NEW YORK (212) 582-4740
8 A.M.-10 P.M. - 7 DAYS A WEEK
Abortion Referral Service (ARS), Inc.

STUDY SOUNDS
IMPROVE GRADES
Improve Grades While Devoting The Same Amount Of Time To Study
USE STUDY SOUNDS
Increase Your Concentration And Improve Your Comprehension. Study At A Faster Rate.
ELECTRONICALLY PRODUCED SOUNDS CAUSE THIS TO HAPPEN
Please Specify:
8 Track Tape, Cassette, Or LP Record
Send Check or Money Order — \$9.95 Each
Include 75c Handling and Postage
Sound Concepts, Inc. — Box 3852
Charlottesville, Va. 22902

M.I.T. CHORAL SOCIETY

Klaus Liepmann, Director
Henry Gibbons, Ass't Director

CARISSIMI BILLINGS Jephthe Oratorio
Solomon's Songs
Lamentation over Boston

MOZART BRAHMS Variations for 4-Hand Piano
Liebeslieder Waltzes
Quartette

Sunday, May 2nd 8:30 pm
Kresge Auditorium

Tickets at Kresge Auditorium Box Office, M.I.T. Building 10 Lobby, Harvard Coop. Reserved seats, \$3.00; unreserved, \$2.00; Students with ID, \$1.00.

Student discount

We give students a break, with special reduced rates in Hilton Hotels from Boston to Honolulu. (Faculty and graduate school students get a discount too.)

Let us send you a pamphlet listing the Hilton Hotels and Inns that offer special student rates. Also a Hilton Student Identification Card to use whenever you register.

Mail this coupon to Hilton Hotels Corporation, Travel Department, National Sales Division, 9880 Wilshire Blvd., Beverly Hills, California 90210.

We want to make it easy for you to come visit the Hiltons. **X**

Name _____
Address _____
City _____ State _____ Zip _____
College _____ Class of 19 _____

HILTON HOTELS

Consider the source

The first malt liquor good enough to be called **BUDWEISER**.

ANHEUSER-BUSCH, INC. • ST. LOUIS