Don Lancaster's

Tech Musings

March, 1999

Two persistent pseudoscience web myths appear to involve pulsing or sparking of water. In one case, an exceptional hydrogen electrolysis superefficiency is claimed. In the second, a strongly "overunity" energy gets attributed to "underwater arcs".

The only minor problem with these pulse sparking claims is that there are now many thousands of water pulse sparking machines in daily use. The devices have long gotten stocked in depth in every large city. These are known as EDM machines, and short for *Electro Discharge Machining*.

As far as I know, no machine shop using these devices has ever reported them vaporizing from excess energy generation. Nor exploding from the utterly trivial amounts of hydrogen they usually produce.

When you generate hydrogen, an efficient electrolysis will take place when you apply a dc voltage near 1.3 volts. At this *continuous* voltage, as much as *one sixth* of your required energy can come from ambient heat rather than the electricity. But only at uselessly low production rates. At a dc *thermoneutral* voltage around 1.5 volts, all of your needed conversion energy has to come from your input electricity. Above 1.5 volts dc, excess heat gets generated and wasted.

It seems to me that pulsing would move you *away* from these optimum values. Further, the cell capacitance is probably quite high, so your pulse charging and discharging can easily *reduce* overall efficiency. Caused by charge-discharge cycles that produce additional waste heat.

There is an arcane field here called *EIS*, for *electrochemical impedance spectroscopy*. Searching the web gets you useful (but costly) resources.

Two things about arcs and sparks: Any time you see them in a motor or generator, you're *guaranteed* to have inherent inefficiency. Any time that sparks are present, the measurements involving them will almost certainly be dead wrong. Because of offscale rms crest factors.

There is also this ridiculous claim that a "pulsed dc" somehow does not involve alternating current. Or vice versa. Sorry, but any "pulsed dc" can easily be shown to consist of a direct current level along with groups of ac sinewave harmonics. At least that's what this *Fourier* dude seems to have claimed a while back.

And he sure has me convinced.

Observations that increased pulse frequencies might generate "more" hydrogen can usually be explained by an increasing duty cycle that simply ups the average dc value.

One misguided website promotes gathering of gases above underwater electric arcs for potential use as fuel substitutes. I don't see how this can be anything but thermodynamically ludicrous. I'd predict absurdly low true efficiencies. Especially when *all* costs are fully amortized.

If you feel otherwise about any of these schemes, please show me some reproducible experiment along with a credible and published theory.

Key points: A *fuel* is a substance that can deliver new BTU's of energy to the on-the-books economy. *Energy carriers* (such as hydrogen) are most emphatically *NOT* fuels! In fact, any energy carrier *always* wastes fuel.

Done supposedly in exchange for convenience, shippability, or safety. But sometimes in stupidity. A current Chicago hydrogen demo project now seems to be trucking the hydrogen in from Pennsylvania.

It's a gas.

A thermodynamic process *must* be *reversible* if it is to have any hope of being efficient. Kicking off minimum waste heat. Thus, a decent electricity to hydrogen converter *must* also be able to decently convert hydrogen to electricity. The best thermodynamic processes usually have to end up as either *isothermal* (taking place at a constant temperature) or *adiabatic* (adding or removing zero heat).

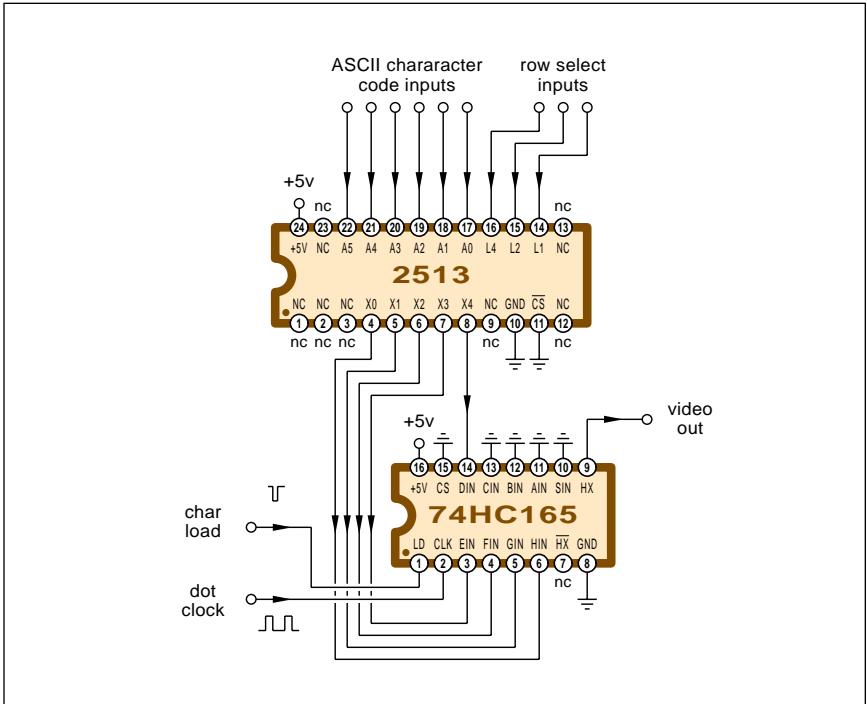A great book on this is Sandfort's *Heat Engines*. And reachable through *www.tinaja.com/amlink01.html*.

Fig. 1 – CLASSIC CHARACTER GENERATOR circuit. Inputs to a special EPROM pick character and row. Output becomes serial dot video.

ITT Semi PIP2250	Picture-in-picture processor
Motorola MC141540	Monitor on-screen display
Motorola MC141541	Enhanced on-screen display
Motorola MC141543	Advanced on-screen display
NEC 42271	Color border PIP generator
Philips PCA8510	Stand-alone on-screen display
Philips PCA8515	Serial I/O on-screen display
Philips PCB8517	Stand alone OSD for monitor
Philips SAA5252	Line 21 Decoder
Philips SAA5355	Single chip color CRT controller
Philips STV5730A	Multistandard on-screen display
Philips TDA8315	NTSC decoder and sync processor
Seimens MEGATEXT	High performance Teletext chip
Seimens SDA5273	Teletext processing system

Fig. 2 – HERE IS A SELECTION of some on-screen display OSD circuits.

More on EDM is in HACK60.PDF, HACK63.PDF, and in the *EDM Today* magazine. More on Fourier analysis in MUSE90.PDF. More about those crest factors in MUSE125.PDF. More about thermodynamics in HACK64.PDF

And lots of "real science" links to electrolysis info sites can be found at my *www.tinaja.com/h2gas01.html*

A Cheap Video Review

There seems to be a lot of renewed interest in lower cost video displays. Especially PIC based video message overlays. Uh, we first looked at these as my classic *TV Typewriter* back in the September 1973 RE issue. Details also were findable in my *TVT*, *Cheap Video*, and in my *Son of Cheap Video* Cookbooks.

On back in those days, a *character generator* approach was used. ASCII characters were typically generated as a 5x7 or a 6x9 mono dot matrix.

A specially organized ROM Read Only Memory was used. You input a character that you wanted (often only 6-bit uppercase ASCII) along with a vertical scan line selector. Some of these even had a then-stunning 2240 bits of internal data storage. A row of dots then got output that matched the desired character and position.

A PISO *shift register* or a similar circuit then changed the parallel dot patterns into a serial string of dots. Those dots either create your actual video or else can get superimposed over existing video.

As we've seen a number of times before, superimposing video can get tricky. You cannot directly add two video signals together. The timing of both video sources must get exactly locked together. This can be done by *genlocking*, use of *frame grabbers*, or by a common *station sync*. We have seen more on this in HACK60.PDF.

The personal computer technology quickly moved beyond this character generator scheme. Instead *bitmapped graphics* screens got used. Removing all the limits of single font text only. With bitmapping, any combination of dots in any color or brightness can be used, mixing text and graphics.

But the character generator method has made a big comeback. Mostly for VCR messages and tv receiver status displays. Also for PIC data displays. And for other lower cost apps where you simply want to put some limited info on screen or on top of another incoming video source.

Figure one shows us the basic cg concept from way back when. This one puts a five dot wide by seven dot high character into your six by eight pixel display space. A monitor or tv set rapidly scans from its right to left but only slowly moves from its top to bottom. The top row of all character

dots gets put down on the first scan line. Followed by the appropriate dot patterns on the lines that follow.

This particular character generator was upper case only. So, it accepts six bits of ASCII code to generate letters and numbers. It also has three *row timing* inputs which pick the dot row needed. The 2513 is basically a read only memory. In exchange for ASCII and row inputs, the parallel five-dot pattern is output.

This dot pattern gets converted to serial video by a shift register locked to the video timing. The shift register also acts as a latch so the character dot info is always available.

These days, single chip solutions can be used to generate all of the dot patterns and all the timing for much fancier color characters. Figure two shows us a selection of some of the available devices. These are typically microprocessor programmable. In one mode, commands are stashed in the internal memory locations to set the display format, color, position, and all other options. In a second mode, ASCII characters are routed into sequential on-screen slots.

We saw program and command set examples back in MUSE115.PDF.

Figure three shows us an example. This *SGS Thomson* chip works either NTSC or PAL formats in a number of options. It can generate a stand-alone display or lock to incoming video. Up to 11 rows of 28 characters each. A transparency option is available. Be sure to study the real data sheet (from *www.queslink.com*) because there are lots of possibilities.

Can a PIC be used to generate its own dot rate video? The surprising answer is that it can. But only with some really intense design.

Tim Jenison's *Calibar* pattern gen from *Newtek* is one example. Tricks here include continuously running the high addresses of a 4x color clock pattern generator EPROM from his 4-bit binary counter, and then letting the PIC control all of the needed low addressing. Even then, a sneaky trick had to get done to provide for the alternate line color phase inversion. Patterns for *Pairs* of horizontal lines got used. Similarly, a full two-field frame was used that read different EPROM sync patterns on each field.

We saw more on the Calibar back

in MUSE120.PDF.

A good source for PIC compatible cg displays is *Decade Engineering*. We saw details on their BOB-5L in MUSE115.PDF. This used the earlier Rohm BU5963AS character generator chip which is no longer sold. Later models use newer chips. Decade may be easily reached through the banner link on my website.

Another route to low priced video displays is to use an older computer. Ideal candidates are the Apple IIe or even a Commodore 64. I've got great heaping piles of Apple IIe's available at *www.tinaja.com/bargca01.html*

There are also a few related new devices known as *Line 21 Decoders* for the hearing impared. Or *Teletext Processors* for European tv displays. These sometimes also include useful stand-alone displays. Once again, the easiest place to find data sheets and samples is *www.questlink.com*.

A Re-raveling of Some Loose Ends

There's all sorts of unrelated short annoyance "fixit" topics which have been piling up around here for quite a while. I've collected and summarized them in figure four. Such as…

HP 3300 Function Generator– This is a really nice old sweepable function generator. These have been cropping up surplus at fairly low prices lately. They were intended to be used with a hard-to-find sweeper or other exotic plug-in. Your only little problem is that the instrument won't work at all without some sort of a plug-in.

Figure 4a shows a connector that lets you run the 3300 as a stand-alone function gen. The connector used is an *Amphenol* 57-30500. You can also use this jumpering as the start of your own custom plug-in. More details are at *www.tinaja.com/bargte01.html*

Packard Bell Woes– Seems I've got this older *Packard Bell* computer that has a nasty habit of randomly turning off all its CDROM and LS120 drives. What usually happens is that a NoIDE flag in the registry mysteriously gets set to its "01" value.

I suspect this is a generic problem. Your fix is to *carefully* go down into the registry and reset this value.

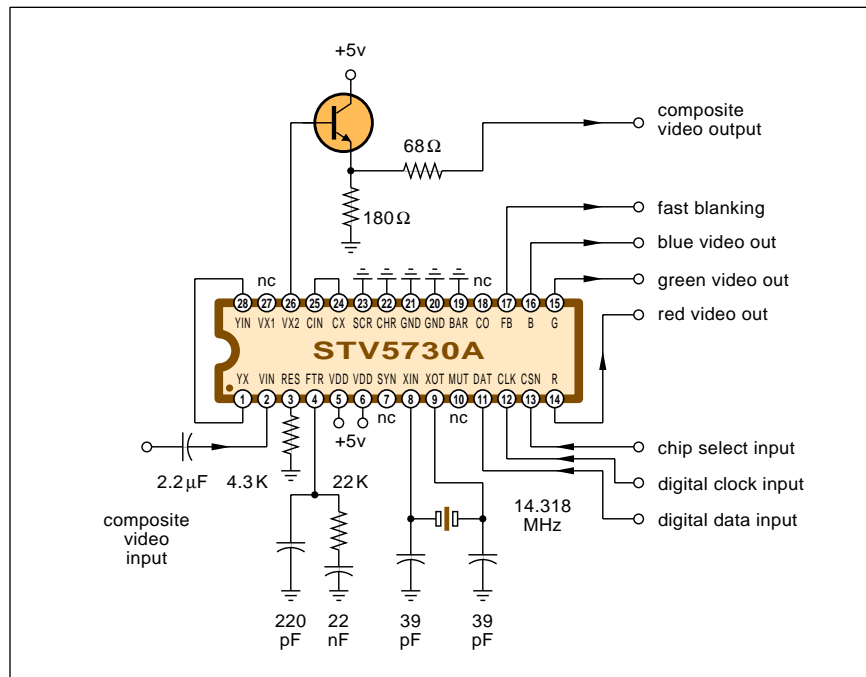Figure 4-B shows you one possible path. On Win 98, you run *REGEDIT*,

Fig. 3 – SIMPLIFIED CIRCUIT EXAMPLE of a single-chip OSD.

then drop down through these folders in order: *HDKEY_LOCAL_MACHINE*; *System*; *CurrentControlSet*; *Services*; *VxD*; and finally *IOS*. Then change the *NoIDE* flag back to 00.

Note that an improper registry mod can trash your machine and a careful backup is a very good idea here. Also note that this repair *only* works if the *NoIDE* flag has in fact gotten trashed to an "01" value.

"NetCenter" infuriations– The latest versions of *NetScape Navigator* seem to stupidly try and force you to go to "Netcenter" rather than the place you really want to go to get your mail. A cure is to go into the *Program Files* and drop on down first into *Netscape* and then to *Users*. Inside of each user folder should be a *lprefs.js* file. Then, by using an editor or word processor, very carefully enter…

> *user_pref("mailnews.sta rt_page.enabled", false);*

at its alphabetical location. Then, you resave your *liprefs.js* file. Should this pref already be present, just change it from "true" to "false". Per 4c.

Shooting the AOL Messenger– Just as infuriating is that AOL messenger in Netscape inexcusably and uselessly cluttering up your browser task bar. This one is easier to cure. Right click

on *Messenger*, then on *Preferences*, then on *Misc*. You'll then unclick the *Start Netscape AIM when Windows Starts* box option. Figure 4d.
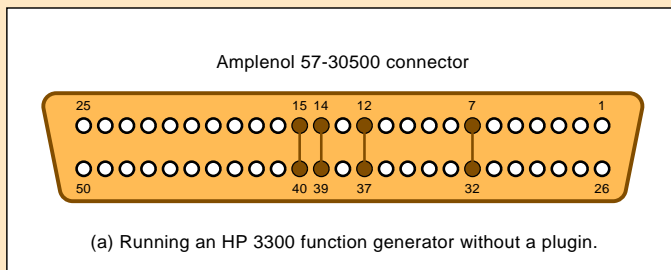
A redirect alternative– Later versions of HTML have a *redirect* command in them. Redirect is useful to move you from an old page to a new one. This is also one method to track responses to banner ads. But any redirect does take time, and gives your viewer an unneeded page to view. Old redirects have a nasty habit of disappearing. Worse, if your redirect delay time is set too short, the browser back arrow no longer works. For any clicking on back immediately gets forwarded.

At any rate, there's a subtle, little known, and older alternate that even works with Apache servers. Just have your ISP put the following command in their Apache server configuration file folder…

Redirect permanant /oldurl/newurl/

This does need close co-operation with your ISP, and I am not sure how a permanent redirect can get used to tally click-through counts. But this is otherwise both cute and useful. Many thanks to Kragen Sitaker for this tip.

More on redirects can be found on my webmastering library pages. Plus lots of other goodies.

Amplenol 57-30500 connector

25   15 14   12   7   1

50   40 39 37   32   26

(a) Running an HP 3300 function generator without a plugin.

1. Run REGEDIT.
2. Select the following folder:

HDKEY_LOCAL_MACHINE/System/CurrentControlSet/Services/VxD/IOS

3. Verify or change NoIDE flag to its 00 value.

(b) Repairing the Packard Bell "lost drives" syndrome.

1. Open Program Files, then Netscape, then Users.
2. In each user file, find the lprefs.js file.
3. Add or modify in its suitable position:

user_pref("mailnews.start_page.enabled";false);

(c) Fire bombing the "Netcenter" infuriation.

1. Right click on the AOL messenger icon.
2. Select Preferences then select Misc.
3. Unclick the following box:

Start Netscape AIM when Windows Starts

(d) Shooting the AOL Messenger.

1. Discuss the redirection problem with your ISP.
2. Verify that a server side solution is workable.
3. Modify and add to the ISP's server config file:

Redirect permanent /oldurl/newurl/

(e) An alternative to the "redirect" command in HTML.

Fig. 4 – SOME "ODDS & ENDS" SOLUTIONS to annoying problems.

Some SETI Books

A thought-provoking paper by Mario Livio recently appeared in the February 1999 *Astrophysical Journal*. In his *How Rare are Extraterrestrial Civilizations?* Mario makes a strong case for dramatically raising the odds on currently present extraterrestrial civilizations. The case gets presented that other civilizations should show up not much sooner nor later than halfway through the parent star's life cycle. Which means they should be emerging "right about now".

There's a lot of reasonable books on SETI topics. I have summarized a few of these in the resource sidebar.

More title details can be found at *http://www.tinaja.com/amlink01.html* Or on this online column version at *http://www.tinaja.com/muse01.html*

Your recently revised classic text remains Frank Drake's *Is anyone out there?* Some earlier thoughts on SETI in HACK65.PDF. Or search the web under "Drake equation". More SETI topics also appear in the online *Space Telescope Science Institute* library at *stlibrary.stsci.edu*

New Tech Lit

From *Analog Devices* their latest *Winter 1999 Short Form Designer's Guide*. Through *AKM Semiconductor*, details on their AK410 24-bit digital audio interface receivers. And from *National*, info on their LM3812 series of "battery gauge" current sensors.

An astounding collection of aerial and satellite photographs appears at that *Terra Server* site which is newly up at *www.terraserver.microsoft.com* The coverage in the four terabyte (!) data base has both aerial and satellite photography. With resolutions down to one meter per pixel.

Metalloradicals latest album has gone platinum! Actually, these are the key compounds to understanding photosynthesis and creating possible organic batteries and energy carriers. Their key paper was first detailed by Hoganson and Babcock in *Science* for September 26, 1997. The more recent pair of biological hydrogen update papers appears in *Science* for Dec 4, 98. See pages 1842 and 1853.

Also do check out *A New Type of Hydrogen Bond* in the December 11, 1998 issue. More links and info on hydrogen and related topics is found in *www.tinaja.com/h2gas01.html*

One source for the WWII Military Tech Manuals is *Surplus Al*. Check his new *www.qsl.net/w3ugd* website. More on test equipment manuals and buying military surplus is found at my *www.tinaja.com/resbn01.html*

Free *Tygon* tubing samples can be gotten from *Norton*. A new catalog of technical plastics and polymer books from the *Hanser Gardner* folks.

From *JKL Components*, data sheets on small narrow spectrum ultraviolet

NAMES AND NUMBERS

1-800-Batteries
2301 Robb Dr
Reno NV 89523
(800) 228-8374

AKM Semiconductor
2001 Gateway Pl Ste 650W
San Jose CA 95110
(888) 256-7364

Analog Devices
PO Box 9106
Norwood MA 02062
(800) 262-5643

Astrophysical Journal
PO Box 37005
Chicago IL 60637
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Card Technology
300 S Wacker Dr 18th Fl
Chicago IL 60606
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Turner OR 97392
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(303) 469-5730

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Bradley IL 60915
(815) 935-5353

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Santa Clara CA 95052
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(781) 904-2500

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Topeka KS 66615
(800) 847-6111

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PO Box 3660
Akron OH 44309
(800) 798-1554

Philips
2001 W Blue Heron Blvd
Riveria Beach FL 33404
(407) 881-3200

Scientific Computing
301 Gibraltar Dr
Morris Plains NJ 07950
(973) 292-5100

SGS-Thomson
1000 E Bell Rd
Phoenix AZ 85022
(602) 867-6259

Siemens Components
2191 Laurelwood Rd
Santa Clara CA 95054
(408) 980-4500

Space Telescope Sci Inst
3700 San Martin Dr
Baltimore MD 21218
(410) 338-4961

Surplus Al
PO Box 215
Hunlock Creek PA 18621
surplsal@tl.infi.net

Synergetics
Box 809
Thatcher AZ 85552
(520) 428-4073

lamps. JKL is a good source for mini fluorescent lamps of all types. From 1-800-Batteries, their latest catalog on batteries for camcorders, cell phones, and similar gear.

Featured insider trade journals for this month include *Digital Graphics* about poster and billboard sized color printers; that *Scientific Computing & Automation* on industrial and lab PC apps; and *Card Technology* on smart cards, PCMCIA, and such.

The latest books from *Newnes* are *CE Marketing Handbook* on safety regs; the *Power Electronics Design Handbook*, and *VCR Troubleshooting and Repair*.

The latest *Lindsay Publications* title is a 1913 Harper's Aircraft Book by A. H. Verrill. This does include detailed modeling instructions for many classic early planes. More info on all sorts of other book titles is up at *www.tinaja.com/amlink01.html*

A FEW SELECTED SETI BOOKS

Is Anyone Out There? Scientific Search for Extra... (Frank Drake)

Alien Life Search: Quest for Extraterrestrial Organisms (D. Jefferis)
Alien Life: The Search for Extraterrestrials and Beyond (B. Parker)
Are We Alone? Philosophical Implications of the... (Paul Davies)
Are We Alone? The Possibility of Extraterrestrial Civ... (R. Rood)
Bioastronomy: The Next Steps (George Marx)
Exobiology: Matter, Energy, and Information in the... (J. Trieste)
Extraterrestrial Intelligence (Jean Heidmann)
Life on Other Worlds: The 20Th-Century Extra... (Steven J. Dick)
Life Out There: The Search For Extraterrestrial Life (M. White)
Other Worlds: The Search for Life in the Universe (M. Lemonick)
Planet Quest: Epic Discovery of Alien Solar Systems (Ken Croswell)
Project Haystack: The Search for Life in the Galaxy (Seti Institute)
Quest for Alien Planets: Exploring Worlds Outside... (Paul Halpern)
Search for Extraterrestrial Life: Essays on... (Peter Day)
Search for Life on Other Planets (Bruce Jakosky)
Seti Pioneers: Scientists Talk About Their Search... (David W. Swift)
Sharing the Universe: Perspectives on Extraterrest... (Seth Shostak)
Strangers in the Night: A Brief History of Life on... (D. Fisher)

For more details, see *www.tinaja.com/amlink01.html*

For the insider secret fundamentals of active filters, check out my *Active Filter Cookbook*. By itself or as part of the *Lancaster Classics Library*. You can visit *www.tinaja.com/synlib01.html* or see my *Synergetics* ad.

The *Synergetics Consultant's Net* has also been recently improved. See *www.tinaja.com/consul01.html*. For instant resource solutions, do check out *www.tinaja.com/info01.html*

The very latest of additions to my *www.tinaja.com/barg01.html* surplus site include radiosondes, frequency synthesizers, *Tektronix* plugins, and centrifuges. Plus some great "project starters" that do include some mondo switches. The latter are heavy duty twelve pole, twenty position plus off, nonshorthing. Prewired, even. Let me know what new uses you can come up with for these.

As usual, most of the mentioned resouces do appear in our *Names & Numbers* or *SETI Resources* sidebar. Always check here before calling our US technical helpline shown in the nearby box. Let's hear from you. ✦

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