

MOBILE CONTROL ROOM

PART NO. 844013/00 & 844013/01

INSTRUCTION AND MAINTENANCE MANUAL

VOLUME ONE

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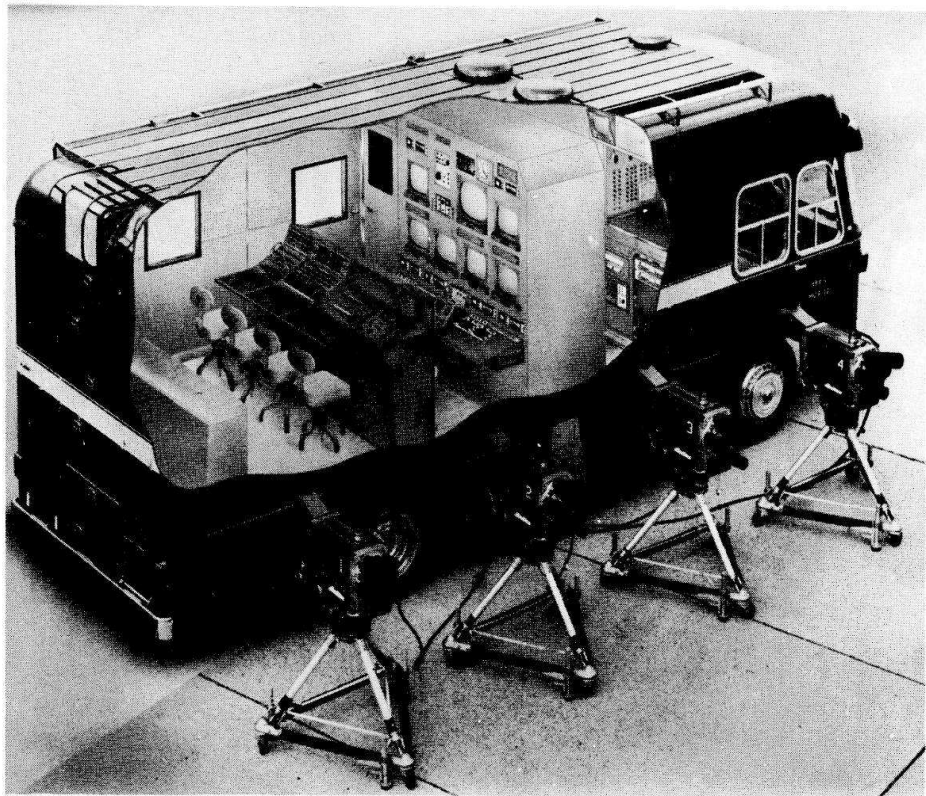


Fig. 1 PHOTOGRAPH OF M.C.R. LAYOUT

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PART 1

VEHICLE DETAILS

POWER DISTRIBUTION

AIR CONDITIONING SYSTEM

EQUIPMENT COOLING

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## SECTION 1 - GENERAL

### 1.1 INTRODUCTION

The Mobile Control Room has been designed and built to meet the requirements of B. B. C. Specifications No. TV96 and TV96/1. The M. C. R. contains all the equipment required to originate a television programme, and can accommodate all the production and engineering staff necessary for that purpose. Cameras, cables, de-rigging equipment etc. are normally transported by a separate vehicle.

All the video equipment in the M. C. R. is designed to operate on 405-line 50-field, 625-line 50-field, or 525-line 60-field television systems.

Provision is made for the joint operation of two or more M. C. R. s, co-ordination of production taking place in one vehicle as chosen.

The equipment in the M. C. R. is designed for easy removal and transport by hand to be set up in the "de-rigged" condition in almost any location. A set of external racks, cables, and connecting boxes is supplied with M.C.R. Type 4013/00. The de-rigged control room layout is designed to resemble the layout of the M. C. R. interior.

M. C. R. Type 4013/00 (TV96) is designed to operate from an external A. C. power supply of between 190V and 260V r. m. s. , 47.5 c/s to 51.5 c/s, single phase. An auto-transformer is supplied to allow for operation with mains voltages below 190V.

M. C. R. Type 4013/01 (TV96/1) is designed to operate from an external A. C. power supply of between 190V and 260V, 49.5 c/s to 50.5 c/s or 59.5 c/s to 60.5 c/s.

Batteries are included so that lighting and sound equipment can be operated in the event of a mains failure or similar emergency.

### 1.2 VEHICLE DETAILS

The M. C. R. is built on a Commer 7-ton ( $7\frac{1}{2}$ -ton for Type 4013/01) forward-control, long wheelbase chassis powered by a six-cylinder petrol engine.

The overall dimensions of the vehicle are approximately as follows:-

Length	24 feet 8 inches	(7.5 metres)
Width	8 feet	(2.4 metres)
Height	11 feet	(3.35 metres)

Technical details of the chassis and engine are as follows:-

Chassis:

Wheelbase	13 feet 6 inches	(4.1 metres)
Wheel Track:		
Front	6 feet 11/16 inches	(1.83 metres)
Rear	5 feet 7 inches	(1.7 metres)
Turning Circle	57 feet	
Rear Circle Ratio	7.2.:1	
Tyres:	8.25 x 20 inches, 14-ply	
Chassis Weight (without fuel, water and spare wheel)	50 cwt 1 qr (2550 kg)	approximately

Engine:

6 cylinders, O.H. V		
Bore	3 $\frac{3}{4}$ inches	(95.25 mm)
Stroke	4 $\frac{3}{8}$ inches	(111.13 mm)
Capacity	4750 c.c.	
B.H.P. at 3000 r.p.m.	111	
Torque at 1200 r.p.m.	230 foot-pounds	

Electrical:

12V positive earth return system  
Battery 12V. 64 Ah capacity

PART 2

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SECTION 7	SYNC DISTRIBUTION
SECTION 8	AUDIO EQUIPMENT
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The following items of equipment are covered in the circuit diagrams, and in some cases have no separate circuit. Certain other items are covered in Volume 2 of this manual.

Vehicle (fittings, wiring and cables)	844013/00
Vision Engineer's Control Panel No. 1	842465/00
Vision Engineer's Control Panel No. 2	842469/00
Remote Vision Engineer's Desk	842886/00
Talkback Junction Box	844487/00
Audio Auxiliary Unit	843992/00
Producer's Desk Unit	844470/00
Trans-Rehearsal Switch Unit	842135/00
Trans-Rehearsal Indicator	844565/00
Monitor Indicator Unit (Line monitor)	844563/00
Monitor Indicator Unit (Prod. monitor)	844563/01
Monitor Indicator Unit (Eng. monitor)	844563/02
De-rig Power Distribution Panel	844571/00
Monitors Remote Services Junction Box (de-rig)	AG24214
Peak Programme Meter (Optical)	AG24026

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## VEHICLE BODY

### Construction

The vehicle body is constructed of light alloy extruded frames, and is clad externally with 16 s. w. g. aluminium sheeting.

The cavity between the inner and outer skins of the body is filled with "Crown 200" fibre-glass.

In M. C. R. Type 4013/00, the van interior is lined with 5/32" single-faced "Decorplast", (colour Sycamore 825). The "Decorplast" is fixed with screws and with "Epoxy" resin glue, and the joints are covered with cream plastic "T" sections. In the production area the inner "Decorplast" lining is perforated with  $\frac{1}{8}$ " diameter holes at  $\frac{3}{4}$ " intervals. These holes, together with the sound-absorbing layer of fibre-glass behind the panels, serve to attenuate sound reflection from the walls and ceiling, thus producing a satisfactory reverberation time and an absence of standing waves. A thin membrane (.0005") of "Melinex" plastic sheeting is stretched and glued behind the holes, thus preventing glass fibres from protruding through the holes, and dust, microbes, etc. from lodging behind them.

In M. C. R. Type 4013/01, the interior lining is of  $\frac{1}{8}$ " Waverite Natural Birch, matt finish. The roof of the production area is finished in perforated steel panels. The roof panelling is fitted with "Crown 200" fibre-glass. In the production area, acoustic panels at the rear and over each side window, together with the perforated roof panels, serve to attenuate sound reflection and produce a satisfactory reverberation time.

The floor of the M. C. R. is constructed of  $\frac{3}{4}$ " resin-bonded plywood, and is covered with "Vynide" P. V. C. linoleum. The floor is not insulated, but at each control position a foot-warming pad is recessed into the floor. Three separate heats are available for each pad (15W., 30W. and 60W.). A wall switch conveniently placed for each control position gives selection of the heat required.

### LIGHTING

Six 20W fluorescent light-fittings, each 2 feet long, are recessed into the cornices; two are fitted in the forward equipment area and are controlled by 2-way switches beside the near-side and off-side doors; four are fitted in the production area and are controlled (in pairs) by switches near the partition door and the rear door.

The fluorescent light gives a high level of shadow-free illumination for servicing and maintenance use.

For transmission conditions, lighting is provided by two special ceiling-mounted masked 20W 2-foot fittings, which cast light only on the tops of the engineering and production desks. These lights are controlled by wall-mounted switches adjacent to the engineering and production desks.

## 1.5 STEP WARNING SYSTEM

A warning buzzer is fitted behind the driver's seat to guard against the vehicle being driven with any of the entrance steps in the down position.

The buzzer is supplied from the switched side of the vehicle ignition switch, the circuit being coupled through three microswitches wired in parallel, one fitted to each of the three entry steps (two forward and one rear). When any step is down the circuit is completed when the vehicle ignition is switched on, and the buzzer will sound.

Additional microswitches may be fitted to the rear and forward termination panel locker doors to include these in the warning system.

## 1.6 A. C. MAINS SUPPLY

The M. C. R. is designed to operate normally from an a. c. mains supply to the vehicle mains input panel between the limits of 190V and 260V, 47.5 c/s to 51.5 c/s, single phase, (49.5 c/s to 50.5 c/s, or 59.5 c/s to 60.5 c/s in M. C. R. 4013/01).

The auto-transformer supplied with M. C. R. 4013/00 makes operation possible at voltages below 190V, and in cases where long lengths of power supply cable have to be used. The auto-transformer extends the lower limit to 160V. Operation is possible at voltages even below this provided the input connector on the auto-transformer is bypassed (B. I. C. C. 60A plug and socket used, which can be over-rated up to 80A, but overheating may occur at currents in excess of 80A).



1.7

### BATTERY SUPPLIES

Batteries for emergency lighting and sound are fitted in well-ventilated compartments, located on the off-side of the vehicle.

Four 12V batteries are housed in the rearmost compartment in pairs, forming the emergency supplies for the 24V lighting and 24V sound equipment. Two more batteries, one 12V and one 6V, are mounted in the centre compartment, and provide the emergency supply for 18V sound equipment.

1.8

### NIGHT SUPPLY

The "night supply" may be fed into the vehicle from a normal 15A or 13A domestic supply point, via a connector labelled NIGHT SUPPLY and is intended for use by a watchman or guard.  
(See Section 2.3)

## SECTION 2 - POWER DISTRIBUTION SYSTEM

### 2.1 SYSTEM

The power distribution system consists of the following:-

- (a) Normal and Standby Supplies, which include the a. c. mains supplies required for the normal functioning of the transmission, rehearsal and servicing facilities in the vehicle: (see Sections 1.4 and 2.2).
- (b) Night Supply, for lighting and heating purposes and battery charging, at times when the normal supply is not required to be connected, (see Sections 1.6 and 2.3).
- (c) Emergency Supplies, for lighting and sound equipment, for use when the mains supply is disconnected or is at fault: (see Sections 1.5 and 2.4). The emergency supplies can also be used when the vehicle first arrives on site and is not connected to a mains supply.

### 2.2 MAINS DISTRIBUTION

#### Mains Termination Panel (see Fig. 2)

Normal and Standby power supplies are connected to the mains termination panel (M. T. P.) on the rear off-side of the vehicle, using B. I. C. C. 60A 3-pin moulded connectors, PL2, PL3. These can both be alive at the same time. Neon indicators (LP1, LP2) show when supplies are on. The mains inputs are fed to two mechanically interlocked circuit-breakers CB1 and CB3, which are designed for rapid changeover between normal and standby supplies, with no possibility of simultaneous connection. A sliding selector-plate allows the required circuit-breaker to be switched on, whilst simultaneously locking the other in the OFF position. It is necessary for both CB1 and CB3 to be switched OFF before the selector-plate can be moved. Thus, both circuit-breakers cannot be ON at the same time, and the input supplies (which could be different in voltage, polarity, and phase) cannot be paralleled.

#### Mains Control Panel

The output connectors of CB1 and CB3 are paralleled with copper bus-bars which connect the rear termination panel via the main feeder to the mains control panel located in the forward

equipment compartment. The line wire of the feeder is taken through the centre of a current transformer (Type S. 164), which has a current ratio of 100A/5A and feeds a 0-5A meter, M2, (scaled 0-100A) on the mains control panel.

The supply to the mains control panel is carried on 100A, P. V. C. insulated cable laid in the under-floor cable-ducts. A single 100A cable is used as an earth connection between the rear termination panel and the mains control panel. All the earth conductors from the sub-circuit supply sockets, equipment and racks terminate at one earth connection on the mains control panel, which is directly connected to the 100A main earth conductor to the mains termination panel, and finally to the MAINS EARTH terminal.

### Earth Leakage Protection

Normal and standby supplies are protected by an earth leakage relay connected between the MAINS EARTH and SPIKE EARTH terminals on the M. T. P. All equipment earths and metalwork within the vehicle are connected to the MAINS EARTH terminal, and this terminal should be effectively earthed. The earth spike provided should be used wherever possible.

The SPIKE EARTH terminal should also be earthed, but at least six feet away from the MAINS EARTH spike.

In the event of a fault between line and mains earth (e. g. via any metalwork in the vehicle) a current will flow through the mains earth connection and rupture the fuse or circuit-breaker concerned. If, however, the earth connection to the soil is ineffective and of high resistance, the potential of vehicle metalwork will rise above earth. When the potential reaches 40V r. m. s. the earth leakage protection relay (RLA1) will operate and energise the trip coils of both the 100A circuit-breakers CB1 and CB2 and the vehicle will thus be isolated from the incoming mains supplies. It is impossible to reset the circuit-breakers while the fault exists.

The earth protection relay is a low-current, high-resistance device, and it does not depend on the spike earth being an effective low-resistance earth connection. The mains earth, however, must always be a low-resistance earth connection capable of carrying at least 100A.

### Mains Lock

The field phase and locking unit (see separate manual) receives signals from two input sources, one originates from the local mains at 240V via PL7 (a 5A L and P type B13R plug) and is transformed to 6.3V and applied to the switch SWH on the mains termination panel; the second is an external 0.1V to 6.3V signal which

is connected to the EXT. SOURCE INPUT terminals, thence to SWH. The external source is usually derived from a telephone line (e.g. from a studio centre). The field phase and locking unit provides a 600-ohm termination for this signal. One or the other of the above sources, whichever is selected by the switch SWH located on the mains termination panel, is applied as the REMOTE INPUT to the field phase and locking unit, which derives from it a field locking signal for the sync pulse generator. (See Section 7).

### Sub-Circuits

The mains supply from the mains control panel is split into four circuits, i.e. Circuits A, B, C, and Unregulated. Each circuit is controlled by a 30A circuit-breaker, with circuit fuses grouped below. A neon indicator above each circuit-breaker is connected to the output terminals and indicates when each circuit is live. Circuits A, B and C are regulated supplies obtained from three 4.2KVA Automatic Voltage Regulators housed in a compartment on the rear-nearside of the vehicle. Each regulator is provided with a by-pass switch located on the Mains Termination Panel. The by-pass switches are double-pole and switch the sub-circuits either to the AVR output or directly to the 30A circuit-breaker output. The input to the AVR remains alive in the by-pass condition to enable testing and fault-finding to be carried out. Should it be necessary to isolate the AVR this is best effected by removing the input connector. The output from the by-pass switches feeds the bus-bars connecting the common poles of the sub-circuit fuses.

The unregulated supply circuit breaker, CB7, feeds a manual voltage regulator which provides hand control of buck-or-boost voltages between 0 and 70 volts above and below the input voltage to maintain a fixed output of 240V. An over-voltage detector is fitted to the manual voltage regulator which, together with the operating coil of an integral circuit-breaker, serves to protect the connected equipment from excessive voltage. This condition may occur if the vehicle has been operating in an area of low voltage supply (necessitating a high boost voltage to maintain an output of 240V) and then moves to an area of higher voltage without the regulator being readjusted. The over-voltage detector may be set to operate at voltages between 220V and 260V. It is normally set to 250V so as to allow for 10V rise on a nominal 240V, to prevent operation on normal mains fluctuations.

### Sub-Circuit Distribution

Each regulator, automatic or manual, feeds a number of supply sockets which are supplied in groups via fuses located on the mains control panel. The fuses are located conveniently beneath each circuit-breaker. Circuits A and B supply mainly vision equipment which is more or less equally divided so that if either circuit develops a fault a vision service can be maintained on the other. The sub division of supplies is shown in Figure 2.

The supply sockets are mounted on the cable ducts close to the units of equipment supplied. Each socket has two sub-sub-circuit fuses adjacent to it.

Circuit C supplies programme sound equipment, general service sockets, and other ancillary items including vehicle lighting.

For full details of supplies to units see Figs. 3 to 6.

### Metering Facilities

An ammeter and voltmeter are fitted on the mains control panel. These meters are provided with illuminated scales lit by two special bulbs accessible from the rear of the panel. The bulbs are supplied from a 240V/2V transformer, located at the rear of the mains control panel with 1A primary fuse adjacent.

The ammeter is supplied from a current transformer fitted at the rear of the M. T. P. The meter has a full scale deflection of 5A but (due to the transformer) is scaled 0-100A. The current transformer has a current ratio of 1-20. The ammeter and voltmeter are moving iron types and have an accuracy of  $\pm 2\%$  of f. s. d.

The voltmeter is connected between the common neutral and the wiper of the voltmeter selector switch. The selector switch has four positions and off, and monitors the voltages after the AVRs on circuits A, B, C and Unregulated, and the Line volts as supplied to the AVRs. It must be noted that since the voltmeter is connected to the common neutral, a break in any of the neutral leads to and from the AVRs may not show as a loss of volts.

### Mains Distribution to Equipment

The vehicle is divided into three racks for purposes of power and services distribution, (see Fig. 3).

#### Rack 1

Rack 1 is in the forward equipment area, immediately behind the driver's cab, and contains the following equipment:-

- Talk-back Junction Box
- Pulse and Bar Generator
- Preview Selector Unit
- Servicing Tektronix Oscilloscope
- Vision Jackfield
- 8 $\frac{1}{2}$ " Monitor
- C. C. Us 1-4

### Rack 1 (Continued)

Capt. C. C. U. (spare)  
S. P. G. s 1 and 2  
Sync. Coincidence Detector  
Radio Mic. Receivers 1 and 2  
Trans/Rehearsal Switch Unit  
Sync. Tee Junction Boxes - 5  
Sync. Junction Box  
Tape Console  
Distribution Amplifier Outfit  
Test Generator Outfit

### Rack 2

Rack 2 is the centre rack between the equipment and production areas, with displays and controls facing the production area.

14" Picture Monitor - Cams. 1-4  
Waveform Monitors - Cams. 1-4  
Engineering Preview 14" Picture Monitor  
Producer's Preview 14" Picture Monitor  
Waveform Monitor (Eng. P/V)  
Waveform Monitor (Prod. P/V)  
17" Transmission Monitor  
Monitor Indicator Unit (Line)  
Monitor Indicator Unit (Prod. P/V)  
Monitor Indicator Unit (Eng. P/V)  
Field Phase and Locking Unit  
Optical Programme Meter  
Master W. F. M. Tektronix Oscilloscope  
Trans./Rehearsal Indicator Unit  
Radio Check Receivers  
Vision Engineer's Control Panel No. 1  
Vision Engineer's Control Panel No. 2  
Waveform Processing Unit  
Camera Power Units 1-4  
Space for Capt. Power Unit  
Manual Voltage Regulator  
Clock

### Rack 3

Rack 3 comprises the sound and vision production desk, and contains the following:

Producer's Desk Unit  
Vision Mixing Unit  
Audio Auxiliary Unit  
Audio Mixing Unit  
Loudspeaker Unit

The distribution of supplies from the mains control panel to the various equipments is effected in metal ducts with the sockets and fuses mounted on the duct covers.

The Mains Distribution Circuit (Equipment) Fig. 3., shows the general distribution of mains supplies to the de-riggable items of equipment while the associated tables 1 - 3 show the details of fuses, cables and connectors for Racks 1 and 2.

The distribution of supplies to Rack 3 is made direct from the mains control panel with flying-end sockets to the units. A junction box located in the under-floor duct below the equipment area gang-way serves as a connecting point for SK. 64, SK. 65, SK. 66 and SK. 67 and the artist's cue circuit.

The 6.3V supply to the two clock lights is obtained from a transformer (Type AL. 20078), which is located inside duct L, behind the monitor rack and carries SK. 42, SK. 43 and SK. 44. This 6.3V supply is also used for pointer and scale illumination of the peak programme meter. This supply to the P. P. M. is remotely controlled from the audio mixing unit via a 24V relay mounted on the peak programme meter assembly.

The Mains Distribution Circuit (Vehicle), Fig. 4 shows the distribution of power supplies to the equipment installed in the vehicle which is not removed for de-rig purposes. The vehicle lights, battery charger, and SK. 11 (fan heater) are supplied from the NORMAL/NIGHT changeover switch, (Mains Control Circuit, Fig. 2), and are powered either from the mains control panel, circuit C or from the night supply input on the mains termination panel as required. In M. C. R. Type 4013/00 the tubular heaters are powered only from the night supply input and are not available on the normal supply so as to avoid the possibility of overheating the camera power units.

## 2.3 NIGHT SUPPLY DISTRIBUTION

The night supply is connected to a 15A L and P type plug, PL. 1, designated MAINS INPUT NIGHT on the M. T. P. This supply is entirely separate from the normal and standby mains inputs, and can originate if necessary from an ordinary domestic supply point.

From the plug, the supply is fed directly to a 15A circuit-breaker, CB. 2, which is fitted with integral earth leakage protection: the coil of the circuit-breaker is connected in parallel with the coil of RLA, the normal supply earth leakage relay, thus the same conditions of earth leakage protection apply.

The output from the night supply circuit-breaker is fed to a rotary change-over switch (located on the M. T. P.) which has two operating positions, i. e. "NIGHT" and "NORMAL". The switch changes over the equipments listed below from the normal supply to the night supply. The sub-circuit fuses applicable to the equipment are common to both supplies.

#### Services available on NIGHT SUPPLY.

Vehicle Interior Lighting (SK. 78)  
Tubular Heaters (M. C. R. 4013/00 only)  
Fan Heater (SK. 11)  
Battery Charger (SK. 23)

#### NO OTHER EQUIPMENT SHOULD BE CONNECTED TO THE NIGHT SUPPLY

### 2.4 EMERGENCY SUPPLY DISTRIBUTION

Emergency supplies are available separately for vehicle interior lighting and to operate audio equipment.

#### Emergency Lighting

A 24V, 100 Ah, lead-acid accumulator supplies a transistorised transverter producing 240V 50 c/s at 400VA for the interior lights. The change-over from "Normal" to "Emergency" lighting is entirely automatic; a change-over relay (located in a locker behind the M. T. P.) is normally energised by the incoming mains supply, and if the incoming mains supply fails the relay becomes de-energised, the associated contacts switch on the d. c. supply to the transverter, and change-over the lighting feed from the normal supply (circuit C) to the transverter output. Restoration of the incoming mains supply reverses the process by energising the relay.

The automatic change-over to battery-transverter lighting can be suppressed (e. g. when the vehicle is not in use) by a switch on the M. T. P. which controls the d. c. input to the transverter. A neon indicator is provided on the M. T. P. to show when the transverter is operating, and serves as a reminder that the battery-operated lights are on when the incoming mains supplies are switched off.

#### Emergency Sound

Two batteries, one 18V and one 24V, each of 100 Ah capacity, supply power in an emergency for the operation of the audio mixing unit, audio auxiliary unit, and radio-microphone receivers.



The change-over from mains to battery operation is automatic and can only be suppressed by switching off the supplies to the sound equipment by means of the MASTER A. C./D. C. switch (located at the bottom of the audio auxiliary unit). If all a. c. input supplies are switched off on the M. T. P. and the MASTER A. C./D. C. switch is left on, the audio equipment will revert to battery operation.

## 2.5 BATTERY CHARGER

A three-circuit battery-charger is installed beneath the bench seat at the rear of the vehicle, with its controls accessible from inside the vehicle through a door.

One circuit is a dual-voltage circuit designed to charge either the 12V vehicle battery or the 18V sound battery. The battery to be charged is selected by a toggle switch, and the charging voltage selected by a rotary two-position "ON" switch on the battery charger. (In M. C. R. Type 4013/01, the battery to be charged is selected by a two-position rotary switch, which also changes the charging voltage accordingly.)

The other two circuits charge the 24V lighting and 24V sound batteries. The maximum charging current is 6A in each circuit.

The battery-charger is convection-cooled by means of a vertical tunnel formed in the wall cavity with an outlet for heated air through a louvre at roof level. This is a re-entrant louvre, and is provided with an internal drip-tray and an external vent, to prevent water (e. g. from a high-pressure hose) from penetrating to the interior. Cool air reaches the bottom of the battery-charger via louvres in the side lockers.

## 2.6 BATTERY-OPERATED LOCKER LIGHTS & POWER SUPPLY POINTS

The mains termination panel and the forward termination panel each have two 24V protected light-fittings for the illumination of the panels during rigging and maintenance. The two lights in each compartment are controlled by a push-on self-cancelling time switch, having an "on" time of approximately two minutes.

The rear battery locker and the AVR locker each have a single 24V light-fitting, which is controlled by the same type of time switch.

The mains termination panel and the forward termination panel are each fitted with a 3-pin 2A. L & P socket, supplied with 24V from the lighting battery. The socket is intended for the connection of a lead light (which is stored in a locker below the forward termination panel) or a low-voltage soldering iron consuming less than 48W.

The Lighting and Batteries Circuit is shown in Fig. 5.

The change-over from mains to battery operation is automatic and can only be suppressed by switching off the supplies to the sound equipment by means of the MASTER A. C./D. C. switch (located at the bottom of the audio auxiliary unit). If all a. c. input supplies are switched off on the M. T. P. and the MASTER A. C./D. C. switch is left on, the audio equipment will revert to battery operation.

## 2.5 BATTERY CHARGER

A three-circuit battery-charger is installed beneath the bench seat at the rear of the vehicle, with its controls accessible from inside the vehicle through a door.

One circuit is a dual-voltage circuit designed to charge either the 12V vehicle battery or the 18V sound battery. The battery to be charged is selected by a toggle switch, and the charging voltage selected by a rotary two-position "ON" switch on the battery charger. (In M. C. R. Type 4013/01, the battery to be charged is selected by a two-position rotary switch, which also changes the charging voltage accordingly.)

The other two circuits charge the 24V lighting and 24V sound batteries. The maximum charging current is 6A in each circuit.

The battery-charger is convection-cooled by means of a vertical tunnel formed in the wall cavity with an outlet for heated air through a louvre at roof level. This is a re-entrant louvre, and is provided with an internal drip-tray and an external vent, to prevent water (e. g. from a high-pressure hose) from penetrating to the interior. Cool air reaches the bottom of the battery-charger via louvres in the side lockers.

## 2.6 BATTERY-OPERATED LOCKER LIGHTS & POWER SUPPLY POINTS

The mains termination panel and the forward termination panel each have two 24V protected light-fittings for the illumination of the panels during rigging and maintenance. The two lights in each compartment are controlled by a push-on self-cancelling time switch, having an "on" time of approximately two minutes.

The rear battery locker and the AVR locker each have a single 24V light-fitting, which is controlled by the same type of time switch.

The mains termination panel and the forward termination panel are each fitted with a 3-pin 2A. L & P socket, supplied with 24V from the lighting battery. The socket is intended for the connection of a lead light (which is stored in a locker below the forward termination panel) or a low-voltage soldering iron consuming less than 48W.

The Lighting and Batteries Circuit is shown in Fig. 5.

An adjustable flap within the air conditioning unit allows the introduction of fresh air into the system, the maximum proportion being 12%.

### 3.2 SWITCHING ON

1. Before switching on the air-conditioning unit check that the louvres in the ceiling duct are open. The discharge louvres can be adjusted to direct the air as required, but should not be set at an angle of less than 60° from vertical. A special combined tool and gauge is provided for the purpose. The inlet louvres are best set to the vertical, so as to offer minimum impedance to the air-flow.
2. Set the thermostat to the required temperature within the maximum and minimum limits (not operative in the VENTILATION position of the switch). The sensitive bulb of the thermostat is located in the return air duct, and it senses the average temperature of the air extracted from the production area. (See SWITCH FUNCTIONS).
3. Switch on the air conditioning unit by rotating the selector switch to the required position (see SWITCH FUNCTIONS). The operation of the unit will then be entirely automatic in the mode selected by the switch.

### 3.3 SWITCH FUNCTIONS

The air conditioning system is controlled by a rotary switch with positions labelled: OFF, VENTILATION, COOLING, DRYING, FULL HEAT, HALF-HEAT. There is also an adjustable thermostat control labelled WARMER and COOLER.

OFF position:

All functions of the air condition unit are inoperative.

NOTE: The unit must NOT be switched off when the production area is occupied unless the communicating door between the technical and production areas is wide open. When all doors are closed, the production area is fully "air-conditioned", i. e. sealed off, and the air-conditioning unit MUST be switched on.

VENTILATION position:

Air is circulated between the production area and the air conditioning unit. A controlled amount of fresh air can be added by means of the flap between the

**VENTILATION position:**

internal and external compartments of the unit; the flap's position being controlled by means of a spring and ball chain, which can be set by slipping the chain into a holding slot. When the chain is released the flap is held closed by the spring; when the chain is pulled out fully the maximum amount of 12% fresh air is added. (A half-way position will usually be adequate for normal operation with up to eight people in the production area).

All circulated air passes through the filter in the unit, and pollution by cigarette smoke is reduced. However, due to the minuteness of the smoke particles, a proportion of the smoke is returned to the vehicle, so that a certain amount of haze will be experienced when a number of people are smoking simultaneously. The VENTILATION condition gives the lowest noise level consistent with essential circulation, because neither the condenser fan nor the compressor is operating. No heating is available, and the thermostat is inoperative.

**COOLING position:**

Air is circulated in the same way as in the VENTILATION condition except that the thermostat is operating and, if the return-air temperature is in excess of the thermostat setting, the compressor and condenser fan will operate. The return air and added fresh air will then be cooled before reaching the production area. When the temperature of the return air in the duct falls below the thermostat setting, the compressor and condenser fan will switch off, and the unit will revert to operation as in the VENTILATION condition.

**DRYING position:**

The DRYING condition is not available, and this switch-position has no effect.

**HEATING (FULL, &  
HALF)**

In the two heating positions air is circulated as described for the VENTILATION condition, but in passing through the unit the air is heated by either one or two 1kW tubular heating-elements, according to whether HALF or FULL heat is selected; in the HALF position

HEATING (FULL &  
HALF)  
(Continued)

one 1kW element is used, and in the full position both elements are used. Thermostatic control is only available in the FULL heating position, when the thermostat controls one of the 1kW elements. A safety thermal control is fitted in the centre of the elements to prevent overheating, if the air-flow is reduced, e.g. if the louvres in the ceiling are closed or the filter in the air conditioning unit becomes blocked.

3.4 SERVICING OF AIR CONDITIONING SYSTEM (M. C. R. 4013/00)

WEEKLY

1. Remove the inspection cover from the right-angle adaptor, by releasing the 6 DZU fasteners. Remove the nylon-mesh filter from its spring clips, shake off any loose dirt, then immerse the filter in warm water to which a few drops of detergent have been added. Move the filter about to loosen attached dirt, then take the filter out and wash it in clean cold water. Shake off surplus water, and dry before replacing. The filter is reversible.
2. Inspect the tapered nylon "sock" under the vehicle to ensure that it opens when the fan is running.

THREE-MONTHLY

The unit should be removed from the vehicle for internal cleaning.

TO REMOVE AND CLEAN AIR CONDITIONING UNIT

1. Switch off the unregulated supply circuit breaker on the mains control panel, and remove the two air conditioner fuses located below the circuit breaker, also remove the 4-way and 11-way connectors from the air conditioning unit.
2. Remove the wire mesh filter below the air conditioning unit (beneath the rear of the vehicle). Access will then be obtained to the four bolts securing the unit. Remove the four bolts.
3. Open the rear locker door and take off both the inspection covers which are fitted to the metal right-angle adaptor. (The near-side cover has quick-release DZU fasteners; the off-side cover is retained by 2BA screws).

4. Remove the long handle, by rotating it while holding the screw with an Allen key.
5. Remove the 2BA screws holding the right-angle adaptor to the unit. Remove the right-angle adaptor with a downward and outward movement.
6. Arrange a suitable support (about 3 feet square and the same height as the top of the rear bumper) in line with the locker door and about 2 ft away. The support must be strong enough to take the weight of the air conditioning unit, which weights 250 lb.
7. Withdraw the unit through the door and place it on the support.
8. Remove the wire-mesh screen and the earth wire near the compressor, and take off the top cover.
9. Clean out all dirt and fluff from both compartments, using a vacuum cleaner with a flat nozzle attachment. Clean both condenser and evaporator fins, using a stiff bristle or nylon brush, and taking care to avoid damage to the thin aluminium fins. Blow out, using compressed air not exceeding 50 lb per square inch.
10. (Every 12 months). Add a small quantity of light machine oil (S. A. E. 10) to both fan bearings.
11. Clean out the condensate drain tube, which is accessible through a hole in the drip tray centre. Use a flexible wire or rod about 2 feet 6 inches long to push down through the tube until it reaches the back.
12. Reassemble the unit, and replace it reversing the order and sense of the instructions given in items 1 to 8.

Test for leaks in the dust covers, and seal any such leaks with 1-inch linen tape.

4.1 OPERATION OF AIR CONDITIONING SYSTEM

Air conditioning is carried out by a Tempair Model 25 air conditioning unit, which is installed at the rear of the vehicle beneath the floor of the production area, and is mounted to the chassis extension. Access to the unit for inspection and maintenance is provided by a hinged door, and provision is made for the unit to be removed through this door.

The unit incorporates noise reduction features such as rubber mountings for the compressor and fan motor, and anti-drumming treatment for the case and cover.

Figure 8B shows the layout of the air duct system. In the production area stale air is extracted at ceiling level via three grilles on the off-side of the vehicle. The air returns to the air conditioning unit via the off-side ceiling duct, going down the rear wall duct and entering the unit through a right-angle adaptor which is fitted with a foam plastic filter and access cover.

A temperature bulb located in the return air duct is coupled by a capillary tube to the thermostat switch mounted below the rear bench seat. Within the "indoor compartment" of the air conditioner the returned air is heated or cooled, as required, according to the setting of the thermostat control, and the air is returned to the production area via the near-side ceiling duct. The conditioned air is discharged through three grilles in the ceiling on the near-side, each grille being fitted with adjustable deflectors.

A by-pass within the air conditioning unit allows the introduction of fresh air into the system, the proportion being about 12%.

4.2 SWITCHING ON

1. Before switching on the air-conditioning unit check that the louvres in the ceiling duct are open. The discharge louvres can be adjusted to direct the air as required, but should not be set at an angle of less than 60° from vertical. A special combined tool and gauge is provided for the purpose. The inlet louvres are best set to the vertical, so as to offer minimum impedance to the air-flow.

2. Set the thermostat to the required temperature within the maximum and minimum limits of the control. The sensitive bulb of the thermostat is located in the return air duct, and it senses the average temperature of the air extracted from the production area. (See SWITCH FUNCTIONS).
3. Switch on the air conditioning unit by rotating the selector switch to the required position (see SWITCH FUNCTIONS). The operation of the unit will then be entirely automatic.

#### 4.3 SWITCH FUNCTIONS

The air conditioning system is controlled by a rotary switch with position labelled: OFF, VENT, NORMAL COND., BOOST COND. There is also an adjustable thermostat control labelled WARMER and COOLER.

OFF position: All functions of the air conditioning unit are inoperative.

NOTE: The unit must NOT be switched off when the production area is occupied unless the communicating door between the technical and production areas is wide open. When all doors are closed, the production area is fully "air-conditioned", i. e. sealed off, and the air-conditioning unit MUST be switched on.

VENT position: Air is circulated between the production area and the air conditioning unit. A fixed amount of fresh air is added by a bypass tube between the internal and external compartments of the unit.

All circulated air passes through the filter in the unit, and pollution by cigarette smoke is reduced. However, due to the minuteness of the smoke particles, a proportion of the smoke is returned to the vehicle, so that a certain amount of haze will be experienced when a number of people are smoking simultaneously. The VENT. condition gives the lowest noise level consistent with essential circulation, because the compressor is not operating. No heating is available, and the thermostat is inoperative.



**NORMAL COND. position:** Air is circulated in the same way as in the VENT. condition except that the thermostat is operating and, if the return-air temperature is in excess of the thermostat setting, the compressor and condenser fan will operate. The return air and added fresh air will then be cooled before reaching the production area. When the temperature of the return air in the duct falls below the thermostat setting, the compressor and condenser fan will switch off, and the unit will revert to operation as in the VENT. condition. If the return-air temperature is less than the thermostat setting the internal 2kW heaters switch on and raise the temperature of the air returned to the Production Areas. When the return-air temperature rises to the thermostat setting, the heaters switch off and the unit reverts to the VENT. condition. A safety thermal control is fitted in the centre of the elements to prevent overheating, if the air-flow is reduced, e.g. if the louvres in the ceiling are closed or the filter in the air conditioning unit becomes blocked.

**BOOST COND. position:** In this condition the circulating fan is run approx. 20% faster and the noise level is slightly higher. All other functions are the same.

**MOTOR GUARD:** The Motor Guard is a thermal switch which operates if the compressor current exceeds the overload value of 15A. The switch may be reset by waiting approx 3 mins for the thermal element to cool and then pressing the red button on the Air Conditioner Control Panel. This process should not be repeated without investigating the cause of the overload.

SERVICING OF AIR CONDITIONING SYSTEMWEEKLY

Remove the inspection cover from the right-angle adaptor, by releasing the DZU fasteners. Remove the foam plastic filter and shake off any loose dirt, then immerse the filter in warm water to which a few drops of detergent have been added. Move the filter about to loosen attached dirt, then take the filter out and wash it in clean cold water. Shake off surplus water, and dry before replacing.

THREE-MONTHLY

The unit should be removed from the vehicle for internal cleaning.

TO REMOVE AND CLEAN AIR CONDITIONING UNIT

1. Switch off the unregulated supply circuit breaker on the mains control panel, and remove the two air conditioner fuses located below the circuit breaker. Disconnect the wires to the block connector inside the inspection cover of the air conditioning unit. Undo the brass adaptor nut attaching the flexible metal conduit to the unit and feed the wires through the hole. The unit is now free of all electrical connections.
2. Remove the wire mesh filter below the air conditioning unit (beneath the rear of the vehicle). Access will then be obtained to the four bolts securing the unit. Remove the four bolts.
3. Remove the 2BA screws holding the right-angle adaptor to the unit. Remove the right-angle adaptor with a downward and outward movement.
4. Arrange a suitable support (about 3 feet square and the same height as the top of the rear bumper) in line with the locker door and about 2 ft away. The support must be strong enough to take the weight of the air conditioning unit which weighs 250 lb.
5. Withdraw the unit through the door and place it on the support.
6. Remove the top cover.

7. Clean out all dirt and fluff from both compartments, using a vacuum cleaner with a flat nozzle attachment. Clean both condenser and evaporator fins, using a stiff bristle or nylon brush, and taking care to avoid damage to the thin aluminium fins. Blow out, using compressed air not exceeding 50 lb per square inch.
8. Clean out the condensate drain tube.
9. Reassemble the unit, and replace it reversing the order and sense of the instructions given in items 1 to 6.

## SECTION 5 - EQUIPMENT COOLING

- 5.1 All items of equipment dissipating any considerable heat are fitted with integral fans for cooling. The fans are designed to force air through the equipment so that the heated air escapes through louvres, usually at the top of the casing. The fan intakes are fitted with nylon mesh filters, easily removable for cleaning.

The design of the vehicle's technical area ventilation system is arranged so as to aid both the forced-flow and the natural-flow cooling of the equipment.

### 5.2 MONITORS

Two 12-inch, "Ventaxia" roof-fans are fitted in the equipment area above the monitors, and exhaust hot air from this area. A baffle, fitted below the air-intake of these fans, improves the air extraction from the depths of the monitor rack.

WARNING: The roof-fans must ALWAYS be ON when any equipment is operating.

### 5.3 FRONT RACK A

Two 6-inch "Ventaxia" wall-fans are fitted in housings, one on each side of the driver's cab. These fans draw air from beneath the vehicle, and force the air through the items of equipment mounted on front rack A, thus aiding the air-flow of the equipment's internal fans. The heated air expelled from the equipment rises in the gangway separating the two side-doors, and is extracted by the roof-fans.

### 5.4 CAMERA POWER UNITS

Air intakes for the camera power units (C. P. U. s) are provided at the rear of the C. P. U. s and extend below the vehicle floor so that air is drawn in from directly beneath the vehicle by the fans integral to the C. P. U. s. The heated air expelled from the C. P. U. s rises in the gangway and is extracted by the roof-fans.

5.5

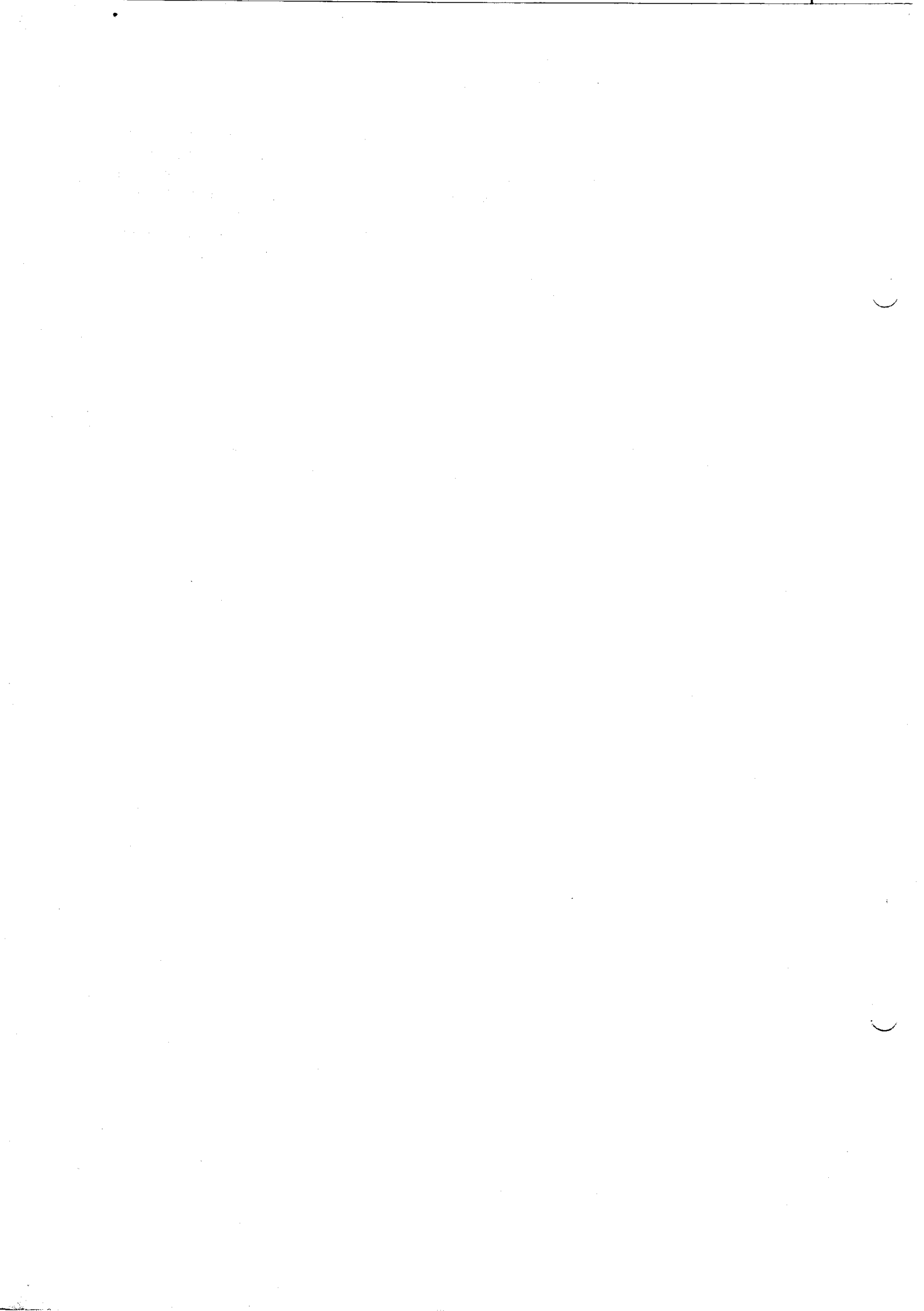
### CONTROL OF FAN SPEED

The speed setting for the "Ventaxia" fans is dictated mainly by the temperature in the technical area. The aim is to maintain a working temperature of approximately 68°F (20°C) in this area. For average ambient temperatures the NORMAL speed settings on all fans will be suitable. For higher ambient temperatures, it is essential for the 6-inch fans to be set at HIGH speed, and the 12-inch roof-fans should also be at HIGH whenever possible commensurate with the higher noise level. For low ambient temperatures the roof-fans may be operated at LOW speed, with the cab-fans at NORMAL (or, in the case of extreme cold, the cab-fans may be at LOW, or OFF)

5.6

### REPEAT WARNING

In no circumstances should the roof-fans be OFF at any time when equipment is operating.



## SECTION 6 - VIDEO DISTRIBUTION

NOTE: The distribution and routing described in this section can be followed by reference to the circuit diagrams (VIDEO CIRCUIT, PARTS 1 & 2).

### 6.1 FORWARD TERMINATION PANEL

All incoming and outgoing video signals enter or leave the mobile control room via the forward termination panel (F. T. P.) which is located on the nearside of the equipment area.

The F. T. P. has a door, with a hinge-down lower half for access to external connections. The upper part of the door may be closed after "cabling-up", in which case the cables are protected from rain etc. by a rubber flap at the bottom of the door, which lays over the cables.

The upper panel of the F. T. P. may be hinged down to give rear access for servicing, whether or not the external cables are connected. The bottom part of the F. T. P. is fixed, and holds only the moulded sockets for the four camera cables and a spare socket for a caption scanner camera cable. The camera cable sockets are connected directly from the F. T. P. to the camera control units by means of short lengths of studio-type camera cable.

### 6.2 CAMERA CONTROL UNITS

The video signal from each camera head amplifier is carried on coaxial leads 10 and 10A within the camera cable via the F. T. P. connections to the NORMAL input of the associated camera control unit (C. C. U.). The signal is processed in the C. C. U. and is fed out from two outputs, 1. TRANS. VIDEO and 2. MON. VIDEO. The MON. VIDEO has an internal parallel connection to the VIEWFINDER VIDEO switch, and is also connected to the waveform monitor and picture monitor for the camera channel, then is fed to the preview selector unit.

The TRANS. VIDEO output is connected (via cables C158), C159, C160, C161) directly to the relative camera input socket in the vision mixing unit.

### 6.3 VISION MIXING UNIT

Selection of the required video signal for transmission is made in the vision mixing unit (V. M. U.).

The V. M. U. has two identical outputs from stabilising amplifiers 1 and 2, which are connected to video jackfield sockets 23 and 24, and connect through jackfield U-links to the video input sockets of Vision Engineer's Control Panel No. 1.

### 6.4 VISION ENGINEER'S CONTROL PANEL NO. 1

The input sockets of the vision engineer's control panel are labelled VIDEO IN 1 and VIDEO IN 2, and receive the corresponding outputs from stabilising amplifiers 1 and 2 in the vision mixing unit. Selection of the required signal is given by the STABILISING AMPLIFIER switch SWB, on the vision engineer's control panel, to which the inputs from the two stabilising amplifiers are connected, the unused input being terminated automatically in  $75\Omega$  by extra poles on SWB.

The output from the STABILISING AMPLIFIER switch is connected to the VIDEO OUT socket of the vision engineer's control panel, which is connected via cable C101 to the input socket of the distribution amplifier, D. A. 7, (part of Distribution Amplifier Outfit Type OT1/502).

The input to D. A. 7 is bridged via cable C50 to the V. M. U. VIDEO socket, SK5, on the transmission-rehearsal switch unit.

In the TRANSMISSION condition of the transmission-rehearsal switch, the V. M. U. VIDEO input is connected directly through to the VIDEO OUT socket SK6. In the REHEARSAL condition, however, the V. M. U. VIDEO input SK5 is terminated in  $75\Omega$  via relay contacts RLD 1-3.

### 6.5 SENDING AMPLIFIER (D. A. 8)

With the transmission-rehearsal switch at TRANSMISSION, the video output from VIDEO OUT, SK6, is connected via cable C51 to the INPUT socket of the sending amplifier, DA8, (part of Distribution Amplifier Outfit Type OT1/502), and terminated by a  $75\Omega$  termination plug inserted in the other side of the bridged INPUT socket.



D. A. 8 has three isolated outputs, as follows:

OUTPUT 1 feeds the LINE INPUT socket on the waveform processing unit in order to monitor the M. C. R. output as close to the sending output as possible.

OUTPUT 2 is the main M. C. R. video output, and connects via video jackfield socket JF25 to the unbalanced output socket labelled VIDEO OUT 1 on the forward termination panel.

OUTPUT 3 is fed to the transmission-rehearsal switch unit SEND VIDEO socket, SK4, and (in the TRANSMISSION condition) the signal is directly connected via SK4 to the LINE MONITOR socket, SK8, from which the 17" picture monitor (TRANSMISSION) is fed via cable C53.

## 6.6 TRANSMISSION & PREVIEW MONITORING

### Transmission Output

The DA8 OUTPUT 3 signal is further connected via cable C53 from the transmission-rehearsal switch to the transmission monitor's VIDEO 1 IN socket by means of a video "T" junction which, via cable C65, connects the output also to the VIDEO 1 IN (SEND OUTPUT) socket in the preview selector unit, where the line is terminated.

### Preview Selector Unit

The preview selector unit provides relay-operated preview switching via switching panels associated with the preview monitors and waveform monitors at the producer's position and the vision engineer's desk. Up to 17 inputs are received by the preview selector unit.

### C. C. U. Monitors

Output 2 of each camera control unit (labelled MON. VIDEO) is connected via "T" junctions to the camera channel monitors and to the camera inputs of the preview selector unit (labelled CAM 1 to CAM 4 as applicable), where each line is terminated. The "T" junctions used for connection enable the camera chain monitors to be removed or replaced without disturbing the preview routing, so that a camera output can be monitored even with the camera chain monitor out of service.

## Camera Viewfinder Feed

The "local" video signal (MON. VIDEO) from each C. C. U. is fed in parallel to the C. C. U. monitor and waveform monitor and to Position 1 of the VIEWFINDER VIDEO switch providing the "LOCAL" signal to the camera viewfinder. Position 3 of the switch is connected to an output of the preview selector unit. When position 3 is selected, the picture fed to the camera viewfinder is selected by the VIEWFINDER selector pushbuttons on Vision Engineer's Control Panel No. 2 (See Appendix 2). When Position 2 of the VIEWFINDER VIDEO switch (V/F MIX) is selected, it causes both the local and the external signals to appear on the viewfinder screen together.

The VIEWFINDER VIDEO switch is controlled remotely by a key-switch on the rear panel of the camera.

## 6.7 VISION TIE LINES

There are twelve vision tie lines on the forward termination panel, numbered 1 to 6, 13 to 16, 21 and 22. Each tie line is directly connected to the correspondingly numbered socket on the video jackfield in the equipment area.

Tie lines 1 to 6 are connected via U-links to cables C125 to C130, which lead from the jackfield to the inputs of distribution amplifiers 1 to 6. D. A. s 1 to 6 are therefore normally fed by tie lines 1 to 6 unless substitution is made on the video jackfield.

Tie lines 13 to 16, 21, and 22 are normally connected beyond the jackfield, and are left unterminated unless required.

The outputs of D. A. s 1-6 are connected as follows:-

D. A. 1	Output 1	to	V. M. U.	Input 5
D. A. 2	Output 1	to	V. M. U.	Input 6
D. A. 3	Output 1	to	V. M. U.	Input 7
D. A. 4	Output 1	to	V. M. U.	Input 8
D. A. 5	Output 1	to	V. M. U.	Input 9
D. A. 6	Output 1	to	V. M. U.	Input 10

D. A. 1	Output 2	to	P/V SEL. U.	D. A. 1	Input
D. A. 2	Output 2	to	P/V SEL. U.	D. A. 2	Input
D. A. 3	Output 2	to	P/V SEL. U.	D. A. 3	Input
D. A. 4	Output 2	to	P/V SEL. U.	D. A. 4	Input
D. A. 5	Output 2	to	P/V SEL. U.	D. A. 5	Input
D. A. 6	Output 2	to	P/V SEL. U.	D. A. 6	Input

D. A. 1	Output 3	to	VIDEO J/F	SK. 7
D. A. 2	Output 3	to	VIDEO J/F	SK. 8
D. A. 3	Output 3	to	VIDEO J/F	SK. 9
D. A. 4	Output 3	to	VIDEO J/F	SK. 10
D. A. 5	Output 3	to	VIDEO J/F	SK. 11
D. A. 6	Output 3	to	VIDEO J/F	SK. 12

Video jackfield sockets 7 to 12 are terminated when U-links are inserted between them and the sockets below. Otherwise they are available for cross-patching on the video jackfield.

Jackfield sockets 9 and 10, corresponding to D. A. 3 and D. A. 4, carrying tie lines 3 and 4, are normally through-connected by U-links to the O. B. 1 IN and O. B. 2 IN sockets on S. P. G. 1, and bridged through to O. B. 1 IN and O. B. 2 IN on S. P. G. 2. Tie lines 3 and 4 are then further bridged via the O. B. 1 OUT and O. B. 2 OUT sockets on S. P. G. 2 and cables C73 and C74 to the O. B. 1 IN and O. B. 2 IN sockets of the sync. coincidence detector, where each line is terminated by a  $75\Omega$  termination plug in the relevant OUT socket. Tie lines 3 and 4, therefore, are permanently connected to the remote source sync. system (see Section 7) as O. B. 1 and O. B. 2 as long as jackfield sockets 9 and 10 are U-linked to the O. B. 1 and O. B. 2 sockets. If any other tie lines are required to serve O. B. 1 and O. B. 2, the U-links should be removed and the required D. A. outputs patched to the O. B. 1 and O. B. 2 sockets on the jackfield.

## 6.8 TEST SIGNALS

Three test signals are generated in the M. C. R. for routing to video equipment; namely PULSE & BAR, SAWTOOTH & BAR, and "PLUGE".

### PULSE & BAR

Pulse and Bar Generator Type GE/504 feeds an output (via cable C111) to the PULSE AND BAR INPUT socket on Vision Engineer's Control Panel No. 1. This generator can be used free-running or synchronised. When synchronised, the trigger input is fed from the SYNC OUT socket on the Sync Junction Box.

### SAWTOOTH & BAR

The sawtooth and bar generator (part of Test Generator Outfit Type OT1/503) feeds a composite signal to D. A. 9, where the input is terminated by a  $75\Omega$  plug in the bridging socket. Output No. 1 of D. A. 9 is fed to the SAWTOOTH INPUT socket on the Vision Engineer's Control Panel No. 1.

The above inputs are connected to contacts of SWC., the TEST SIGNAL switch in Vision Engineer's Control Panel No. 1., (see Appendix 1.). The switch selects the test signal sent to line when the transmission-rehearsal switch is in the REHEARSAL position. The unused test signal is automatically terminated in  $75\Omega$ .

#### D. A. 9 Outputs

Sawtooth & Bar outputs are also provided from two other outputs of D. A. 9 as follows.

Output 2 of D. A. 9 is connected (via cable 76) to Input 2 of the Waveform Processing Unit, and provides a waveform for calibration and differential comparison.

Output 3 of D. A. 9 is connected (via cable C122 to jackfield socket No. 20. and from there via jackfield link to input No. 17, (COMP S/T), in the preview selection row, and may be selected on Vision Engineer's Control Panel No. 1 or (when switched to LOCAL) on the preview selection unit.

#### NON-COMPOSITE SAWTOOTH & BAR

The non-composite output of the sawtooth and bar generator is fed to input No. 16 of the preview selection unit, and is available only on the viewfinder selector located on Vision Engineer's Control Panel No. 2. Selection of NON-COMP S/T connects this signal to the EXT. VIDEO input in each camera control unit (via the viewfinder isolation distribution amplifier output 3) in series, using video "T" pieces, the signal being terminated by a plug at C. C. U. 4 input. The non-composite sawtooth signal may be injected either at the camera head amplifier or at the viewfinder input by means of a switch within the C. C. U. (see separate manual).

#### PLUGE

The preliminary line-up generator equipment is part of Test Generator Outfit OT1/503, which contains two PLUGE units, one for the 405-line system and one for the 625-line system. Only one compartment is connected, so that it is necessary to interchange the position of the units when line standards are changed.

The PLUGE output socket connects via cable C121 to the input of JF. 19 and then connects through via the U-link to the VIDEO 2 IN socket of the Production Preview Monitor using a video "T" piece. The PLUGE test signal continues

to the VIDEO 2 IN sockets of the Engineering Preview, Cameras 1, 2, 3, 4, and 17" Transmission monitors in the order given and is connected in the same way using video "T" pieces. At each monitor the VIDEO 2 OUT socket, (bridged to VIDEO 2 IN by the adjacent switch), is connected by a short co-axial link to the SYNC IN socket. The SYNC IN socket is unterminated in all monitors except the 17" Transmission Monitor. The connection of the PLUGE signal to the SYNC IN socket provides for the monitor to be driven from PLUGE syncs when the SYNC switch (located on the front panel of the monitor) is put to EXT. The SYNC IN socket on the 17" Transmission Monitor is terminated by the BRIDGE/TERM switch adjacent to the socket.

The PLUGE test signal may be displayed separately on each monitor by switching to VIDEO 2 on the front panel input switch. In addition, the PLUGE signal may be displayed on all monitors simultaneously by operating the PLUGE switch on Vision Engineer's Control Panel No. 2. In this case the changeover to VIDEO 2 input in the monitor is relay-operated via a connection to the REMOTE SERVICES socket in the rear panel.

## 6.9 MONITORING

### WAVEFORM MONITORING

Each camera picture monitor has associated with it a waveform monitor (Type MN6/501) which is fed with the MON. VIDEO signal from each C. C. U. Connection is made with a video "T" piece so that the waveform monitor may be removed without interruption of the signal. The MON. VIDEO signal continues to the VIDEO 1 IN socket in the picture monitor and ends at the respective CAM INPUT socket in the preview selection unit where it is internally terminated.

The production and engineering preview monitors also have waveform monitors (Type MN6/501) mounted above which are fed from the PROD. OUT 1 and ENG. OUT 1 sockets respectively in the preview selection unit. In each case the line is connected to the picture monitor and terminated at the waveform monitor with a 75 $\Omega$  termination plug.

In the equipment area of the M. C. R. provision for monitoring and servicing is made by a Tektronix Type 515A oscilloscope and an 8 $\frac{1}{2}$ " picture monitor. These are normally fed from the preview selection unit, ENG. OUT 2 via J/F18 and connected to the Tektronix INPUT 2 with a video "T" piece and onward to the 8 $\frac{1}{2}$ " picture monitor VIDEO 1 IN, where the line is terminated in 75 $\Omega$ . By removing the jackfield U-link, the Tektronix and 8 $\frac{1}{2}$ " picture

monitor are made available for general monitoring on 75Ω circuits by connection at the jackfield. In addition, the Tektronix is available for servicing and fault-finding by using the test leads connected to INPUT 1 and switching accordingly. In this case the input is high.

A second Tektronix 515A oscilloscope is installed between Vision Engineer's Control Panels 1 & 2, and functions as the master waveform monitor. It is fed at INPUT 2 with the output of the waveform processing unit, and for accurate calibration the correct termination at the oscilloscope "T" piece is a 110Ω termination plug. This is marked yellow for identification from the 75Ω plugs used elsewhere.

The waveform processing unit provides facilities for connecting the input signal, line or preview, direct, clamped, or differentially compared with the signal at INPUT 2, to the OUTPUT socket. In addition, an internal sync. separator provides line and field syncs at the TRIGGER socket which is connected to the TRIG. INPUT socket on the oscilloscope.

The waveform processing unit receives three video inputs. The LINE input is fed from OUTPUT 1 of D.A. 8, the sending D.A., and enables monitoring of the M. C. R. video output to line, isolated only by the separate output stage of D.A. 8. The PREVIEW input is fed from ENG. OUT 3 of the preview selection unit and enables any signal available on the engineering preview selector buttons on Vision Engineer's Control Panel No. 1 to be processed and monitored. Selection of "Line" or "Preview" is made by a key-switch on the front panel.

The third input is a composite sawtooth test signal from Test Generator Outfit OT1/503 and is supplied from OUTPUT 2 of D.A. 9 and connects to INPUT 2 on the waveform processing unit. This sawtooth signal serves as a reference signal for channel testing and level setting or it can be compared differentially with the same signal after passage through any part of the video system as connected at the jackfield.

### PREVIEW FACILITIES

The hub of the preview system is Preview Selection Unit Type 2699/00 which is housed in the equipment area of the M. C. R. (Rack 1). The unit provides the necessary switching facilities between 17 sources and five outputs which are isolated by five built-in D. A. s.

Selection of the various inputs is made from external controls located on Vision Engineer's Control Panels 1 & 2 and the Producers Desk Unit. In addition there is a row of selector

buttons on the unit itself for local control of the engineering preview facilities, operative only when the local-remote switch on Vision Engineer's Panel No. 1 is at LOCAL.

Preview facilities are divided into five groups as follows:-

Group 1 - Viewfinder

Selection from the following 14 inputs is made by pushbuttons on Vision Engineer's Control Panel No. 2.

<u>Input No.</u>	<u>Source</u>
1	Camera 1
2	Camera 2
3	Camera 3
4	Camera 4
5	Not used. Available for Capt. Scanner
6	Remotes - D. A. 1
7	" D. A. 2
8	" D. A. 3
9	" D. A. 4
10	" D. A. 5
11	" D. A. 6
12	Mixer Output
15	Wipe/Insert
16	Non-comp Sawtooth

There are three outputs available from this row but only output 3 is connected to the EXT. VIDEO socket of each C. C. U. in turn, using video "T" pieces with a 75Ω termination plug on C. C. U. No. 4. The other two outputs 1 and 2, are terminated with 75Ω plugs.

The signals available from this push-button row are inserted as external video signals into any camera channel, as required, and are displayed on the camera viewfinder screen, as detailed in Section 6.7.

Group 2 - Engineering

Selection from the following 16 inputs is made by pushbuttons located in the Preview Selection Unit and Vision Engineer's Control Panel No. 1. Selection can only be made at one control or the other as determined by the Local/Remote control switch on Vision Engineer's Control Panel No. 1. When in the LOCAL position selection can only be made at Vision Engineer's Control Panel No. 1. The pushbuttons are illuminated when control is available.

<u>Input No.</u>	<u>Source</u>
1	Camera 1
2	Camera 2
3	Camera 3
4	Camera 4
5	Not used. Available for Capt. Scanner
6	Remotes - D. A. 1
7	" D. A. 2
8	" D. A. 3
9	" D. A. 4
10	" D. A. 5
11	" D. A. 6
12	Mixer Output
13	Send Output
14	R. F. Check
15	Wipe/Insert
17	Comp. Sawtooth

There are three outputs from the engineering preview distribution amplifier, which are connected as follows:-

- OUT 1 connects a VIDEO 1 IN in the engineering picture monitor and is through-connected using a video "T" piece to VIDEO 1 IN on the associated Waveform Monitor MN6/501, VIDEO 1 OUT being terminated with a 75Ω plug.
- OUT 2 connects via J/F socket No. 18 to the equipment area Tektronix waveform monitor, INPUT 2, using a video "T" piece, and continues to the VIDEO 1 IN socket in the 8½" servicing picture monitor where the line is terminated in 75Ω.
- OUT 3 feeds the PREVIEW input socket in the waveform processing unit.

### Group 3 - Production

Selection from 14 inputs is made by pushbuttons on the vision mixing unit control desk.

<u>Input No.</u>	<u>Source</u>
1	Camera 1
2	Camera 2
3	Camera 3
4	Camera 4
5	Not used. Available for Capt. Scanner
6	Remotes - D. A. 1
7	" D. A. 2
8	" D. A. 3



<u>Input No.</u>	<u>Source</u>
9	Remotes - D.A.4
10	" D.A.5
11	" D.A.6
12	Mixer Output
14	R. F. Check
15	Wipe/Insert

The outputs from the production distribution amplifier are connected as follows:-

OUT 1 is connected to the VIDEO 1 IN socket of the production preview picture monitor, using a video "T" piece, and is through connected to the VIDEO 1 IN socket of the associated Waveform Monitor MN6/501 where the line is terminated with a 75Ω plug.

The remaining two outputs are not used and terminated with 75Ω plugs.

#### Groups 4 & 5 - Commentators 1 & 2

Selection from three inputs is made by keyswitches located on the producer's secretary's control desk.

<u>Input No.</u>	<u>Source</u>
11	Remote - D.A.6
12	Mixer Output
14	R. F. Check

OUT 2 from each commentator's distribution amplifier is connected to the appropriate commentator's picture monitor socket in the forward termination panel, and provides the video feed to the commentator's picture monitor, controlled by the producer's secretary.

## SECTION 7

### SYNCHRONISING

#### 7.1 GENERAL

Two Synchronising Pulse Generators, (S. P. G. s) Type W. G. 63 are provided in the mobile control room, and are located side-by-side in Rack 1 of the forward equipment area. Means are provided to switch immediately from one S. P. G. to the other, the control (S. P. G. c/o switch) being sited on Vision Engineer's Control Panel No. 1 (see Appendix 1).

The pulse outputs of both S. P. G. s are fed to S. P. G. Change-over Unit Type 4531, where the selection of pulses from the operational generator is made by means of relay-actuated contacts, according to the changeover switch position. Synchronising pulses are fed from the S. P. G. changeover unit to the equipment listed in section 7.2, using multiway coaxial cables. Sync. tee-pieces or looped input-output connectors are used for routing the sync. line through the equipment. The sync. line is terminated at the service bench in the forward equipment area, in a sync. junction box fitted with a  $75\Omega$  termination plug.

Reference should be made to the Sync. Control and Distribution circuit diagram (Fig. 17).

#### 7.2 PULSE OUTPUTS

Each S. P. G. has four pulse outputs, as follows:

VERT. DRIVE  
COMP. SYNC.  
COMP. BLANKING  
HOR. DRIVE

The four output sockets of each S. P. G. are directly connected to the corresponding input sockets of the S. P. G. changeover unit. The changeover unit has two relays, RLA and RLB, each with four sets of changeover contacts, arranged to provide low-crosstalk switching between the inputs, see Section 6.3. Full details of the changeover unit are given in a separate manual.

The selected pulses are fed out from the changeover unit via an 8-way socket (of which contacts 2, 4, 6 and 8 are earthed) to multiway coaxial cables which connect the pulses to the seven units

requiring them in the following order:

CAMERA CONTROL UNIT No. 1	(tee-piece connection)
CAMERA CONTROL UNIT No. 2	(tee-piece connection)
CAMERA CONTROL UNIT No. 3	(tee-piece connection)
CAMERA CONTROL UNIT No. 4	(tee-piece connection)
TEST GENERATOR OUTFIT	(bridge connection)
VISION MIXING UNIT	(bridge connection)
SYNC. COINCIDENCE DETECTOR	(tee-piece connection)
SERVICE BENCH (Sync Junction Box)	(terminated)

Connection to the C. C. U. s, the sync. coincidence detector and the service bench are made by means of sync. tee-junction boxes (tee-pieces) in order that any of these units may be unplugged from the sync. chain without loss of syncs to the remaining units. The line ends in the sync junction box on the service bench, which has an 8-way socket into which a sync. termination plug is normally plugged. The sync. lines may, however, be extended beyond the sync. junction box, provided the lines are finally terminated.

The sync. junction box is fitted with a musa socket for test purposes; this being a parallel connection from the comp. sync. line only. It is important that this socket should not be loaded with more than 3 feet of co-axial cable, with a terminating resistance greater than 10k $\Omega$ .

### 7.3 S. P. G. CHANGEOVER SYSTEM

Selection and remote control of the S. P. G. is made from Vision Engineer's Control Panel No. 1. The REMOTE/LOCAL switch on each S. P. G. should be in the REMOTE position. Sync. lock switching and line phasing are then controlled from the remote position, and a negative 6V supply is taken to pin 3. of the remote-control socket from each S. P. G. According to the setting of the S. P. G. changeover switch SWH, the -6V circuit is completed via the diode (MR6 or MR7) in the operative circuit, and lights the REMOTE ON-AIR lamp of the generator supplying the pulses to equipment.

Other contacts of SWH supply +24V to the indicator lamp on the control panel, showing the generator in use, and to the changeover relays, RLA and RLB, in the S. P. G. changeover unit. The pulses are routed via the relay contacts to the output socket of the changeover unit.

NOTE: Refer to Fig. 18, S. P. G. REMOTE CONTROL CIRCUIT. Full information on the S. P. G. operating modes is given in the S. P. G. Type W. G. 63 handbook.

Provision is made in the M. C. R. for locking the S. P. G. pulses to remote sources, as follows:

- (a) Locking the field frequency to a mains supply with a frequency between 47.5 c/s and 51.5 c/s. (Mains Lock)
- (b) Locking the field and line frequencies to a standard video signal with syncs (Genlock).

(a) Mains Lock

Field pulses may be locked either from the local mains supply or from a remote supply, nominally 50 c/s.

The local a. c. supply, 240V, is applied to PL7 on the mains termination panel (or the connection may be modified so that the supply is brought to a switch on the rear of the mains termination panel).

The remote supply is connected to the EXT. SOURCE input terminals on the mains termination panel. The signal is acceptable at a level between 0.1V and 6.3V into 600 $\Omega$ , and is usually derived from a P. O. line.

The 240V local supply is transformed to 6.3V by T1 located on the mains termination panel, and applied to SWH together with the EXT. SOURCE input, giving selection of local remote locking signal, which is fed to Field Phase and Locking Unit Type 5704 REMOTE REF. socket. The unit also has a LOCAL REF. socket, which may be used for connecting in any other reference signal of 2V p-p.

Field Phase and Locking Unit Type 5704 is described in a separate handbook. The locking reference signal from the field phase and locking unit is connected to the EXT. MAINS input of both sync. pulse generators, using a tee-junction to one S. P. G. so that either S. P. G. can be removed without affecting the reference signal to the other.

(b) Genlock

Signal Routing and Switching

Of the six vision tie lines on the forward termination panel, tie lines 3 and 4 are connected semi-permanently to O. B. 1. input and O. B. 2. input respectively on the S. P. G. s.

Any two of tie lines 1, 2, 5, 6, may be connected in place of tie lines 3 and 4 provided that the Musa U-links on JF 9 and 10 and the relevant two U-links from JF 7, 8, 11, 12, are removed and the required D.A. outputs are connected via Musa plug and cable links to JF 9 and 10.

The O. B. 1. and O. B. 2. signals are looped through both S. P. G. s, with the termination switches at BRIDGE, and are terminated in the sync. coincidence detector.

On the S. P. G. s, selection of the signal to be used (O. B. 1 or O. B. 2) is made by means of a switch on the front panel. In the M. C. R. the operation of the switch is extended so that control is available on Vision Engineer's Control Panel No. 1 via switch SWG. (REMOTE 1/2). This switch controls relay RLA, the contacts of which perform the required switching (see Fig. 16).

In the Genlock condition, the field and line pulse frequencies are automatically locked to the reference signal, and an accurate line phasing control is provided by R21 and R22 (LINE PHASING), on the vision engineer's control panel, for the S. P. G. in use. The control operates only when the S. P. G. s are in the REMOTE condition.

Genlock is controlled by switch SWK on Vision Engineer's Control Panel No. 1 which operates as follows.

Operation

SWK directly switches the line phasing potentiometers, R21 and R22, into circuit to control the operating S. P. G., and switches the 12V circuit so as to light the GENLOCK ON lamp on Vision Engineer's Control Panel No. 1. (The OFF lamp lights when SWK is off).

Indirect switching is also carried out by SWK via relay contacts RLA2. When SWK is on, RLA 3 supplies +12V to diode MR8 or MR9 (according to the remote line in use via switch SWG) lighting the indicator lamp, (LP5 or LP6) of the remote line in use, on Vision Engineer's Control Panel No. 1. The lamp does not light, however, until sync. coincidence has been obtained (line and field), when RLA in the sync. coincidence detector unit de-energises and RLA1 closes, completing the circuit to the lamps via RLA3

and SWK of the vision engineer's control panel. When SWG is in the REMOTE 2 position; +12V is supplied to RLC via RLA3 when SWK is ON.

Indication of sync. coincidence is also provided on vision mixing unit channel selectors, 7 to 10, being shown by a change of colour from amber to green. These channels can be used for either sync. or non-sync. working. The selection of channels 7 to 10 to be OB1 or OB2 is made on Vision Engineer's Control Panel No. 1 (Channel Selection Switch, SWD, SWE). The switch has separate poles for Remote 1 (SWE) and Remote 2 (SWD), the operative pole being selected by RLA4, in the vision engineer's control panel, RLA being operated by SWG (REMOTE 1-2). Any of channels 7 to 10 can therefore be set up as Remote 1 or Remote 2.

A final over-riding control circuit for sync. coincidence indication to the V. M. U. is provided by SWF, (NON-SYNC, SYNC) on Vision Engineer's Control Panel No. 1, which is completed via RLA2 in the sync. coincidence detector; this contact closes on sync. coincidence.

Indication of sync. coincidence is also provided by a signal lamp labelled GENLOCK SYNC. COINCIDENCE on Audio Auxiliary Unit Type 3992.

## SECTION 8 - AUDIO EQUIPMENT

### 8.1 PROGRAMME ROUTING

Most of the audio signals for the mobile control room programme output originate from microphones which are placed in fixed or mobile locations to provide the services best suited to the requirements of the programme. The microphone outputs become inputs to the audio mixing unit, and flexibility of input arrangements is provided so that only those sources to be used will occupy mixer channels.

The microphone inputs are grouped so that they enter the forward termination panel via 3 multi-microphone connectors, which in turn are wired so that 20 individual microphone outputs are available on the panel via 3-pin connectors. These outputs may be linked to the audio mixing unit channel amplifier inputs on the forward termination panel, additional linkage being provided in the audio mixing desk itself.

Two channels can be fed from radio microphones, each of which consists of a microphone and mobile transmitter and a receiver. The radio microphones are used in situations where a trailing microphone cable would be undesirable.

An output from a tape reproducing machine may be linked into an audio mixing unit channel via connections in the audio mixing desk jackfield.

Signals from remote sources may be fed in on G. P. O. lines and connected for inclusion in the programme by routing to channels in the audio mixing unit.

#### Audio Mixing System

##### (a) Audio Mixing Unit

The audio mixing unit is built into a desk, and contains the necessary channel, group, and output amplifiers for programme routing, also the mixing control panel, and units concerned with monitoring, tone generation, programme and talkback distribution, prefade, and public address systems. All the amplifiers are fully transistorised and are described in individual handbooks. The audio mixing unit is the subject of a separate publication.

(b) Audio Mixing Control Panel

The audio mixing control panel is mounted on the top of the desk, and is fitted with all controls necessary for selecting, controlling and monitoring the signals forming the system output. Controls are also fitted for all auxiliary facilities.

(c) Audio Transmission Chain

The basic system operates as follows:-

Signals from the programme sources form the inputs to the channel amplifiers; up to 20 separate sources can be accommodated: Inputs are made by plug and socket connections at the rear of the audio mixing desk or via the audio jackfield. Each channel amplifier is associated with a separate quadrant fader, mounted on the control panel. The 20 channel faders are arranged in 3 groups; of 10, 4, and 6 faders, respectively. In each group the operative channel or channels is selected by advancing each channel fader to the point on its quadrant scale necessary to obtain the required output.

Each group of channels is controlled by a group fader, the output of which is divided into two, one line going to the main amplifier for inclusion in the main system output, and the other line via the group amplifier selection switch to a group amplifier (see item (d)).

Thus the main amplifier receives the total output of the three groups. This amplifier is controlled by the main gain fader, and the output is divided into three. Main outputs 1 and 2 are routed via the audio transmission switch; a three-position switch which selects the output from one of three sources, i. e. the tone generator, the identification signal unit, or the main programme amplifier. Main output 3 is fed directly from the main programme amplifier. Each of the three main outputs may be separately controlled by a potentiometer control on the audio mixing unit, and each is fed to a separate output amplifier, thence to a separate output socket.

(d) Group Clean Feed Outputs

The three group amplifiers receive their inputs via three-position switches which select the output of any of the three primary group faders. Thus it is possible for all three group amplifiers to have the same input, or for each to have a different input, as required. For this reason, the transmission groups are denominated by letter (A, B, and C) and the clean feed groups (i. e. the group amplifier outputs) are numbered (1, 2, 3).



The output of each group amplifier is available by plug and socket connection as a separate clean feed.

(e) Public Address

The audio mixing system incorporates three public address amplifiers, which are fed in parallel from the channel amplifiers; each public address amplifier having a separate output. Any channel that is faded up can be selected for input to the public address system whether the group and main faders are faded up or not. The selector switches are mounted above the channel faders. (see also item (f)). Each of the three public address outputs is controlled by a separate potentiometer control on the audio mixing desk.

(f) Prefade

Any channel on the audio mixing unit can be selected for input to the pefade amplifier. The pefade output from each of the 20 channels is taken from a point preceding the channel fader, and is fed to the pefade amplifier via a pefade switch. Thus, any channel can be monitored before fading it into the transmission chain.

The pefade switch is part of a two-way switch, of which the public address selector switch is also a part. Each individual channel may therefore be switched either to PREFADE or to PUBLIC ADDRESS, but not to both. Such selection does not prevent the channel from being faded to transmission, nor does it affect the equipment performance.

(g) Audio Jackfield

A two-row audio jackfield is provided on the audio mixing desk, below the fader control panel; each row consists of 20 jacks.

The upper ("A") row of jacks contains source, output, and tie line jacks. These can be used to monitor the outputs etc. by means of headphones plugged into the appropriate jack.

The lower ("B") row of jacks contains break-jacks to the inputs of the 20 channel amplifiers; the signal from any jack on the "A" row can be routed into any channel (in place of the usual source for that channel) by patching the "A" row source jack to the "B" row input jack selected.

For further information refer to the handbook on the audio mixing unit.

Peak Programme Amplifier Monitoring

Two large peak programme meters are mounted on the audio mixing unit at approximately eye level. The peak programme meters and their amplifiers are described in separate handbooks. P. P. M. 1 is normally operating, whilst P. P. M 2 is a spare; changeover between the two is made by relays, operated by the P. P. M. changeover switch on the meter panel.

The input to the operating peak programme meter is from a push-button operated selector switch. By selection on this switch, any of the following may be monitored on the peak programme meter;

Mains Outputs 1, 2, and 3.  
Group Clean Feed Outputs 1, 2, and 3.  
Public Address Outputs 1, 2, and 3.

The peak programme amplifiers are mounted in the audio mixing desk, and each has a small peak programme meter embodied in the control panel, which operates in parallel with the large one, and is of use in setting-up.

Loudspeaker Monitoring

Loudspeaker monitoring in the mobile control room is carried out on a high quality loudspeaker unit mounted overhead. The signal fed to the loudspeaker unit is selected by a switch on the audio mixing unit (MONITOR L. S. switch). This has three positions; in the central position the loudspeaker input is from the main output; in the "up" position the output of the radio check receiver is monitored, and in the "down" position the loudspeaker unit receives the same input from the monitor selector switch as the peak programme meter.

"Normal", "L. S. Dim" and "L. S. Cut" facilities are provided by a three-position key.

Facilities are provided for an extension loudspeaker to be connected in parallel with the main loudspeaker; this is used when the equipment is de-rigged from the van as the normal loudspeaker is permanently fixed.

## Headphone Monitoring

Monitoring by headphones to prefade and other listening points, including talkback and main amplifier output, is achieved by plugging the headphone plug into the appropriate jack on the jackfield on the audio mixing unit immediately below the mixing desk top.

Headphone monitoring is also available at the senior engineer's desk, to which the required jackfield signals can be routed by the lines.

### 8.3 TALKBACK

Comprehensive talkback circuits are included in the mobile control room to enable the producer to communicate with all operating and control personnel, and for camera and microphone operators to communicate with the control engineers.

Each camera is fitted with jacks to allow headsets to be inserted by means of which the cameraman may speak or listen to the control engineer or the producer. Jacks are also fitted (for listening headphones only), for other personnel to receive instructions from the producer.

The vision control engineers' panels have each a single jack to receive the engineer's headset; the circuit is switchable so that the camera concerned can be selected. Vision control engineer No. 1 can also switch to all cameras, or to remote talkback. Mixed camera talkback is also available at the audio mixing desk and can be used by the senior television engineer.

Each microphone boom operator is provided with a listen only circuit, by means of which instructions are received from the audio engineer, the senior television engineer, or the producer.

The producer's desk unit is fitted with a microphone and loudspeaker for talkback, also facilities for switching to a headset if required. Full information about the talkback system is given in Volume 2 of this manual.

## SECTION 9 - MAINTENANCE

### 9.1 GENERAL

Maintenance information for units embodied in the mobile control room is given in the individual handbooks for the units concerned.

Most routine testing may be carried out by using equipment provided as part of the mobile control room, notably the Tektronix oscilloscope, test waveform generators, tone generator, etc. A 20 000 ohms per volt multi-range meter and a bridge megger should also be carried for use in testing.

Spares for all items listed in the parts lists of Pye T. V. T. equipment may be obtained from Pye T. V. T. Ltd. The Pye reference number should be quoted when ordering. When ordering cables, the length should be quoted in addition to the part number. (See Section 10).

### 9.2 CABLES

Units within the mobile control room are interconnected by ducted cables. Periodic inspection should be carried out, removing the covers of the ducts to see that no water or other undesirable element has entered. If at any time cables are removed from the ducts, great care should be taken to replace them so that the cables and terminations reach their proper receptacles without straining or pulling at the connections.

External cables to cameras, microphones, etc. should be examined before and after every period of use for signs of damage through being coiled for long periods, or through dragging or other rough treatment in the field. Suspect sections of cable should be removed and tested for continuity and insulation.

### 9.3 TRANSISTORISED EQUIPMENT

It is emphasised that careful attention should be given to the special instructions contained in handbooks dealing with transistorised units. Special maintenance techniques are formulated for such units in order to avoid damage to the components. (See Appendices 4 & 5).

SECTION 10 - EQUIPMENT LIST FOR MOBILE CONTROL ROOM

NOTE: Where equipment differs for M. C. R. Type 4013/01 the information is given in the Remarks column.

10.1 1. VISION EQUIPMENT

<u>ITEM</u>	<u>PYE PART No.</u>	<u>REMARKS</u>
Camera, 4½" Image Orthicon	842115/00	842115/01 used on M. C. R. 4013/01
Camera Control Unit	842173/00	842173/01 used on M. C. R. 4013/01
Camera Power Unit	842402/00	
Vision Engineer's Control Panel No. 1	842465/00	
Vision Engineer's Control Panel No. 2	842469/00	
Vision Mixing Equipment	-	B. B. C. Type
Sync Pulse Generator & Fixing Plate	AG21968	Inc. Ferguson P. G. WG/63
Waveform Monitor & Fixing Plate	AG21966	Inc. B. B. C. W. F. M. MN6/501
Pulse & Bar Generator & Fixing Plate	AG21969	Inc. B. B. C. P & B Gen. CE4/508
Tektronix Oscilloscope & Fixing Plate	AG21967	Inc. Tektronix Osc. 515A.
Field Phase & Locking Unit	845704	
Sync Coincidence Detector	844132/01	
S. P. G. Changeover Unit	844531/00	
Monitor Indicator Unit	844563/00	Line Monitor
Monitor Indicator Unit	844563/01	Producer's Monitor
Monitor Indicator Unit	844563/02	Engineer's Monitor
Waveform Processing Unit	842453/00	
Radio Check Receiver	842715/00	
Transmission/Rehearsal Switch	842135/00	
Transmission/Rehearsal Indicator	844565/00	
Preview Selector Unit	842699/00	
14-inch Picture Monitor	842822/00	842822/02 used on M. C. R. 4013/01
17-inch Picture Monitor	842824/00	842824/02 used on M. C. R. 4013/01
Distribution Amplifier Outfit	-	B. B. C. Type OT1/502
Test Generator Outfit	-	B. B. C. Type OT1/503
Sync Junction Box	844569/00	
Sync "T" Junction Box	844568/00	
Viewfinder Hood Assy.	750032	Periscope type

## 10.2 AUDIO EQUIPMENT

<u>ITEM</u>	<u>PYE PART No.</u>	<u>REMARKS</u>
Audio Mixing Unit	845705/00	Including amplifiers etc.
Audio Auxiliary Unit	843992/00	Including amplifiers etc.
Producer's Desk Unit	844470/00	Including amplifiers etc.
Talkback Junction Box	844487/00	
Commentator's Communication Unit	844530/00	
Monitor Loudspeaker Unit	845703/00	
Programme Meter (Optical)	AG24026	Including B. B. C. Type PRM1/B
Radio Microphone Receiver Assembly	AG21970	Inc. B. B. C. Receiver Type HR20A/7 (Not supplied with M. C. R. 4013/01
Headset, Lightweight	715551	S. T. C. 405-line version
Headphones	715688	S. T. C.
Microphone	FM03502	A. K. G. D15/200S
Tape Recording/Reproducing Console	844573/00	(Supplied with M. C. R. 4013/01 only.)

## 10.3 MISCELLANEOUS EQUIPMENT

<u>ITEM</u>	<u>PYE PART No.</u>	<u>REMARKS</u>
Power Cable Assembly	749043/100	See drawings for details
Earth Cable Assembly	749044/30	See drawings for details
Mains Distribution Panel	844035/00	
Manual Voltage Regulator	844564/00	
Automatic Voltage Regulator Assembly	AG22387	
Auto-Transformer	EA19006	(Not supplied with M. C. R. 4013/01)
Multi-Channel Aerial Assembly	AG22564	
U. H. F. Aerial Assembly	AG22565	
Transverter Assembly	AG24470	
Battery Charger Assembly	AG24301	EA19262 supplied with M. C. R. 4013/01
Earthing Pin	723262	
Earth-pin Adaptor Plate	BC22257	
Sync Termination Plug Assy.	AG24418	
Co-axial Termination Plug Assy.	AG24419	
Portable Voltmeter	842495/00	
Light Box	844534/00	
Jackfield (Co-axial)	-	B. B. C. Type JF3/502
Camera Cover	715721	

10.4 DE-RIG EQUIPMENT

<u>ITEM</u>	<u>PYE PART No.</u>	<u>REMARKS</u>
De-rig Equipment (Complete)	845620	
De-rig Cable Assembly	751197	
De-rig Front Rack Assy.	751595	
De-rig Extension Cord Assy.	750584/20	
De-rig Splitter-box (M. C. R.)	844566/00	
De-rig Splitter-box (Remote)	844567/00	
De-rig Power Distribution Panel	844571/00	
De-rig Audio Termination Panel	844572/00	
De-rig Monitor Remote Services Junction Box	AG24214	
Steel Trunk for cables	EA15153	





PART 3 - APPENDICES

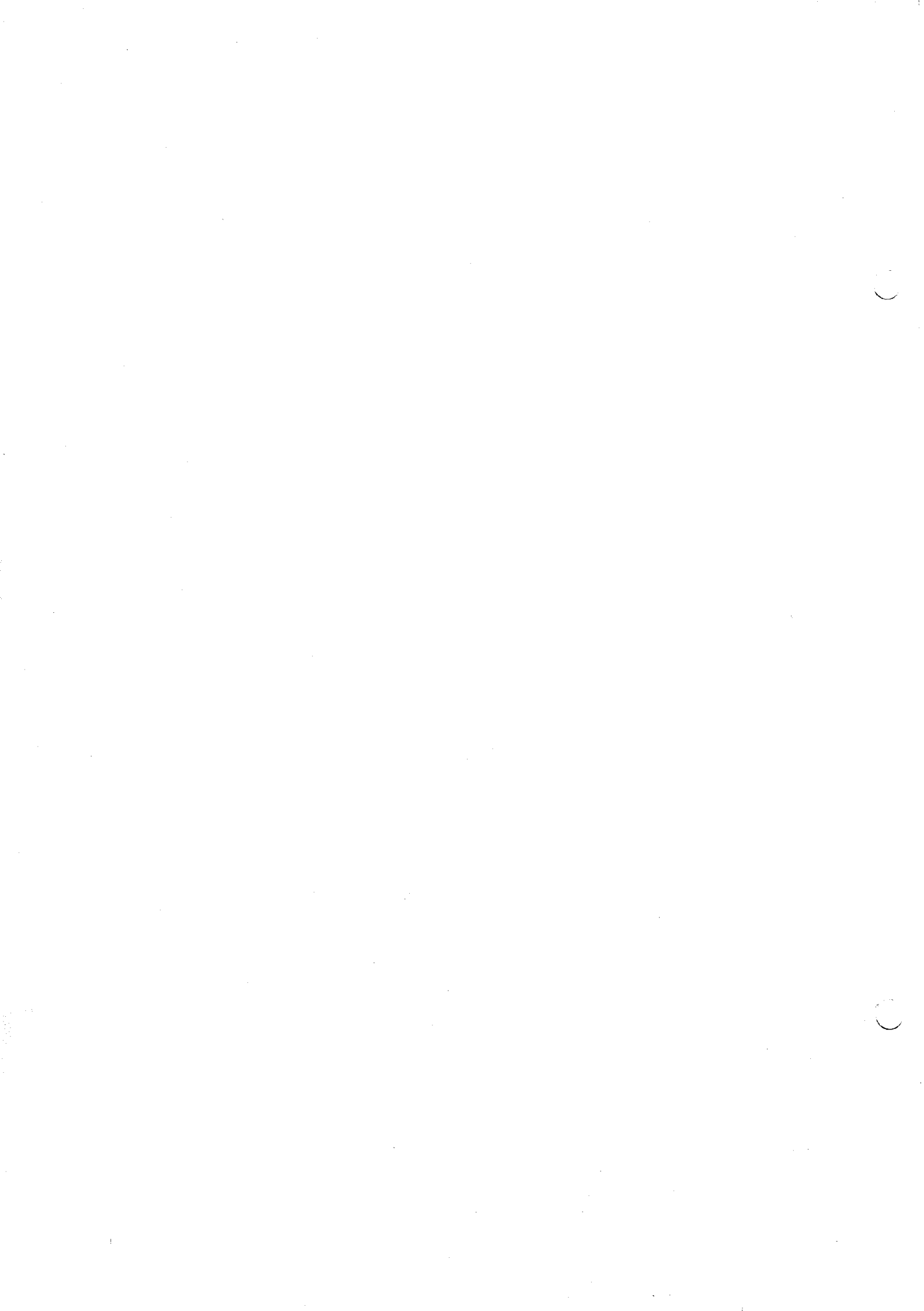
Appendix 1                    Vision Engineer's Control Panel (No. 1) Type 2465/00

Appendix 2                    Vision Engineer's Control Panel (No. 2) Type 2469/00

Appendix 3                    De-rigging

Appendix 4                    Maintenance Precautions for Semi-conductor Units

Appendix 5                    Unit mounting and Wiring Techniques



APPENDIX 1

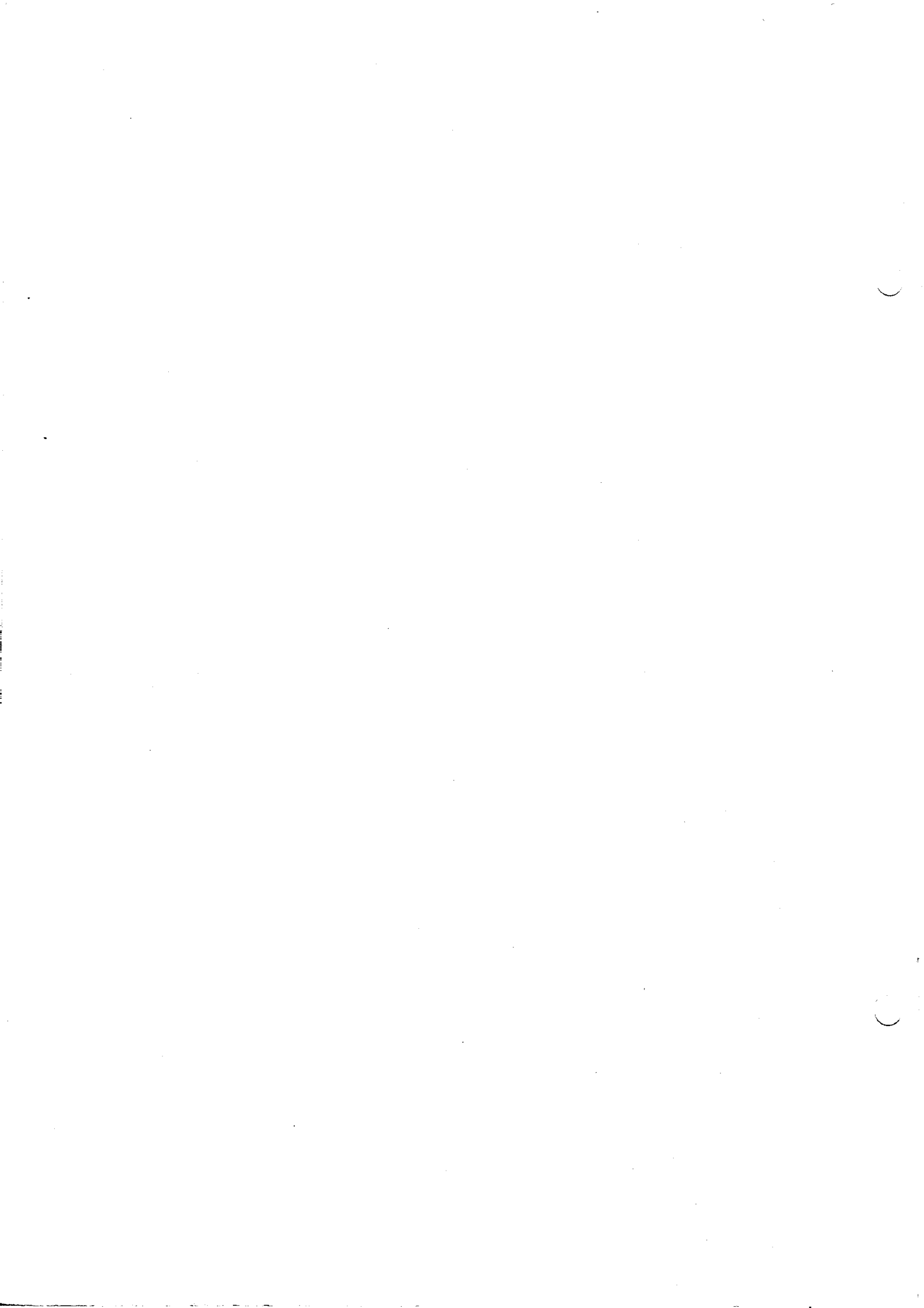
VISION ENGINEER'S CONTROL PANEL NO. 1

PART NO. 842465/00



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## FACILITIES

Vision Engineer's Control Panel No. 1 (Type 2465) is designed to give control of two Image Orthicon camera chains, a sync. pulse generator changeover unit, a sync. coincidence detector, engineering preview switching, talkback facilities, and certain test facilities, on a compactly arranged panel suitable for use in the limited space of a mobile control room.

The camera control section of the vision engineer's control panel consists of two standard camera control panels as described in the handbook supplied with the Image Orthicon camera chain; the sync. pulse generator changeover unit and the sync. coincidence detector are also described in separate handbooks. These handbooks should be referred to in order to supplement the information given in the Description and Operating section of this instruction.

## INSTALLATION

The vision engineer's control panel is installed in the appropriate position in a mobile control room as part of a control-desk unit. Four separate sections form the complete panel, one section for each of the two camera control panels, a strip panel along the top upon which are mounted switches including a preview selection switch assembly, and a panel to the left which contains system switching, telephone and talkback arrangements. Connections to all facilities are made via plugs and sockets behind and underneath the desk-top.

The desk-top is fitted into position on the front of the apparatus rack by sliding shoulders on the desk-top into slots in the apparatus rack frame. Similar slots are provided in the collapsible "de-rig" rack for use when the vision engineer's control panel is removed from the mobile control room.

## DESCRIPTION AND OPERATION

### FACILITIES

Vision Engineer's Control Panel No. 1 is mounted on a desk-top in a position convenient for operation by the vision-control engineer, and contains remote switches, indicators and/or controls for the items shown in the following list.

- Camera Control Panel No. 1
- Camera Control Panel No. 2
- Comprehensive Talkback
- Stabilising Amplifier Changeover
- Test Signal Changeover
- Remote Signal Input Changeover and Indicator
- Sync Pulse Generator Changeover and Indicator
- Sync Coincidence Indicator
- Transmission/Rehearsal Switch and Indicator
- Master/Slave Switch and Indicator
- Engineering Preview Selection
- Engineering Preview Local/Remote Switch

Each item in the list will be described separately.

### CAMERA CONTROL PANELS NO. 1 AND NO. 2

#### General

The two camera control panels are mounted side-by-side in the vision engineer's control panel, and are identical, each embodying the remote control of its associated camera control unit, and consequently of the camera electronic circuits.

The camera control panel is physically divided into two parts, the lower half being protected by a hinged cover and containing a number of controls which require little operational attention once the camera chain has been set up to give optimum performance. These include controls for



centring and aligning the scans, controls for beam current and target potentials and for electrical focusing, and controls for shading, lift, and aperture correction. Reference should be made to the camera chain handbook for explanation of these controls.

The upper half of the camera control panel contains controls required for the normal operation of the camera chain. These controls will now be described, reading from left to right and top to bottom of the panel.

### Switching-on Group

Two toggle switches, A. C. ON-OFF and PREHEAT ON-OFF are mounted one on either side of a group of three indicator lamps. The green lamp is illuminated when the a. c. switch is ON, and the amber lamp indicates that H. T. is on, the latter coming on automatically after a short delay. The PREHEAT ON condition is shown by the blue lamp lighting up; in this condition a circuit operates to warm up the camera chain quickly, in order to shorten the time taken for the chain to reach optimum working temperature. The PREHEAT switch may be operated whether the A. C. switch is on or off.

### Camera Call Indicator

A window labelled CAMERA CALL, is let into the panel; this window is illuminated by a lamp behind the glass when the circuit is completed by the cameraman pressing the button of his "CALL" circuit in order to attract the attention of the vision engineer.

### Gain Control

The GAIN control at the top right-hand side of the panel is a potentiometer control connected in a stage of the camera control unit, and provides a method of increasing the amplitude of the video signal from a normal setting calibrated during the setting-up procedure. Advancing the control clockwise from the NORMAL position requires slight pressure to overcome the physical resistance of a spring-loaded switch, thus avoiding accidental increase of gain. As an additional precaution, a small lamp, labelled GAIN UNCALIBRATED lights up as soon as the gain control is switched into operation. The gain control is intended only for limited use in circumstances where poor lighting conditions make it necessary to apply extra amplification to the signal. The control should always be kept at NORMAL when lighting is adequate.

### On Air Indicator

An ON AIR indicator window is let into the panel on the top right-hand side. The indicator is illuminated by a circuit from the vision mixing unit when the camera is selected for transmission.

## Function Switches

Three toggle switches are mounted below the ON AIR window, these are for operational functions as follows:-

(a) A. G. C. Switch

This is for switching the automatic gain control circuit on or off.

(b) Overscan Switch

The switch labelled NORMAL/OVERSCAN is kept in the NORMAL position during operation, but for setting-up and centring the scans it may be switched to OVERSCAN, which increases the area scanned by the beam so that the whole of the target and part of the tube end are visible in the monitored picture.

(c) Video Polarity Switch

This has NORMAL and REVERSE positions, and is usually kept at NORMAL, giving a "positive-going white" output signal. For special effects the REVERSE position may be used, reversing the polarity of the video signal so that the output signal will then be "negative-going white", with the result that black articles will appear white and vice versa on the monitored picture. The sync. circuits are not affected.

## Iris and Black Level Controls

Control of the lens iris aperture and of the picture black level is carried out by means of a "joystick" type of control fitted in the centre of the camera control panel. Opening and closing the iris is achieved by longitudinal movement of the "joystick". An increased range of control can be obtained by pushing the lever down into the slot whilst moving it.

Black level is controlled by turning the knob at the top of the "joystick".

## Contrast Correction

The CONTRAST CORRECTION control is on the right-hand side of the panel, and consists of a four-position switch, each position switching in a **different** compensation circuit in the camera control unit to give a different contrast law. The control is normally kept at the LIN (linear) position, the positions A, B and C being used to compensate for special conditions.

## Camera Tube Function Switch

The switch on the lower right-hand side of the camera control panel has four positions, giving the following conditions:

- (a) NORMAL                      The camera chain operates normally, with the scene focussed on the target and the scanning beam switched on.
- (b) CAP                              The scene is prevented from forming an image on the target, by a change in electrode potentials. The beam continues scanning normally, but the camera chain output is black level plus noise.
- (c) CUT BEAM                      The tube is capped and the beam is cut off. There is no video signal output.
- (d) TEST VIDEO                      The conditions of CUT BEAM apply, but any signal applied via the test video circuit to the camera viewfinder will now be routed through the camera chain, and will become the output of the chain.

#### TEST SIGNAL SWITCH

The test signal switch is on the top left-hand side of the vision engineer's control panel, and has 3 positions. The switch makes available pulse and bar or sawtooth waveforms for test purposes, or switches in a 75-ohm termination. When a test signal is selected the circuit arrangement is such that this signal is passed to the transmission switch unit and becomes the signal sent to line when the transmission switch is in the REHEARSAL condition; the other signal is automatically terminated in 75 ohms.

#### SYNCHRONISE ORBITING SWITCH

The synchronise orbiting switch requires to be pressed down to operate; the circuit thus made is common to all four cameras, and has the effect of arresting the image orbiting device of each camera at a set point in the orbiting cycle (12 o'clock), and re-starting image orbiting on all four cameras simultaneously. Thus, image orbiting is synchronised, an important requirement especially for wipes and superimpositions involving two or more cameras.

#### V. M. U. REMOTE SOURCE INDICATOR GROUP

Three switches are included in the REMOTE SOURCE INDICATOR group, which is concerned with switching signals from remote sources to certain channels of the vision mixing unit.

##### (a) Sync. Indicator Switch

In the SYNC position this switch connects the output of the sync. coincidence detector to the appropriate channel selection switch.

At NON-SYNC, the sync. coincidence detector is disconnected from the indicator lines to the mixer, and the vision mixing unit remote-sync. indicators are inoperative.

(b) Channel Selection Switches

Two switches are connected in parallel and labelled REMOTE 1 and REMOTE 2. These determine the mixer channel on which the remote signal is to appear, and a signal from the sync. coincidence detector informs the vision mixer (e. g. by lighting an indicator lamp) when the local and remote syncs coincide, making the remote signal available for mixing.

LOCAL-REMOTE CONTROL SWITCH

This toggle switch selects the control position of the engineering preview selection switching.

When the switch is in the LOCAL position, +24V is connected to the preview selection push-button switches on the engineer's control panel, lighting the lamps illuminating the push-buttons, and making the push-buttons available to operate relays in the preview switching unit, (see separate manual).

In the REMOTE position, the d. c. potential is disconnected from the local switch panel and routed to a duplicate panel in the preview switching unit.

PREVIEW SELECTION SWITCH PANEL

The preview selection sub-assembly contains 16 push-buttons, each labelled with a source designation.

When the LOCAL-REMOTE switch is at LOCAL the push-buttons are illuminated; when any button is pressed the circuit is completed between +24V and the preview switching unit (mounted elsewhere) so that the appropriate relay in that unit is energised to switch the source required to the engineer's preview monitor.

If a second button is pressed, the first is released and the second source is routed to the monitor in place of the first.

When the local-remote switch is in the REMOTE position, the local preview selection panel is inoperative, and the panel lamps are extinguished.

## TRANSMISSION-REHEARSE SWITCH

This two-position switch is used to set and indicate the operational stage of the equipment, lighting the appropriate lamp of the TRANSMISSION-REHEARSE pair beside the switch. The circuit is completed in the transmission switch unit by relay action according to the position of the TRANSMISSION-REHEARSE switch. +24V is sent to the transmission switch unit relay when the switch is in the REHEARSE position, and no voltage is sent when the switch is in the TRANSMISSION position, so that failure of the +24V supply will always leave the apparatus in the TRANSMISSION condition.

## SYNC. PULSE GENERATOR CHANGEOVER SWITCH

This switch operates the sync. pulse generator changeover unit (see separate manual) and indicates, by lighting the appropriate lamp of the pair beside the switch, which generator is in use.

## GENLOCK GROUP

### Genlock ON-OFF Switch

When this switch is in the ON position, the circuit of the operating sync. pulse generator is switched to the "Slave" condition in which the time bases of the local sync. pulse generator are brought into phase with those of a remote input. When the genlock switch is OFF, the local sync. pulse generator acts with its normal triggering. The ON and OFF conditions are indicated by lamps beside the switch.

### Remote Switch

The REMOTE 1 - REMOTE 2 switch is immediately below the Genlock ON-OFF switch, and operates a relay to select from two remote input lines which remote signal is to be used as master in the event of the Genlock ON-OFF switch being switched ON. The line selected is indicated by lamps beside the switch.

The LINE PHASE control adjusts a twin ganged potentiometer so that the line phase of the genlocked sync. pulse generator can be adjusted to suit the incoming triggering pulses. (Note: Field phasing is carried out on a field phase and locking unit in the equipment area).

## STABILISING AMPLIFIER SWITCH

The stabilising amplifier selection switch is situated below the line phase control, and legended STAB AMP 1 - STAB AMP 2. The switch is connected to the +24V line, and this voltage is connected to circuits bringing the

appropriate stabilising amplifier into operation according to the switch positions. Indicator lamps beside the switch are also operated by the +24V, and show which amplifier has been selected. The unused stabilising amplifier is terminated in 75Ω by the switch action.

### TALKBACK SELECTION SWITCH

This is a four-position switch control operating together the various switching circuits which select the required talkback destination for the microphone of a headset plugged into the jack on the lower left-hand side of the engineer's control panel. Selection of any destination/source also completes the headphone circuit so that talkback from the selected position may be heard in one earpiece of the headset.

The switch positions are:

- CAM 1           (2-way private talkback to Camera 1 operator)
- CAM 2           (2-way private talkback to Camera 2 operator)
- REMOTE CCU (2-way private talkback to Remote Control Operator)
- ALL CAMS       (2-way talkback (omnibus) to all camera chain positions)

### TALKBACK INDICATORS & CONTROLS

A lamp below and to the left of the talkback selection switch is lit when the circuit is made via a remote camera control unit call key. This calls the attention of the vision engineer to the fact that the remote camera control unit is calling him, so that he can select "REMOTE C. C. U." on the talkback selector switch and establish communication.

The CALL switch, on the right-hand side of the panel, is connected to external circuits via the talkback selector switch, and sends a call signal to indicators on other equipment. The OFF and MIC ON positions of this switch control the headset microphone circuit.

The HEADSET is plugged into a double jack on the left-hand lower part of the control panel. Gain controls are fitted on the panel as follows:-

- (a) PROD. T. B.           This is the gain control for the receiving circuit from the producer's talkback line.
- (b) PROG. SOUND           This is the gain control for the receiving circuit from programme sound. Programme sound is heard on the same earphone as the camera and remote talkback.

- (c) CAM. T.B. This is the gain control for the receiving circuit from the camera-to-camera control talkback, normally heard in the opposite earphone to the producer's talkback.
- (d) REMOTE C.C.U. T.B. This is the gain control for the receiving circuit from any remote source control point.

### TALKBACK CIRCUIT DESCRIPTION

The inputs to the talkback circuit are derived from the camera control panel inputs, and are arranged to make talkback to either or both cameras possible via the talkback selection switch and at the same time preserve the continuity of programme sound and producer's talkback circuits.

Programme sound, camera talkback, and remote camera talkback are fed via input transformers and control potentiometers to a three-input amplifier, where the signals are mixed so as to appear as a single output feeding the right-hand socket of the dual jack. The producer's talkback is fed from camera control panel No. 2 into the left-hand socket of the dual jack.

The "MIC ON-CALL" switch is a three-position keyswitch; in the "CALL" position, a signal is sent to attract the attention of the person or group called, selection being made by the talkback selection switch. In the "MIC ON" position, the switch connects the headset microphone via the right-hand socket of the dual jack to the input of the microphone amplifier. An electrolytic capacitor is interposed to block d. c. The outputs from the microphone amplifier are fed to the talkback selector switch, thence to the talkback junction box for distribution. In the OFF position of the key, the circuits are inoperative.

The talkback selection switch can be set to communicate with any of the following: camera 1, camera 2, remote camera control unit, or in an omnibus position to call all three of these points. A "call" lamp is fitted to indicate when the remote camera control unit is calling.

A telephone handset with ringing generator is fitted to the panel for communication with points not connected to the general talkback system.

### CIRCUIT DIAGRAMS

The circuits of the vision engineer's control panel are treated functionally and included in the overall circuit diagrams for the mobile control room.

## MAINTENANCE

### CONNECTIONS

The units controlled from the vision engineer's control panel are connected via ducted cable into termination panels on the underside of the control desk. The connectors used are as follows:

<u>Unit</u>	<u>Connector</u>	<u>Location</u>
Camera Control Unit 1	16-way Pye	Front Panel
Camera Control Unit 2	16-way Pye	Front Panel
Interpanel link	8-way Pye	Front Panel
Sync. Pulse Generator 1	Cannon EP-12-14	Front Panel
Sync. Pulse Generator 2	Cannon EP-12-13	Front Panel
Sync. Pulse Generator Changeover	4-way Pye	Front Panel
Talkback Junction Box	20-way Pye	Front Panel
Vision Mixing Unit: Video 1	Coaxial	Front Panel
Vision Mixing Unit: Video 2	Coaxial	Front Panel
Vision Mixing Unit: Video Out	Coaxial	Front Panel
Test Signal Inputs (3)	Coaxial	Rear Panel
Sync. Coincidence Detector	8-way Pye	Rear Panel
Sync. Selection Unit	8-way Pye	Rear Panel
Preview Selection Unit	20-way Pye	Rear Panel

### SEMI-CONDUCTORS AND PRINTED CIRCUITS

The vision engineer's control panel contains semi-conductors and printed circuits, therefore reference should be made to the special appendix, "Maintenance Precautions for Semi-Conductors and Printed Circuits".



PARTS LIST FOR VISION ENGINEER'S CONTROL PANEL 842465

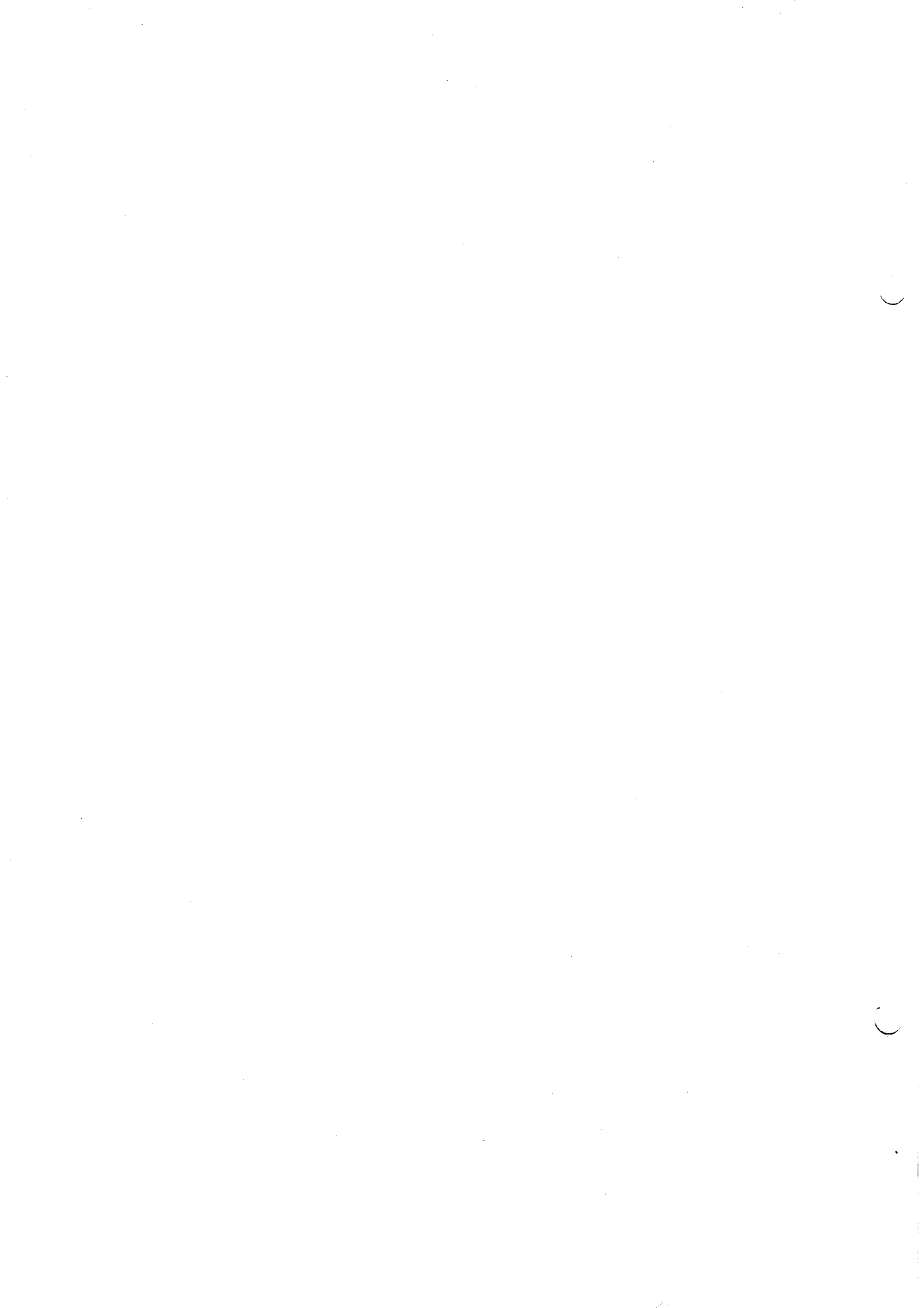
<u>Item</u>	<u>Pye Part No.</u>	<u>Manufacturer</u>	<u>Manufacturer's Code No.</u>
Push-button switch 16 way	830789	N.S.F.	130
Push-button guide 16 way	BJ21213	Pye	325668
Switch, rotary, 3 pole 3-way	831024	N.S.F.	DM
Switch, rotary, 12 pole 4-way	FS020338	B.S.F.	DM
Switch, push-button, time-lag	FS03034	Neiver Eyre	"Columbus" 110
Switch, toggle, 2 pole c/o	FS03024	Arrow	93A/402B
Switch, toggle, 3 pole c/o	FS03025	Arrow	93A/416B
Switch, key, 2 p.c/o+2 p.c/o) (N/L)	831325/C/B	Ericsson	N9335A
Lamp 28V, 3.5W, M.C.C.	709114	Osram	MCC995-1271
Lamp 28V, 0.04A	FL01001	Thorn	995-9118
Lampholder, M.B.C.	720456	Bulgin	M.B.C./M102
Lampholder, D.Type	FL01013	Bulgin	D739/Ins/White
Lampholder, D.Type	FL01012	Bulgin	D739/Ins/Blue
Potentiometer, 2.5k $\Omega$ +2.5k $\Omega$ ) ±10% 2W ganged )	PL02870	Colvern	CCR 3033/115
Potentiometer, 47k $\Omega$ ±10% ) 2W log )	811573	Plessey	Type E
Potentiometer, 47k $\Omega$ ±10% ) 2W lin )	811553	Plessey	Type E
Resistor, 75 $\Omega$ ±2% $\frac{1}{2}$ W	ND75050	Erie	108
Resistor, 270 $\Omega$ ±5% $\frac{1}{2}$ W	NE27125	Dubilier	BTT
Resistor, 560 $\Omega$ ±5% $\frac{1}{2}$ W	NE56125	Dubilier	BTT
Resistor, 750 $\Omega$ ±5% 1W	NE75126	Dubilier	BTT
Resistor, 1k $\Omega$ ±5% $\frac{1}{2}$ W	NE10255	Dubilier	BTT
Resistor, 5.6k $\Omega$ ±5% $\frac{1}{2}$ W	NE56225	Dubilier	BTT
Resistor, 10k $\Omega$ ±5% $\frac{1}{2}$ W	NE10325	Dubilier	BTT
Diode OA210	FV09016	Mullard	OA210
Diode OA202	FV09009	Mullard	OA202
Diode HG5008	FV09006	Hughes International	HG.5008
Transistor ACY18	FV05004	Mullard	ACY18
Jack (headphone)	830167	S. T. C.	4112B
Relay, 700 $\Omega$ , 4 c/o	FR01022	Siemens	TBV65421/93c
Transformer (T.B. input),	AL20043	Pye	B9175
Induction Coil	710727	Siemens	T15853A
Bell, 1k, 20V	710705	Ericsson	
Nickel Cadmium cell, 1.2V	870016	S. Palmer	D. E. A. CBD2.5
Hand Generator	711410	Plessey	4012A-70V
Handset	FH00500	Ericsson	5894/A1
Micro-switch	FS03017	Burgess	V4LR1
Connector, 20-way (plug)	734483	Power Con- trols Ltd.	734483
Connector, 20-way (socket)	734493	Power Con- trols Ltd.	734493
Connector, 12-way (plug)	734482	Power Con- trols Ltd.	734482

PARTS LIST FOR VISION ENGINEER'S CONTROL PANEL 842465 (Cont.)

<u>Item</u>	<u>Pye Part No.</u>	<u>Manufacturer</u>	<u>Manufacturer's Code No.</u>
Connector, 8-way (plug)	734481	Power Con- trols Ltd.	734481
Connector, 8-way (socket)	734490	Power Con- trols Ltd.	734490
Connector, 4-way (socket)	734480	Power Con- trols Ltd.	734480
Connector, 12-way (plug)	FP00003	Cannon	EP-12-14
Connector, 12-way (socket)	FS16003	Cannon	EP-12-13
Connector, Coaxial (50239)	FS16010	Amphenol	50239
Capacitor, 0.1 $\mu$ F $\pm$ 10% 125V	PQ32001	Mullard	C296AA/A100K
Capacitor, 2 $\mu$ F $\pm$ 10% 150V	669594	Dubilier	428/A150
Capacitor, 6.4 $\mu$ F $\pm$ 10% 25V	PS21000	Mullard	C426AM/F6.4
Capacitor, 500 $\mu$ F +20%-50% ) 25V )	680154	Plessey	CE1246/1

APPENDIX 2

VISION ENGINEER'S CONTROL PANEL NO. 2  
PART NO. 842469/00



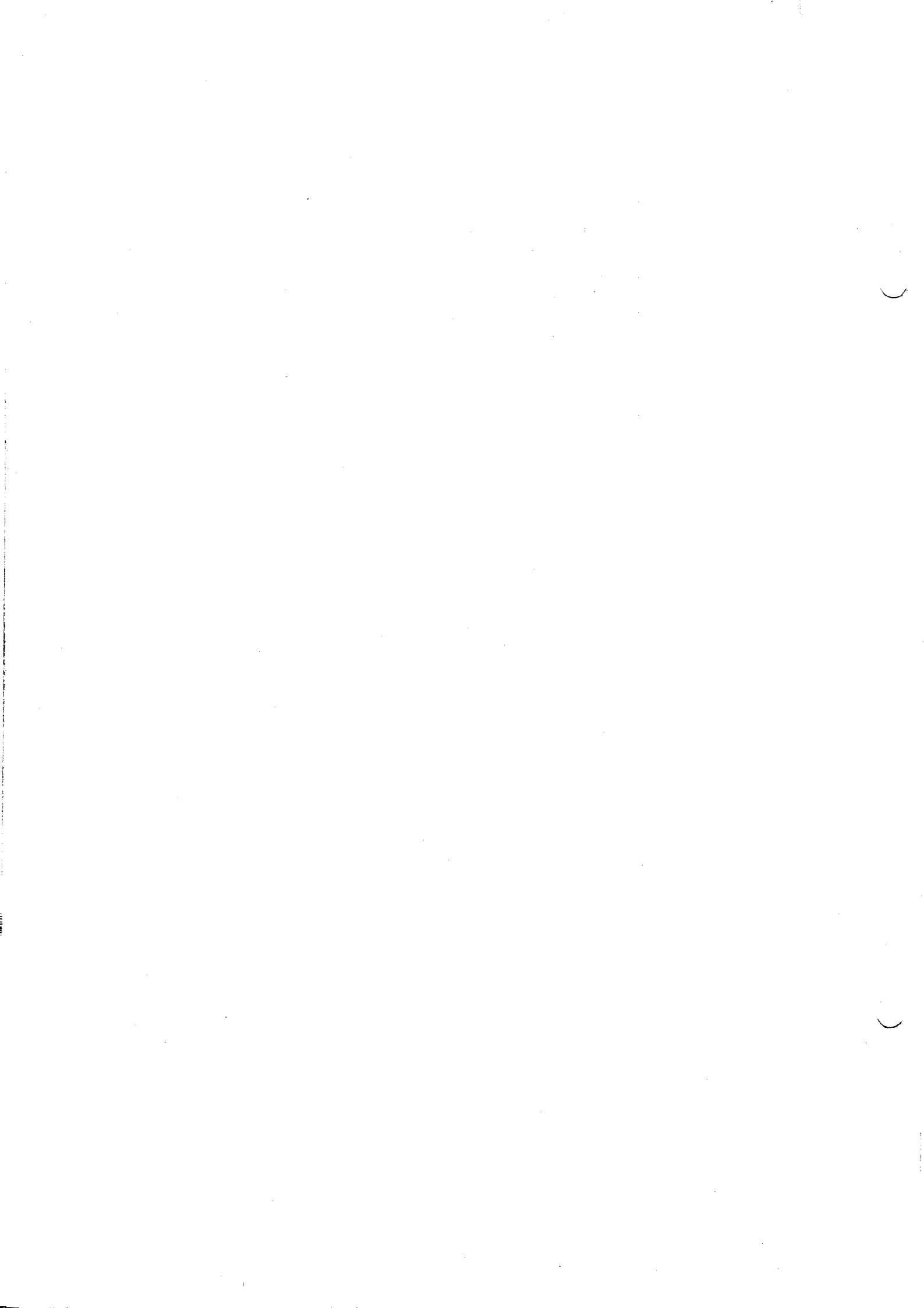
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Connectors	2
Mechanical Fixing	2

### PARTS LIST FOR VISION ENGINEER'S CONTROL PANEL 842469/00



## DESCRIPTION AND OPERATION

### CAMERA CONTROL PANELS

Vision Engineer's Control Panel No. 2 (Type 2469) is fitted for the control of two Image Orthicon cameras (Nos. 3 and 4) and certain ancillary facilities. Full descriptions of the camera control panels and the operation thereof are contained in the description of Vision Engineer's Control Panel No. 1, (see Appendix 1) the panels fitted for the cameras being identical.

### VIEWFINDER-MIXING SELECTOR

A 15-way push-button switch on the top right-hand edge of the desk is connected to the preview selector unit, and the source selected by the switch is routed to the camera viewfinders. All four cameras receive this signal, but only those requiring it need have it displayed on their viewfinder monitors, a switch on each camera providing a means of accepting or rejecting the signal.

In this way, a camera can be set up quickly so that its picture can be accurately superimposed on that from another source. Wipes, mixes, **superimpositions** and split-screen effects are thus greatly facilitated. Test waveforms are also made readily available.

The 15 push-buttons include an "OFF" button to remove any extra signal from the viewfinder circuits when it is not required. The fourteen sources available for viewfinder mixing are:-

- Cameras 1 to 4
- Distribution Amplifiers 1 to 6
- V. M. U. output
- Wipe/Insert Amp. output
- Caption Scanner output
- Non-composite Sawtooth

### TALKBACK CONTROLS

The talkback controls for Vision Engineer's Control Panel No. 2 are less comprehensive than those on Vision Engineer's Control Panel No. 1. A talkback selection switch is fitted, allowing talkback to either of the two cameras controlled by Vision Engineer No. 2. Potentiometer controls are fitted to control the volume of the producer's and cameraman's talkback and the programme sound, as heard in a headset plugged into the socket at the top right-hand edge of the desk.

## PICTURE LINE-UP GENERATOR EQUIPMENT (PLUGE)

A switch is fitted on the top centre of the desk to introduce the picture line-up generating equipment into the line-up chain. With the switch at OFF, no signal reaches the picture monitors from this equipment; with the switch at ALL MONITORS a test signal is sent from the equipment to all the picture monitors in the control room simultaneously, so that it is possible to set the monitor controls to standardise picture quality throughout the control room.

## CONNECTORS

Each camera chain and ancillary facility is connected to the relevant part of the panel by a detachable connector, thus facilitating the removal of the desk for de-rigging or maintenance.

## MECHANICAL FIXING

The desk is fitted into position by sliding built-in shoulders on the desk into slots in the mounting. The slots are duplicated in the "de-rig" rack.



PARTS LIST FOR VISION ENGINEER'S CONTROL PANEL 843469

<u>Item</u>	<u>Pye Part No.</u>	<u>Manufacturer</u>	<u>Manufacturer's Code No.</u>
Pushbutton switch, 15-way	830788	N.S.A.	130
Pushbutton guide, 15-way	BJ21312	Pye	BJ21312
Pushbutton	324677	Pye	324677
Transformer	AL20043	Pye	B9175
Potentiometer, $47k\Omega \pm 10\%$ 2W ) log	811573	Plessey	Type E
Potentiometer, $47k\Omega \pm 10\%$ 2W ) lin	811553	Plessey	Type E
Resistor, $75\Omega \pm 2\%$ $\frac{1}{2}W$	ND75050	Erie	108
Resistor, $1k\Omega \pm 5\%$ $\frac{1}{2}W$	677348	Dubilier	BTT
Capacitor $500\mu F$ -20%+50% ) 25V	680154	Plessey	CE1246/1
Diode OA202	709052	Mullard	OA202
Jack (headphone)	830167	S.T.C.	4112/B
Switch 2 pole c/o, N/L	831301/ C/B	Ericsson	N9314A
Switch 3 pole 2 way rotary	FS02016	N.S.F.	DM
Switch toggle, 2 pole c/o	FS03024	Arrow	93A/402B
Lamp, 28V, 3.5W, M.C.C.	709114	Osram	MCC995-1271
Lampholder, M.C.C.	720456	Bulgin	MBC/M105
Plug, 20-way	734483	Power Con- trols Ltd	734483
Clamp 20-way	730610	Power Con- trols Ltd	730610
Locking Device, 20-way	732602	Power Con- trols Ltd	730602
Socket, Coaxial SO239	FS16010	Amphenol	SO239
Isolation Amplifier Assembly	AG22664	Pye	AG22664

