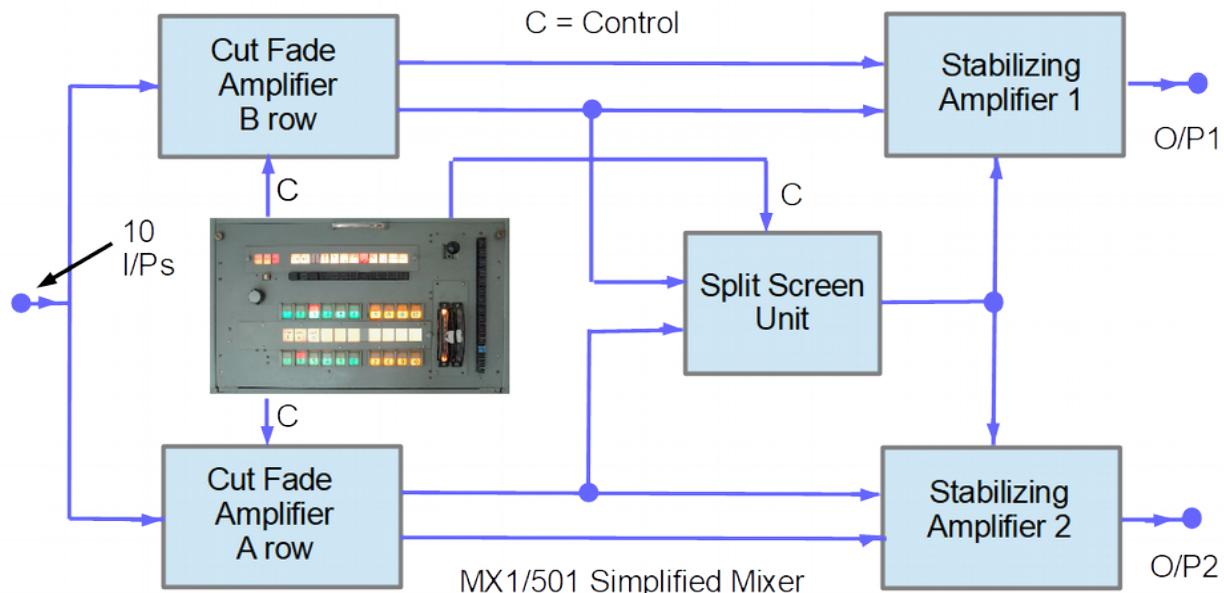


## MCR21's Vision Mixer BBC type MX1/501

The BBC designed this mixer in 1962 for installation into the 10 new “Main Fleet<sup>1</sup>” outside broadcast vans. It has 10 input channels, 6 are for synchronous sources and 4 can be switched to Sync or non-sync<sup>2</sup>. Cuts, mixes, wipes, inserts, and split fader operations are possible.

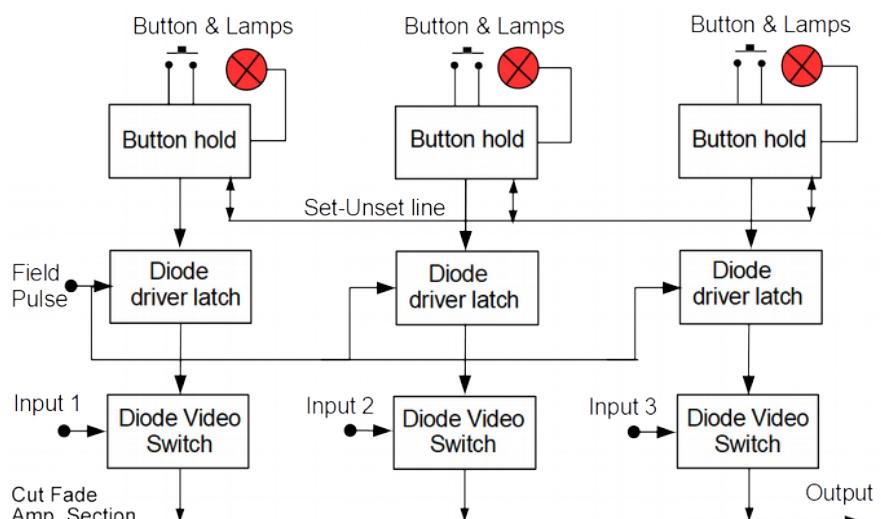
For the first time this is a fully solid state mixer for the signal path using transistors and diodes as the switching elements. Relays and solenoids are used for the bulk of the controlling logic. The design was quite advanced for the time, other manufacturers<sup>3</sup> were still using relays as the switching elements. The design was adapted for colour working and was installed in a further 12 CMCRs<sup>4</sup> as well as many studio installations. It was in use into the early 1980s a remarkable span of 20 years.



In the diagram, the 10 inputs go to both Cut-Fade Amplifiers, the selected input is connected to the Stabilising Amplifier which clamps the signal and corrects any errors in the sync and blanking. There is also the option of the Split Screen Unit which can do Wipes, Inserts and has the ability to Key-in a caption.

There are two Stabilising amplifiers, main and reserve with a changeover switch. The mixer is so arranged, with dual power supplies, that it can continue to operate with reduced facilities in the event of a fault.

In this diagram (right) of part of the Cut Fade Amplifier unit three of the ten button-latch-diode switches are shown. Each illuminated button can have up to 4 coloured lamps which light to indicate the button status. When a button is pressed it releases the previously selected button and with the field pulse activates the diode switch to operate in the blanking period. This timed cut-in-blanking switch



operation is to eliminate or minimise, any picture disturbance on switching.

<sup>1</sup> Pye called them Main Fleet OB vans

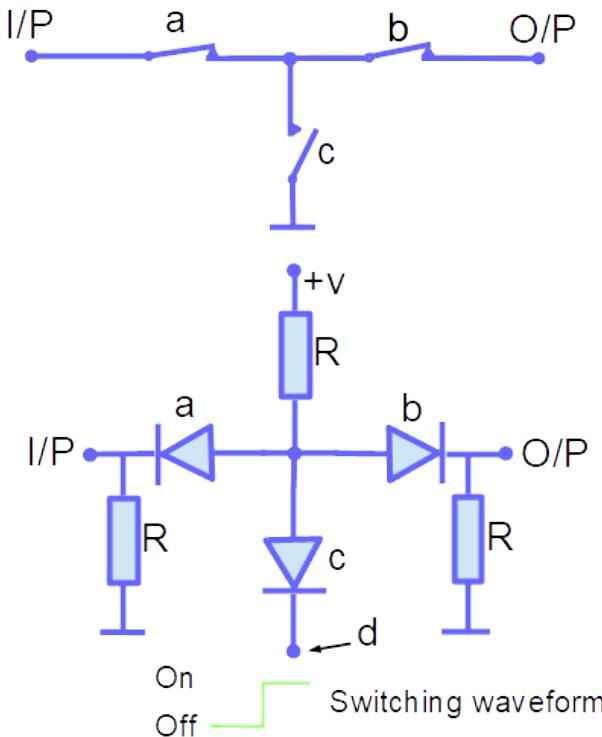
<sup>2</sup> Non-synchronous sources can't be mixed to and only crash cuts are possible. Ask for further explanation.

<sup>3</sup> A “Modern Relay Vision Mixer”, G.E. Partington, Marconi, IEE paper 4037, June 1963. Received 11 May 1962.

<sup>4</sup> CMCR = Colour Mobile Control Room.

## Diode Video Switching

The electronic switching of the video using diodes is VERY fast, much faster than the previous generation of mixers using mechanical switches or relays<sup>5</sup>. The 405 line post sync blanking period is 6.5µs and the switch must operate in a shorter time period, perhaps less than 1µs<sup>6</sup>. The diode switch circuits achieve this with ease.



In the idealised top diagram, switches a & b are closed and switch c is open. The video is passed from the input to the output. Opening switches a & b and closing c blocks the video signal.

The lower diagram has a very much simplified representation of the Diode switch.

Diodes have a low resistance when forward biased and a high resistance when reverse biased.

When the switching waveform at point d is high (on) current flows through the Rs and diodes a & b forward biasing them to low resistance. Current does not flow through diode c and it has a high resistance. The video is passed to the output.

When the switching waveform is low (off) the current is diverted through diode c, now low resistance and diodes a & b are reverse biased and high resistance. The video path is blocked.

This is a most simplified description of the diode electronic switch, the real ones have 9 diodes and 2 transistors in each of the twenty switches plus a number of other components common to all circuits.

The Mixer electronics are arranged in 6 plug-in removable crates each crate containing a number of individual modules. There are two AM1/504 Cut Fade Amplifiers each containing 6 modules and a power supply. The extended module is a UN9/510 three channel switch. It has 3 sub boards each is a single diode video switch. The complete cut fade amplifier unit has the following modules:-  
UN9/510 3 channel switch x 3  
UN9/509 Single channel switch  
AT3/501 Fader module  
AM5/506 2 channel amplifier  
PS2/503 Stabilised power supply.

The other main plug in crates are the UN4/501 split screen unit, the UN3/502 control unit, two AM18/503 Stabilising Amplifiers all fitting in a CT3/4 cabinet and the Producers Control Panel PA/507 fitting on top. For studio use the PA/507 could be 300 ft away from the mixer unit.



The Cut Fade Amp. with a switch module on the extender card

<sup>5</sup> A Relay is a mechanical switch(es) operated by an electromagnet. There are many different types for various applications.

<sup>6</sup> 1µs = 1 microsecond, a millionth of a second.