



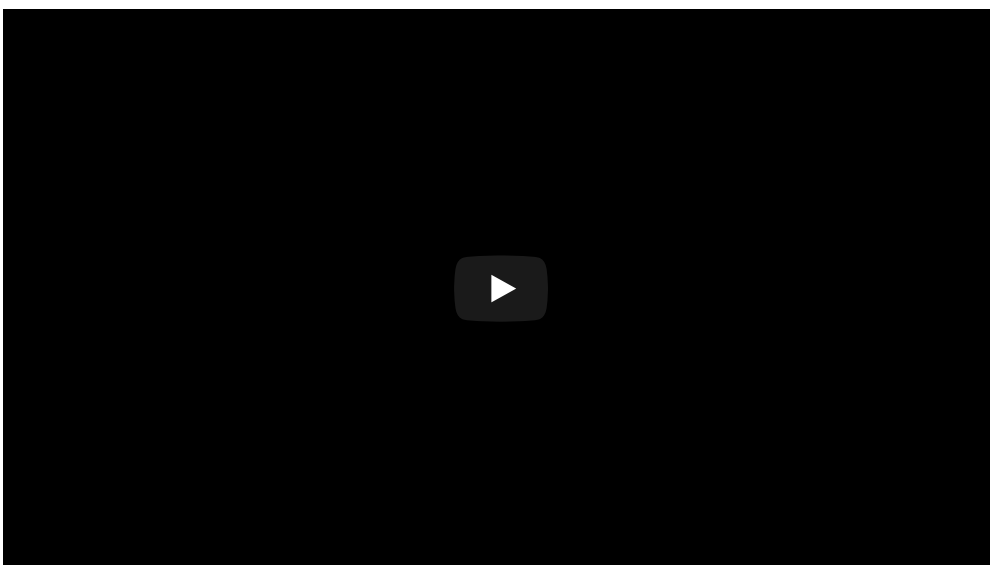
A Tribute to the ARP 2500, the Close Encounters Synth

Published August 22, 2017 by [Travis Thatcher](#)
Gear History



Science fiction and synthesizer enthusiasts alike will agree that making contact and communicating with life from another planet would almost certainly involve the use of a large, complicated synthesizer. Something metallic and sexy, with tons of sliders, knobs, and lights blinking purposefully into the cosmos.

Perhaps the most famous example of this can be found in Steven Spielberg's *Close Encounters of the Third Kind* from 1977. The synthesizer featured at the heart of that film's alien communication was the incredible [ARP 2500](#). Phil Dodds, ARP's VP of Engineering, was responsible for setup of the synthesizer on set and actually made an appearance as its operator in the scene.



The famous musical encounter scene from Spielberg's 1977 film.

But beyond this notable film appearance, the ARP 2500 remains a fascinating synthesizer in a number of ways. Today, we're taking a closer look at this model, its history, and the inner workings that made it such a compelling instrument.

Early History and Early Adopters of the ARP 2500

ARP Instruments, Inc. was named for Alan R Pearlman who, along with David Friend, founded the company in New England in 1969. ARP's first instrument was the model 2002 followed by the 2003, commonly known as the ARP 2500 in 1970.

Like the famous and elegant modular systems from [Moog](#) and [Buchla](#) that came before it, the ARP 2500 was a versatile, expensive, and rare piece of technology that few could afford.

Produced from 1970–1981, the ARP 2500 was the more fully featured and over-engineered brother to the famous ARP 2600. The smaller ARP 2600 was used by countless artists and composers throughout the '70s and beyond and was even responsible for the voice of R2D2.

Only about 100 ARP 2500 systems were made with an estimated 50 remaining in working condition today. Because of their scarcity, any unit you can find will sell for well over its initial list price, which already ranged from \$7,180–\$20,000.

French composer Elian Radigue worked exclusively with the ARP 2500 as her main sound source for nearly all of her electronic compositions.

A student of musique concrète innovator Pierre Schaeffer and assistant to Pierre Henry, Radigue's compositional practice not only incorporated the techniques of musique concrète but grew to include more experimental tape manipulation, microphone techniques, and painstaking sound design on the ARP 2500.

Radigue credits Schaeffer for encouraging her to think beyond 12-tone musical composition and to explore new sound worlds of microtonality — something modular synthesizers are perfectly suited for.

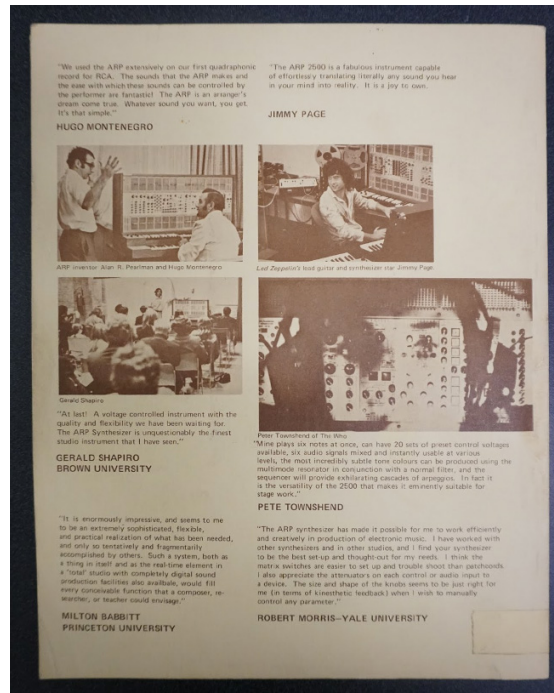
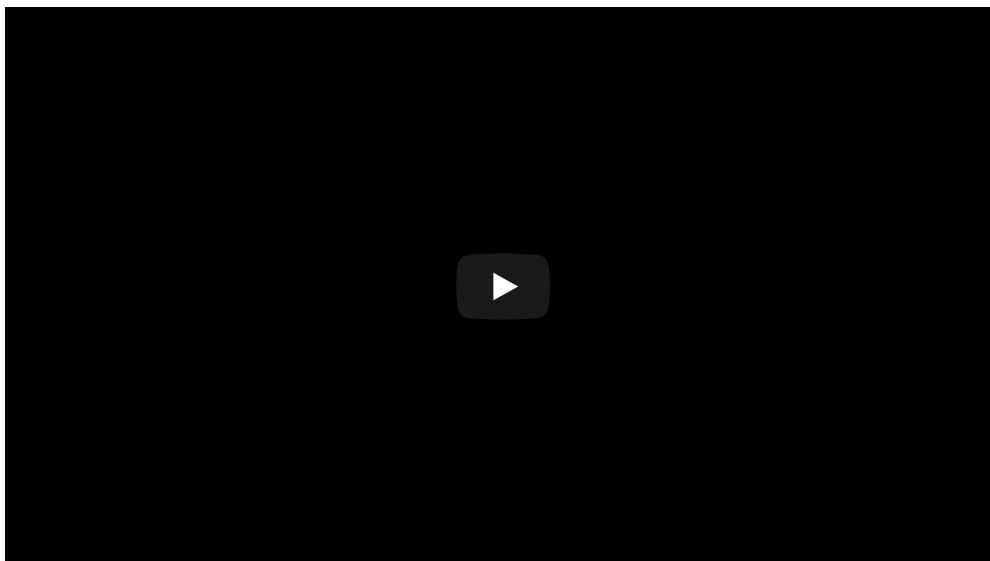


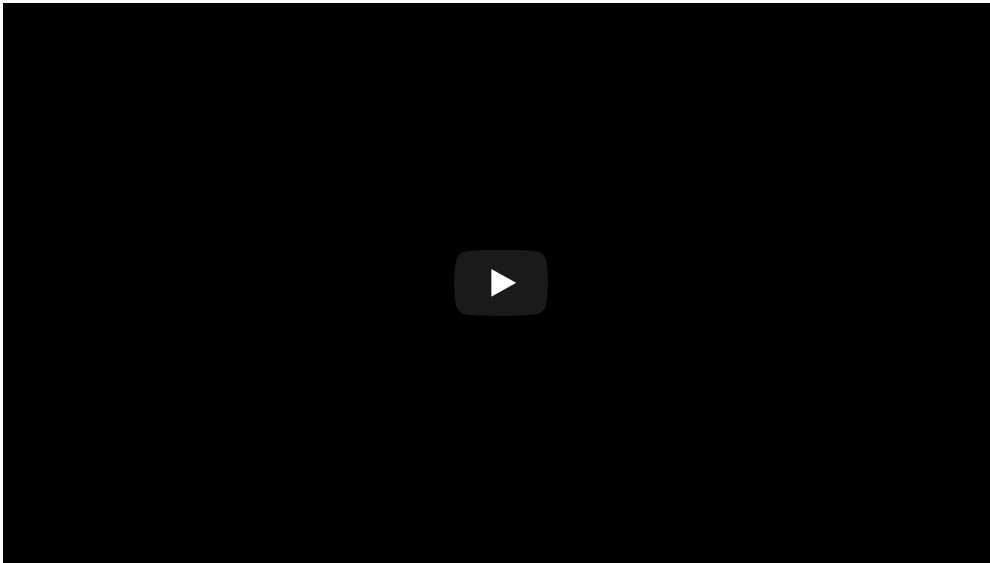
Image from the back of the original user manual featuring Townshend amongst others



Radigue created meticulous patch sheets — musical scores in the form of connection schematics — for many of her works.

An early adopter of the 2500 in the popular music world was The Who's Pete Townshend. The 2500 can be heard all over the band's *Quadrophenia* album.

Many of those parts were recorded in Townshend's own home studio, as the unwieldiness of the instrument made it difficult to transport and set up in multiple locations.



"Distance of Time" - A Piece for Arp 2500 Synthesizer by David Baron.

The ARP 2500's Many Configurations

The 2500 was available to customers as a configurable 15-module console or main cabinet with one-, two-, three-, or four-voice keyboards and optional eight-module wing cabinets. There are also some systems that exist with smaller main cabinets.

People familiar with modular synthesizers will understand the basics of most module operations. However, there are a few standouts that are crucial to defining the unique sound of the 2500.

Like the Moog modular and most other analog synthesizers of the '70s, the 2500 utilizes a 1v/octave pitch control, meaning that for every volt of DC control signal, the oscillators would increase an octave in pitch.



Pictured are both the 1004-T Oscillator and the 1023 Dual Oscillator modules, as well as the rare 1045 complete synthesizer voice module.

Compared to the scaled-down ARP 2600 and many other analog synthesizers, the 2500's oscillators are somewhat more complex, boasting both a sawtooth and triangle core. When calibrated and tuned, they are extremely stable.

There are several types of oscillator modules in the 2500 system, but they all share the same main VCO circuit that produces typical sine, triangle, pulse, and sawtooth waveforms.

A Switch Matrix and Defining Modules

Instead of patch cables, the 2500 uses an alternative design that incorporates a large switch matrix to make connections. While these switch matrixes are known for dirty connections and cross-talk, they were an interesting alternative to a mess of patch cables that can sometimes obscure panel controls.

The inputs and outputs are marked on the module faces, and the keyboard cv and gate signals are normalized to the top patchbay rows for easy signal routing.

The other module responsible for much of the 2500's unique tone is the 1047 Multi-Mode Filter/Resonator. This two-pole, 12db/octave filter has lowpass, highpass, bandpass, and notch responses.

It also includes an extra "keyboard percussion" circuit that, when pinged with a trigger and gate from a keyboard or sequencer, creates a percussive resonant attack.

The triggering scheme of the 2500 uses 10v gates as well as 10v trigger pulses. The envelopes can be set to "single" position, where only an incoming square wave-type gate signal will trigger the envelope.



1047 Multimode Filter/Resonator



1050 Mix-Sequencer Module in the center with 1006 Filamp module to the left

In "multiple" position, the envelopes can be triggered by a gate that is held (e.g. a note being held down) and then re-triggered by incoming trigger pulses from other notes to make for interesting articulation control.

Another uncommon addition to the filter is the resonance-limiting circuit. Enabled by a switch, this circuit limits the resonance gain to unity causing the frequency response to fall off more sharply on either side of the center frequency — somewhat like the "surgical mode" found in modern digital EQ plugins.

When overdriven on the input, the character of the 1047 really stands out as one of the best-sounding analog filters ever found in a synthesizer.

The 2500 offers a relatively typical three-channel, 10-step sequencer for generating melodic patterns or repeating control voltages, but some systems also included a rare mix sequencer module.

This module is composed of two independent four-channel audio mixers with gates on each channel that are controlled by a clock sequencer. The sequencing of the mixers can be combined in different ways to sequentially enable channels.

This allows rapid waveform switching and the ability to sequence up to eight different sound channels. It is a module that has yet to be copied or found in another system.

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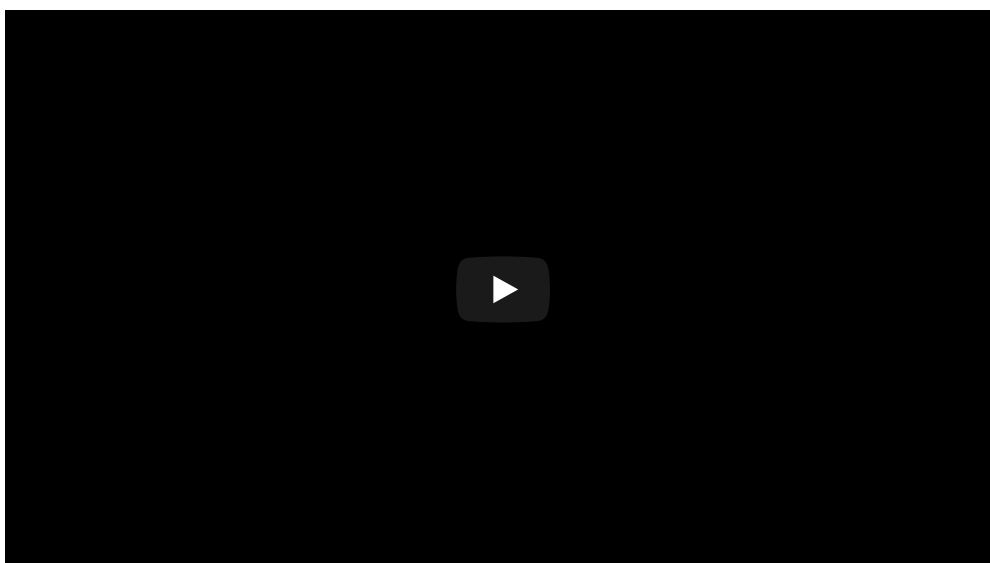
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The ARP 2500 Today

The ARP 2500 is a rare synth but can still be found in several universities and music studios around the world. The photos in this article are of the 2500 at the Virginia Center for Computer Music lab at the University of Virginia.

Jack Dangers of Meat Beat Manifesto and Aphex Twin are notable current users of the 2500, and one can be spotted and heard in use by Jean Michelle Jarre during his recent live *Oxygene* performances.



Synthesizer Test recorded by Jack Dangers



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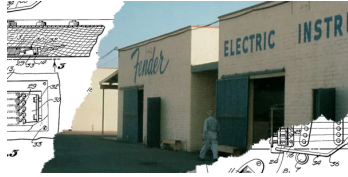
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OR SIGN UP WITH DISQUS Name **Randy Walters** • 4 years ago • edited

I worked extensively with an ARP 2500 when I was a student at Brown University's MacColl Studio for Electronic Music in the '70s. (I was the first student to arrive there with a synth of my own – an ARP 2600 – and they had to re-write the requirements for a Music major for me, as I wasn't a member of the orchestra!)

One thing I rarely see mentioned about the 2500 is that while the matrix switching system was conceptually brilliant, the real-world reality was that it suffered greatly from crosstalk and signal leakage. Still, it was quite powerful and tremendous fun, and I was thrilled to see its appearance in Close Encounters.

I actually met Phil Dodds – the ARP tech who wound up playing the ARP tech onscreen – when I visited ARP's headquarters to get some service work done on an ARP Odyssey. (I think was getting it retrofitted with pressure pads... it's been a long time!)

Edit – On second reading, I see that you did mention the crosstalk issue... believe me, it was real and it was significant.)

2 ^ | ▾ • Reply • Share ›

**Lorne Hammond** • 4 years ago • edited

Oscar Peterson had an extensive private electronic music studio but made his living as a jazz pianist. He donated his ARP 2500 wing cabinet to Canada's National Music collection in Ottawa but it may have been transferred to the National Music Museum in Calgary. He also had a British Oscar which he declined to endorse. He is also famous in Acid circles for his photo endorsement of the Roland TB-303. The University of Victoria sold its 2500 privately. The 80s electropop band Men With Hats had one which they sold. Theirs may have come from Montreal. Carleton University in Ottawa had one which I believe was exported to the UK. There is a complete 2500 on display in Calgary with two wing cabinets but it is not clear if it was or was not used in Close Encounters. Its lovely.

1 ^ | ▾ • Reply • Share ›

**libra8r** → Lorne Hammond • 3 years ago

Lorne Hammond WOW!!!!!! Oscar was a synthophile?!?!?! Thanks for that post, it's..... well I presumed Oscar would be a stringent purist..... like my father, a legendary jazz bassist for whom the developing technology of sampling and synthesizers was an irritant. Like DJ's replacing live bands.....

It's reasonable to say it's in bebop jazz you'll find a by-far majority with little tolerance for anything but the authentic and genuine. I'm no jazz player; my rather passionate addiction is in salsa of Colombia, Cuba, and Puerto Rico, and bluegrass. Looking back to some time in the late 80's/early 90's, there came somewhat of a revolution in sampled instruments..... terms like mangled, bit-crush, decimated,

My father and I hung out many hours listening to Oscar's Pablo label sides..... with/without Ella, Joe Pass, etc. I always pictured the fitness of musculature in his hands and forearms, and how incredibly strong one must be to play not just the sequences of notes but there's the dynamics, embellishments, and speed, all on a grand piano with weighted keys.

ANYWAY, that's really cool to hear about him. "Extensive private electronic music studio", eh? Love to see a photo or two..... been kinda light on the covet front lately :)

Joe Zawinul's home audio wiring is all integrated into his "Music Room" studio, which essentially is the entire house :) Great article in a trade magazine Sound on Sound:

<https://www.soundonsound.co...>

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**Lorne Hammond** → libra8r • 3 years ago • edited

Yes. But he clearly understood and protected his identity was as a jazz pianist. No EM releases that I know about. He was a close friend of the founder of Roland and there is some footage of his massive private studio which I think was at his home. He had a huge early digital rig as well.

The other Jazz people to look into is the brief 2-3 lp flurry of jazz pianist Paul Bley into and out of electronics with the out of this world vocal work of Annette Peacock (lots of intense

out of electronics with the out of this world vocal work of annette peacock (lots of intense vocal processing).

1 ^ | v · Reply · Share >



Elan B · 2 years ago

lucky enough to own one of these, maybe there are 50, hard to say, but Ive never seen modules come up for sale the whole time Ive owned it which speaks to how rare they are. It sounds very unique and not very much like the 2600 as you would expect. It sounds much more raw, powerful and bright, it feels less restrained electronically. The bandpass filter (shown in the synthesizer test video, looks like they have 2) is amazing and the way envelopes snap is just perfect. Despite its quirks its a 70s dream machine.

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stpope · 3 years ago

So why is there no soft-synth that emulates the ARP 2500???

Hey Arturia and Native Instruments (and others), the 2500 had the unique 1045 voice module, multi-mode filters and mix/sequencer mentioned in this article, but also had dual and quad envelope generators with gate delay(!), combined VCF/VCA and a powerful sample/hold processor. In addition, the matrix switch interconnection--while quite problematic (noisy) in the real world--would be great for a soft-synth.

How about a configurable polyphonic ARP 2500 soft-synth that uses a multi-touch screen like the Slate Raven for interaction? The Arturia ARP 2600 is close, but is missing the extra envelope generators that many users put in place of the speakers, and doesn't support multi-touch screens...

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John K Gudgeon → stpope · 3 years ago

one has just been released for macintosh only. here's the link: <http://niclasen.name/G2500/...> 100 Euro, I'll be downloading it tonight.

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libra8r → stpope · 3 years ago

stpope

I ask the same about a soft-synth 2500..... and speaking of Arturia and NI, I wish I could be blessed with an opportunity to collaborate with Arturia and author a manual on at least the 2600. Their manuals are okay but like so many other such manuals, it seems as if they were authored by the programmers. As such they wouldn't easily see what's missing or so vague..... and it may even be translation to English being a little jittery?

Gotta admit, though, their software is rock-solid and stable.....

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John K Gudgeon → libra8r · 3 years ago

one has just been released for mac only, here's the link. <http://niclasen.name/G2500/...>

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stpope → John K Gudgeon · 3 years ago

Awesome - thanks for the pointer, John! Now I'll get started sending them feature requests...

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djsmps · 3 years ago

Spielberg left, Phil Dodds right

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her legendness? Wow...that wasn't RUDE it was just a statement of face. Don't just accuse people of being rude because they just got right to the point. Jerk

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rocket → Peter Diggler · 3 years ago

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