TECHNICAL DESCRIPTION

TELEVISION monitors play a vital role in the production of a programme and are found at various points in a transmission channel.

PICTURE AND WAVEFORM MONITOR CHASSIS
Type BD.627

The picture and waveform monitor is a standardised unit designed for universal application wherever a combined picture and waveform display is required. As such it is employed—in the Marconi system—in the following ways :

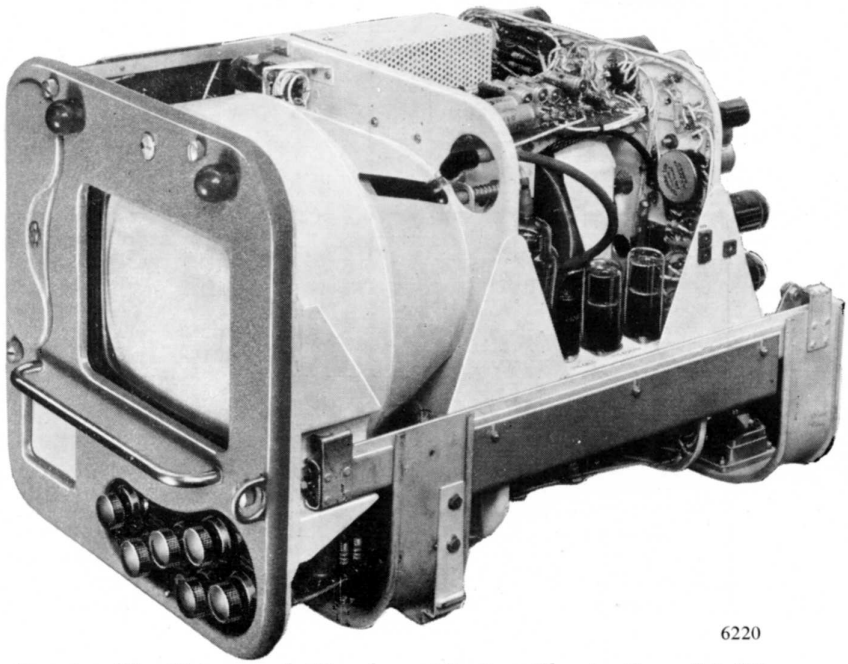
1. Combined with a Camera Control Chassis Type BD.626 to form a camera control and preview monitor unit.
2. Combined with a Vision Mixer Panel to form a vision mixer.
3. In studio and master control switching systems.
4. As part of a transmitter control desk.
5. As an individual monitor unit.

When directly associated with another unit as in the first two cases mentioned above, the monitor mounts directly on that unit and all interconnections are made automatically by means of mating connectors. The combined assembly may then be housed in either a console housing Type BD.650 for studio use or a mobile case Type BD.628 for mobile service. For studio and master control switching purposes the monitor may be rack or cabinet mounted, and in the case of the transmitter control desk it is, of course, built-in. In all these applications, power supplies are normally taken from an associated regulated power supply unit, the Types BD.653 and BD.641 being commonly used. (These are described in pamphlet ref. TD.142). When the monitor is required for a separate function, the special Monitor Regulated Power Supply Unit Type BD.653 is again used, and the two units fit together for assembling in either a console housing or a mobile case. If fitted in the latter and intended for general test purposes, the assembly may be fitted on a Single Equipment Stand Type BD.631C, an arrangement offering great versatility.

The monitor includes a 10-inch picture tube and a $3\frac{1}{2}$-inch waveform tube and is available in various editions to operate on the three commonly-used standards, i.e. 405 line 50 field, 525 line 60 field and 625 line 50 field.

Construction

The monitor chassis mounts the picture and waveform tubes, with associated amplifiers, scanning circuit components, EHT generator, shaping and calibration circuits. Three vertical flanged plates with apertures through which the tubes pass, form the basis of the mechanical assembly. These plates, one of which forms the front panel, are strengthened by the central conical picture tube screen, and supported by the moving members of two runner assemblies which, in turn, are attached to a supporting



6220

FIG. 1. *The Picture and Waveform Monitor Chassis Type BD.627 showing the type of construction. When combined with an associated unit the cradles lock together and interconnections are made automatically*

www.tvcameramuseum.org

cradle. This cradle carries on its underside two plug assemblies through which connection is made to the associated unit below and also includes the necessary fasteners and abutments to retain it in position. A flexible rubber conduit protects the wiring where it passes between the fixed cradle and the withdrawable chassis assembly. A latch mechanism, released by a trigger on the front panel, secures the sliding chassis in either the fully closed or fully open position. When in an assembled position, therefore, the monitor may be readily withdrawn from its housing thus rendering all parts readily accessible.

All operating controls are accessible from the front of the unit. Main controls have conveniently placed knobs, subsidiary controls are provided with screwdriver slots and are grouped behind a hinged flap. Both main and subsidiary controls have scales to facilitate logging.

The picture tube is provided with a mask of standard 4 × 3 aspect ratio whilst the waveform tube is visible through a rectangular aperture enabling the largest practicable display to be readily observed. The front panel has a light grey rivelled enamel finish with chromium plated fittings.

Two cue lamps, one of which is wired for relay operation, are provided on the face of the monitor. Their function depends upon the purpose for which the monitor is employed. When used as a camera control and preview monitor one cue lamp would normally indicate " Channel Available " and the other " On Air ".

Circuit Description

The picture and waveform monitor chassis contains three vision amplifier chains ; two of variable gain feeding the picture and waveform cathode ray tubes and a third, combined with a synchronising separator, which provides line and field synchronising signals. This is shown schematically in Fig. 2.

The picture tube amplifier comprises a variable gain pentode stage, this feature providing for contrast adjustments, a double-diode clamp keyed at line frequency and a tetrode output stage. The clamp circuit ensures the stability of black level at the picture tube irrespective of amplitude variation and low frequency errors in the incoming signal. A beam tetrode output stage is employed and is directly coupled to the picture tube.

The waveform amplifier is generally similar except that a DC restorer replaces the keyed clamp and a push-pull output stage is employed to give a symmetrical drive to the electrostatically deflected waveform tube. Synchronising signals are taken from a separator stage which is fed from the vision input via a triode amplifier and its operation is therefore independent of the picture contrast setting. The synchronising separator has three outputs feeding the clamp keying pulse generator, the line scanning oscillator and the field drive

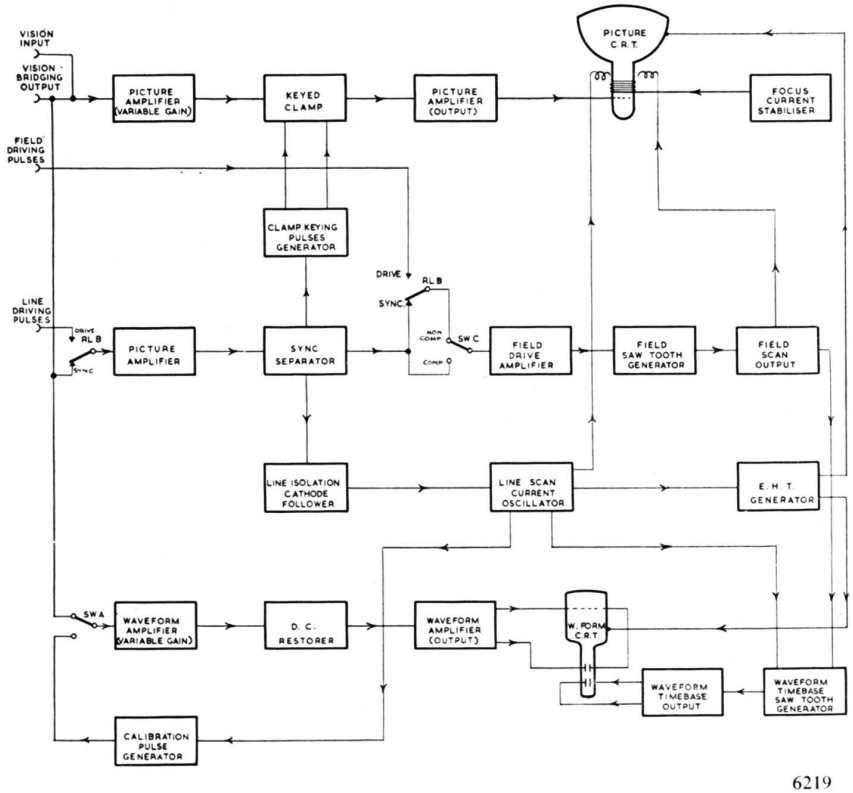


FIG. 2. *Schematic diagram Picture and Waveform Monitor Chassis Type BD.627*

amplifier respectively. In the latter case the output is partially differentiated to accentuate the field component and the amplifier itself effects further separation of line and field information. The amplifier output is used to trigger the field sawtooth generator which, in turn, drives the field output stage. A cathode follower isolation stage is interposed between sync. separator and line scan current oscillator to prevent any feedback of line information into the field scanning circuits, of importance for the maintenance of interlace when the unit is not directly driven.

When the input signals are non composite, the relay RLB (see Fig. 2) is operated and local line driving pulses are fed via the picture amplifier to the sync separator, and field driving pulses are applied to the field drive amplifier. The clamp keying pulses, which are normally timed to occur during the back porch, are advanced and lengthened in this condition to take advantage of the longer blanking period.

To facilitate the setting of the input to standard level, the waveform tube screen is provided with an illuminated graticule marked to correspond with the appropriate picture and synchronising signal amplitudes. These settings are valid only if the amplifier gain is correct, and to enable this to be properly adjusted, a calibration pulse generator is included which produces a pulse at line frequency and of known amplitude. The pulse may be injected into the input of the waveform amplifier by the operation of a switch (SWA see Fig. 2).

A synchronised time base is provided for the waveform tube and operates at either half-line or half-field frequency. Two continuously-running blocking oscillators are triggered by the line and field scan outputs and the output of one of these oscillators, selected as required, is amplified in a push-pull circuit using a double-triode and is applied to the horizontal plates of the waveform tube.

Anode supplies for all circuits other than the two cathode ray tubes are provided from an external voltage regulator unit. EHT for the picture and waveform tubes however, is derived from a ringing choke generator which is driven from the line scan output stage. This generator employs a tetrode valve which draws current through a 300-watt anode choke during the forward line scan but is cut off entirely by a negative pulse taken from the scanning coils during the fly-back. In consequence the potential at the anode rises momentarily to a peak value of some 10 kV before falling again in the form of a damped oscillation. The first such peak is rectified to provide the anode potential for the picture tubes and similarly the first negative peak—due to the negative excursion of the anode before the valve again conducts—is likewise rectified, to provide, via an adjustable resistance network, the operating potentials for the waveform tube.

The picture tube, being of the magnetically focused type, has an energised focus coil, the supplies to which are regulated.