A VERSATILE VISION SWITCHING UNIT

INTRODUCTION

Vision switching units, used independently or in multiple configurations, are widely employed for signal routeing and monitoring applications. The growth of colour with its more stringent vision signal specifications requires an enhanced performance from such units. This has resulted in direct and relay switching methods being superseded by solid-state techniques. These techniques provide transient-free switching during blanking, which are essential for transmission and very desirable for monitoring applications, together with improved performance and reliability.

The solid-state switching unit (Type B3760) has been designed to satisfy the many and varied requirements of modern video systems. The unit caters for eight inputs and one duplicated output. It can be used independently for simple video monitoring purposes and a second set of control connections provide override facilities for camera matching applications. However, because of its excellent performance, the unit can also be used in transmission paths. Comprehensive control facilities allow the interconnection of a number of units into larger matrices ideal for signal routeing and assignment purposes. A sync input connection, which can accept either a synchronizing or a composite picture signal, times the cut-in blanking operation. An integral power supply ensures simple installation and allows the unit to be considered as a simple system building block.

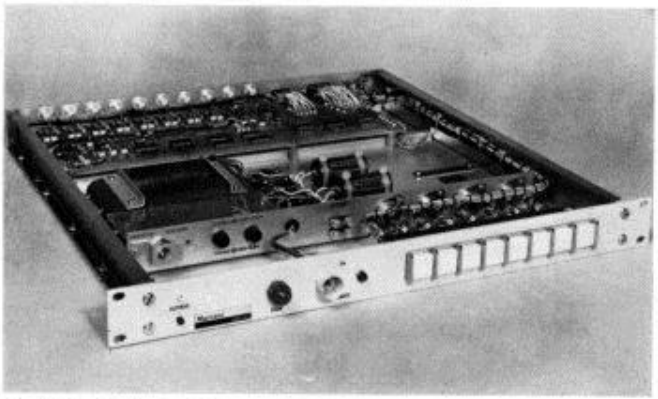

Fig.1 Vision Switching Unit, type B3760, (including optional local control panel).

CONSTRUCTION

The unit, which occupies only 1¾in of rack space, is shown in figure 1. A steel front panel and side members carry an aluminium tray which mounts the power supply components. A single printed board carrying all the principal electronic circuits is wired into the main frame. Immediately behind the front panel is an opening which directs cooling air to the power supply regulator devices mounted on the front lip of the power tray. The power transformer is an astatic type designed to produce minimal leakage flux thus allowing the unit to be mounted adjacent to monitors.

A cover plate protects the printed board underside and may be removed for servicing accessibility. The board is double-sided with plated-through holes. Generous components spacing facilitates servicing. All control circuits utilize digital integrated circuits while the video path employs conventional transistor circuitry.

VISION FACILITIES

The vision facilities are shown in figure 2. Eight bridging inputs are switched by transistorized crosspoint circuits to an output amplifier. The bridged inputs are coiled out in such a way that up to 8 inputs may be bridged while retaining a good input return loss.

The output amplifier drives two 75Ω loads with a front panel gain control allowing the gain to be standardized at unity. An internal link may be connected to boost the output amplifier gain to +3dB should it be desired to incorporate passive equalizers to compensate for response errors in long cable systems. Intermediate values of gain may be obtained by using resistors in the link position. An interesting feature of the output arrangements is the use of a 300Ω test output. This allows normal high-impedance monitoring of the output signals and also, when terminated in a 75Ω

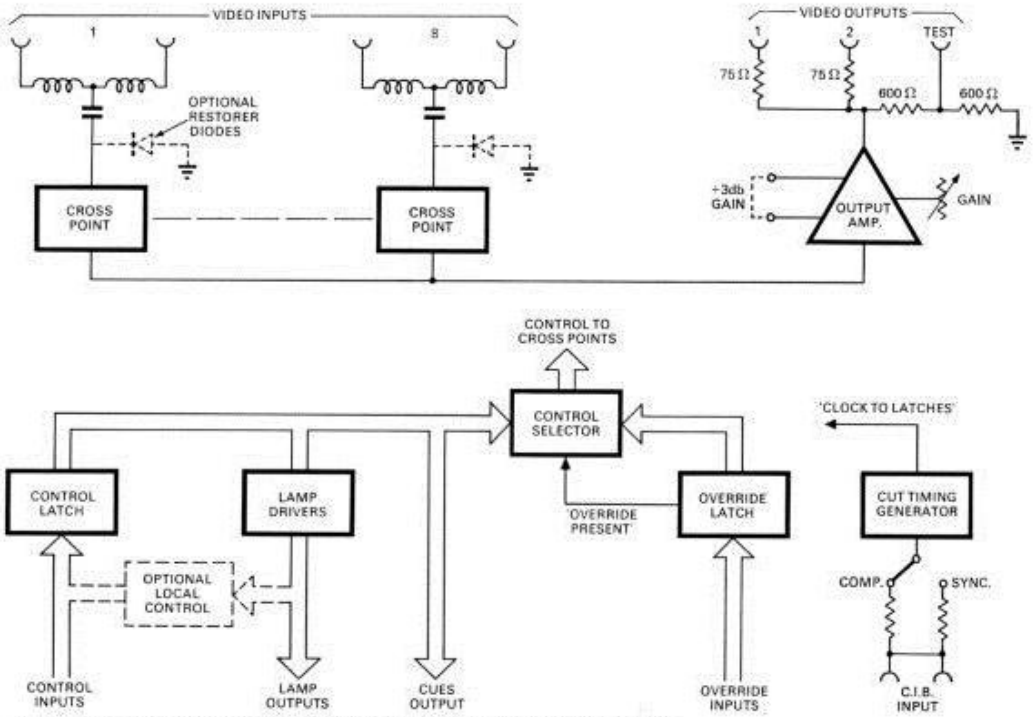

Fig.2 Block diagram of Vision Switching Unit (power supplies omitted).

test load, the monitoring at full bandwidth of one-fifth of the output voltage. This facility is useful in the routine adjustment and calibration of large switching systems.

CONTROL FACILITIES

Operational experience has shown that more comprehensive control facilities than have been previously associated with this type of unit are now desirable. As can be seen from figure 2, input selection is controlled by two means. Normally momentary touch control buttons set control latches to memorize the input selection. This control circuit can be operated from an 8-way remote control panel. Alternatively, a special edition of the basic switching unit can be supplied with a built-in 8-way control panel (as shown in figure 1). The output of the control latch is passed to a cues output connection and also to lamp drive circuits for external indication of the input selection condition. Referring to figure 2, the block designated 'Control Selector' normally passes the output of the 'Control Latch' through to the crosspoint. The second method of input selection operates when an override input is selected. A signal from the 'Override Latch' then forces the 'Control Selector' to pass the output of the 'Override Latch' to the crosspoint. On release of the override input, selection reverts to that last made at the normal control input.

Control and override inputs are on a wire-per-source basis as are also the indicator lamp outputs associated with the main control inputs. No lamp outputs are provided for the override inputs since these inputs will normally be operated from micro-switches on the camera matching panel joysticks.

The cues output, fed out at the override connector, is in binary coded form. It may be used to operate extra remote source selection indicators or, after decoding, to provide camera 'on air' cues.

The application to the cut-in-blanking input of either a composite video or mixed sync signal causes the cut timing generator to operate in synchronism with the television system. All cutting operations will then occur in the blanking interval. Cutting may be at random if desired by the simple expedient of omitting the CIB input.

INPUT EXPANSION

Interlock connections, together with control lamp and override connections, are available to allow several units to be interconnected thus catering for a larger number of inputs. The interlocks are carried on the main control cables and may be simply interlinked at the control panels. A larger number of inputs can be handled in two ways. First, units can be operated in series when each additional unit will handle a further seven inputs. Second, an additional unit can be used to select the output of one of a number of units. The second method is recommended where high performance is required since, for a given number of inputs, the signal will pass through fewer units in series. Also, whichever unit is selected the signal will pass through the same number of units thus giving equal performance and timing from all inputs. As an example, nine units may be interconnected in a 'tree' to handle 64 inputs where each input passes through only two units. Passing through three units in such a tree will allow over 500 inputs to be handled. This demonstrates how the unit may be applied in large automatic switching systems.