B/009 Issue 3

Broadcast Equipment Division
EMI Electronics Limited

Closed Circuit Television
Type 9

Closed Circuit Television Type 9 is a high-quality system of great versatility.

FEATURES

★ *All-transistor circuits for reliability*

★ *High sensitivity and resolution enable good pictures to be obtained under normal room lighting conditions*

★ *Choice of television scanning system*

★ *Modular design offers a wide range of installations from simple to highly complex*

★ *Two of the camera types can be remotely controlled*

★ *Extensive use of printed circuits*

★ *Choice of three cameras for particular applications*

DESIGN

Basic Units

Camera Type BC900
Camera Type BC910
Camera Type BC930
Power Unit Type PU900
Camera Control Panel Type RA908
Camera Control Unit Type CC900

Camera Type BC900

Camera BC900 is a rugged cylindrical camera of 3·625 in (9·5 cm) diameter. It uses a 1-inch high-resolution separate-mesh vidicon tube. Optical focus is simply operated by means of a knob on the rear of the camera. A 32-way camera cable connects the camera to the Power Unit PU900. Provision is made to fit a cover enclosing the lens, thus sealing the whole camera unit. The Camera BC900 is used for general industrial purposes.

Camera Type BC910

Camera BC910 is a rectangular camera, similar electrically to the Camera BC900. It uses similar camera cable. Facilities are provided for mounting a viewfinder on top and a two-lens turret on the front. Optical focus is operated by means of a knob on the rear of the camera. A Camera Control Panel RA908 can be fitted to enable *target, beam focus* and *beam current* to be controlled at the camera. The Camera BC910 is used for small studio types of applications such as education, sales promotion, etc.

Camera Type BC930

The Camera BC930 is a small cylindrical camera of only 1·7 in (4·3 cm) diameter. It uses a $\frac{1}{2}$-inch vidicon, together with a cylindrical amplifier unit of the same diameter. Both these units are sealed to stop the ingress of moisture, and the cable interconnecting them has hermetically sealed plugs and sockets. A 22-way camera cable, also with hermetically sealed plugs and sockets, connects the amplifier unit to the Power Unit PU900. Optical focus on the camera is achieved by micrometer adjustment on the 16 mm or 8 mm 'D' mount lenses. The Camera BC930 is specially designed for the inspection of pipes and inaccessible locations.

Power Unit Type PU900

Power Unit PU900 provides power to a Camera BC900, BC910, or BC930 and to Camera Control Unit CC900, Synchronising Pulse Generator GS900 and associated equipment. Multi-way plugs and sockets for connection to cameras and remote controls are located on the rear of the module unit. Space is provided for the normal inclusion of Camera Control Panel RA908. When this panel is located remotely, Switch Panel RA912 is supplied for this space. Alternatively, Autolight Unit RA914 can be fitted.

Camera Control Panel Type RA908

Camera Control Panel RA908 carries the necessary controls for the operation of *target, beam focus, beam current,* and *mains supply ON-OFF*. The panel can be fitted to Power Unit PU900 or to Camera BC910; alternatively it can be used remotely.

Camera Control Unit Type CC900

Camera Control Unit CC900 provides synchronising pulses and video circuits for the television system operating with 'random' interlace. The most simple CCTV Type 9 system requires both a Camera Control Unit CC900 and a Power Unit PU900, so the two modules are supplied joined together.

Additional Units

To extend the system for particular applications the following units are available.
Synchronising Pulse Generator Type SG900
Broadcast Sync Shaper Type BSS900
Autolight Unit Type RA914
Remote Accessory Control Panel Type RA901
Switch Panel Type CM902
Switch Panel Type CM903
Remote Accessory Module Type RA905

Synchronising Pulse Generator Type SG900

Synchronising Pulse Generator, a modular unit, can be joined to Camera Control Unit CC900, and provides the necessary drive pulses for 2:1 interlace scanning on either 625, 525 or 405 line television system. When this unit is used, the Plug-in Board, CC901 is removed from the Camera Control Unit CC900. When the Synchronising Pulse Generator SG900 is used with a Broadcast Sync Shaper BSS900, both Plug-in Boards CC901 and CC902 are removed from the Camera Control Unit CC900.
Crystal control can be provided as an optional extra.

Broadcast Sync Shaper Type BSS900

Broadcast Sync Shaper BSS900, a modular unit, can be joined to Synchronising Pulse Generator SG900, and enables the camera system to operate with synchronising pulses to CCIR broadcast standards. *Output pulses* are *line drive, field drive, mixed sync,* and *mixed blanking*.
Three modular units, PU900, SG900, BSS900, can be joined together to form a self-contained synchronising pulse generator if required.
A Studio Accessory Kit BSS901 inserted into the Broadcast Sync Shaper BSS900 provides 75-ohms outputs so that a number of camera channels can be driven together.
The four units, PU900, CC900, SG900 and BSS900, joined together, can be fitted with mounting brackets so as to enable the resultant unit to be screwed to a standard 19-inch rack.

Autolight Unit Type RA914

Autolight Unit RA914 enables the cameras BC900, BC910 and BC930 to be self-adjusting in signal level under varying light conditions. The unit can be fitted into Power Unit PU900 in place of Camera Control Panel RA908 or, alternatively, can be remote.

Remote Accessory Control Panel Type RA901

When the appropriate drive units are fitted to the cameras, the Remote Accessory Control Panel RA901 will remotely operate focus, iris, zoom, lens turret and pan and tilt. The panel can be located at any remote position in the Remote Accessory Module RA905.

Switch Panel Type CM902

Switch Panel CM902 provides remote switching of frame and line scan reversal.

Switch Panel Type CM903

Switch Panel CM903 provides remote switching of negative and positive picture output.

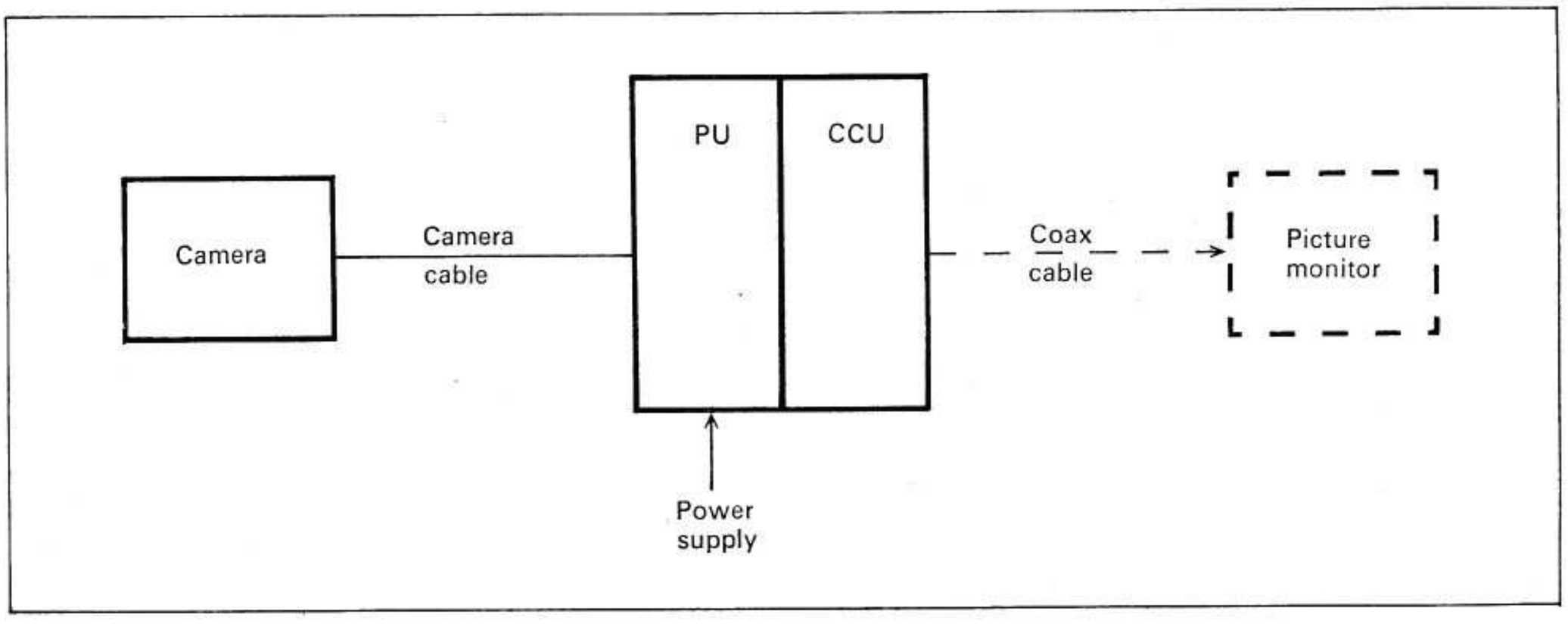
Remote Accessory Module Type RA905

Remote Accessory Module RA905 consists of a modular unit which can be joined to the other modular units or can be remotely located. RA905 is used for accommodating units such as Camera Control Panel RA908, Autolight Unit RA914, Remote Accessory Control Panel RA901, Switch Panel CM902, and Switch Panel CM903. Each Remote Accessory Module RA905 houses three panels.

TYPICAL SYSTEMS

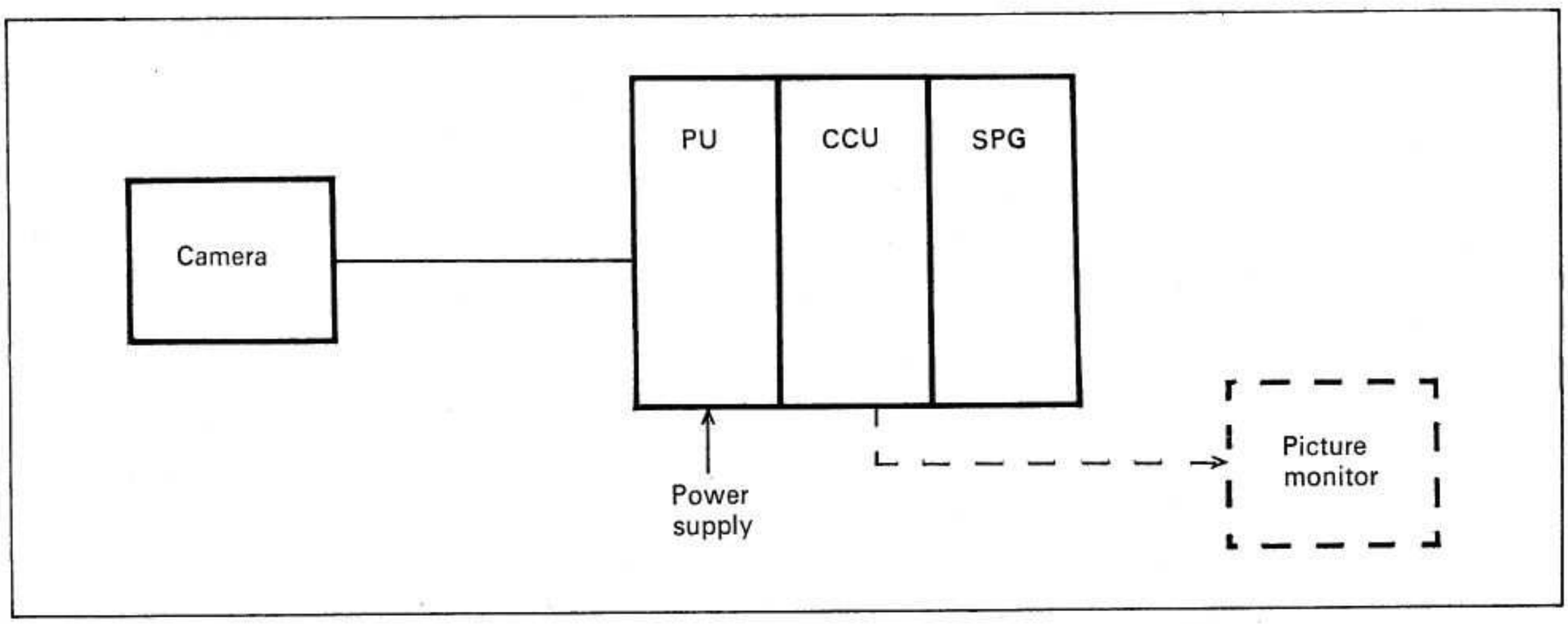
Basic System

The basic system consists of one of the three types of camera (BC900, BC910 or BC930) and Power Unit PU900, Camera Control Panel RA908 and Camera Control Unit CC900. The camera cable can be up to 1,000 feet (305 m) in length. The system will work with random interlace. Two 1·0 V composite video outputs are available at 75 ohms impedance for feeding picture monitors. One camera system can be synchronised with another so that picture holds when the two outputs are switched to one picture monitor.



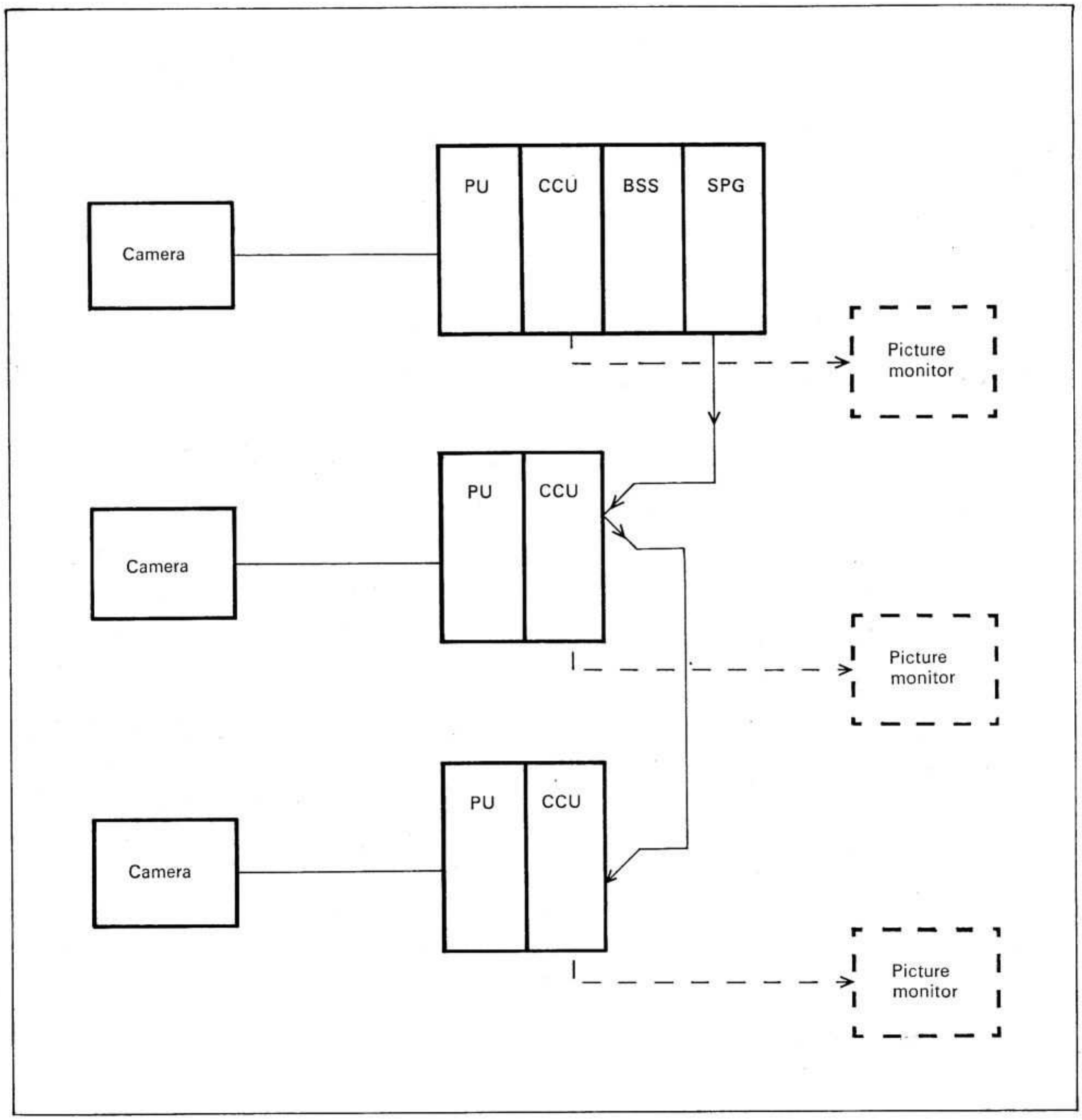
Interlace Scan System

With the addition of Synchronising Pulse Generator SG900 the system operates with 2:1 interlaced scanning on either 625, 525 or 405 lines.



Broadcast Sync System

With the addition of Broadcast Sync Shaper BSS900, the camera system signal output conforms to CCIR broadcast standard.
With a Studio Accessory Kit BSS901, the drive pulses can feed several camera systems simultaneously at CCIR broadcast standard.



SYSTEM PLANNING

The Planning Department of EMI Electronics Ltd can produce a detailed plan for individual requirements from the most simple to the most complex systems. The installations can be extended at any time to include extra cameras, extra monitors, or other accessories which can be manually or remotely controlled. The equipment is easy to install, straightforward to operate and economical in service.

DATA SUMMARY

Systems

Simple 625 line random interlace system
or
625, 525, or 405 line 2:1 interlace system
or
625 line 50 field, 525 line 60 field (CCIR standard system),
or
405 line 50 field (CCIR standard system)

Power Supply

100 V to 125 V rms 50 c/s to 60 c/s single phase
or
200 V to 250 V rms 50 c/s to 60 c/s single phase
Permitted variation: $\pm$ 7·5%
Consumption: approximately 60 VA

Outputs

Two 1 V composite outputs at standard level (0·7 V picture, 0·3 V sync) with 75 ohms impedance

Operational Controls

Mains supply ON-OFF, BEAM, TARGET, electrical FOCUS

Preset Controls

Camera Control Unit:
Line Frequency, Black Level, Peak White Limiter, Gain, D.C. Level, Aperture Correction, Cable Compensation, Sync Level, Clamp Delay
Power Unit:
X and Y Shift, Alignment, Heater Volts, Focus Current

Bandwidth

8 Mc/s $\pm$ 2 dB

Resolution

Within a circle of diameter equal to picture height resolution is 650 TV lines
Within a circle of diameter equal to picture width resolution is 500 TV lines
In outer areas the resolution is 400 TV lines

Sensitivity

With a scene illumination of 4 foot candles (40 lux) assuming 50% subject reflection, and lens aperture of f1·9, a normal contrast picture is obtained

Geometric Distortion

Displacement of any part of the scan raster from its true position is within 2% of picture height or width

Vidicon Tube

EMI high-resolution separate-mesh 1-inch Vidicon Type 9677 (for Camera BC900 and Camera BC910)
EMI high-resolution separate-mesh $\frac{1}{2}$-inch Vidicon Type 9697 (for Camera BC930)

Spectral Response

The spectral response of the Vidicon tube is similar to panchromatic film. Ultra-violet sensitive tubes are available to special order

Finish

Two-tone green and black

Working Temperatures

−5°C to +50°C (134°F) ambient (camera)
−5°C to +45°C (other units)

Lens Mount

The cameras have been designed to use the range of RTH Vidital and Vidiac lenses (EMI LTV range) which have a geared iris ring (for remote iris control), or the range of Dallmeyer 'C' mount lenses (EMI LDC range)
With the addition to the camera of 'C' Mount adaptor 7A/A5681, lenses can be used of the 16 mm cine type (EMI LDF range) which have micrometer focusing

Connectors

For camera cable on cameras: 32-way Burndy Type BTO 6AC 18-32

For remote control accessory module:
19-way Burndy Type BTO 6AC 14-19
Mains supply input: 4-way Cannon Type EP-4-18s
Video and pulse output: co-axial F & E Type 239/PL259

Overall Dimensions and Weight

	Diameter	*Height*	*Width*	*Depth*	*Weight*
Camera Type BC900	3·625 in			11 in	5 lb 10 oz
	9·5 cm			28 cm	2·6 Kg
Camera Type BC910		7 in	7·5 in	11 in	10 lb 5 oz
		18 cm	19 cm	28 cm	5·3 Kg
Camera Type BC930	1·7 in			4·5 in	1 lb 12 oz
(each part)	4·5 cm			11·5 cm	0·8 Kg
Module Units PU900, CC900,		7 in	4·25 in	10 in	10 lb
SG900, BSS900, RA905		18 cm	11·5 cm	25 cm	4·5 Kg
Panels RA908, RA914, RA901		2·125 in	3·775 in	4·875 in	8 oz
		5·39 cm	9·84 cm	12·38 cm	0·23 Kg

SCHEDULE OF EQUIPMENT

Basic Units

1	Camera Type BC900	One
	or	
	Camera Type BC910	One
	or	
	Camera Type BC 930	One
2	Power Unit Type PU900	One
3	Camera Control Panel RA908	One
4	Camera Control Unit CC900	One
5	Camera Cable 4E/B2425	
	(for Camera BC900 and Camera BC910)	One
	or	
	Camera Cable 4E/B 11694 (for Camera BC930)	One

Ancillary Equipment

1	Synchronising Pulse Generator Type SG900	One
2	Plug-in Board CC902 (replaces CC901 in Camera Control Unit CC900)	One
3	Broadcast Sync Shaper Type BSS900	One
4	Studio Accessory Kit Type BSS901	One
5	Autolight Unit Type RA914	One
6	Remote Accessory Control Panel Type RA901	One
7	Switch Panel Type CM902	One
8	Switch Panel Type CM903	One
9	Remote Accessory Module Type RA905	One
10	Lenses	as required
11	Accessory Unit Connecting Cable 4E/B2426	One
12	Switch Panel Type RA912	One

Accessories

1	Remote Focus Unit Type RA902 (for single lens) (on Camera BC900 and Camera BC910)	One
2	Remote Iris Unit Type RA903 (on Camera BC900 and Camera BC910)	One
3	Lens Turret Type RA904 (for Camera BC910)	One
4	Pan and Tilt Type PTM ML/JCB (manual)	One
	or Pan and Tilt Unit Type RA804/D (remote control, indoor)	One
	or Pan and Tilt Unit Type RA805/D (remote control, outdoor)	One
5	Weatherproof Housing Type RA807/D	One
	or Dustproof Housing Type RA809/D	One
6	Video Monitor, 14 in (35·5 cm) screen	as required
	or Video Monitor, 19 in (47·5 cm) screen	as required
	or Video Monitor, 23 in (57·5 cm) screen	as required
7	Viewfinder Type (for Camera BC910)	One
8	Tripod Type CT100 (heavy duty)	One
	or Tripod Type CT101 (lightweight)	One

Broadcast Equipment Division Products

Colour and monochrome studio camera channels
Colour and monochrome closed circuit television system
Studio vision and sound equipment
Telecine equipment
Outside broadcast units
Aerial systems

Community television systems:
Master aerials
Receiving equipment
Distribution equipment
Cable routes

EMI Electronics Ltd Broadcast Equipment Division
Hayes Middlesex England (*Controlled by Electric & Musical Industries Limited*)
Telephone: *Hayes 3888 Extension 2011* Cables: *Emidata, London* Telex: *London 22417*

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