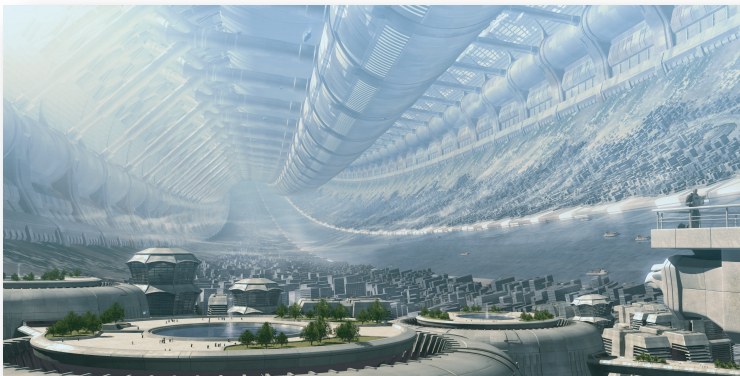


Amin Bhatia



VIRTUALITY

VIRTUALITY

A journey inside your computer

Produced by David Greene

1	Hymn to the Users	1.06
2	Into a Virtual World	3.32
3	A Pocketful of Data	2.49
4	World Wide Web	3.42
5	Need for Speed	3.22
6	Inside the Computer	3.15
7	Virus Attack	4.51
8	Aftermath	1.58
9	In Search of Lost Identities	4.59
10	Second Life	3.42

BOLERO ELECTRONICA

75 years of synthesizers in chronological order

Including guests Steve Porcaro and Patrick Moraz

11	Switch On	
12	Into the '60's	
13	The '70's - Transistors and Chips	
14	The '80's - FM Synthesis and MIDI	
15	The '90's - Samplers and Computers	
16	The New Millennium of Virtual Instruments	15.30

17 Bolero Electronica, 7 minute version

Composed and/or Arranged by Amin Bhatia (BMI)

Mixed by David Greene and Jeff Wolpert

Mastered by Chad Irschick

Cover illustration "The Return To Abalakin" by Alexander Preuss

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A portion of each sale is donated to the Bob Moog Foundation

www.aminbhatia.com

This album would not have been possible without the talent and support of my mentors
David Greene and Steve Porcaro.
Each of them gave me just the right amount of guidance while still letting me run wild.
Thank you both so much.

Thank you to Michelle Moog-Koussa at the Bob Moog Foundation.

EVERYONE WHO HELPED

John Leimseider and Andrew Mosker at Cantos.
Ikutaro Kakehashi, Paul McCabe, Kim Nunny and Dennis Houlihan at Roland.
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Mark Vail, Jeff Wolpert and Byron Wong for outstanding work on a moment's notice.

Thanks also to Tony Crea, Rob Duncan, Pamela Kurstin, Jean Laurendeau,
Dominic Milano, Kathryn Moses and Simon Wynberg.

About the illustration:

"The Return To Abalakin" by Alexander Preuss is exactly what I envisioned when composing
Virtuality. To me it looks like a city inside a giant fibre optic cable. It is completely computer
generated making it a virtual world of its own. I encourage you to explore more amazing artwork
from Alexander Preuss at www.abalakin.de.

EVERYONE WHO ENCOURAGED

Dennis Quinn, Dave Gross, Dave Kletke, Bruce Ehlert, Doug Wong
Ralph Dyck, Steve Royea and Anna Lidstone
James Porteous, Cory Mandel, Rob Kirkpatrick and Stephen Hudecki
Mark Dwyer, Aaron Key, Blair Packham and Simon Law.

Thank you Mum, Dad, Nina and Aneesa for enduring all the strange noises.
Thank you to my daughters Angela and Kelsey who helped raise me.
Thank you Rochelle for a lifetime of friendship and understanding.
Thank you Arlene Bishop for helping to make this dream a reality.
Thank you Danielle for making my reality as wonderful as a dream.

This album is dedicated to Bob Moog
for his brilliance and for his friendship.
We all miss you.



Mark Vail, Bob Moog, Dave Gross and Amin Bhatia

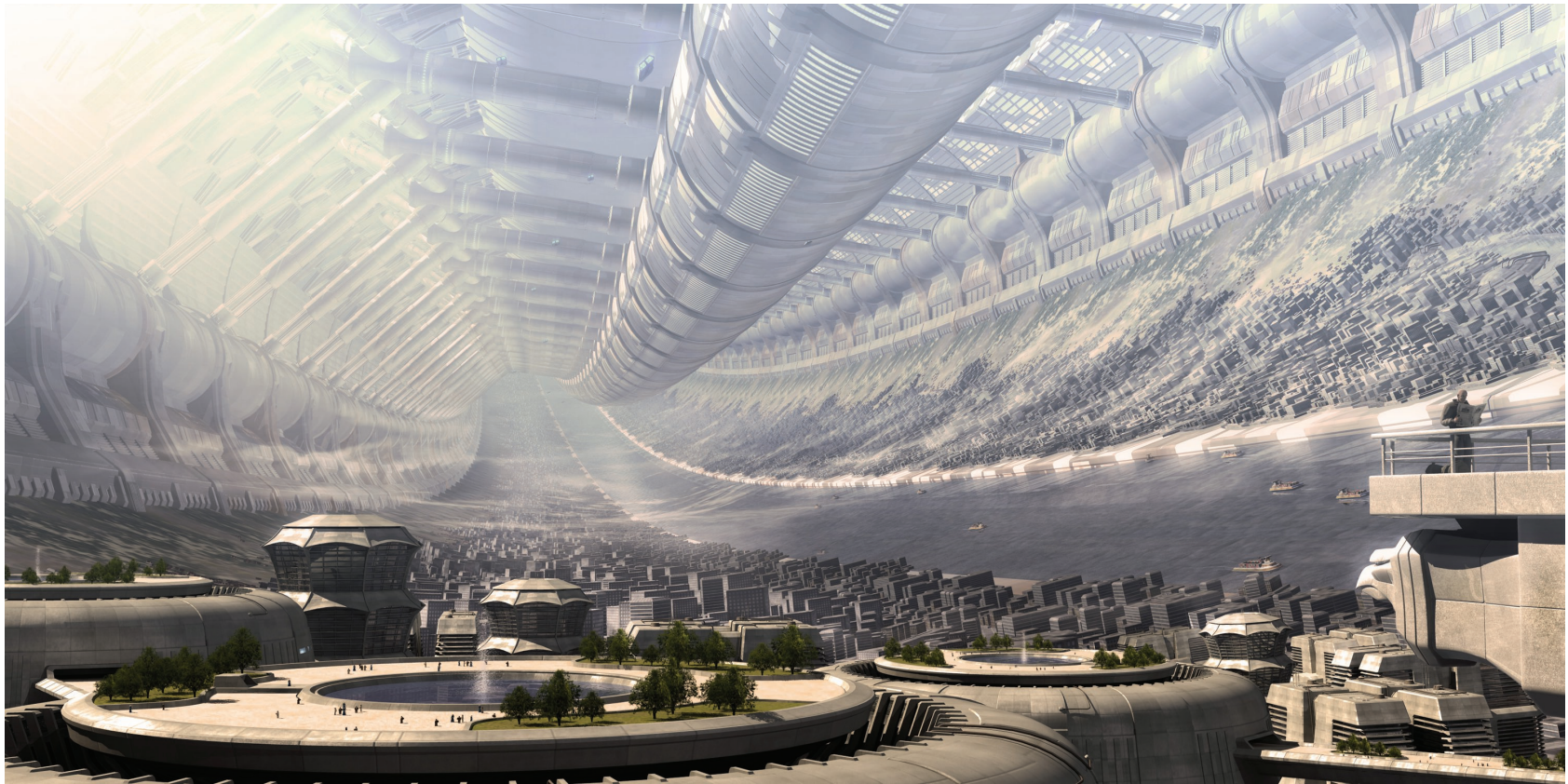


Illustration "The Return To Abalakin" by Alexander Preuss

VIRTUALITY

A journey inside your computer
Tracks 1 - 10

Composed and performed by Amin Bhatia
Produced and Engineered by David Greene
Co-producer on "Need for Speed" Steve Porcaro
Orchestrated and Conducted by Jamie Hopkings
Additional Engineering Chad Irschick for Inception Sound Studios
Bruce Fowler for Modular Music
Scott McCrorie and Kevin Bond for Supersonics
Glenn Lorbecki for Glenn Sound
Mixed by David Greene and Jeff Wolpert

MUSICIANS (REAL) Erika Raum violin, Douglas Perry viola, Winona Zelenka cello, Les Allt flute, Lesley Young oboe / english horn, Max Christie clarinet

Choir Christopher Dedrick, David J King, Lief Mosbaugh, Norman Nurmi, Rebecca Pellett, Rebecca Whelan

Orchestral Contractor Bev Spotton

Rhythm programming on "Second Life" Byron Wong
Additional violin on "Second Life" Lindsay Hilliard

Bass Tom Szczesniak on "World Wide Web" and "In Search of Lost Identities"

Drums Rick Gratton on "World Wide Web" and "In Search of Lost Identities"

Guitar James Brown on "In Search of Lost Identities"

Additional rhythm programming Dave Gross on "World Wide Web"

MUSICIANS (VIRTUAL) Roland, Moog, Korg, Yamaha, Nord and Oberheim synthesizers, Vienna Symphonic Library, Project Sam Brass library, Apple Logic Instruments, Native Instruments, Spectrasonics Software, Redmatica Utilities

Virtual choir East West Quantum Leap Symphonic Choirs
Peter Siedlaczeks' Classical Choir

Virtual studio Apple/Emagic Logic, Digidesign Pro Tools, Ableton Live

BOLERO ELECTRONICA

75 years of synthesizers in chronological order
Tracks 11 - 17

Arranged, performed and produced by Amin Bhatia

Guest artists Steve Porcaro (Arturia and NI software)
Patrick Moraz (Korg Triton/Moog Voyager)
Thomas Bloch (Ondes Martenot)
Kevin Kissinger (Theremin)

Recorded at Cantos Music Foundation
Bhatia Music
Porcara Musica

Mixed by Jeff Wolpert at Desert Fish Audio

Additional Engineering by Julius Hocott
Aaron Key
Owen McAuley

Equipment provided by The Cantos Music Foundation www.cantos.ca
and from the personal collections of Amin Bhatia
Steve Porcaro
Byron Wong
John Leimseider
Mark Dwyer

Special thanks to synth forums Vintage Synth Explorer www.vintagesynth.com
Matrix Synth www.matrixsynth.com
Synthmuseum www.synthmuseum.com
eboard museum www.eboardmuseum.com

Synthesizer Historian Mark Vail

Equipment used in BOLERO ELECTRONICA in order of appearance:

Moog Modular (Roger Luther model)
 Arp 2600 Modular
 Buchla 100 Modular
 Ems Synthi 100
 Ondes Martenot performed by Thomas Bloch
 Roland Space Echo 201
 Mellotron
 Wurliitzer Elec Piano
 Theremin performed by Kevin Kissinger
 Studer 820 vari-speed tape fx
 Vox Continental
 Moog Minimoog Model D
 Moog Taurus Bass Pedal
 Moog Memorymoog
 Oberheim SEM module
 Moog Polymoog
 Roland System 100M
 Roland CR78
 E-mu Modular (owned by Patrick Gleeson)
 Bode Vocoder
 Yamaha CS-80 (owned by Ralph Grierson)
 OSC OSCar
 RMI Explorer Synth
 Arp Pro-Soloist
 Sequential Circuits Prophet-5
 Solina String Ensemble
 Roland TR 808
 Yamaha DX7
 Fender Rhodes Chroma
 Yamaha TX802 w/microtonal tuning

Digital Keyboards Synergy II+
 Linn Drum
 Sequential Circuits Prophet VS
 Casio CZ101
 E-mu SP12 Sampling Percussion
 Roland D-50
 Oberheim Xpander
 Korg Wavestation Module
 Korg M1
 Sequential Circuits Prophet T8
 E-mu Emulator II
 Roland Jupiter 8
 Roland JX10 Super JX
 Kurzweil K2000
 Spectrasonics Distorted Reality
 Spectrasonics Ethno Techno
 Spectrasonics Heart of Asia
 Roland V-Synth
 Korg TR-Rack Module
 Propellerhead Reason and ReCycle
 Spectrasonics Stylus
 Spectrasonics Atmosphere
 Spectrasonics Trilogy Bass
 Roland XV-5080 Module
 Native Instruments Absynth
 Yamaha Motif Rack ES
 Clavia Nord Rack
 Waldorf Q
 Native Instruments Reaktor
 Roland JP-8080
 Native Instruments Stormdrum
 performed by Steve Porcaro
 Andromeda A6
 Korg Triton performed by Patrick Moraz
 Dave Smith Evolver
 Moog Voyager performed by Patrick Moraz

Arturia Moog Modular V
 performed by Steve Porcaro
 Access Virus-b Synthesizer
 Moog Constellation Lyra (owned by Keith Emerson)
 Apple/Emagic Logic v7
 Ableton Live v6
 TAMA TS5305 Drum Module
 Simmons Drum Kit
 Vienna Symphonic Library
 Orchestral Cube
 Project Sam
 Horns/Trumpets/Trombones
 Dan Dean Solo Strings
 East-West Quantum Leap
 Symphonic Choirs

For the mix Jeff Wolpert employed a number of different signal processors from various eras including a vintage Echoplex tape delay, TL Tubetracker console, Lexicon and TC Electronics reverbs and various plug-ins from Digidesign, Waves and Sony Oxford.

Recording software: Apple/Emagic, MOTU, Digidesign, Bias Peak, and Redmatica.

Honourable mention to New England Digital Synclavier, Fairlight CMI and many other fine synthesizers and companies that I couldn't find room for on this tribute.

Guest performances by:
 Steve Porcaro (Arturia and Native Instruments software)
 Patrick Moraz (Korg Triton/Moog Voyager)
 Thomas Bloch (Ondes Martenot)
 Kevin Kissinger (Theremin)



In 1928 composer Maurice Ravel wrote his famous Bolero. It was meant both as a dance and as a showcase of orchestration, featuring the same melody played by different instruments of the orchestra one after another in growing layers and dynamics.

Bolero Electronica pays homage to Ravel, but instead of orchestral instruments, it is a showcase of synthesizers and recording technologies over the past 75 years.

A GUIDE TO BOLERO ELECTRONICA

by Mark Vail

Synthesizers began as very bulky and strange instruments that could only sound one note at a time. Adorned with knobs, sliders, switches, phone jacks, patch cables, and unstable circuitry, early synthesizers were combined with multitrack magnetic tape recorders for the creation of music that would take hours or even days to produce a simple phrase. The earliest pioneers of synthesis were Maurice Martenot and Leon Theremin, who independently developed their most significant instruments during the 1920s and eventually influenced the designs of modular electronic instruments made during the 1960s by Bob Moog, Don Buchla, Alan R. Pearlman and others.

TRACK 11 Switch On



Prologue Bolero Electronica begins with a low C generated by a Moog Modular, followed by effects from an ARP 2600, Buchla 100 Series, and EMS Synthi 100, all of them state-of-the-art machines of their time. Whereas many Moog Modular systems and the British EMS machine were really large, both the ARP 2600 and most Buchla instruments were considerably smaller and more portable. Also heard here are sections from other parts of the Bolero played at high speed and backwards. This “Switch On” prologue does not exist in Ravel's original, but Bhatia wanted to set the stage for the wall of sound that is

coming. (Photo of Roger Luther's Moog Modular System by David Kean, courtesy of the Audities Foundation)

TRACK 12 Into The '60's

Verse 1 Ondes Martenot and Moog Modular The snare drum that starts the entire work was created with a Moog Modular's noise generator. A Moog module called the 903A was dedicated to producing noise, something like the sound of static electricity, which could be routed through voltage-controlled filters to simulate wind, jet engines, surf, and drums. In 1968 synthesist Wendy Carlos released Switched-On Bach, an electronic realization of music by Johann Sebastian Bach that introduced many listeners to Moog synthesizers and became the first classical-music album to sell over a million copies. The first solo melody you hear in this section was played on an Ondes Martenot. Only around 300 of these ever existed because each was hand-made by Frenchman Maurice Martenot between its introduction in 1928 and his death in 1980. The Ondes has both a keyboard and a ribbon controller, as well as a left-hand bar for note articulation. Artist Thomas Bloch performed and edited this Ondes part using all three types of controllers. (Photo of Ondes Martenot by David Kean, courtesy of the Audities Foundation)



Verse 2 ARP 2600 and Roland Space Echo Featured next is an ARP 2600 with a close approximation of the clarinet sound that appeared in Ravel's original composition. ARP founder Alan R. Pearlman designed the 2600 from an educational standpoint with the intent that it be used to teach synthesis techniques to musicians who played traditional acoustic instruments. It proved quite popular with many performing and recording musicians and therefore remained in production from 1970 to 1981. The space effects you hear in the background were produced using a Roland RE-201 Space Echo, a magnetic tape-based and widely cherished signal processor, along with a Buchla 100 Series synthesizer that evolved from Don Buchla's original electronic instrument, which he completed for the San Francisco Tape Center in 1963. (Pictured: ARP 2600)



BOLERO ELECTRONICA Timeline of Technology

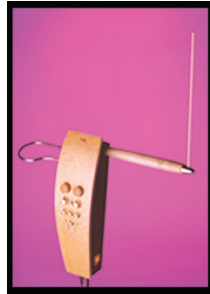
Switch On	Into the '60's				The '70's - Transistors and Chips				The '80's - FM Synthesis and MIDI				The '90's - Samplers and Computers				The New Millenium of Virtual Instruments														
Prologue	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Finale											
L E A D		Ondes Martenot		Mellotron		Vox Conti- nental		Yamaha CS-80		Fender Rhodes Chroma		Sequential Circuits Prophet VS		E-mu Emulator II		Roland V-Synth		Korg Triton		Moog Voyager		Vienna Symphonic Library	East-West QL-SC Symphonic Choirs								
			Arp 2600		Theremin										Mellotron and Novotron					Arturia Moog Modular V		Project Sam Trumpets						Arturia Moog Modular V			
							Moog Polymoog		Arp Pro Soloist			Yamaha TX802 microtonal tuning			Polymoog	Spectra- sonics Heart of Asia															
							Roland System 100		Bode Vocoder						Yamaha DX7		Prophet T8					Moog Constel- lation Lyra									
H A R M O N Y		Moog Modular							RMI Explorer	Yamaha DX7													Vienna Symphonic Library								
		ARP 2600 Modular																					Project Sam Horns/Trombones								
																						Dan Dean Solo Strings									
																						Spectrasonics Distorted Reality									
R H Y T H M		Moog Modular								Roland TR808																					
S F X																															

Arranged, performed and produced by Amin Bhatia (BMI)



Verse 3 Mellotron Tape playback of strings via a Mellotron Model 400 is featured in this stanza. Considered by many to be one of the earliest sample players, the Mellotron originally appeared during the mid '60s and was loaded with 3/8" magnetic tapes - one for each key - that contained recordings of cello, flutes, choir, and other acoustic instruments. A Mellotron tape only plays for about eight seconds, so you have to be careful when playing extended notes that you don't sustain them for too long. The chords are introduced by a Wurlitzer electric piano. (Pictured: Mellotron Model 400)

Verse 4 Theremin Presenting the distinctive sound of the Theremin, an incredibly expressive instrument originally fashioned by Russian inventor Leon Theremin in 1920. It's played without being touched thanks to antennas that sense the positions of the performer's hands for pitch and volume control. The Theremin was invented long before the synthesizers you've already heard, but musically it fit best here to portray Ravel's original voicing in the high register of a clarinet. It is performed here by virtuoso Kevin Kissinger. The space sound effects you hear in the background are from the EMS Synthi 100. One of them was used to make many of the sound effects that appeared in BBC's Doctor Who series. (Pictured: Moog Music Etherwave Theremin)



TRACK 13 The '70's - Transistors and Chips

During the '70s synthesizers began to take hold in the music community, both in the classical and pop worlds. Advancements in the design and production of transistors, integrated circuits, and other electronic components made smaller and more powerful devices possible. Rhythm machines migrated from the home organ and became popular in electronic music. The results were sounds and melodies that were both surreal and sometimes silly by today's standards, but definitely representative of an ongoing evolution.



Verse 5 Vox Continental and Minimoog The Vox Continental was distinctive among combo organs from the '70s in that additional expression could be induced using a lever to the side of the player's knee. It is soloed here with harmony coming from a Memorymoog and Moog Taurus Bass Pedals. The Taurus is rare but highly valued for its groundshaking bass tones. It hit the market in 1973. Additional parts are played by one of the most popular monophonic analog synthesizer of all time: The Minimoog. (Pictured: Moog Minimoog)

Verse 6 Polymoog Since synthesizers originally could only sound one note at a time, it was very difficult to simulate harpsichord and piano. Not to say analog synthesis could ever convincingly simulate the sound of an acoustic piano, but this situation changed with the introduction of several polyphonic synthesizers. Among them was the Polymoog, featured here doubled with a Roland System 100M for added dynamics. Moog engineer Jim Scott designed the Polymoog, whose components more resembled what you'd expect to find in an electronic organ than a synthesizer. Roland's System 100M came out in 1979 and isn't as well known as modular synths from other manufacturers. However, it packed considerable power in small spaces, and the system was capable of generating some impressive timbres. Additional bass comes from an Oberheim SEM module, and there's a lot to be said about that innovative product from Tom Oberheim. In fact, the Synthesizer Expander Module progressed from being an add-on voice for the Minimoog, ARP 2600, and other monophonic synths to the basic building block for two of the best analog polysynths ever made: the Oberheim Four Voice and Eight Voice. (Photo of Polymoog and Moog Taurus bass pedals by David Kean, courtesy of the Audities Foundation)





Verse 7 Bode Vocoder and Yamaha CS-80 Harald Bode was a synth pioneer who knew how to design devices for making electronic music. The Bode Vocoder was one of the first uses of electronic vocal effects and has been used (and overused) in electronic pop music. The melody in this part comes from a Yamaha CS-80, a 220-pound behemoth that was as impressive and colorful to look at as the sounds it could make. This particular CS-80 was owned by renowned keyboardist Ralph Grierson. Also featured is a Sequential Circuits Prophet-5 invented by Dave Smith. It was the first programmable polyphonic analog-

digital hybrid synthesizer. Featured rhythm machines in this section include Roland's CR-78 and TR-808. While the CR-78 was the first drum machine equipped with a microprocessor and was among the earliest that were programmable, the TR-808 sported a collection of analog percussion sounds that helped launch hip-hop and techno. The 'rainstorm' sound effects you hear within this section were produced from a combination of Moog Modular noise generators and an E-mu Modular unit owned by synthesist Patrick Gleeson. (Pictured: Yamaha CS-80)



Verse 8 ARP Pro-Soloist Another very expressive monophonic instrument was the ARP Pro-Soloist, due to its modulation capabilities and a digitally-scanned keyboard that could sense varying finger pressure. Called aftertouch, this control function could be assigned to vary a note's pitch, volume, vibrato, brilliance, 'growl' or 'wow'. A preset-only instrument, the Pro-Soloist provided 30 different timbres, some of which sounded very impressive - as you can hear here. Chords are provided by a Solina String Ensemble, a string machine designed and manufactured in Holland, then imported to North America by

ARP. The panning 'strums' heard here are courtesy of an RMI Explorer from an earlier era. What's really cool about the Explorer, which first appeared in 1967, was its Flying Hammer action, a combination of weights and mechanical electronic contacts that allowed the keybed to bounce and induce guitar-like strumming effects. A Prophet-5 and an Oxford Synthesiser Company OSCar share the hybrid bass line. Whereas the Prophet-5, introduced in 1978, set the industry on fire, the OSCar was a programmable British monosynth released in 1984 and designed by Chris Huggett. Although the OSCar itself looked rather toyish it could pump out some wicked synth tones. (Photo of ARP Pro-Soloist by David Kean, courtesy of the Audities Foundation)

TRACK 14 The '80's - FM Synthesis and MIDI

Almost simultaneously, FM synthesis and MIDI came into being. Although FM, or Frequency Modulation, can in its simplest form be performed by modulating the frequency of one analog oscillator with another at audible pitches, the version licensed in 1973 by Yamaha was mathematically developed at Stanford University by John Chowning. FM could generate previously unheard timbres and was best epitomized in the DX7, one of the most popular synths of all time. In fact, so many synthesists fell in love with the sound of FM that analog synthesizers virtually disappeared from the market for many years. Another major development in electronic music from 1983 was MIDI, the Musical Instrument Digital Interface, which allowed instruments from different manufacturers to be connected and played simultaneously using a single cable instead of multiple patch cords and pricey black boxes. MIDI unquestionably revolutionized the music industry.

Verse 9 Yamaha DX7 This stanza includes the Yamaha DX7, Rhodes Chroma, and Digital Keyboards Synergy. Their "bright" timbres are the results, respectively, of FM, a brilliantly conceived implementation of second-generation analog/digital hybrid synthesis, and additive synthesis, all of which were quite new to the existing synth landscape. The Chroma began life as an ARP synthesizer and ended up being manufactured by CBS, who also owned the name of one of the most popular electric pianos ever made, those invented by Harold Rhodes. The Chroma featured multitimbral operation, voice layering, keyboard splits, and the best velocity response offered by any synth up to that time. In contrast, the Synergy was an all-digital instrument based on the additive synth engine developed at Bell Laboratories by Hal Alles. (Pictured: Yamaha DX7)



Verse 10 Just Intonation Just Intonation tuning is made possible thanks to the tuning accuracy offered by digital oscillators. While possibly feeling out-of-tune to some, Just Intonation is actually a mathematically correct presentation of the 12-notes-per-octave scale in Western music. For a truly educational experience in this realm, check out the Beauty In the Beast album by Wendy Carlos, which she realized using a pair of Synergy synths. The snare drum part in this section comes from one of Roger Linn's LinnDrums. The LinnDrum was a descendant of the Linn LM-1, the first programmable drum machine that played sampled sounds. (Photo of Digital Keyboards Synergy II+ by Dominic Milano)

Verse 11 MIDI Combo 1 Once MIDI made it possible to blend timbres generated by instruments that utilized different types of synthesis, so began the age of electronic instruments that combined multiple forms of synthesis inside a single machine. One of them was the Sequential Prophet-VS, which used vector synthesis to create shape-evolving waveforms generated by four oscillators and combined with dynamic crossfading controlled via a dedicated envelope generator and a joystick. Sequential engineer Chris Meyer came up with the concept for the Prophet-VS's complex voicing structure. A VS handles the melody here while synth modules from Roland and Casio provide the harmony. (Pictured: Sequential Prophet-VS)



Verse 12 MIDI Combo 2 Roland's groundbreaking D-50 incorporated a new type of synthesis called 'linear arithmetic', which combined sampled sounds, subtractive synthesis, and built-in reverb, delay, chorus, and EQ effects. By merging the initial attack of a sampled acoustic sound with a synthesized, sustained body of sound, the D-50 could fool a listener into believing he or she was hearing a single, complete sample. Korg's Wavestation, a vector-synthesis descendent of the Prophet-VS by virtue of the collaborative efforts of many who were involved in the VS's development, is also featured with its rhythmic sliced-waveform combinations. Other background parts include the Oberheim Xpander, Tom Oberheim's no-compromise microprocessor-controlled hybrid polyphonic synth that was introduced in 1984, and an E-mu SP-12 sampling drum machine. (Pictured: Roland D-50)

TRACK 15 The '90's - Samplers and Computers

By 1990 sampling memory had become economical enough that many new synthesizers were equipped with sampling capabilities that allowed the recording and playback of externally produced sounds. The best electronic music from this era incorporated both synthesis and sampling in a unique blend.

Verse 13 Strings Combo 1 As Ravel introduced strings in the melody voicing of the original Bolero, featured here are three types of synthesized strings from various eras: E-mu's Emulator II (sampled), a Yamaha DX7 (FM), and a Roland Jupiter-8 (analog). Before E-mu introduced the original Emulator in 1981. Sounds sampled with the Emulator II, released in 1984, were stored on 5-1/4" floppy disks. Remember them? Vintage-synth enthusiasts know all about the Jupiter-8, another colorful and extremely desirable polyphonic analog synth that hit the scene in 1981. (Photo of E-mu Emulator II by David Kean, courtesy of the Audities Foundation)



Verse 14 Strings Combo 2 This stanza introduces Ravel's three-part harmony in the string section. Bhatia accumulated as many string synthesizers as possible from earlier stanzas, plus a pair of wonderful synths. First there's a Sequential Prophet-T8, an improvement on the Prophet-5 that included a 76-note weighted-action keyboard with velocity sensing and polyphonic aftertouch, keyboard splits, voice layering, and lots of knobs for realtime parameter control. Second, there's a Roland Super JX-10, which didn't have any knobs, but it did include a couple of assignable sliders and a 76-note keyboard that sensed velocity and aftertouch, and it could generate awesome analog tones. The warm, regal brass harmony comes from Korg's landmark M1 — the best-selling synth of all time, complete with excellent sampled sounds, multitimbral operation with dynamic voice allocation, built-in digital effects, and eight-track sequencing — along with a Kurzweil K2000, a potent and popular synth equipped with VAST (Variable Architecture Synthesis Technology), supporting multiple types of synthesis, optional sampling, and built-in digital effects. (Pictured: Korg M1)

Verse 15 Computer Combo 1 As the processing power of personal computers surged skyward, everything from hard-disk recording to sampling to plug-in synthesizers fell within the computer realm. Featured here are virtual instruments and sampled libraries from Spectrasonics and Native Instruments, as well as Propellerhead's Reason and ReCycle. While Spectrasonics is run by Eric Persing, the brilliant synthesist, performer, and programmer who's been a key consultant for Roland since 1984, Native Instruments is a major Germany-based developer of software instruments. Propellerhead Software of Sweden has 'virtually' turned the music industry on its ear thanks to Reason, a virtual studio that provides outstanding state-of-the-art music-making tools including mixers, synthesizers, samplers, drum machines, linear and step sequencers, and effects processors. Many of these tracks were played and programmed by synth veteran Steve Porcaro. (Pictured: Bhatia Music circa 2006)



Verse 16 Computer Combo 2 Additional virtual parts come from Native Instruments and Spectrasonics softsynths as well as Apple/Emagic Logic 7. Representing hardware synths on the digital side of the equation are a Roland V-Synth, Clavia Nord Rack, Access Virus B, and Yamaha Motif; on behalf of analog synthesis there are an Alesis Andromeda and a Dave Smith Instruments Evolver. The melody is provided courtesy of extraordinary keyboardist Patrick Moraz playing a Korg Triton, a fifth-generation offspring of the legendary M1. (Pictured: screenshots from Spectrasonics and Native Instruments)

TRACK 16 The New Millenium of Virtual Instruments

The past is celebrated again in the present. Virtual instruments realized entirely inside personal computers are now commonplace. Whereas many virtual instruments pay homage to previous generations of synthesizers, others make new forays into sounds and processing combinations that have never existed in the hardware world.



Verse 17 Today's Studio This track is processed through all manner of rhythm and audio plug-ins within Ableton Live. The actual sources come from dozens of synths featured in previous stanzas. The melody is performed by Steve Porcaro on Arturia's Moog Modular V software and Patrick Moraz on a Moog Music Voyager hardware synth. Amin Bhatia also snuck in a few notes played on Keith Emerson's custom-made Moog Constellation Lyra, which Bhatia found at the Cantos Music Foundation Museum. (Pictured: Arturia Moog Modular V)

Verse 18 Orchestral Power The orchestral frontier has been a source of much inspiration and controversy in electronic music. Should synthesists try to imitate the sounds of acoustic instruments? How close have they come to doing that? How far can and should they go? Bhatia demonstrates the state-of-the-art here with Vienna Symphonic Library instruments, Project Sam Brass, and Dan Dean Solo Strings. Extra percussion comes from a Simmons Electronic Drum Kit, a Tama Techstar TS5305 drum module, and Native Instruments' StormDrum — just for added power. (Pictured: Vienna Symphonic Instruments)





Verse 19 Virtual Choir Some versions of Bolero have included a choral part, and Bhatia meets this requirement with East West Symphonic Choirs. Its integral "word builder" software allows for text entry of lyrics, which then trigger a series of vowel and consonant samples from the library, resulting in the "singing" of actual words. In this case, "Bo-le-ro." (Pictured: East-West Symphonic Choirs)

Verse 20 Finale Ravel's original finale featured glissandi trombones and gongs. Bhatia has simulated those acoustic timbres with the additions of Moog solos and the virtual choir singing "Hallelujah. Deux ex machina." The gongs came from physically bashing the spring reverbs of Bhatia's ARP 2600. Warning: Don't try this at home . . . unless you're willing to sacrifice your speakers. (Pictured: a wing of the Cantos Foundation Museum)



This tribute was only one path through multiple possibilities. Many synthesizers here are featured only briefly, and there were lots of other fine instruments that simply could not find a home in this particular orchestration. Should you find yourself inspired to explore the world of synthesizers, there are several paths you can take - virtual, vintage, or whatever.

Given a reasonably up-to-date computer, a capable MIDI input device such as a USB keyboard, a decent soundcard, audio interface, or reliable headphone output, and a good set of speakers, you might want to consider any of the wide array of softsynths that are available from companies including Ableton, Apple, Applied Acoustics, Arturia, Cakewalk, Cycling 74, Digidesign, E-mu, East West, IK Multimedia, Mark of the Unicorn, McDSP, Native Instruments, Propellerhead, SoniVox, Spectrasonics, Steinberg, Tascam, and Ultimate Sound Bank. The variety is truly astounding, and the possibilities immense.

Within the hardware realm, you could buy a state-of-the-art synth from companies such as Access, Alesis, Clavia, Korg, Kurzweil, Moog Music, Muse Research, Novation, Roland, Dave Smith Instruments, Studio Electronics, Yamaha, or Zarg Music. If you're interested in investigating modular synthesizers, you'll be happy to learn that they've made a huge comeback since being excused by a plethora of synthesists during the '80s due to the popularity of digital synthesis. Makers of modular synths now outnumber those from the early days and include Buchla and Associates, Cwejman, Cynthia, Doepfer, Electro-Acoustic Research, Livewire Electronics, Paia, Synthesizers.com, and Synthesis Technology.

Maybe you get enthused about some of the older technology that's been explored by Amin Bhatia and his friends in the making of this project. In that case, there are tons of treasures waiting to be found out there, whether you search via the Internet, your local music store, newspaper want ads, or your personal network of electronic-musicking friends. Understand that much loving care and some repair may be awaiting if and when you find something special. Just remember: It's the journey that counts. Enjoy yourself and make some noise!

- Mark Vail