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New England Digital Corporation 1976–1992: Developing the Capabilities of Digital Sound

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In 1985 Brad Naples, business manager of New England Digital Corporation, claimed that over half the population of the United States heard a Synclavier every day in commercials, records, sporting events, and movies. By that time, over 400 systems had been sold to recording studios, video post-production operations, and professional musicians such as Michael Jackson, Pat Metheny, Oscar Peterson, Sting, and Stevie Wonder. Television commercial producers such as Richard Lavsky used the Synclavier to create accompaniments for Canon camera commercials, promotional shorts for ABC News, and Sesame Street.

Sydney Alonzo and Cameron Jones, founders of New England Digital Corporation, were among the first engineers in the commercial realm to realize that digitized music, expressed entirely in numeric values, could be infinitely edited, controlled, and manipulated in any way desired. Although an enormous quantity of numeric values would be required, they were convinced that computers then coming on the market would be capable of effectively dealing with them. Their company produced the world's first commercially available digital synthesizer, the world's first commercially available direct-to-disk digital recording system, and the world's first useable and commercially available music typesetting system for digital computer. In many other areas they were also on the cutting edge: FM synthesis, digital sampling, sound analysis and editing, sequence editing, and computer control of functions such as timbre building, mixing, routing, synchronization, etc.

What follows is a brief history of the company and its accomplishments, gleaned from personal files;[1] from the files of music printing programmer Alan Talbot, and technical-writing department head Ellen Frye; from internet sources; and from recent talks with other principals involved who still live and work around Hanover, New Hampshire, where the company arose.

1. From 1985 to 1990, the author worked for New England Digital as a technical writer. For a time he owned a Synclavier II, and still uses a descendant of their music printing system on which, among other things, he has prepared the musical examples for Albert R. Rice's books on clarinets, published by Oxford University Press.

Synclavier I

Jon Appleton (fig. 1), a native of Los Angeles, came to Dartmouth College as an assistant professor in 1967. In 1970 he was simultaneously awarded a Guggenheim Fellowship, a Fulbright Fellowship, and a Dartmouth Faculty Fellowship; he spent 1970–71 in Stockholm, working in the electronic music studios of Swedish radio. Beginning in 1972, Appleton collaborated with the Dartmouth College engineering department to produce a device to enable students to receive and complete musical assignments using the main campus computer. Sometime during this project, he asked the engineers if they could computerize control of the complicated patch bay of his Moog synthesizer (fig. 2). The computer engineers he talked to were Sidney Alonso, an MIT graduate and Dartmouth research engineer, and Cameron Jones, a brilliant undergraduate (fig. 3). Their reply was "why not do it right and build a computerized digital music synthesizer." In 1975 New England Digital Corporation (NEDCO) was formed by Alonso and Jones to produce a mini-computer for educational and scientific projects (fig. 4). At this time both left Dartmouth College to work full-time with the new company. During the next couple of years, while the company produced the ABLE mini-computer, they also began work on a digital music synthesizer they called the Synclavier, in answer to Appleton's patch bay problems. By the summer of 1977, the first prototype of what became the Synclavier I was in operation. The first unit was sold in November of that year.

In the fall of 1977 Appleton introduced the Synclavier I (fig. 5) at the International Computer Music Conference at San Diego. It was the world's first commercially available digital music synthesizer. It consisted of a 64-note keyboard, a separate control unit, and a computer the size of a small suitcase. It could create FM (frequency modulation) synthesis sounds and store them; the user could play using these or other stored sounds, record what was played on up to sixteen tracks, and instantly play it all back.

NEDCO also developed a musical programming language called SCRIPT, which could be used to display recorded tracks numerically for editing. With the aid of SCRIPT the user could also type complete musical performances into the Synclavier's computer memory without playing anything on the real-time keyboard.

A 1978 New England Digital catalog makes no mention of the Synclavier. In their 1979 catalog there are fourteen pages describing scien-

FIGURE 1. Jon Appleton at the Synclavier I. *Valley News* photo, April 5, 1978, 8.

tific mini-computer products and just this one short paragraph about the Synclavier:

> The Synclavier, also produced by New England Digital, is a unique computerized musical instrument used for both the composition and performance of electronic music. It has established for NEDCO a world-wide reputation as a leader in the innovative application of digital technology to complex systems problems. An ABLE/40 computer inside the Synclavier controls a proprietary digital music synthesizer to create a wide variety of pleasing and interesting sounds.

With the Synclavier I the user could:

- Create and modify sounds with FM synthesis by adding or altering the first sixteen harmonics of any sound
- Design volume and harmonic envelopes for each sound (attack, initial decay, peak level, sustain level, final decay)
- Store up to sixteen created sounds in memory, or many more on 8-inch floppy disk drives
- Tune the keyboard to any Western, non-Western or unique scale

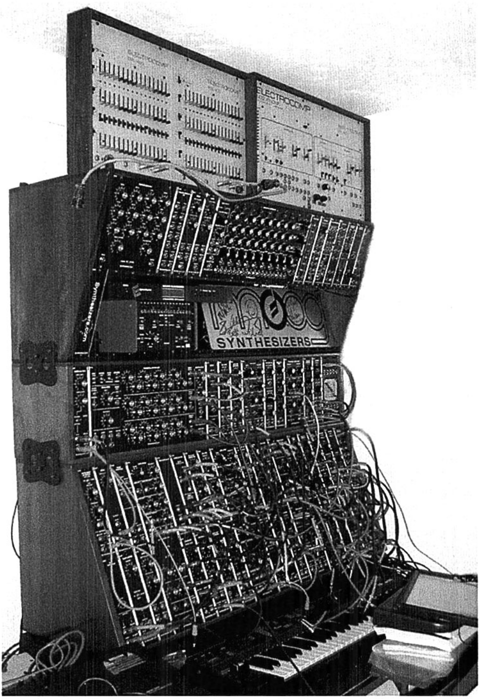

FIGURE 2. Moog Synthesizer; photo courtesy of Dartmouth College.

- Play and simultaneously record on one of up to eight tracks
- Record additional notes to the same track
- Play back recorded tracks while performing or recording another track
- Loop any recorded passage
- Slow or speed a sequence without changing the pitch; or change the pitch without affecting the speed
- Change the timbre of any recorded track
- Store recorded passages to disk drives

FIGURE 3. Cameron Jones, Sidney Alonzo, Jon Appleton. *Valley News* photo, April 5, 1978, 1.

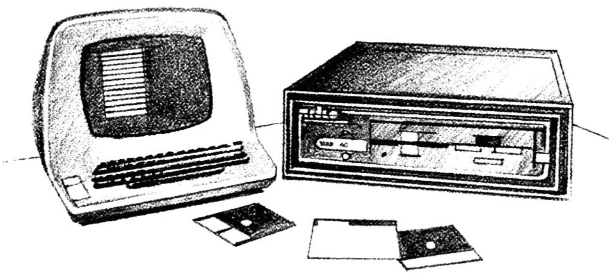

FIGURE 4. ABLE Mini Computer. Drawing from NEDCO brochure, May 6, 1979.

FIGURE 5. Synclavier I control knob, display window, and first button panel. Photo from a 1981 NEDCO promotional poster.

From January 1 of 1978 through April 5, ten Synclaviers were sold for between $10,000 and $13,000, and by the end of the year a total of fifteen had been sold.[2]

Synclavier II

The next stage in Synclavier development began in 1979. With $350,000 in venture capital from the Boston firm of Burbank & Co.,[3] the company, now called New England Digital (NED), made the decision to focus on the development of the Synclavier. Brad Naples was

2. *Valley News*, April 5, 1978, 1, col. 5; and *New England Digital Annual Report 1981*, 2, col. 2.

3. *New England Digital Annual Report 1981*, 2, col. 2.

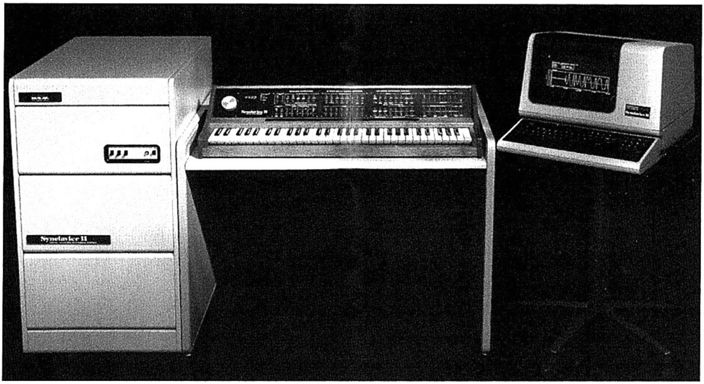

FIGURE 6. Synclavier II. Photo from NEDCO Advance Product Release folder, 1981.

hired as business manager, and a West Coast musical consultant was engaged who was involved in commercial musical applications in the recording industry.

The Synclavier II (figs. 6, 7) was introduced about the middle of 1979, and by the end of the year about thirty-five units had been sold. The new model combined the keyboard and control panel into one unit, added a computer terminal, and offered a number of other new capabilities.

The computer terminal and terminal support package were offered in the second half of 1981. They greatly expanded and simplified sound construction and analysis functions, the storing and recalling of sounds and sequences, and recording and editing procedures. They also made it possible to display music in print form.

One of the obstacles to more widespread use of the Synclavier was that not all musicians were keyboard players. One solution to this was development of a guitar interface (fig. 8) allowing a guitar player to hook up to the Synclavier and use the guitar to play and record in the same way as one could use the keyboard. NED also experimented with woodwind and brass interfaces, but none of them became commercial products.

The process of digitizing an analog sound was first described in 1937 by the British scientist Alec Reeves (1902–71), working in the Paris

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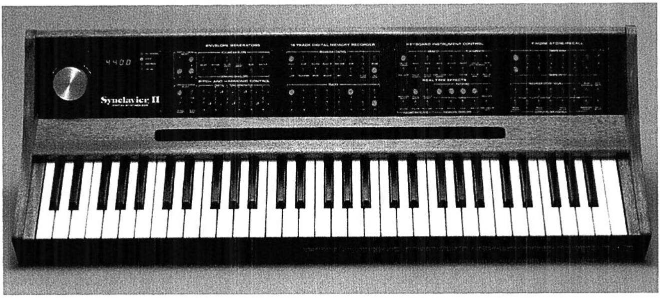

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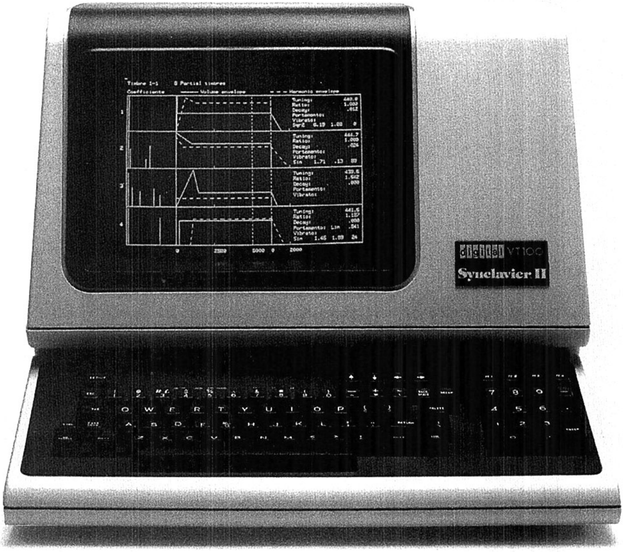

FIGURES 7a–b. Synclavier II Keyboard and Computer Terminal. Photos from NED promotional materials.

research laboratories of the International Telephone and Telegraph Company (ITT) (fig. 9). The idea, called pulse code modulation, was designed to reduce noise in telephone communications. Samples of an

FIGURE 8. Guitar interface. *Synclavier Digital Audio System* brochure, 1986, [8].

analog, a natural or continuous sound, were taken at regular intervals, measured or quantized, and recorded in digital form. Noise, not having a measurable frequency, was ignored. The process was not practical until the invention of the transistor, though it was used in certain secure applications such as the telephone link between Roosevelt and Churchill during the Second World War.

Julius Edgar Lilienfeld patented a field-effect transistor in 1926 but it was not actually possible to construct a working device at that time.

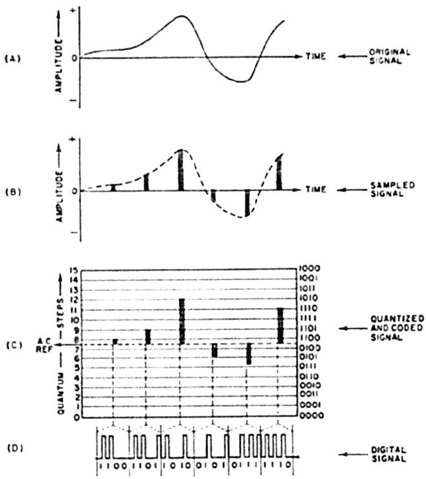

FIGURE 9. Sampling technical basis. Drawing from *Electronics World*, 1970, 10.

The first practically implemented device was a point-contact transistor invented in 1947 by American physicists John Bardeen, Walter Brattain, and William Shockley.

Digital sampling of musical sounds using this technology was first available on the Australian Fairlight CMI synthesizer in 1979. It was offered on the Synclavier in 1981. With this capability, samples of the sound of any instrument could be used to create a synthesized sound exactly like the original. The sample could be edited to include an attack, vibrato, decay, and given the required pitches for assignment to keys of the keyboard. Instruments were usually sampled at several pitch levels to obtain the slightly different sounds of different registers. The result was that a realistic sound of the original instrument could be played on the keyboard of the synthesizer.

The accuracy of the reproduction of a sound in this way depended to a large extent on the sampling rate, the number of samples per second. For telephone voice transmission, 8,000 samples per second were sufficient. For music, however, much higher rates were required because of the higher frequency of some of the sounds. The Synclavier first offered

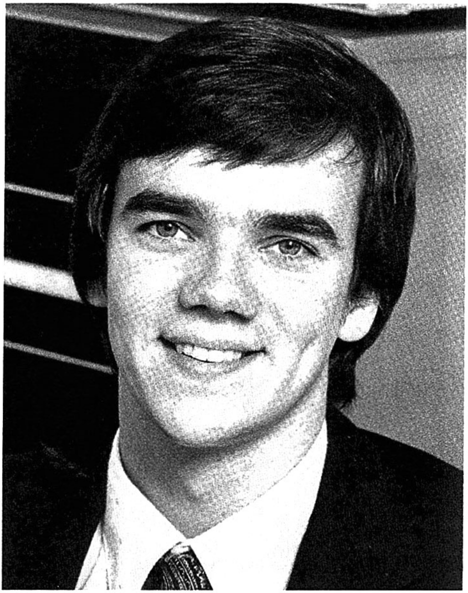

FIGURE 10. Alan Talbot. Photo courtesy of Alan Talbot.

sampling rates of up to 50,000, and eventually up to 100,000 samples per second. These higher sampling rates, however, created a greater volume of data and required enormous amounts of storage.

Because sampling produced such large files, and internal memory was limited and expensive, a way of recording directly to the hard disk was developed. The Synclavier Sample-To-Disk system, offered in 1982, was the world's first commercially available digital recording system. It not only improved sampling capabilities, but made it possible for the Synclavier to record a live performance digitally.

In the spring of 1981 Alan Talbot, a Dartmouth computer engineering student (fig. 10), having written out an arrangement of a friend's song for a band in which they were playing, decided that notating music was something computers should do. A class project was required for a course that summer, so he and another friend teamed up to create a

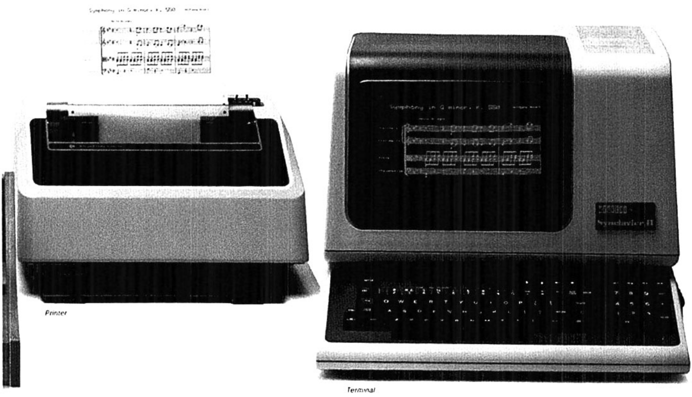

FIGURE 11. Music Printing terminal display and printer. Photos from NED promotional materials.

music printing program. The instructor of the course, Bill Arms, showed the results to the people at New England Digital.

In the fall of 1981 Talbot was hired by NED, and the first version of his work was shown at the Audio Engineering Society show in October of that year.[4] By the middle of 1982 the Synclavier II was offered with music printing capability, another world's first: a useable, commercially available, computerized music printing system (figs. 11, 12).

Score, a music typography program being developed by Leland Smith at the time, was not commercially available. Fairlight demonstrated a music printing system for their machine at the American Engineering Society meeting in 1981, but it didn't work well enough to be considered useable. *Music Construction Set* developed by Will Harvey for the Apple II computer did not come out until 1984. *Finale*, by Phil Farrand, was first offered in 1988.

The Synclavier music printing option improved during the 1980s until it was capable of handling the most complex scores of traditional or modern music. It was noted for a particularly elegant music typeface and even added some new possibilities to the repertoire of notation (fig. 13).

4. *New England Digital Annual Report 1981*, p. 6.

FIGURE 12. Music Printing Example 1.

A price list from January 1, 1983 (fig. 14) shows the components and capabilities of the Synclavier II available at that time.

- 64-note Keyboard/Control unit/32-track Memory Recorder
- 16-bit Mini Computer and graphics terminal
- Double-density floppy disk drive, Winchester hard drives
- Up to 128 voices
- Sample-to-Disk
- Music Printing Option
- Stereo Option
- Digital Guitar Interface Option
- Clock Interface Module
- Printer

Well-equipped models at this time cost over $50,000.

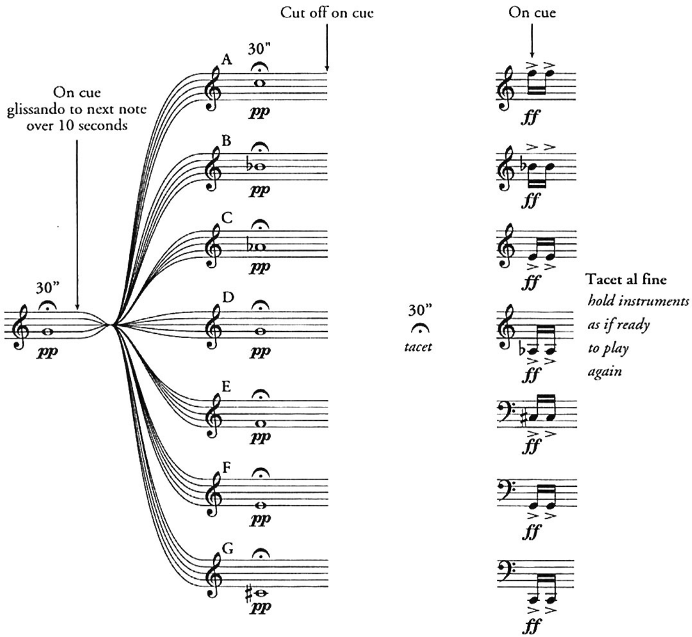

FIGURE 13. Music Printing Example 2: the slide.

The Later Synclaviers

Additional financing was sought in 1983, and the venture capital firm of Stanfill, Bowen & Co. of Los Angeles agreed to inject $2 million into New England Digital in exchange for a 29-percent stake. Dennis Stanfill, a partner, had plenty of Hollywood contacts as a former chairman of Twentieth Century Fox Film Corp., and realized that the Synclavier had a chance to become an important tool in Hollywood studios.

A new keyboard was designed (fig. 15) and many new features were added to meet the needs of Hollywood studios as well as performers.

The new keyboard, lengthened to seventy-six notes, featured velocity- and pressure-sensitive keys. The velocity with which a finger hit a key, and pressure exerted on the key after it was struck, were sensed separately and could be used as controllers of any aspect of a sound. For in-

SYNCLAVIER® II
DIGITAL MUSIC SYSTEMS

Real-Time Systems		PRICE
8-Voice Synclavier® II System: 32K		$14 150*
16-Voice Synclavier® II System: 32K		19,150*
24-Voice Synclavier® II System: 32K		24,150*
32-Voice Synclavier® II System: 32K		29,150*

Each of the systems above includes as standard: 16-Bit Mini Computer; one 5¼" double-density floppy disk drive; Clavier/Control Unit; Three future software updates; diskettes including 200 pre-set timbres; Sequence storage; and Diagnostics. The 32-Voice System further includes one foot pedal for real-time effects. (Note: ***All systems require 64K memory.**)

PERIPHERALS

Terminals:		
VT100/640 Graphics Terminal		$ 4,500
ADM-5		1,150
Zenith Z-19		1,000
Disk Drives:		
5¼" Single Density Floppy	ea	1,000
5¼" Double Density Floppy	ea	1,400
8" A/60 Drives	pair	3,500
Winchesters:		
5¼" WINCHESTER DRIVES (Portable System)*		
1) Initial 5¼" 10-Megabyte (50 or 60 Hz. PS)		5,950
2) Second 5¼" 10-Megabyte (50 or 60 Hz. PS)		2,975
*Protective Case Required for each		125
8" WINCHESTER DRIVES (Non-Portable System)*		
1) 8" 20-Megabyte (50 or 60 Hz. PS)		8,500
20-Megabyte (Remote Packaging)		500
*Protective Case Required		145
Printers:		
Prism - Dot Matrix*		1,450
Diablo 630-RO Printer*		2,800
*D-40 Printer Interface Card Required		400
Software Licenses:		
SCRIPT, MAX, XPL/4		1,000
Music Printing		1,000
16-Bit Conversion Unit		
16-Bit AD/DA Converters		4,500

January 1, 1983
Prices subject to change without notice
All currency in US dollars
Synclavier® II and Sample-To-Disk are
registered trademarks of New England Digital Corp.

EXAMPLES OF
SYNCLAVIER® II SYSTEMS

EXAMPLE #1
16-Voice Real-Time Synclavier® II (32K) with TSO (Terminal Support Option)

16-Voice Synclavier® II		$19 150
Terminal Support Option:		
M32K Memory	$2 500	
Additional Double Density Drive	1 400	
Software License (SCRIPT, MAX, XPL4)	1 000	
VT100/640 Graphics Terminal	4 500	
	9 400	9 400
	TOTAL	$28,550

This system is packaged in a standard two-level ATS case

EXAMPLE #2
16-Voice Real-Time Synclavier® II (32K) with TSO/Sample-to-Disk and Music Printing Options
(Note: In this example a Winchester replaces the second drive.)

Real-Time System:		
16-Voice Synclavier® II	$19 150	
Special 3-level ATS packaging	600	
	19 750	$19 750
Terminal Support Option:		
VT100/640 Graphics Terminal	4,500	
M32K Memory	2,500	
Software License (SCRIPT MAX, XPL4)	1 000	
	8,000	8 000
Sample-to-Disk Option:*		
(Winchesters available in different sizes)		
5¼" Winchester (10MB)	5 950	
Protective Case	125	
AD/DA Converters	4 500	
	10,575	10 575
Music Printing Option*		
Software License (Music Printing)	$1 000	
D-40 Printer Interface Card	400	
Prism Dot Matrix Printer	1 450	
	2,850	2 850
	TOTAL	$41,175

*Above options require VT100/640 terminal

EXAMPLE #3
32-Voice Real-Time Synclavier® II (32K) with TSO/Sample-to-Disk and Music Printing Options (Packaged in Small White Cabinet)

Real-Time 32-Voice Synclavier® II		$29 150
Terminal Support Option		
VT100/640 Terminal	$4 500	
M32K Memory	2,500	
Software License (SCRIPT MAX, XPL4)	1 000	
	8 000	8,000
Sample-to-Disk*		
8" 20MB (50 or 60 Hz PS)	8,500	
Case	145	
AD/DA Converters	4,500	
Small White Cabinet	750	
Protective case for cabinet (req'd)	500	
	14,395	14 395
Music Printing Option*		
Software License	1,000	
D-40 Printer Interface Card	400	
Prism Printer	1 450	
	2,850	2,850
	TOTAL	$54,395

*Above options require VT100/640 terminal

SYNCLAVIER® II EXPANSIONS/OPTIONS

Synthesizers		
8 Voices (128 Voices Limit)		$5,000 each
Memory		
M-32K		$2,500 each
Foot Pedals		$250 each
H.O.P.		
(Hand Operated Processor/ diagnostic tool)		600
Ebony Finish		
for Clavier		750
Z-80/CPM Option		1,500
Stereo Option	8 voice	1,000
	16 voice	2,000
	24 voice	3,000
	32 voice	3,500
Digital Guitar Interface		4,450
Digital Tape (Winchester Back-up)		5,500
Clock Interface Module		750

See reverse for optional protective cases
All shipments F.O.B. W.R. Jct., VT

FIGURE 14. January 1, 1983, NED Price List.

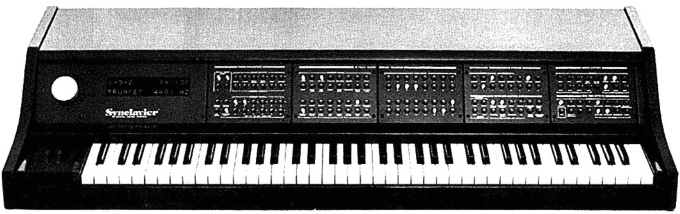

FIGURE 15. Velocity Pressure Keyboard. NED Advance Product Release brochure, 1984.

stance, velocity could be routed to control the kind of attack, and pressure could control volume. Or velocity could be routed to control volume, and pressure to control timbre, adding more sounds as pressure increased. Pitch and modulation wheels, standard on most synthesizers, were also added, as were optional breath and ribbon controllers. (A ribbon controller is a stretch of ribbon-like contact surface allowing the adjustment of sound characteristics by a sliding finger.) The new keyboard also featured a revised control panel with a 32-character text display, and an expanded Real-Time Effects panel, including an Info button in case you forgot what you were doing.

The new Synclavier could record and edit live performance (fig. 16), and read and generate Society of Motion Picture and Television Engineers (SMPTE) time code to synchronize with film or video (fig. 17). It was also equipped to receive and send in the Musical Instrument Digital Interface (MIDI) format so that it could control other MIDI instruments and be controlled by them. For example, other synthesizers or a drum machine could be attached using MIDI and played from the Synclavier keyboard, or another keyboard could be used to play on the Synclavier. A MIDI file could even be routed to the Music Printing Program to be edited and printed.

The limits of monophonic sampling soon became apparent, so in 1985 a complete new subsystem for polyphonic, 16-bit RAM based stereo sampling was developed, along with a faster ABLE "Model C" processor to cope with the extra workload. As the original FM system was mono, NED upgraded this to stereo to be compatible with the stereo sampling by doubling up on the mono FM voice cards and enabling dynamic panning in software. This was the capability of moving the perceived aural source of stereo sound left or right to match real stage position.

Sampled sounds could now be combined with each other or with synthesized and re-synthesized sounds to create unique combinations. For example, a string sound could consist of a layer or partial timbre with a sharp attack, another with a normal attack, and another with more vibrato controlled by the velocity or pressure with which the key was pressed. Even more unusual combinations for sound effects could be programmed on up to four divisions of a sound, called partial timbres.

The user could digitally record voice or other instrumental tracks in stereo and then add Synclavier tracks of new sounds or sounds from a library, mix them, synchronize them to film or video, use them as part of a live performance, even print out a score and parts. It was now possible to record or create sound effects, assign them to keys of the keyboard, and synchronize them visually to film or video. Voice-overs could easily be added to film and synchronized with great accuracy.

Using the Recorder Display, the user could view up to three tracks in the Digital Memory Recorder simultaneously in terms of note pitch, duration and time. Any of these parameters could be edited simply by typ-

FIGURE 16. Digital Recording. *Synclavier Digital Audio System* brochure, 1986.

ing in new values. An entire piece could be lengthened or shortened without changing the pitch, transposed, cut and pasted, and edited in any way.

Additional financing in 1987 from Goldman, Sachs & Company fueled continued development. In that year the company sold 130 Synclaviers at prices ranging from $75,000 to $250,000, for total revenues of $13 million. By 1988 over 600 systems had been sold and revenues were expected to be over $20 million. A distributor network had been built with offices in New York, Nashville, Chicago, Los Angeles, Canada, England, France, Germany, Australia, and Japan.

Quality was never second in consideration at NED. The bright red buttons on the Synclavier control panel were chosen for their functionality, durability, and visibility in all light conditions. They were the same buttons used in the cockpit of the B52 bomber.

The computer running the Synclavier was first designed for the scientific community. It was compact, built of the best materials and

FIGURE 17. Video Post Production. *Synclavier Digital Audio System* brochure, 1986.

components available regardless of cost, and constantly upgraded to the latest engineering developments. A testament to its capability and reliability is that NASA used a specially built version of the Synclavier ABLE computer in the Galileo Space Probe to Jupiter launched in 1989 (fig. 18). It functioned flawlessly for fourteen years until it deliberately crashed into the Jovian atmosphere in 2003.

To allow for full control and stereo panning of all voices, the Synclavier used two 100 kHz digital-to-analog converters for each voice. Again these were the best that money could buy, as used by NASA and in Boeing flight simulators.

The Synclavier was based on a modular system, with individual computer hardware cards for each function, easy to fix and even easier to upgrade. No software was taken out of the new releases, just added. Users of new 9600 (fig. 19) and upgraded machines could continue the old way of doing things, and more importantly, still have full access to any

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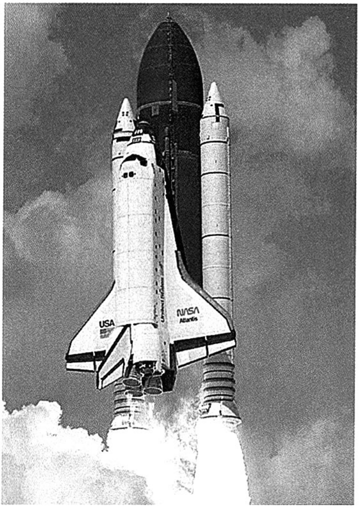

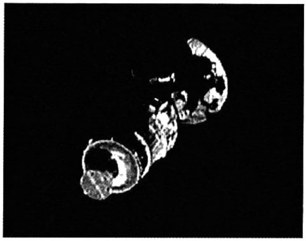

(b)

FIGURES 18a–b. Galileo Space Probe. Internet images.

FIGURE 19. Synclavier 9600. *In Sync* (in-house NED publication), Fall 1988, 3.

old projects. To this day sequences and projects from the earliest Synclaviers can still be played on the latest equipment.

By 1990 Synclavier capabilities included:

Input
- Velocity pressure sensitive 76-note keyboard
  - programmable key by key
  - knob, breath, foot pedal, and ribbon controllers
- Macintosh II Graphics workstation (computer)
- Guitar interface
- MIDI inputs
- Memory Recorder inputs
- Direct to Disk inputs

Storage
- Up to 32 MB RAM (random access memory)
- Superfloppy disk
- 80 MB Winchester hard disk drive
- 320 MB Winchester hard disk drives (optional)
- 2 GB optical disk drives (optional)

Storage resources
- Timbre library of synthesized and sampled sounds
- Violin library (optional)
- Sound effects library (optional)
- Sound and sequence directories
- Sound Librarian software

Processing
- 16-bit computer processor
- 200-track memory recorder or sequencer
- FM synthesis
- Polyphonic sampling at up to 100 kHz
- Sound Editor
- Audio Event Editor
- Virtual mixing board
- SMPTE, VITC synchronization
- Music engraving and printing of scores with up to 64 staves

Output
- 16 assignable stereo outputs
- 2 X 8 MIDI module
- SMPTE reader/generator

Conclusion

By the early 1990s a well-equipped Synclavier could easily cost $300,000. One owner, visiting NED to pick up some additional equipment and options, cautioned employees that if any prices were mentioned in the presence of his wife we were to remove a zero!

During the early 1980s the Fairlight and the Synclavier were the high-end option for synthesis and sampling, beyond the reach of all but the most up-market studios. The recession in the early 1990s caught up with NED, dropping sales precipitously. Other factors also were not favorable to the company. The number of studios and artists that could afford a Synclavier was limited and probably nearing saturation by that time. NED didn't have a low-price model that could be sold in volume to average musicians, and lower-cost machines with some of the Synclavier's capabilities, such as Ensoniq's "Mirage," Emu Systems' "Emulator," and AKAI's S1000, were on the market. In any case, the company could not continue, and discontinued operations in 1992.

A former employee, Brian S. George, formed a company called Demas and purchased most of NED's hardware and technical assets, continuing maintenance and customer support. Simultaneously, a group of ex-employees and product owners collaborated to form The Synclavier Company, primarily as a maintenance organization for existing customers, but with an eye to adapting Synclavier software for stand-alone personal computer use. Parts of the company were also purchased by the Japanese electronics company, Fostex, which hired some former employees and used their technical knowledge to build several hard-disk recording systems in the 1990s (Fostex Foundation 2000 and 2000re).

In 1998, NED co-founder Cameron W. Jones (original and current owner of the Synclavier trademark and software) collaborated with Demas and original co-founding partner Sydney Alonso to develop an emulator designed to run Synclavier software on Apple Computer's Macintosh computer systems, and designed hardware to share core processing with the later generation of Apple computers, giving enhanced features and greater speed to the system. Later software releases have been significantly updated by a freelance programmer, Todd Yvega, one of the world's foremost Synclavier composers and programmers.

In Europe, the previously profitable but now motherless NED Europe continued under the ex-head of European operations, Steve Hills, and is still trading to this day in London as Synclavier Europe. The latest developments can be followed on the internet at Synclavier.com.

The music printing software continued to develop under the control of a company called Graphire Corporation, founded and run by Alan Talbot, who wrote the original software. This company is now also out of business, but the software lives on with a number of users, including this author, and has been adapted for Macintosh System 9 and PC Windows computers. No one, however, is maintaining or improving it.

The importance of New England Digital and the Synclavier lies in their success in applying digital technology to the creation and manipulation of sound. The founders recognized the possibilities of this technology for music applications in the middle 1970s and were at the forefront of its development throughout the 1980s. Although overwhelmed in the early 1990s by less expensive devices, the Synclavier was a significant milestone in the development of digital sound, and continues in use in some studios today.