

Building an interface for Rediffusion TV



Objective

To build an interface for a B&W 625-line Rediffusion television enabling HDMI sound and vision without modification of the set.

I dimly remember Rediffusion from my time at Hull university, some sort of modulation on only a few MHz for video and a Tannoy-like distribution for sound – all down twisted pair cable.

Very little solid information on the web for this, so it was a bit of a reverse-engineer job.

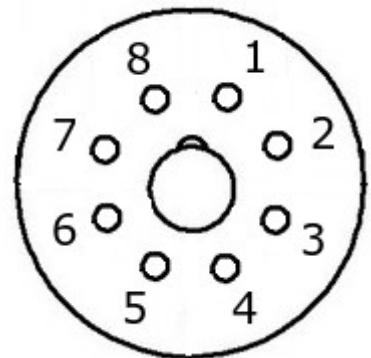
Input

The input to the set is via an 8-pin 'valve' connector on the back.

The cable plug is actually a valve socket, i.e. the pins are on the back of the set (see pic).

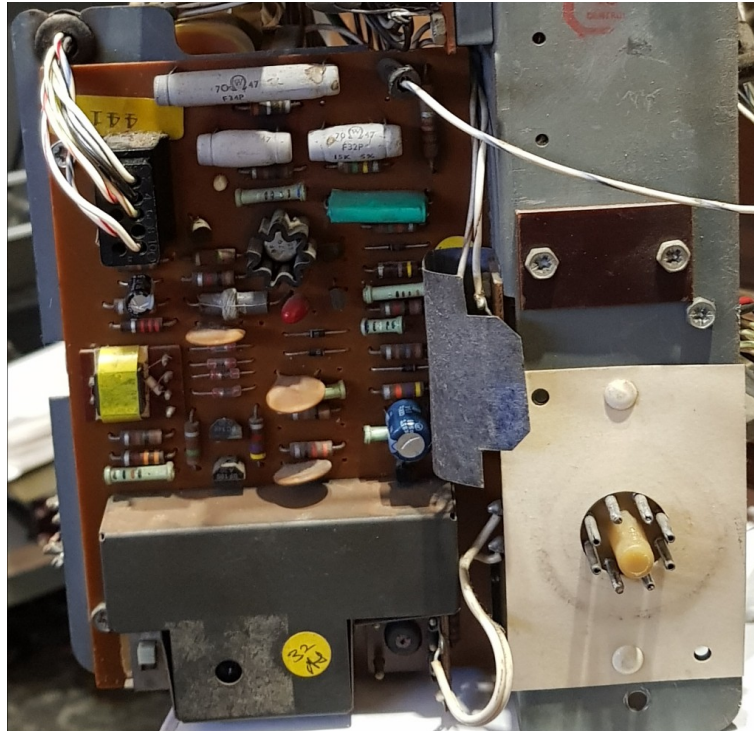
Only 4 pins are used:

1, 8	Audio input
4, 5	RF input

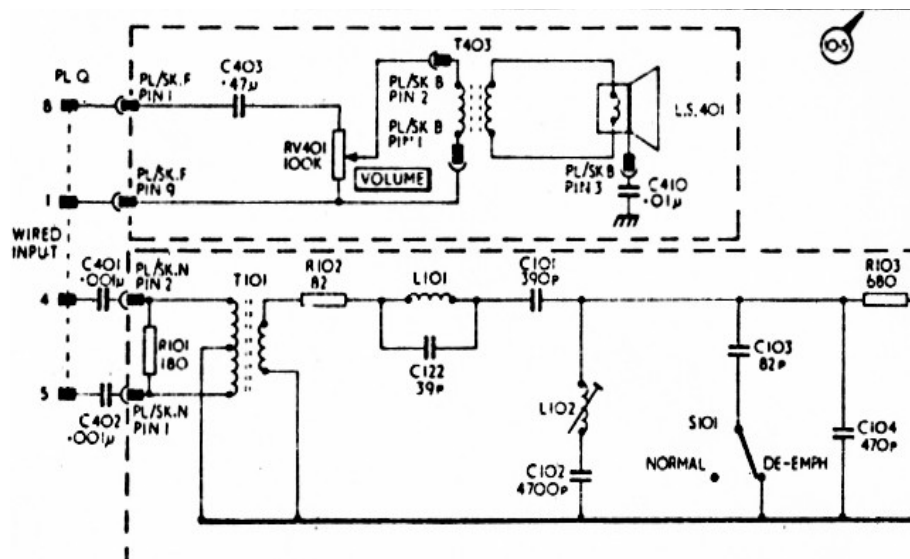


The audio is isolated from the chassis internally and the RF is fed via two 0.001uF capacitors. I reckoned it'd probably be safe enough to run without an isolation transformer given the driving circuitry will be earthed.

Picture showing the input plug and RF board



The input schematic.

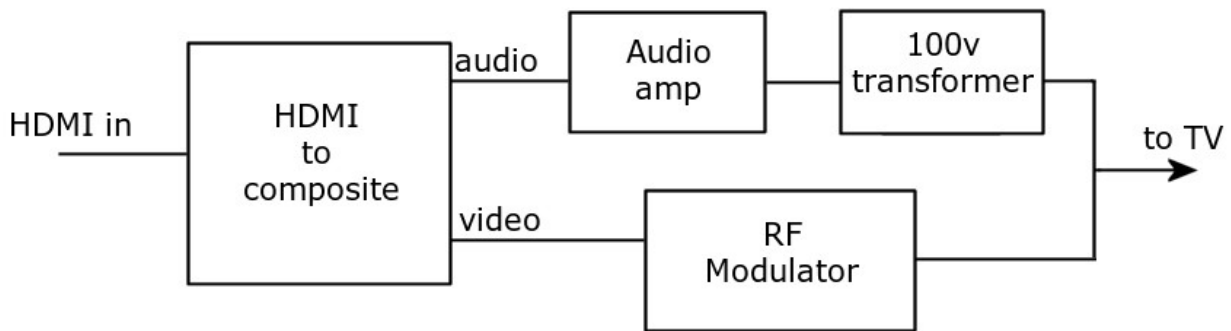


Note the dotted line around the “Tannoy” audio section denotes that it is isolated from the main chassis.

Pet peeve of mine: why is it that schematics usually show idents and *values* for all components except bloomin' inductors ?

Anyhow, after pulling off the shielding can I could probe the input stage while feeding in some likely RF. Anything around 6MHz +/- 2MHz seems fine, figuring more Hz is better, I decided to modulate the video with 8MHz and tweaked L102 a bit for that frequency.

Interface General Design





Initially, I did wonder if anyone still made composite video stuff – apparently they do and it's ridiculously cheap on AliExpress:

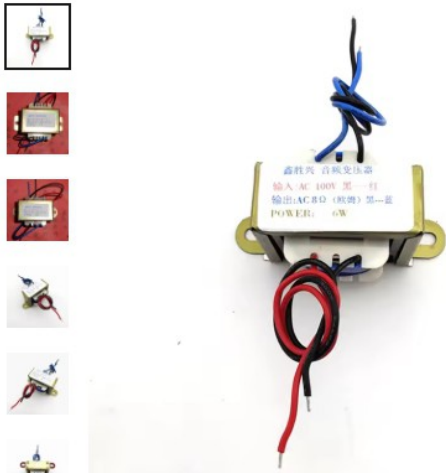
The image shows a screenshot of an AliExpress product page. At the top, the AliExpress logo is on the left, and a search bar contains the text 'rca to hdmi converter'. To the right of the search bar is a magnifying glass icon. Below the search bar, on the left, is a vertical list of product thumbnails. The main product image is a black rectangular box labeled 'MINI HDMI2AV UP Scaler 1080P'. It has an 'HDMI' input on the left, a 'USB POWER' port at the bottom, and 'OUTPUT' RCA connectors on the right. To the right of the product image, there is a pink banner that says 'Save £0.12' and 'ANNIVERSARY SALE'. Below this, the price is listed as '£1.89' with a crossed-out '£2.01' and '5% off'. A note indicates '+£0.38 estimated tax'. Further down, a red banner says '£2.00 off orders over £15.00'. The product title is 'HD 1080P HDMI-compatible To RCA AV/CVBS Adapter Mini HDMI2AV Video Converter BOX For PS3 VCR DVD PALMTSC PC'. It has a 4.7 star rating from 97 reviews and 462 sold. Below the title, it says 'Color: Black' and shows two small images of the product in its packaging.

I also found:



The image shows a screenshot of an AliExpress product page. At the top, the AliExpress logo is on the left, and a search bar contains the text 'converter hdmi to rca'. To the right of the search bar is a magnifying glass icon. Below the search bar, on the left, is a vertical list of product thumbnails. The main product image shows several black and gold 8-pin tube sockets. Some are shown from the top, some from the side, and some are disassembled to show the internal pins. A small logo 'CZH-HIFI' is visible. To the right of the product image, there is a pink banner that says 'Save £0.13' and 'ANNIVERSARY SALE'. Below this, the price is listed as '£1.35' with a crossed-out '£1.48' and '8% off'. A note indicates '£1.09 each, ≥ 10 pieces' and '+£0.27 estimated tax ; Extra 5% off with coins'. Further down, a red banner says '£2.00 off orders over £15.00'. The product title is '1PC 8PIN K8A Octal TUBE SOCKET BAKELITE VALVE BASE for EL34 5881 6SL7 5AR4 6CA7 6V6 KT88 Vintage Audio Amplifier DIY'. It has a 4.9 star rating from 12 reviews and 41 sold. Below the title, it says 'Color: Tin Plated Top' and shows four small images of the product in its packaging.

and:

AliExpress  rca to hdmi adapter 



£ 7.40 ~~£ 7.87~~ 6% off
+£ 1.48 estimated tax ⓘ ; Extra 2% off with coins

 £ 2.00 off orders over £ 15.00 


6-30W sound column public broadcasting constant pressure wall-mounted speaker ceiling speaker 100V to 8Ω audio line transformer

★★★★★ 5.0 2 Reviews | 8 sold


Color: 10W

6W	10W	20W	25W	30W
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Went to eBay for a mega-power audio amplifier:

**Bluetooth AK-370**
FM Radio MP3 Play AUX Input SD Card

~ 5w
400W 12V HiFi Bluetooth Digital Power Amplifier Mini Stereo Audio Amp Car Home

 **firstchoice667** (4135) · Business
99.7% positive · [Seller's other items](#) · [Contact seller](#)

£10.95
or Best Offer

Condition: **New** ⓘ

Quantity: **Out of stock** · 101 sold

Pay less? [Turn old devices into money with Trade In](#)

Collection: [Click & Collect](#) - Select store at checkout.

Postage: **Free delivery in 2-3 days**

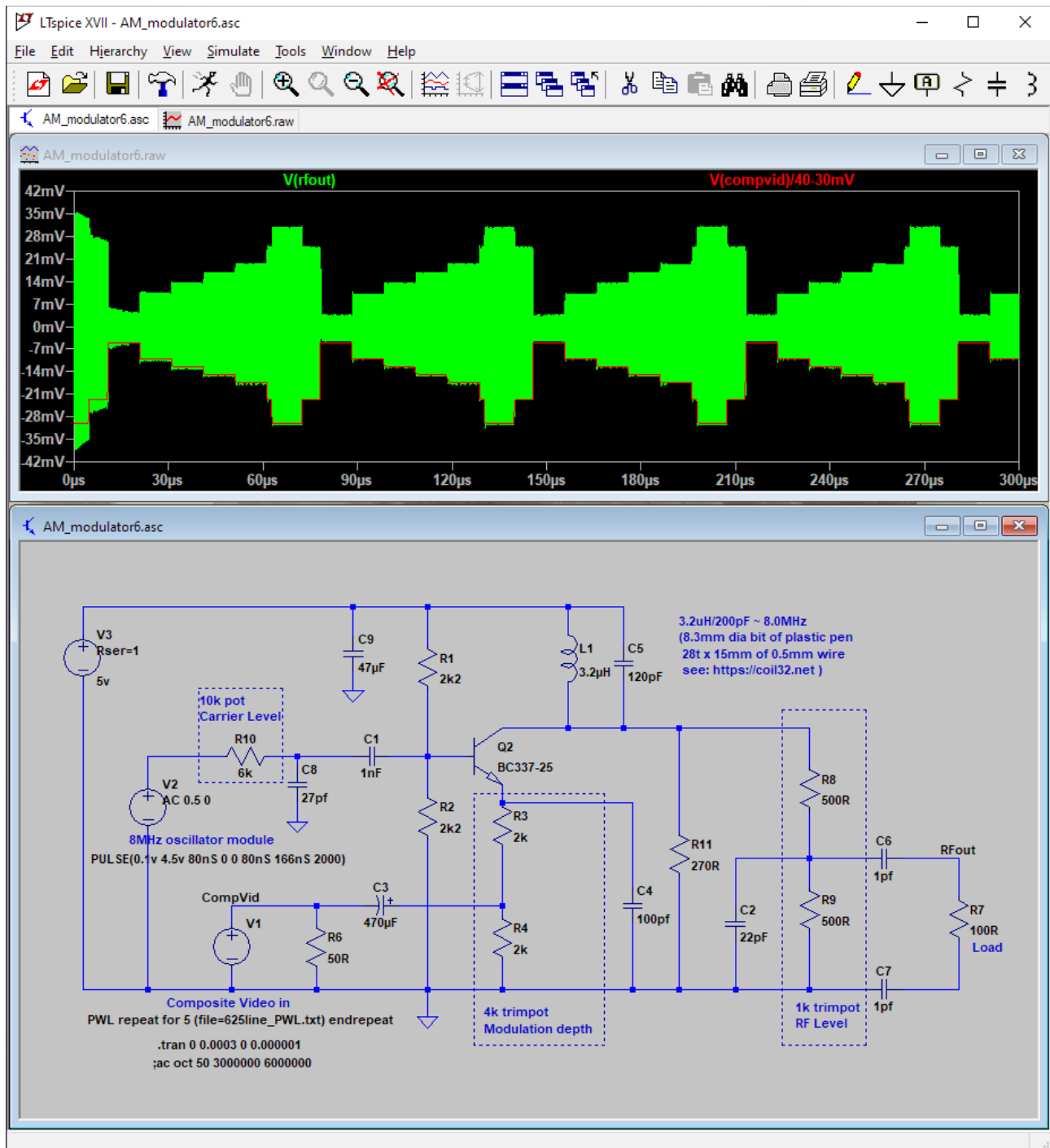
This ended up a bit underpowered but acceptable.

I intended powering all this from a 12v power supply (which I got from Farnell / CPC so I could sorta trust it) so a 12v amp was ideal.

The extra features: FM radio, MP3 player (SD card and USB) and Remote control also allow for that authentic Rediffusion experience... listening to the radio with the telly turned off !

The RF Modulator

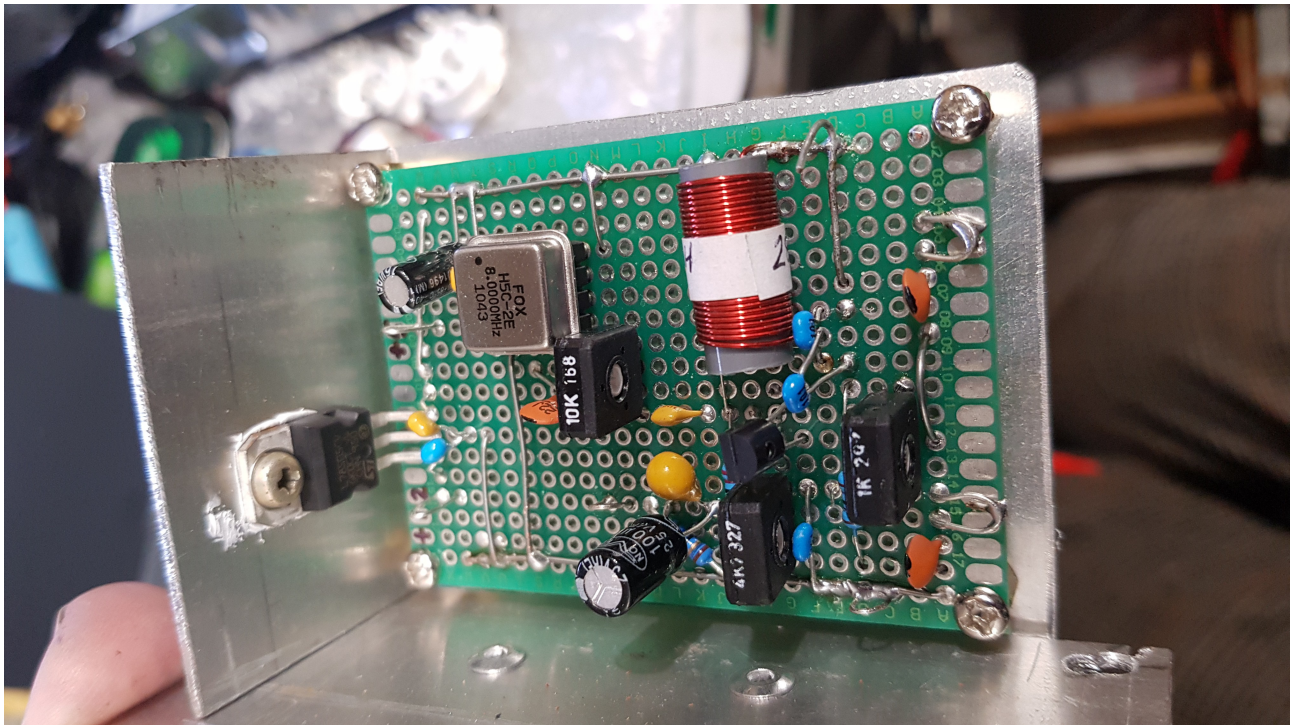
Despite selling almost everything I would ever want, AliExpress and eBay let me down when it came to an AM video modulator at around 8MHz. So I designed this:



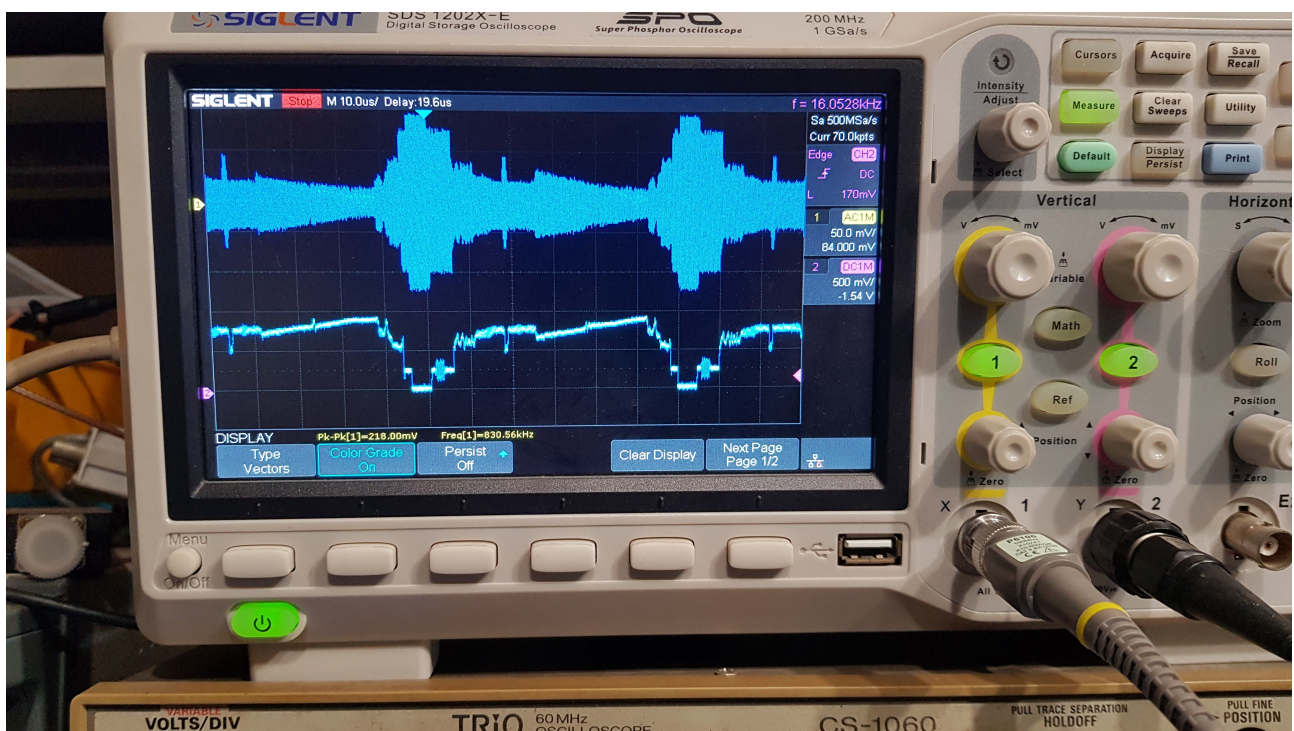
Simple but effective, oodles of RF drive allowed me to couple it to the cable via 1pf caps (to allay any remaining "it's a live chassis !" fears).

Be careful about the cable you use tho... Cat.5 network twisted pair worked fine, a chunk of random VGA monitor coax I had lying around corrupted the signal surprisingly badly.

The RF modulator along with a 5V regulator which powers it and the HDMI converter.

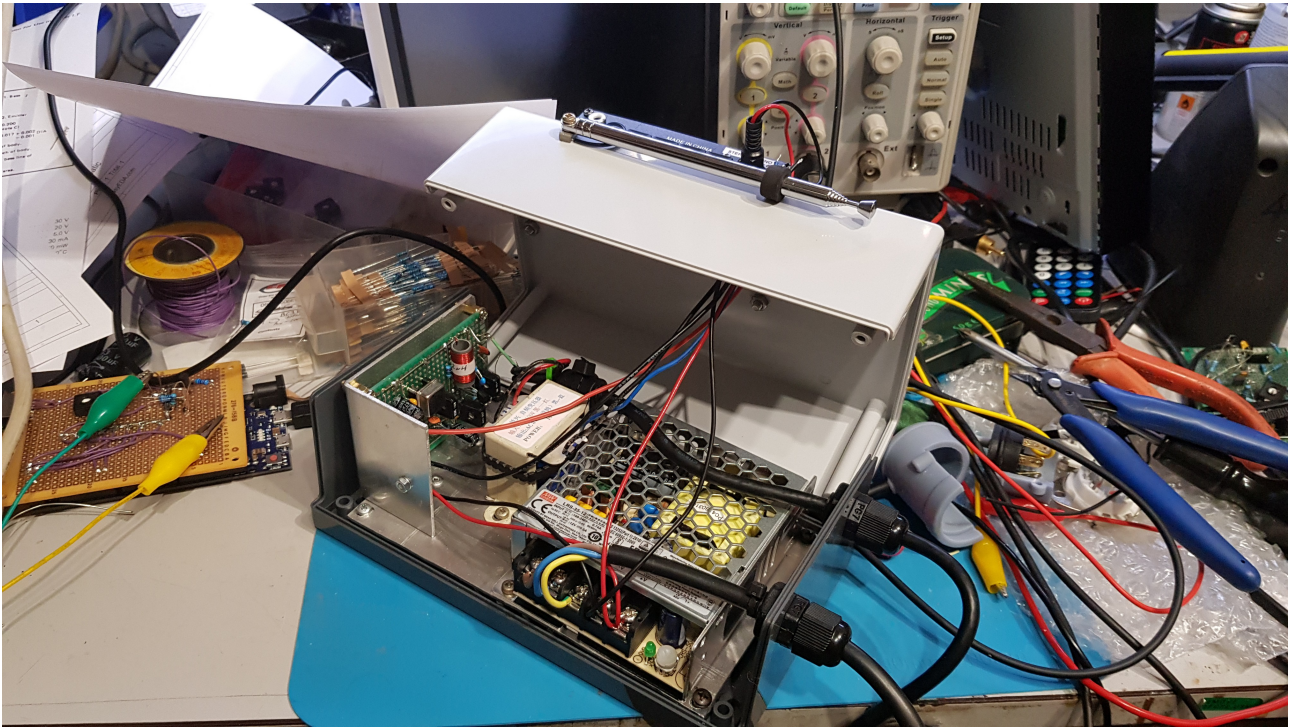


Traces showing composite in, RF out:

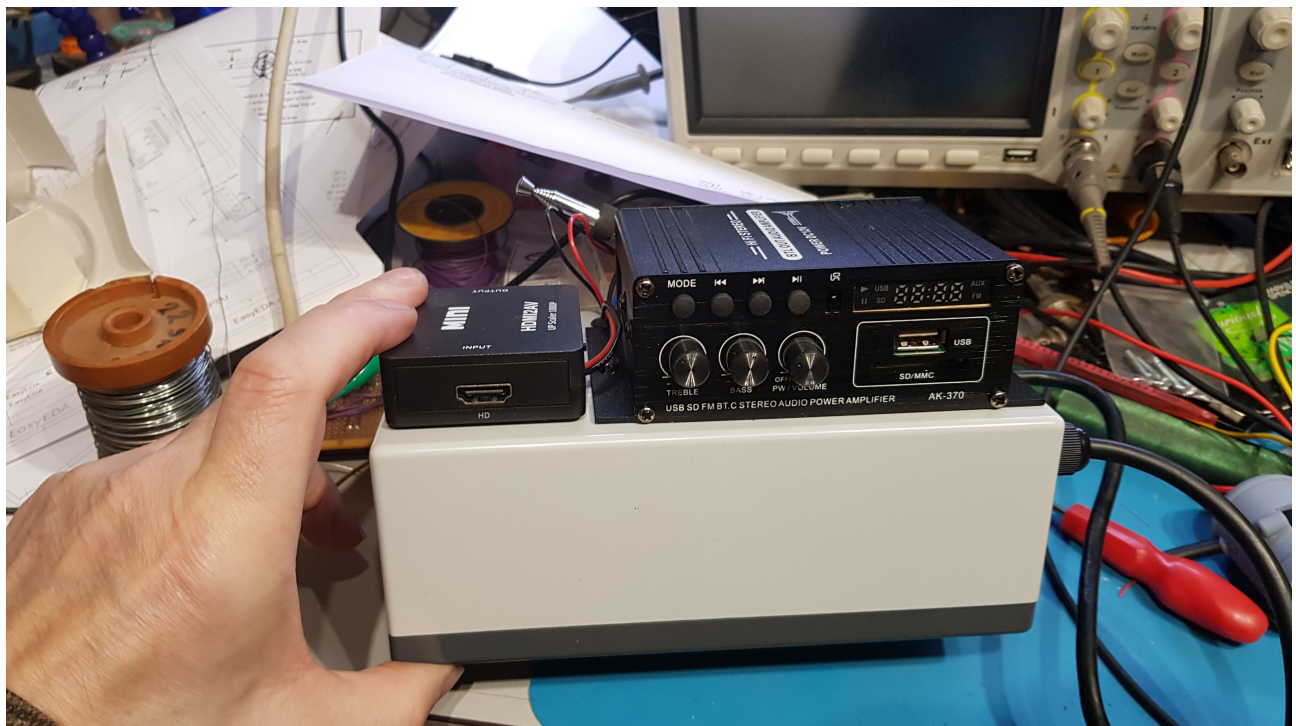


Putting it all together

The power supply, RF modulator and audio transformer went in a box I had lying around:



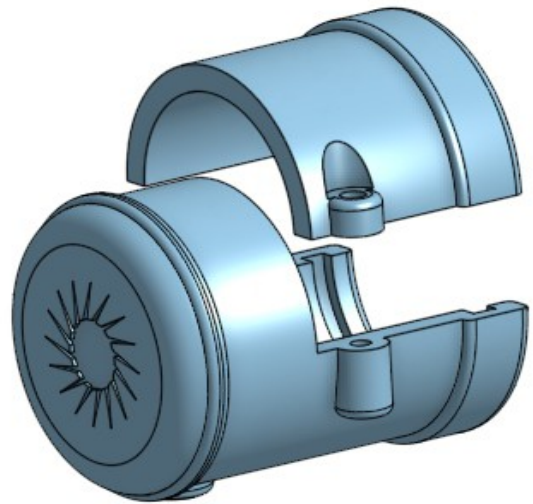
The completed unit with audio amp and HDMI-composite converter bolted on top:



Last but not least... the plug:

3D modelled using Onshape and printed on an Elegoo Saturn 4 Ultra in Elegoo ABS-like resin.

Fits one of the octal valve bases (after removing the metal clip):



<https://cad.onshape.com/documents/db6b34586fc09d3ad80df23f/w/460ef7d7fca96b6b3de0edf0/e/f9431314af35ae4c178cdeb6?renderMode=0&uiState=68dad10262d1e43322b8bbde>

or search for “Rediffusion_Plug” by user 'tony_wilk'.

Here's the final setup playing a clip from the OGWT from USB stick via Blu-Ray player into the HDMI interface.



TonyWilk,
September 2025

Some notes on repairing the TV

As shown by the owner, the set did power up and displayed a very crushed raster – so there was some hope for it.

At first I went around the chassis to clean it up and look for obvious problems, of which there were a few: mostly loose connections, dry joints and the like. Gave all the pots a clean and treated 'em to some Electrolube contact treatment grease.

After wiring it up to an isolation transformer, I fired it up and checked some voltages – nothing dangerous but the low voltage (starting at 12v across C308) was a couple of volts down.

Decided to start with the RF input board so I could develop the composite to RF interface. There was a dead transistor and a couple of dodgy caps on this, nothing too terrible.

Hunting down the 12v supply I found VDR301 had a 10k in series for some reason – I left that alone. Didn't like the look of D301 RPX200, a fast 100v 1A rectifier which someone had added 4.7nF in parallel. I left the cap in and replaced the diode with a 1N4937.

After much head-scratching, I figured VDR201 was the reason for the waveforms and voltages being wrong... but what was VDR201 ?

In common with inductors, circuit diagrams fail to indicate the value or part number for the VDR's
The part in question is this:

STANDARD VDR DISC COLOUR CODING (E 299D./P...)

Colourband A indicates measuring current

A	measuring current
1	100 mA
2	10 mA
3	1 mA

Silvertip 10% tolerance
Colourbands B and C indicate voltage at measuring current

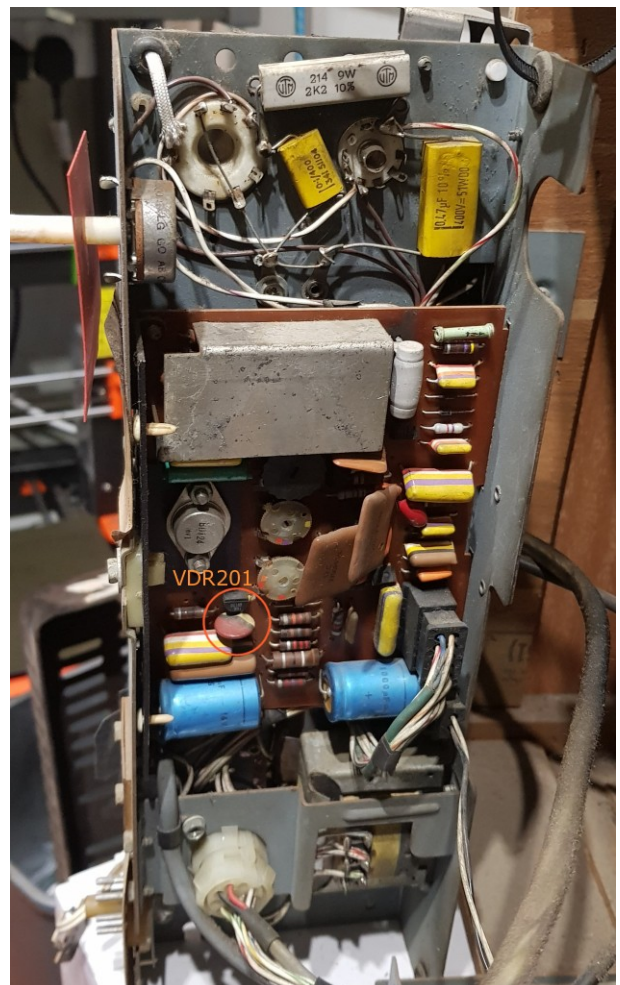
B	C	voltage
1	6	8 V
1	8	10 V
2	0	12 V
2	2	15 V
2	4	18 V
2	6	22 V
2	8	27 V
3	0	33 V
3	2	39 V
3	4	47 V

B	C	voltage
3	6	56 V
3	8	68 V
4	0	82 V
4	2	100 V
4	4	120 V
4	6	150 V
4	8	180 V
5	0	220 V
5	2	270 V
5	4	330 V

Colour-coding for special types VDR not indicated in this table.

STANDARD NTC DISC COLOUR CODING

Colourbands BCD indicate resistance value at 25 °C.



Probably a Mullard E299DD/P220, not a cat in hell's chance of finding one of them, so I played with some modern varistors and found one that seemed to work quite well: a nominal 14vac varistor from Epcos: B72220S0140K101

This restored most of the low volts and the raster looked a lot better. Setting the 'boost' and adjusting the height and linearity gave me a decent picture.