TOSHIBA

Flat Bomba

29AZ5DA RGB MOD

VajskiDs Consoles 2022

Used a service manual for '29AZ5DE'

Possibly 'E' for Europe / 'A' for Australia where Euro would have likely come with RGB SCART from factory? Either way, no tech sheets will come up when searching for this model.

A quick summary!

Basically a SUPER easy RGB mod and very rewarding – This is a nice set! No need to fork out insane amounts of cash for a tiny little PVM. This beast is 29inches of goodness and you'll probably find one free!

Warning: There are super high voltage components in CRT's and you can easily shock yourself, furthermore – you can even kill yourself. You've being warned! Please educate yourself on the dangers of working on CRT's prior to this modification.

...Why is this so easy to mod?

Because we are going to take a huge shortcut and use this adapter lead! I got mine from cool-novelties eBay store! I have made quite a few in the past using a PCB mount female SCART input connector on a custom made PCB - I've even sold these home made ones and they work fine, but in the time I've been heavily into modding, the retro 'scene' has blown up. These are now being made to a high quality and this particular one is priced right at about $50 AUD landed. When I threw one together for a PVM a couple years back, these were incredibly hard to source.

By utilising the existing inputs already on the TV, it makes this a super easy mod you can finish easily within an hour.

Which ever input you use for Sync (yellow plug) will be our RGB channel, you can use AV1 or AV2 on the rear. It wouldn't make sense to use the front input (AV3?).

Also, we are going to use the Audio inputs on this channel too! We've already run our Audio LEFT, audio RIGHT, Audio GND LEFT, audio GND RIGHT, Sync input, Sync GND... without actually running anything! If you're lucky you'll find yourself a 5 way SCART switch (5 in one out) for about $40 Landed, so you can have up to 5 RGB inputs from consoles / DVD players etc. All plugged in at once 😊

Blanking (enable / disable RGB input)

10 and 1 page intelligent teletext decoders   SAA5264; SAA5265

SYMBOL	PIN	TYPE	DESCRIPTION
G	33	O	Green colour information pixel rate output
R	34	O	Red colour information pixel rate output
VDS	35	O	video/data switch push-pull output for pixel rate fast blanking
HSYNC	36	I	horizontal sync pulse input: Schmitt triggered for a Transistor Transistor Level (TTL) version; the polarity of this pulse is programmable by register bit TXT1.H POLARITY
VSYNC	37	I	vertical sync pulse input; Schmitt triggered for a TTL version; the polarity of this pulse is programmable by register bit TXT1.V POLARITY
V_{SSP}	38	–	periphery ground
V_{DDC}	39	–	core supply voltage (+3.3 V)
OSCGND	40	–	crystal oscillator ground
XTALIN	41	I	12 MHz crystal oscillator input
XTALOUT	42	O	12 MHz crystal oscillator output
RESET	43	I	reset input; if this pin is HIGH for at least 2 machine cycles (24 oscillator periods) while the oscillator is running, the device resets; this pin should be connected to V_{DDP} via a capacitor
V_{DDP}	44	–	periphery supply voltage (+3.3 V)
Port 1: 8-bit programmable bidirectional port			
P1.0	45	I/O	input/output for general use
P1.1	46	I/O	input/output for general use
P1.2	47	I/O	input/output for general use
P1.3	48	I/O	input/output for general use
SCL	49	I	I²C-bus Serial Clock input from application
SDA	50	I/O	I²C-bus Serial Data input/output (application)
P1.4	51	I/O	input/output for general use
P1.5	52	I/O	input/output for general use

Only using the set for RGB?
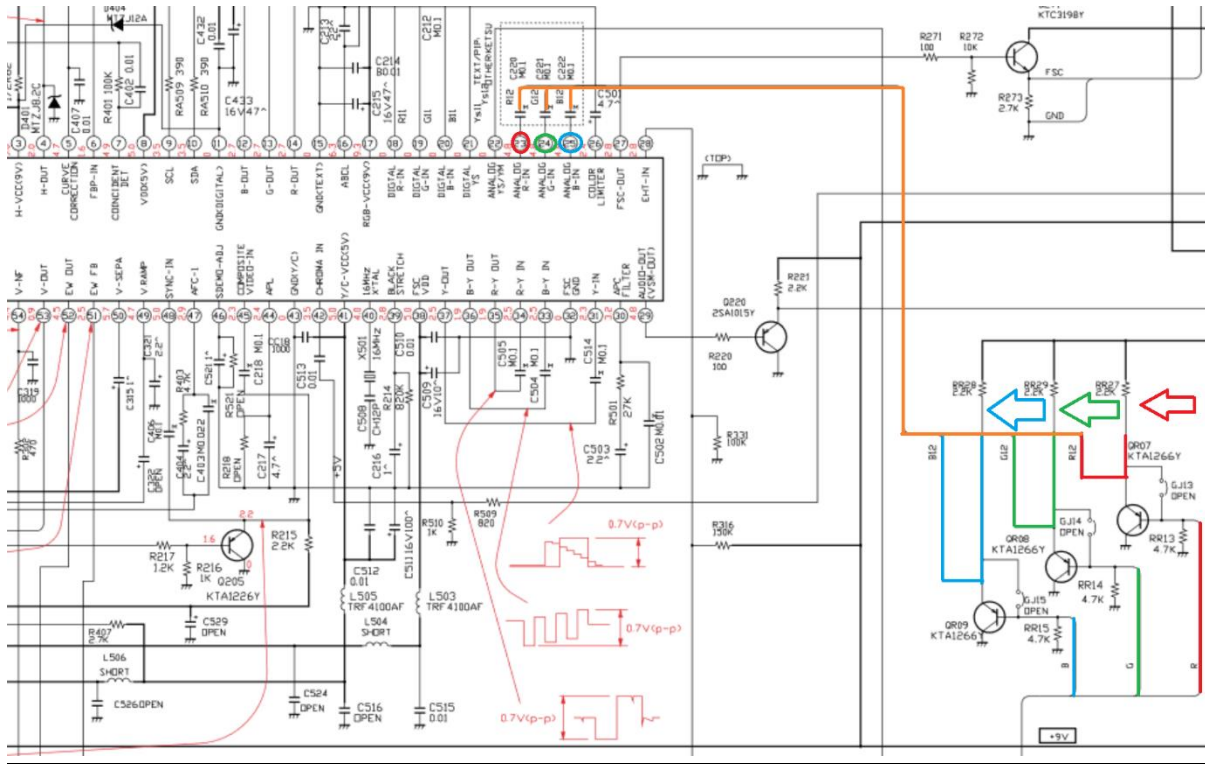Just run a link wire from pin 35 / VDS on this exposed IC across to VDDC / pin 39

Otherwise, run an SPDT switch of your preference (pole, rocker, push button (on/off), sliding etc.). This way you can disable RGB and use S video, composite and tune in on the old school silver fuzz RF! This still comes in handy for testing some old consoles out prior to a mod!

If using a common SPDT pole switch, run one leg of the IC to the centre pin of the switch and the other to either of the outside pins of the switch, the other stays blank. There's heaps of room on the rear input plate to mount the switch. Most other switches share the same pinouts.

Here is the IC you would be working with! I've just tied mine permanantly to RGB enable here. As mentioned, you can use a switch.
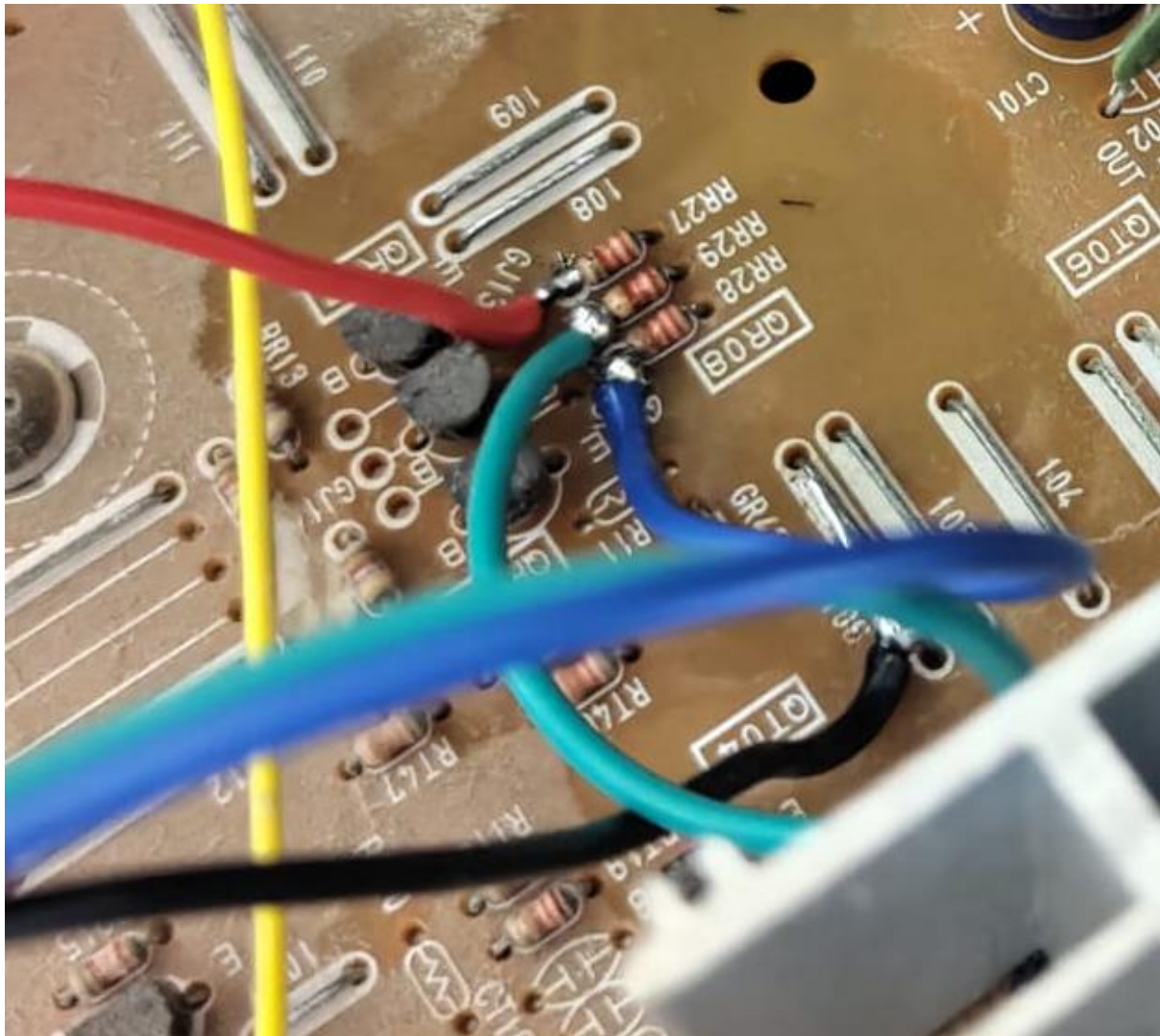
RGB Inputs

...remember, all the other inputs are 'done' 😊

This is a little mudmap of the sets internals in regards to our analogue RGB input path, I've just marked it up with some colour! We don't even need to expose the top of this IC (it's covered with a shield / plate) and can take a shortcut and jump the inputs to where the arrows are!

RR28 = Blue
RR29 = Green
RR27 = Red
Black = GND (common)

**The yellow wire is from factory and not part of the mod.
The black wire is our GROUND wire – I just used a meter on
continuity mode with one end on a parts shield/ casing
(they're always grounded) and that was the first link i
checked (as it's nearby!) and just by chance, it happened to
be a ground link! 😊 😊**

...but the signals too strong

Unless you are some strange Japanese person designing the PAL super nintendo and decided that, on this one particular occasion you just need to be 'your own' and go against the grain (PAL SNES RGB and their cables?? Why?!). ....RGB *generally*, *almost* always works like this!

You have a 0.7vpp signal (zero point seven volts, peak to peak) which goes into an amplifier for X2 (double). The signals then come out @ 1.4vpp. This is then a nice strong signal able to be pushed through a cable into the set.. BUT, the signal/s pass/es through a 75r (75 ohm) resistor which is either in the console / device or in the cable (the signals also pass through a capacitor to eliminate the DC aspect and only allow AC to pass through, usually these are in the cable to save manufacturers money). Passing through this 75r resistor forms the first half of a resistor divider.

The next half of the resistor divider is also a 75r resistor, but instead of in series, its terminated to ground. This divides the 1.4vpp signal back into 0.7vpp for the set. We have the first half of the resistor divider, but we need to add the second half in the set!

Voltage Divider Calculator

A voltage divider circuit is a very common circuit that takes a higher voltage and converts it to a lower one by using a pair of resistors. The formula for calculating the output voltage is based on Ohms Law and is shown below.

$$V_{out} = \frac{V_s \times R_2}{(R_1 + R_2)}$$

where:

- V_s is the source voltage, measured in volts (V),
- R_1 is the resistance of the 1st resistor, measured in Ohms (Ω).
- R_2 is the resistance of the 2nd resistor, measured in Ohms (Ω).
- V_{out} is the output voltage, measured in volts (V),
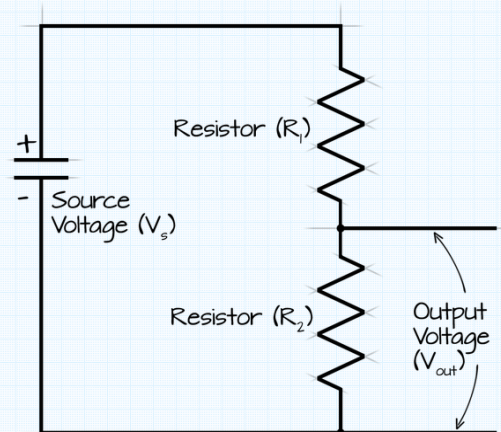
Enter any three known values and press 'Calculate' to solve for the other.

Voltage Source (V_S)	1.4	Volts (V)
Resistance 1 (R_1)	75	ohms (Ω)
Resistance 2 (R_2)	75	ohms (Ω)
Output Voltage (V_{OUT})	0.7	Volts (V)

https://ohmslawcalculator.com/voltage-divider-calculator

Simple!

I've just linked the grounds on the RCA jacks with a piece of desoldering braid. This way I can run a single ground wire, with the added benefit of the 75r terminating resistors being easily added as pictured. Now the TV gets the signal it expects, and we get cristhhhhpyyyyyyy RGB.