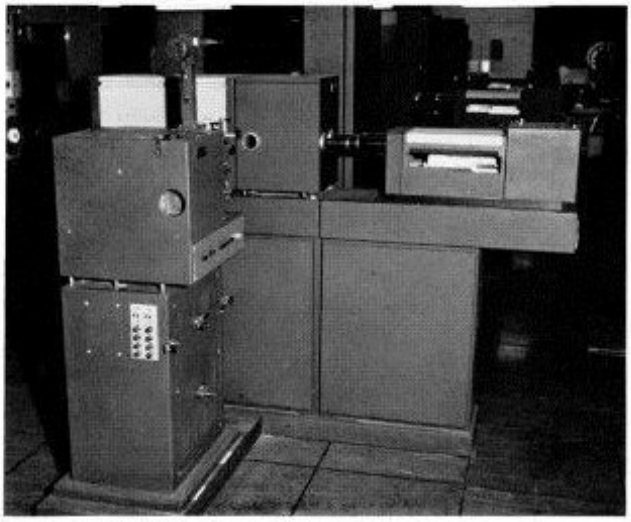
TELECINE EQUIPMENT

Full Facilities Telecine Type B3402

A high proportion of television programmes continue to be on motion picture film. The Marconi Company have produced highly successful black and white telecine equipment for many years. The advent of colour television has led to the introduction of the B3402, a new range of telecine equipment, capable of both black and white and colour working. Special versions of the latest Marconi television cameras, the Mk VII and the Mk VI, are incorporated resulting in the highest quality colour and black and white pictures.



Type B3402 full facilities Telecine at Yorkshire Television

Features

Suitable for black and white or colour television.

Positive and negative film.

Automatic operation.

Colour version uses Plumbicons.

Operation can be machine side or remote.

Light control by special optical filter.

Lamphouse common to all projectors.

Colour masking incorporated.

Camera channel modules common with Mark VII live colour camera channel.

Unique multiplexer.

Highly flexible, versions available are:
(a) 35mm Uniplex
(b) 16mm Uniplex
(c) 35mm and 16mm Multiplex
(d) 16mm and 16mm Multiplex
(e) 35mm and 35mm Multiplex
(f) Edition (c), (d) and (e) above can have an additional single or dual slide projector.

Description

Camera Channels

All the above arrangements can be supplied with either the B3124 Black and White Telecine Channel or the B3211 Colour Telecine Channel, which, being a separate luminance camera, can be operated as a black and white only camera.

The B3124 Black and White channel is described on page 122.

The B3211 colour telecine channel uses an all solid-state 4-tube camera, based on the design of the highly successful Mark VII colour camera. Its outstanding stability gives true long-term 'hands off' operation.

As in the live version, four Plumbicon tubes are used, since the excellent sensitivity proves invaluable for televising of dense film.

The relay optical system employed is ideally suited to telecine operation, enabling a compact multiplexer to be used, and giving the highest possible picture quality.

Film Projectors

Marconi's have arranged with R. Bosch to use a basic Bauer 16mm film moving mechanism to provide an extremely rugged projector specifically for use in television applications.

The 35mm film projector is based on the Philips FP20 mechanism, also known throughout the world for its excellent performance and reliability.

These projectors both provide the following facilities and features:
1. Forward and reverse running.
2. Forward inching.
3. Automatic stop and cueing to a predetermined position by means of metallic markers on the film.
4. Provision is made for running a loop of film approximately 3m (10ft) long.
5. Solarcell optical and magnetic sound heads are fitted.
6. Marconi plug-in sound amplifiers. Film capacity of the 16mm projector is 1220m (4000ft) and of the 35mm projector 914m (3000ft). Standard, 1828m (6000ft) optional.

Control panels fitted to each projector enable full machine-side operation or remote control of all major functions, as below:

Forward Reverse Show Stop Inch	Local or remote control
Optical/Magnetic Local/Remote Interlock ON/OFF	Local control only

Control relays and circuits are contained in the machine pedestals and provide for:
(a) Interlock with other machines.
(b) Switching of aperture correction circuits.
(c) Control of multiplexer.

Slide Projector

The B3402 Telecine uses the B3442 Slide Projector, which is described in detail on page 135.

Camera Operational Controls

The camera Operational Control Panel is standard with all systems. Movement of a quadrant fader adjusts the filter wheel in the lamphouse and sets the required white level; rotation of the same control adjusts the black level. The colour Operational Control Panel also has controls to select black and white working.

Black and White Balance Controls

Optional white balance and black balance controls are available for the maintenance of accurate colour reproduction with varying densities on the film.

Multiplexer

The B3211 Colour Telecine Camera uses a field lens of 4·06cm (1·6in.) and advantage is taken of this to reduce the size of the mirrors used in the B3414 multiplexer. These small mirrors can be rapidly changed and cutting between two inputs is carried out in one twentieth of a second.

The mechanical connection between the multiplexer and the colour telecine camera is effected by a rubber seal which ensures a light and dust tight joint. The camera and the multiplexer stand on a rigid metal base supported by a pedestal cabinet which matches the base and pedestal of the slide projector.

Data summary

16mm Film Projector Type B3422

Sound: Optical and magnetic.
Magnetic—may be common or separate, with up to two sound followers.
Pre-amp output −12dBm.

Power:
(a) Three phase 220V 50Hz at 1kVA starting and 250VA running.
(b) Single phase 100–125V/200–250V, 50Hz, 500VA.

35mm Film Projector Type B3431

Sound: Optical and magnetic sound heads are fitted. Output from the sound pre-amplifier is −12dBm into 600Ω

Power:
(a) Three phase 220V, 50Hz at 1kVA starting and 250VA running.
(b) Single phase 100–125V/200–250V, 50Hz, 500VA.

Slide Projector B3442

Lamps: 4 per B3442 projector, 2 on, 2 standby, all standard 24V 150W quartz halogen. Lamphouses are standard Marconi, with light control etc.

Magazines: 2, each holding 30 slides 5×5cm (2×2in.).

Power: 100–125V or 200–250V, 50/60Hz, 500VA.

B3414 Optical Multiplexer

Fits to the pedestal which also carries the Mark VI or Mark VII Camera. Powered by the system power supplies.

Inputs: Four, 2 from B3442 Slide Projector 2 from Film Projectors which may be 16mm and/or 35mm.

B07-3402 Sound Control Panel

Available to order fitted with PPM or VUM.

Inputs

Power: 24V d.c, from rack mounted supply.

Signal:
5 inputs each at −12dBm in 600Ω.
1 input from rack-mounted amplifier module.
1 input to slave PPM (if fitted).

Outputs

Main: +12dBm for 100% modulation, 600Ω or 75Ω.

Output: One, direct to the camera optical system.

Remote Control

All remote controls may be provided up to 90m (300ft) from the machines. Machine controls alone may be remoted to much greater distances. The dimensions of each type of panel are listed, control functions are described in the text.

Monitor: via XLR connector to L.S amplifier, facility for headphone output if required.

Controls:
Main LEVEL control.
Equalizer IN/OUT.
60Hz CUT and LIFT.
10kHz CUT and LIFT.
Monitor LEVEL and CUT.

Channel Video Characteristics

(a) Colour

Inputs: Power 100–125V/200–250V, 50–60Hz, short term changes ±6% plus variations of ±6% acceptable. Consumption 550VA (approximately).

Video:
(a) Special inputs, YGRB, 0·7V, 75Ω.
(b) Test, 0·7V non-comp in 75Ω.
(c) Coder, 1·0V comp., to monitor circuits. Bridging input.
(d) External Video. Bridging input.

Pulse: Line drive, Field drive, Mixed Blanking and Syncs. Colour Step sync. facility. Bridging inputs.

Cues and Standard Switching to P.W.M.

Outputs

Video:
(a) Special Outputs, YGRB, 0·7V, 75Ω or switched to bridge to Special Inputs.
(b) Transmission, YGRB, 0·7V, 75Ω matched to 0·2%.
(c) Waveform Monitor, 0·7V in 75Ω.
(d) Picture Monitor, 0·7V in 75Ω.
(e) Composite Monitor output 0·7V in 75Ω
(f) Auxiliary Transmission Outputs 0·7V in 75Ω.

Pulse: Colour Step to Waveform Monitor Colour Step Sync. Pulse.

Control to Coder and Remote Control Panels.

Cues to P.W.M.

Performance: Aperture correction and film loss correction are provided, separately adjustable.

Internally generated test and calibration signal (saw tooth).

Gamma Correction, adjustable $\gamma=$ 0·25–0·5 or linear positive, $\gamma=$ 0·6–0·9 for negative.

Colour Masking, remote selection between 2 preset and 1 adjustable settings.

(b) Black and White

Inputs

Power: 100–125V/200–250V, 50–60Hz, 200VA.

Pulses: Bridging input for line drive, field drive, mixed blanking and mixed syncs. 1·5–8V.

Video: Test input. Bridging.

Cues: On air cue connection.

Outputs

Video: Three isolated standard level signals which may be independently set to composite or non-composite as required.

Gamma Correction: Two gamma correction controls provide continuous variation of law. 0·4 to 1·0 for normal polarity. −0·4 to −1·0 for negative polarity.
The correct control is selected by the Picture Polarity switch.

Aperture and film correction: Continuously variable control giving up to 12dB boost peaking at:

625/525 lines:	35mm film 8·5MHz
	16mm film 4·8MHz
405 lines:	35mm film 4·8MHz
	16mm film 3·2MHz

Dimensions

Type	Height	Weight
B3422 16mm Film Projector	194cm (76in.)	150kg (330lb)
B3431 35mm Film Projector	218cm (86in.) (including 1828m spool)	209kg (460lb)
B3442 Slide Projector	132cm) (52in.)	154kg (340lb)
B3414 Optical Multiplexer	50·2cm (19·8in.)	50kg (111lb)
B3211 Colour Camera	50·2cm (19·8in.)	58kg (128lb)
B3207 Camera Control Unit (R)	49cm (19·25in.)	52·6kg (116lb)
B3210 Power Supply Unit (R)	22cm (8·75in.)	49·5kg (109lb)
B01-3124 Mk. VI (B/W) Camera	12·7cm (5in.)	12·3kg (27lb)
B3126 Mk. VI (B/W) CCU (R)	17·8cm (7in.)	21·4kg (47lb)
Rack Mounted Ancillaries (inc. PPM) (R)	17·8cm (7in.)	12kg (26lb)

The suffix (R) indicates units for 48·3cm (19in.) rack mounting.

Control Panels

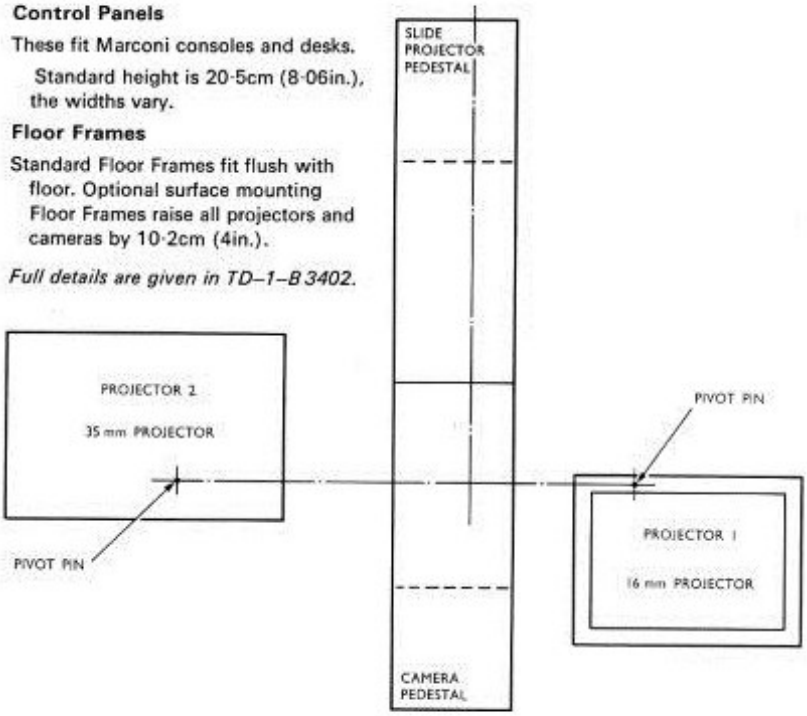
These fit Marconi consoles and desks.

Standard height is 20·5cm (8·06in.), the widths vary.

Floor Frames

Standard Floor Frames fit flush with floor. Optional surface mounting Floor Frames raise all projectors and cameras by 10·2cm (4in.).

Full details are given in TD–1–B 3402.



16mm Telecine Channel Type B3400

The Marconi range of telecine equipment has been streamlined and the B3400 telecine now uses the Mark VI photo-conductive camera channel Type B3124, which is available as a special telecine version. The camera is described in detail on page 122. The telecine channel also uses a slide projector Type B3441 and one or two 16mm film projectors Type B3423. These are multiplexed using the B3412 Multiplexer in the base of which is housed the camera.

16mm Telecine Projector Type B3423

The mechanism is a modified Philips EL5100 equipment. Magnetic and optical sound heads are fitted, and an integral control panel carries a volume control, and treble and bass lift and cut controls.

The sound amplifier uses all solid state devices, the optical pick-up being a solar cell for long and stable performance.

Quick and easy film threading is a feature of this projector, operation of a single lever giving immediate access to the whole film path.

The projector will run forward and in reverse, the projection lamp remaining on whilst the changeover is performed. Still frame viewing is also provided. The new quickly replaceable Delrin running surfaces resist dirt deposits and contribute to extended film life and good picture steadiness.

Telojector Type B3441

The telojector is a slide projector of the rotating disc type. Two discs, each holding up to six 5×5cm (2×2in.) slides, are mounted in a vertical plane, one each side of the central optical assembly. Slides in each disc are illuminated alternatively by independent optical systems and the image formed is deflected by mirrors to a single projection lens.

Optical Multiplexer Type B3412

The multiplexer uses two pellicle semi-mirrors and a fully silvered mirror. By using these, it has been possible to eliminate the need for moving parts within the multiplexer. The mirrors and field lens are housed in a sealed box fitted with silica-gel desiccators.

Outside the sealed box, and immediately below the field lens, is fitted a test slide holder. This will take any 9×12·3cm (3·6×4·8in.) test slide (such as a Marconi Resolution No. 1). With light provided from any projector this then affords a convenient way of setting up the camera channel.

The pedestal normally contains the B3124 camera head, which is fitted with the vidicon yoke mounted vertically. The pedestal ensures that the multiplexer inputs are at the correct optical height. The camera head can be easily removed for servicing, and no re-alignment of the optical system is required when it is replaced.

Control System

The remote control panel carries a row of illuminated push buttons. These are labelled 'RUN, SHOW OFF' for each film projector and 'ON, OFF, CHANGE'

for the slide projector. The remote control panel may be mounted at any reasonable distance from the machines.

Each machine also has its own local control panel and a LOCAL, REMOTE switch is included on it. The film projectors have sound controls mounted on them.

Sound

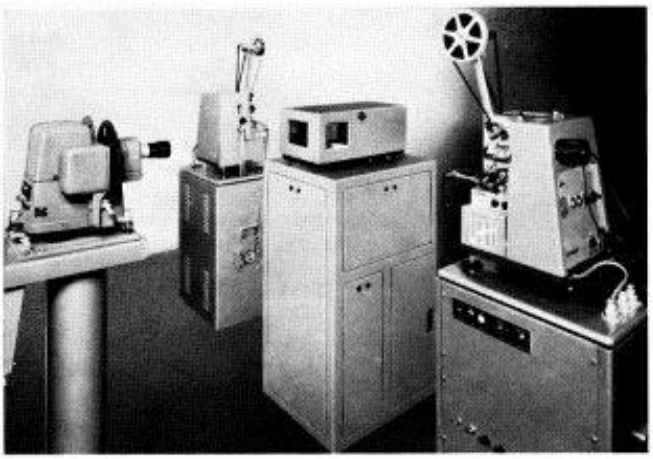
In the simplest arrangement, sound outputs are taken direct from the projector pre-amplifiers at 0dBm. The projectors are fitted with VOLUME, TREBLE and BASS controls. As an optional extra a separate Sound Control Panel is also available, and this, used in conjunction with the main control system, provides selection of up to four inputs. The selected input, which may be at −20dBm or 0dBm, is monitored by a programme meter and an equalizer giving 10dB of cut and lift at 60Hz and 10kHz can be switched in if required. A headphone monitoring jack is provided on the front panel and the main output can be taken at 600Ω or at 75Ω, at +20dBm.

A high quality monitor loudspeaker with amplifier, such as the Marconi Type LE2/AS can be connected to the sound output whether the optional Sound Control Panel is used or not.

Data summary

The B 3400 standard Telecine consists of:

- One B 3124 Photoconductive Camera Channel which comprises:
  - One camera head.
  - One camera control and power supply unit.
  - One camera control panel.
- One Studio Console Type B 4311.
- One Picture and Waveform Monitor Type B 3901.
- One set of cables.
- One camera cable.
- One lens 5cm (2in.) f/1·9 'C' mount.
- One B 3412 Pellicle Optical Multiplexer with pedestal giving 122cm (48in.) optical height.
- Two B 3423 16mm Projectors complete with pedestals, lenses, local control panels, sound amplifiers.
- One B 3441 Telojector complete with lens, pedestal and local control panel.
- One 24V Power Supply Unit Type B 4203.
- One set of connectors.
- Also available if required:
  - One sound control panel.
  - Spare film reels, test film slides.



B 3400

Dimensions:

16mm Projector Type B 3423

Height	160cm	(5ft 3in.) (from floor to spool centre)
Width	43·2cm	(1ft 5in.) (over controls)
Length	61·4cm	(2ft 0·19in.) (from rear handle to spool centre)

Multiplexer Type B 3412

Height	136·5cm	(4ft 5·88in.) (from floor)
Width	50·2cm	(1ft 7·75in.)
Length	64·8cm	(2ft 1·5in.)

Telojector Type B 3441

Height	138cm	(4ft 6·25in.) (from floor)
Width	47cm	(1ft 6·5in.) (over discs)
Length	65·4cm	(2ft 1·75in.) (over lens and controls)

Remote control panel

5cm (2in.) high, 35·5 cm (14in.) wide channel panel.

Sound control panel

9cm (3·5in.) high, 35·5cm (14in.) wide Channel panel.

Full details are given in TD B 3400.

Slide Projector Type B3442

Features

Sequential or random selection.

Two removable magazines, each holding 30 slides.

Automatic lamp changeover.

Remote light control with no shift of colour temperature.

Low voltage quartz-halogen lamps, of standard type.

Integral cooling fan.

Construction

The Type B3442 consists of two identical projectors mounted side-by-side on a specially designed pedestal which is styled to match other units in the Marconi Type B3402 Telecine System.

Illumination is provided by the Marconi Lamphouse which is of advanced design. Each lamphouse contains two 24V 150W quartz-halogen lamps of a widely used standard type.

Control System

A Local Control Panel is fitted to the rear of the pedestal, this accommodates controls for:

Mains	Reset
Show	Load A
Off	Load B
Forward Change	Sequential
Reverse Change	Auto

The Reset control is a momentary-touch push-button which returns the magazines to the condition where slides Nos. 1A and 1B are ready.

The Auto condition enables changes to be controlled by signals from, for example, the cue track of a sound tape recorder.

The Remote Control Panel may be one of two types. For sequential operation, the controls are:

Show	Reset
Off	Auto
Forward Change	Sequential
Reverse Change	

For random selection, the control panel obviously has to be more complex, and it includes two rows of buttons which enable any slide to be chosen with illuminated readouts to identify the slide selected for each projector, and a CUT button to complete the change.

B3442

Data summary

Change times:

(a) Between slides in A and B projectors, depends on multiplexer, with Marconi B3414 is approximately $\frac{1}{4}$ second.

(b) Between adjacent slides on one projector 1 second.

(c) Longest path random change on one projector 2·5 seconds.

Power: 100–125V or 200–250V 50/60Hz, consumption about 500VA.

Lamps: 4 per B3442 projector, 2 on and 2 standby; all 150W 24V standard 2 pin quartz-halogen.

Magazines: 2, each holding 30 slides, 5×5cm (2×2in.).

Gate Size: 28·58×21·44mm (1·125×0·843in.) transmitted area (American and British Standard Specifications).

Dimensions: Spacing between optical centres. 14·0cm (5·5in.). Height above floor, optical centres 122cm ±1·25cm (48in. ±0·5in.).

Overall Height: 132cm (52in.).

Overall Width: 35·6cm (14in.).

Overall Length: 103cm (40·5in.).

Length of base: 66cm (26in.).

All-up weight: 159kg (350lb) approx.

Note that dimensions may vary slightly from those stated above.