Communications Equipment for Television Studios Type B3650 series

Good communications in a television studio are essential and production of any kind of programme demands at least basic talk-back facilities. Complex productions call for more sophisticated systems, high-quality speech reproduction and dynamic microphones.

Communication Unit Type B3654

The B3654 is a rack-mounted modular unit consisting of two Dual Talkback Amplifiers and a Power Supply (Type B05–4203) which plug in to a common back connection kit.

This complete assembly occupies only half the available space in Type B4306 Rack Mounting Frame 17·8cm (7in.) high, and provides the facilities listed below for up to five camera channels.

Standard Facilities

Programme Sound (PS) to all cameras and vision control positions.

Production Talkback (TB) from the producer and/or his assistant.

Mixed Control Room Talkback (MCRTB) from vision engineer and camera control positions to all cameras and control positions.

'On air' cues, routed to cameras and control panels from mixers.

Separate outlet of MCRTB.

Auxiliary outlet of complete communications facilites.

'Emergency call producer'. Operation of a key on any camera reduces the level of PS fed to the producer, and superimposes CTB. This facility is exclusive to the Mark V.

Extra amplifiers and a second power unit can increase the facilities if desired.

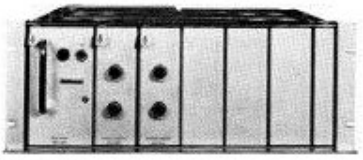
Data summary

Inputs

Mains: 200–250V or 100–125V, 50/60Hz.

Microphone Inputs for: producer; production assistant; vision engineer. All at low level to suit dynamic microphones.

Programme sound: 600Ω zero level from sound mixer.



B3654

Cues: from vision mixer.

Standard switching: Control signal routed to camera channels.

Selective camera calling: Relay control from Engineering Talkback Panel, Type B17–3653 or B18–3653.

Relay control: from Production Talkback Panel Type B15–3653.

Outputs

PS, TB, MCRTB, MCTB, available at every camera, camera control unit and operational control position.

Rehearsal loudspeaker output: MCRTB (separate output); and an auxiliary output: consisting of a complete spare set of paralleled connections for use as required.

Controls:

Two pre-set gain controls are provided on the front of each dual talkback amplifier. Separate level controls for PS, CTB, etc, are fitted as standard to production talkback panels, cameras and engineering talkback panels, control room and studio loudspeakers.

Dimensions:

Height	17·8cm	(7in.)
Width	48·3cm	(19in.)
Depth	40·6cm	(16in.)
Weight	10kg	(16lb)

Communications Auxiliaries

Because of the way in which communication facilities must be closely integrated with the operating techniques of a television studio, it is inevitable that special control and outlet panels must be produced. However, a series of standard panels has been made which will satisfy a large proportion of operating positions. These include:

Engineering Talkback Panel
Production Talkback Panel
Production Talkback and Communication Panel
Commentator's Communication Unit

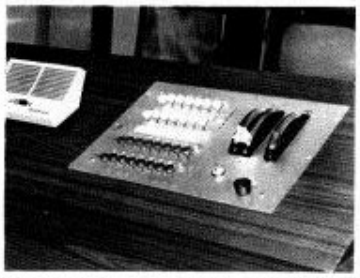
Further details will be supplied on request.

Lightweight headsets or headphones are available which are designed for use with this equipment. Both feature high impedance earpieces and the headset has a carbon microphone fitted on a small boom.

Full details are given in TD B3650.

Mobile Vision Mixer Type B3714

This mixer embodies all the improvements gained from experience with the successful mobile mixers produced by The Marconi Company in the past. It achieves the same standard of performance as can be obtained in a studio.



Type B3714 Vision Mixer installed at Jordan TV Studios at Amman

Features

Provision for 7 inputs and 4 outputs.

Transistors employed to their best advantage.

Passive control panel, operating a vision matrix.

Each cross point uses a highly reliable spring-wire contact relay.

Isolation amplifier on cut output.

Emergency bypass switch makes preview row available for transmission.

Television Switching System Type B3715

Data summary

H.F Response: 0·2dB to 6MHz. Not more than −3dB at 10MHz.

L.F Response: Tilt on a 50Hz square wave less than 2%.

Input Impedance: 75Ω ±2Ω to 5MHz

Output Impedance: 75Ω ±5Ω to 6MHz.

K. rating: Not more than 0·5%.

Cross Talk: With 5MHz fed to all inputs except one, and all outputs taking this one, the cross talk measured on the one output will not be more than —50dB.

Cross mixing: With the same standard-level signal fed to each channel the constancy of output during cross mixing will be maintained at better than ±5%.

Dimensions:

	Height	*Width*	*Depth*
Vision Matrix	47cm (18·5in.)	22cm (8·63in.)	62cm (24·5in.)
Control Panel	28cm (11·06in.)	38·7cm (15·25in.)	18·4cm (7·25in.)
Mixer Processing Unit	35cm (14in.)	48cm (19in.)	38cm (15in.)
		Weight	
Vision Matrix		25·7kg	(56·5lb)
Control Panel		6·4kg	(14·5lb)
Mixer Processing Unit		31·7kg	(70lb)

Full details given in TD B3714.

The requirements of the television industry for programme switching systems are extremely varied. The Type B3715 System is designed to meet the needs of:

(a) A master control switching system for small television stations.
(b) A presentation studio mixer of the 'next channel' type.
(c) An A/B and cut studio mixer.
(d) A special-effects selector.
(e) Additional preview switching for use with larger mixers.

Features

Provision for 12 inputs and 3 outputs

Vision and sound switching.

Input isolation amplifier provided on all inputs.

Roving preview provided.

Emergency by-pass provided.

Each cross point uses a highly reliable spring-wire contact relay.

Matrix housed in a dustproof box.

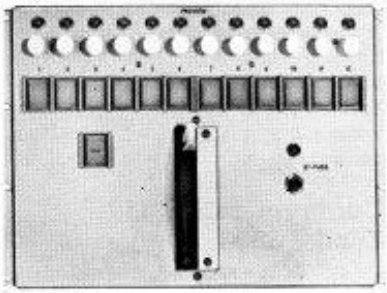
Transistors used throughout.

Plug-in units and modular construction for ease of servicing.

Data summary

H.F response: ±0·2dB to 6MHz; not more than −3dB at 10MHz.

L.F response: Tilt on 50Hz square wave not more than 2%.



B3715

Input impedance: 75Ω ±2Ω to 5MHz.

Output impedance: 75Ω ±5Ω to 5MHz.

Crosstalk: Less than 50dB at 5MHz.

Dimensions:

Matrix

Height	35·6cm	(1ft 2in.)
Width	48·3cm	(1ft 7in.)
Depth	33·0cm	(1ft 1in.)
Weight	25·9kg	(57lb)

Control panel

Height	31cm	(12·13in.)
Width	33cm	(1ft 1·38in.)

Mixer mounting frame

Height	14cm	(5·25in.)
Width	48·3cm	(1ft 7in.)
Depth	45cm	(1ft 5·5in.)

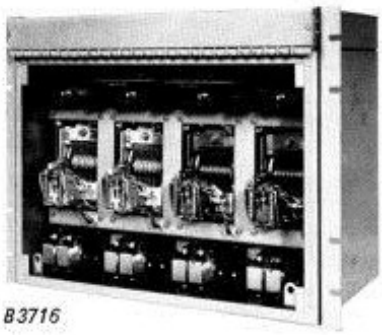
Full details given in TD B3715.

Uniselector Switching Panel Type B3716

Equipment

The Marconi Uniselector Switching Panel Type B3716 comprises a 48cm (19in.) rack mounting chassis containing four uniselectors and associated control relays and circuits enclosed within dustproof covers. The 25 vision input circuits are split through four-way resistance attenuators to supply each uniselector bank contact individually. Transistor output amplifiers restore the level and apply the outgoing signals to line. Muting relays replace the outgoing signal with a synchronizing or distinctive picture signal whilst the uniselector wiper is in motion, preventing a quick succession of pictures from appearing at the output as the wiper revolves. Another relay operates to mute the sound input. The sound inputs are looped over the banks of the four uniselectors.

In addition to switching sound and vision signals simultaneously, each uniselector switches the associated cue and sync-interlock circuits with muting during movement as before.



B3716

Control Systems
Control systems and panels are designed and built to customers specific requirements.

Channel selection may be carried out in several ways. For example, a selector button can be provided for each input, or for economy of control panel space two-character selection may be used (e.g Button T and Button I are pressed for Telecine 1, Buttons T and 2 for Telecine 2, Buttons S and 1 for Studio 1 and so on). Pre-set and automatic switching can also be arranged.

Master control switches
Uniselector switching panels, operating on a pre-select basis may be used as Master Control switches in the Master Control room.

Presentation Mixer
In this type of control, each input circuit is selected by a 'tab' key which is similar to those used in organs. With this type of control, light pressure operates one contact and increased pressure overides the first contact and operates a second contact. In this way, the first touch can be arranged to pre-select the next channel which is finally cut to transmission by a second heavier touch.

Data summary

Note: The following data refers to The Uniselector Switching Panel Type B3716 and not to a complete system.

Inputs

Power: −24V d.c (in duplicate from central battery supply).

Vision: Composite or equivalent non-composite, white positive, 1V p–p. Input impedance 75Ω ±2% to 6MHz. Up to 25 inputs (plus one as above to provide sync. input at 0·3V for muting).

Sound: Up to 25 balanced inputs at a standard level in the range ±10dBm. 600Ω terminations, if required, should be fitted to terminal block.

Outputs

Vision: Levels as at inputs, one from each of the four selectors.

Sound: Levels as at inputs, one from each of the four selectors. To bridging impedance.

Cues: 24V, all above earth.

Performance

Amplitude/frequency: ±0·2dB, 100kHz to 6MHz is not greater than −3dB at 10MHz.

Waveform distortion: $\sin^2$ pulse and bar tests give K ratings of less than 0·25% for a 2T pulse for a cut off frequency of 5MHz.

Differential gain: ±1% at 1MHz measured with 0·1 p–p 1MHz on 1V p–p composite sawtooth or staircase, every 4th line. With intermediate lines variable from reference black to reference white.

Crosstalk: To a wanted input from identical unwanted adjacent inputs or from muted input better than 56dB at 4·43MHz.

Dimensions:

Height	36cm	(14in.)
Width	48cm	(19in.)
Depth	33cm	(13in.)
Weight	25kg	(56lb)

Connectors: All connections apart from the 4-wire outputs are by means of taper pins.

Semi-Automatic Master Switching System Type B3720

This switching system has been designed to simplify master control switching operations. It is based on the use of a range of standard modules, grouped to provide the facilities required, and is capable of fulfilling the needs of most television stations.

Semi-automatic master switcher at Amman studios of Jordan TV

Features

Vision and sound switching for 12 inputs.

Automatic sequencing of up to 8 events using a memory switcher.

Full colour standard.

Transistorized electronic circuits.

Rapid access to change memory.

Cut-in-blanking vision switching.

Roving preview facility, also usable as an emergency by-pass.

Isolated vision inputs for bridging.

Separate sound input facilities, for announcer or film programme.

Sound monitoring by meter and loudspeaker.

Dual-colour illuminated control buttons.

Equipment

The equipment consists of:
(a) A relay matrix.
(b) An 8-event memory store.
(c) A set of processing units, consistin of a cut-in-blanking amplifier, a sync. and burst separator (for NTSC colour), a fading amplifier, a clamped output stage and two sound isolation amplifiers.
(d) Main transmission logic unit.
(e) Rehearsal logic unit.

Manual

Operating one of the 12 pre-selection buttons on the control panel causes the selected vision signal to be routed to an auto-preview monitor output. Similarly, the sound from the selected source is automatically available to the v.u meter and pre-listen loudspeaker. This source can then be transferred to transmission by operating either a 'cut' button or faders.

Automatic

The memory is put into the start position by using the 'reset' button. Pressing the

appropriate selector button will then put the required source into the first event position of the memory. The memory then automatically steps into the second event position which can be filled using the source selection button appropriate for this event. Eight events can be stored in this way at which point the memory automatically steps back to Event 1. If less than eight events are needed, the 'reset' button can be used to return to Event 1. The event indicators show the chosen sequence for the break and this can be checked against the programme schedule. Corrections or changes can be made in the memory store at any time during the read-in, waiting, or read-out period. Changes can be made to any event including the event already pre-selected and ready to be switched on-air. These changes are made by operating the random-access button for the event to be changed, and simultaneously pressing the selection button of the new source required. Once the first event has been transferred to transmission the second event is automatically available for vision and sound monitoring and so on. If more than eight events are required the ninth and tenth events can be inserted into the memory in the first and second positions. immediately the earlier events have been completed. At the end of the eighth event, the first event is again automatically selected and the sequence can be continued. A 'skip' button enables any event to be rejected.

Rehearsal Facility

A rehearsal switch enables station breaks or 'panic periods' involving event-store changes to be rehearsed without affecting the outgoing signal.

Data summary

Inputs

Vision: 12 composite inputs, 1V p–p, 75Ω (±2Ω) to 5MHz.
Sound: 12 zero-level inputs (married to video), 600Ω. 4 zero-level inputs (separate sources), 600Ω.

Outputs

Vision: 3 (isolated), 1V composite p–p, 75Ω (±5Ω) to 5MHz.
Sound: 1 zero-level 600Ω.

H.F response: ±0·2dB to 6MHz; not more than −3dB at 10MHz.

L.F response: Tilt on 50Hz squarewave not more more than 2%.

Differential gain: Less than 1% at 4·43MHz.

Differential phase: Less than 0·5° at 4·43MHz.

Dimensions:

Control panel

Height	45cm	(1ft 5·5in.)
Width	48cm	(1ft 7in.)
Depth	23cm	(9in.)
Weight	13·6kg	(30lb)

12×3 matrix

Height	36cm	(1ft 2in.)
Width	48cm	(1ft 7in.)
Depth	33cm	(1ft 1in.)
Weight	25·9kg	(57lb)

8-event store

Height	71cm	(2ft 4in.)
Width	48cm	(1ft 7in.)
Depth	33cm	(1ft 1in.)
Weight	36·75kg	(81lb)

Processing amplifier

Height	18cm	(7in.)
Width	48cm	(1ft 7in.)
Depth	28cm	(11in.)
Weight	12·7kg	(28lb)

Power supply unit

Height	18cm	(7in.)
Width	48cm	(1ft 7in.)
Depth	24cm	(9·5in.)
Weight	16·3kg	(36lb)

Logic unit

Height	18cm	(7in.)
Width	48cm	(1ft 7in.)
Depth	27cm	(10·5in.)
Weight	3·6kg	(8lb)

Full details are given in TD–3–B 3720.

4-Channel Vision Mixer Type B3723

The B 3723 Vision Mixer is an inexpensive vision mixer with four inputs for small studios and outside broadcast vans. It can also be used to extend existing vision mixing facilities. The B 3723 has the operational simplicity of the AB type of mixer and the further advantages of extreme portability due to the use of semiconductors.

Cutting is possible between remote, non-synchronous signals. The mixer is designed for composite (picture plus sync.) inputs.

B 3723

Features

Simple operation.

Fully transistorized.

Cutting or cross-mixing between 4 inputs with fading facilities.

Completely self-contained in one small portable unit.

Data summary

Inputs

Mains: 100–125V or 200–250V, 50 or 60Hz.

Four video: 1V composite monochrome only.

Synchronizing pulses: 2V or 4V.

Outputs

One video: 1V composite.

On-air cues

H.F performance: ±0·5dB to 6MHz better than −3dB at 10MHz.

L.F response: Less than 3% tilt on 50–60Hz square wave.

Input impedance: 75Ω return loss on 2T pulse not less than 26dB.

Output impedance: 75Ω return loss on 2T pulse not less than 30dB.

Dimensions:

Case

Height	26cm	(10in.)
Width	31cm	(12in.)
Depth	40cm	(16in.)
Weight	3·4kg	(7·5lb)

Control panel

Height	27cm	(10·5in.)
Width	31cm	(12in.)
Depth	26cm	(10in.)
Weight	4·75kg	(10·5lb)

Full details are given in TD–2–B 3723.

Vision Mixer Type B3724

The B3724 is a new basic design for vision mixing systems based on a long and careful study by The Marconi Company on problems associated with all solid-state video switching.

The modular design makes available a Studio or a Mobile version having the following facilities:

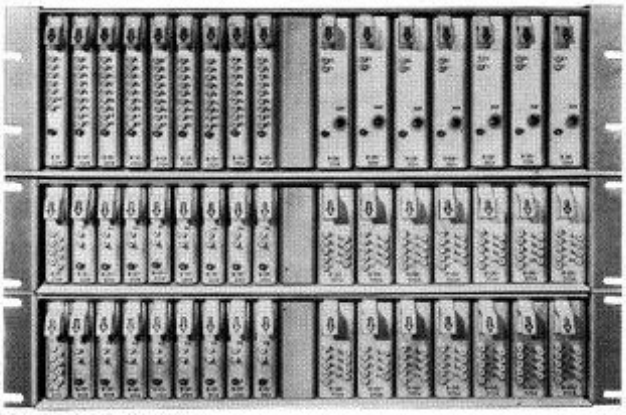
	Studio	*Mobile*
Inputs	16	8
Rows	7 A/B/C/D/ CUT/ PV1/PV2	4 A/B/CUT/PV
Special Effects	Standard	Optional
Re-entry	Yes, from Mix and Special Effects.	No
Black and White NTSC and PAL Colour Working	Yes	Yes
Transmission Outputs	3	3
Vertical Interval Cutting at all points	Yes	Yes

Equipment

The solid-state matrix at the heart of the mixer is built up of modular eight-by-one video switches using microelectronic crosspoints. This new crosspoint is the design feature which has made really high performance solid state mixers a reality.

New video input and output amplifiers and control components have been developed to go with the matrix. The control system also relies mainly on microelectronics and uses digital coding technique to reduce the complexity and bulk of inter-unit wiring. The control system lends itself to vertical interval cutting and so all the signal transitions are made in this mode. Brief details of the sub-assemblies and individual modules which make up the Vision Mixer are given below.

Semi-Conductor Matrix B01-3724 (Sub Assembly)
This is extended from 8 inputs (Mobile) to 16 inputs (Studio) by the addition of an extension Crosspoint unit. This requires only 8·9cm (3·5in.) additional rack space. The matrix can be further extended to 24 or 32 inputs.



The Solid State Matrix

Crosspoint Unit B03-3724 (Sub Assembly)
This contains up to 8 video switches, up to 8 Video Input Amplifiers and the Cues Output module. The extension crosspoint unit is similar.

Video Switch B06-3724 (Module)
Each switch is a single output, eight input matrix, the crosspoints of which are of the micrologic flatpack form which function as an amplifier of unity gain when switched on and give a high degree of isolation when switched off.

Video Input Amplifier B07-3724 (Module)
This silicon transistor amplifier has a high input impedance, making bridging connections possible and an output impedance such that eight crosspoints can be driven.

Cues Output B12-3724 (Module)
Reed relays are used for cues control. One pair of closing contacts is associated with each video input. The mixer logic ensures that each cue relay is energized only when its related video input is connected to transmission output.

Store and Output Unit B02-3724 (Sub Assembly)
Contains up to eight Video Output Amplifiers, up to eight Buffer Stores and one Cut Timer.

Video Output Amplifier B08-3724 (Module)
This is an isolation amplifier having two 75Ω standard level outputs, designed for use at the output of a matrix row.

Buffer Store B10-3724 (Module)
Receives and processes binary coded control information. Outputs are passed to the 8×1 video switches and to the cue lamps in binary form.

Control Panels (Sub Assembly)
Standard Marconi control panels fit the Studio Control Console, Type B4313 but custom built panels can be produced if required. Clare Pendar illuminated momentary-touch push buttons are used and each row of buttons has its associated printed board binary encoder.

Cut Timer B11-3724 (Module)
Two sets of clock pulses, derived from external sync. pulses and produced during the vertical blanking interval, perform the functions of setting up the digital control circuits and determining the exact moment of video switching.

Mixer Logic B18-3724 (Module)
Silicon integrated circuits in this module determine the pattern of control needed for the re-entry circuits.

Mixer Electronics Unit B04-3724 (Sub Assembly)
The plug-in modules in this unit are housed in a frame 17·8cm (7in.) high and include the Mixer Logic, the A/B Mixer, and 4×1 switching module.

A/B Mixer B16-3724 (Module)
This unit is controlled by a single fader and provides a very high cross fade linearity of better than 1½%. Sync. pulses, colour burst and picture amplitudes are thus maintained substantially constant during the mixing operation and regeneration of sync. pulses and colour burst in the output processing amplifier is therefore not essential for local signals. Two outputs are provided.

4×1 Switch (Module)
This module is a 4×1 matrix providing

four inputs and two identical outputs.

Power Supply Unit B 4205-01
This unit operates from most mains supplies and provides the voltages required by the Vision Mixer. It occupies 17·8cm (7in.) of rack space.

Output Processing Equipment
The Master fade and the by-pass facilities are effected by the Output processing equipment for which a version of the Line Clamp Amplifier Type B4011 is normally supplied (see page 150).

Data summary

Input and Output: Return loss better than 30dB to T Pulse and Bar.

Impedance: nominally 75Ω.

Input Level: 1·0V p–p normal.
1·4V p–p max.
Gain Stability (overall) over 1 hour. < ±0·25dB.

Temp Range: 0° to 45°C.

Sig. to Noise Ratio: p–p Signal: to r.m.s weighted noise. >60dB.

Crosstalk:
Worst path at 4·43MHz.
Studio < 52dB, Mobile < 56dB.

Differential Gain:

(a) Standard Input Level	2%—Studio
	1%—Mobile
(b) +3dB Input Level	4%—Studio
	2%—Mobile

Differential Phase:

(a) Standard Input Level	1·5°—Studio
	0·5°—Mobile
(b) +3dB Input Level	3·0°—Studio
	1·0°—Mobile

L.F Response: 50Hz Square Wave Tilt is < 0·2% per m sec.

Mains Input: 100–125V and 200–250V, 48–62Hz Single Phase.

Mixed Sync Input: 1 Standard level

Rack Space

In a standard 48·3cm (19in.) wide Rack Cabinet, the sub assemblies will occupy vertical rack space as follows:

Matrix, Store and Output	31cm (12·25 in.)—Studio 22·2cm (8·75 in.)—Mobile
Special Effects	17·8cm (7in.)
Mixer Electronics	17·8cm (7in.)
Power Supply	17·8cm (7in.)
Output Processing	17·8cm (7in.)

Total: Studio—102·2cm (40·25in.)
Mobile—75·6cm (29·75in.)
OR
93·4cm (36·75in.) with Special Effects.

Full details are given in TD B3724.

Special Effects Equipment Type B3740 series

The complete assembly comprises an electronic switch, a pattern generator and a power supply.

Either the electronic switch or the pattern generator can be supplied separately, with or without a power supply.

Control units are provided which can be mounted, for example, on the vision mixer desk.

Features

Full colour performance.

15 transitional patterns as standard, 72 optional.

Self-keying overlay mode.

Corner insert facility.

External inlay keying mode.

Colour caption generating facility (optional for PAL and NTSC).

All solid-state.

0–45°C ambient temperature.

Modular construction.

Electronic Switch Type B3740

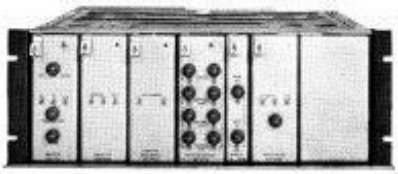
The transistorized electronic switch functions as a high-speed changeover switch between two synchronous vision sources. The vision sources may be colour or monochrome. The keying signal which actuates the switch is derived from the associated electronic pattern generator or from an external high contrast source.

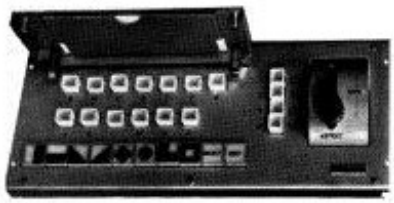
Data summary

Video inputs:
'A' and 'B' Channels–1V p-to-p composite; bridging inputs from 75Ω line. External keying input; bridging 75Ω 0·7V non-composite or 1V composite; Sync. Input—1·5V to 6V negative going composite sync. bridging input from 75Ω line. Subcarrier Input 2V p-to-p ±1dB. bridging input from 75Ω line.

Power input: −24V ±0·5V d.c at 0·5 amp.

Video outputs:
Two 1V p-to-p comp relative amplitudes within 2%. Return loss 30dB





Multi-pattern selection panel

Performance:
H.F Response ±0·2dB to 7MHz.
L.F Tilt < 0·2% per millisecond.
Differential gain 0·5%
Differential phase 0.25° } at 4·43 MHz.
'A'—'B' Crosstalk better than 55dB below 1V up to 5MHz.

Pattern Generator Type B3742

This provides the selected keying signal for the Electronic Switch. The timing of this signal is varied by the wipe control to move the transition across the picture.

Provision is made for the reversal of direction of wipes, and for automatic unidirectional wiping irrespective of the end from which the wipe control is moved. The aspect ratio of corner inserts can be adjusted.

The pattern generator controls normally form part of the vision mixer panel, but may be separate.

Multi-pattern Selector Panel Type B05–3742 carries similar controls but provides a choice of 72 patterns.

Data summary

Drive inputs: 1·5V to 6V negative going line and field drive, bridging input from 75Ω.

External vision input:
0·7V p-to-p non-composite or 1·0V p-to-p composite, ±2dB bridging input from 75Ω.

Power input: 24V ±0·5V d.c at approx 0·5 amp.