

**CHROMINANCE NON-LINEARITY TEST SIGNAL GENERATOR GE4/526**

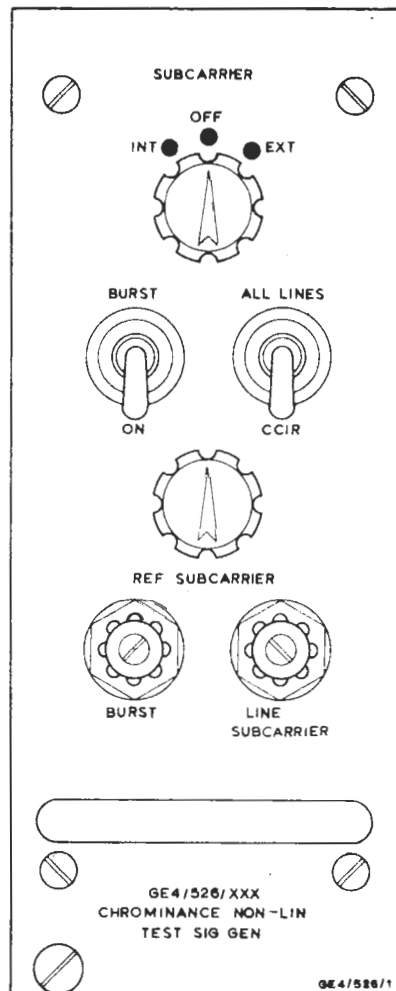


Fig. 1 Front Panel of the GE4/526

**Introduction**

The GE4/526, used in conjunction with a Luminance Non-Linearity Test Signal Generator GE4/525, produces the chrominance component of a colour non-linearity test signal and a feed of reference subcarrier. The GE4/526 accepts line-frequency and quarter-line frequency trigger pulses from the GE4/525.

The GE4/526 is constructed on two printed wiring cards mounted on a modified CH1/12A chassis with index peg positions 4 and 41.

**Facilities**

The layout of the front panel controls of the GE4/526 is shown in Fig. 1.

**Subcarrier Source Switch**

- Internal* Subcarrier signal derived from an internal oscillator.
- Off* No subcarrier signal.
- External* Subcarrier signal derived from an external source.

**Burst Switch**

- Off*
- On*

**Line Subcarrier Switch**

- All Lines* The line subcarrier appears on all lines.
- CCIR* The line subcarrier appears only on lines with the staircase waveform.

**Reference Subcarrier Amplitude**

A range of 0.5 volts p-p to 1.5 volts p-p is provided.

**Burst Amplitude**

This control provides a range of 0.25 volts p-p to 0.35 volts p-p measured at the output of the associated GE4/525. At the output of the GE4/526 the figures are about 9 dB higher.

**Line Subcarrier Amplitude**

This control provides a range of 0.1 volts p-p to 0.42 volts p-p measured at the output of the associated GE4/525. At the output of the GE4/526 the figures are about 9 dB higher.

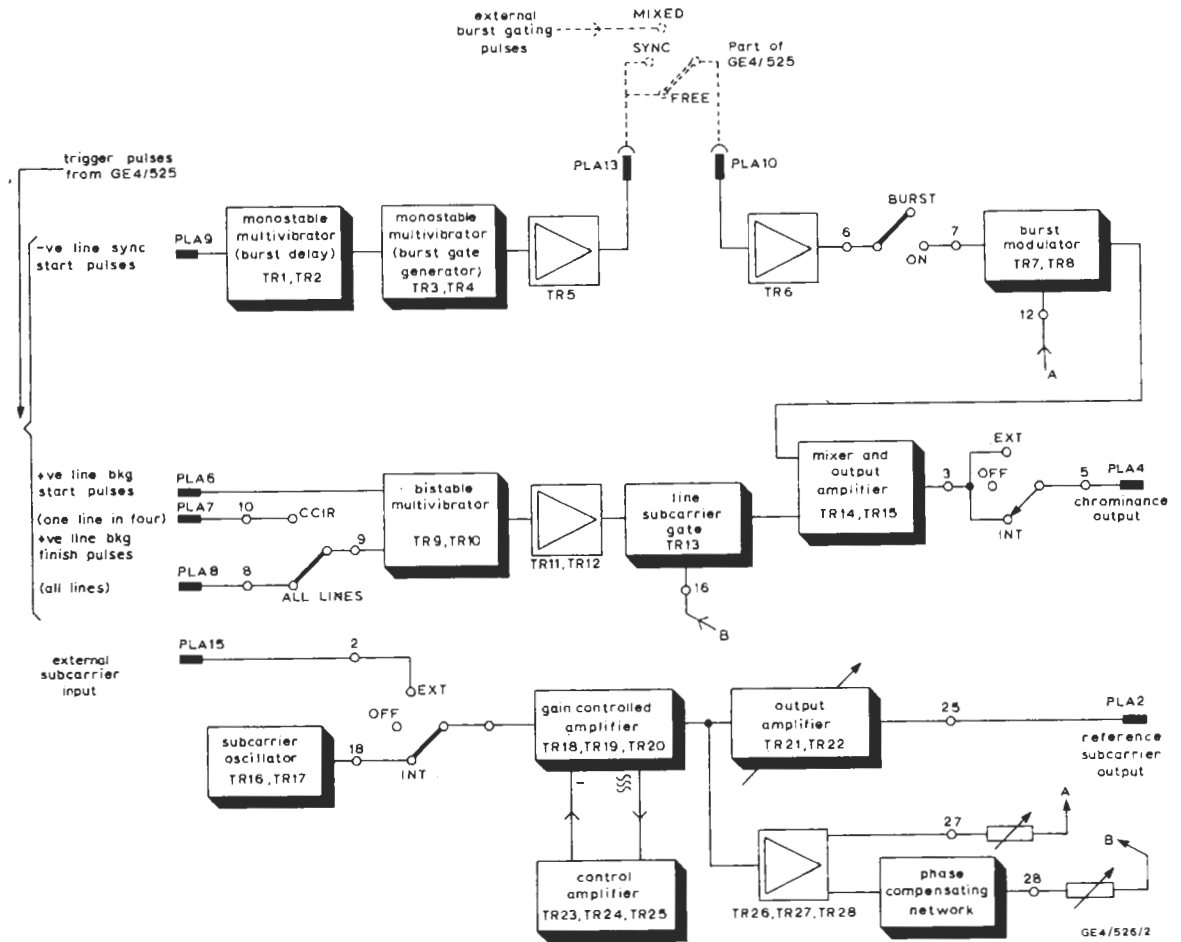


Fig. 2 Block Diagram of the GE4/526

**General Description**

A block diagram of the GE4/526 is given in Fig. 2. Negative-going pulses at the start of line sync pulses trigger two monostable multivibrators (burst delay and burst-gate generator) connected sequentially. The output pulse of the burst-gate generator is fed to the GE4/525. The selected burst-gating pulses from the GE4/525 are fed via a driving amplifier and the burst switch to the burst modulator. This modulator is also fed with subcarrier signal and its output is a reference burst of 9 to 11 cycles of reference subcarrier.

Trigger pulses from the GE4/525 are fed to a bistable multivibrator to produce pulses either on every active line or on those lines on which the GE4/525 produces a staircase waveform. These pulses are fed together with subcarrier signal to a

line subcarrier gate. The output of the gate is a subcarrier signal during the active portion of the lines selected by the bistable multivibrator.

The outputs of the burst modulator and the line subcarrier gate are mixed and passed through an output amplifier.

Sub-carrier signal selected either from an internal oscillator or an external source is fed to a gain-controlled amplifier. The output of this amplifier is fed to a control amplifier where it is rectified to produce a d.c. signal which stabilises the output level of the gain-controlled amplifier. This sub-carrier output signal is also fed to two amplifiers which provide a feed of reference subcarrier and feeds of subcarrier to the burst modulator and the line subcarrier gate.

### Circuit Description

The circuit of the GE4/526 is given in Fig. 3.

The burst-delay and burst-gate generators are two conventional monostable multivibrator circuits.

The primary winding of transformer T1 is shunted by a diode D3 to reduce transients at the trailing edge of the burst gating pulse.

Transistors TR7 and TR8 in the burst modulator are arranged in push-pull with respect to the bursting pulse input and in parallel with respect to the subcarrier input. The two outputs are connected in parallel so that the gating pulse is balanced out leaving bursts of reference subcarrier signal. Balance is adjusted by means of a variable resistor R27. The adjust-on-test components in the emitter circuits of transistors TR7 and TR8 control the shape of the reference burst.

The output of a conventional bistable circuit (transistors TR9 and TR10) is taken via an emitter follower and transistor TR12, connected as a common-base amplifier, to a 3rd-order gaussian low-pass filter; see Designs Department Technical Memorandum No. 9.42(64). The output of the line subcarrier-gate transistor TR13 is fed to the output amplifier via a constant- $k$  high-pass filter to remove the line-frequency pulse leaving the modulated subcarrier. A high-pass bridged-T filter on the output of the GE4/526 prevents luminance signals being fed back to the output amplifier.

The oscillator comprises a common-base stage transistor TR16 feeding transistor TR17. Positive feedback is applied via a crystal and additional tuning components from the emitter of transistor TR17. Negative feedback is also applied from the collector of transistor TR17. Variable resistor R73 controls the amount of negative feedback used in order to equalise the level of subcarrier at the base of transistor TR18 in the external and internal modes.

Transistor TR19 in the gain controlled amplifier has an inductive collector load and transistor TR20 has a tuned collector load. The subcarrier signal at the collector of transistor TR20 is rectified and fed to a long-tailed pair. Variable resistor R97 balances the d.c. gain in the two transistors. The output of the long-tailed pair is fed via an emitter follower to the bias chain of transistor TR19. A change in bias controls the emitter current and hence the gain of transistor TR19. Variable resistor R100 sets the output level of the controlled-gain amplifier.

The variable gain output amplifier comprises an emitter follower TR21 followed by a common emitter transistor TR22 with a variable emitter resistor.

The subcarrier signal is also fed via an emitter follower TR26, to the base of transistor TR27. The collector of transistor TR27 feeds the burst modulator and the emitter feeds the line subcarrier gate via transistor TR28 and a phase shifting network comprising inductor L7 and capacitors C54 and C55 which puts the burst and the line subcarrier in phase.

### Test Schedule

#### Apparatus Required

Tektronix oscilloscope Type 545.

GE4/520 with tested GE4/525 and power supplier.

Feeds of 625-line mixed sync pulses and mixed blanking pulses.

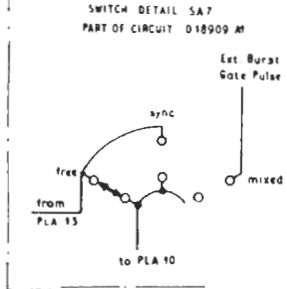
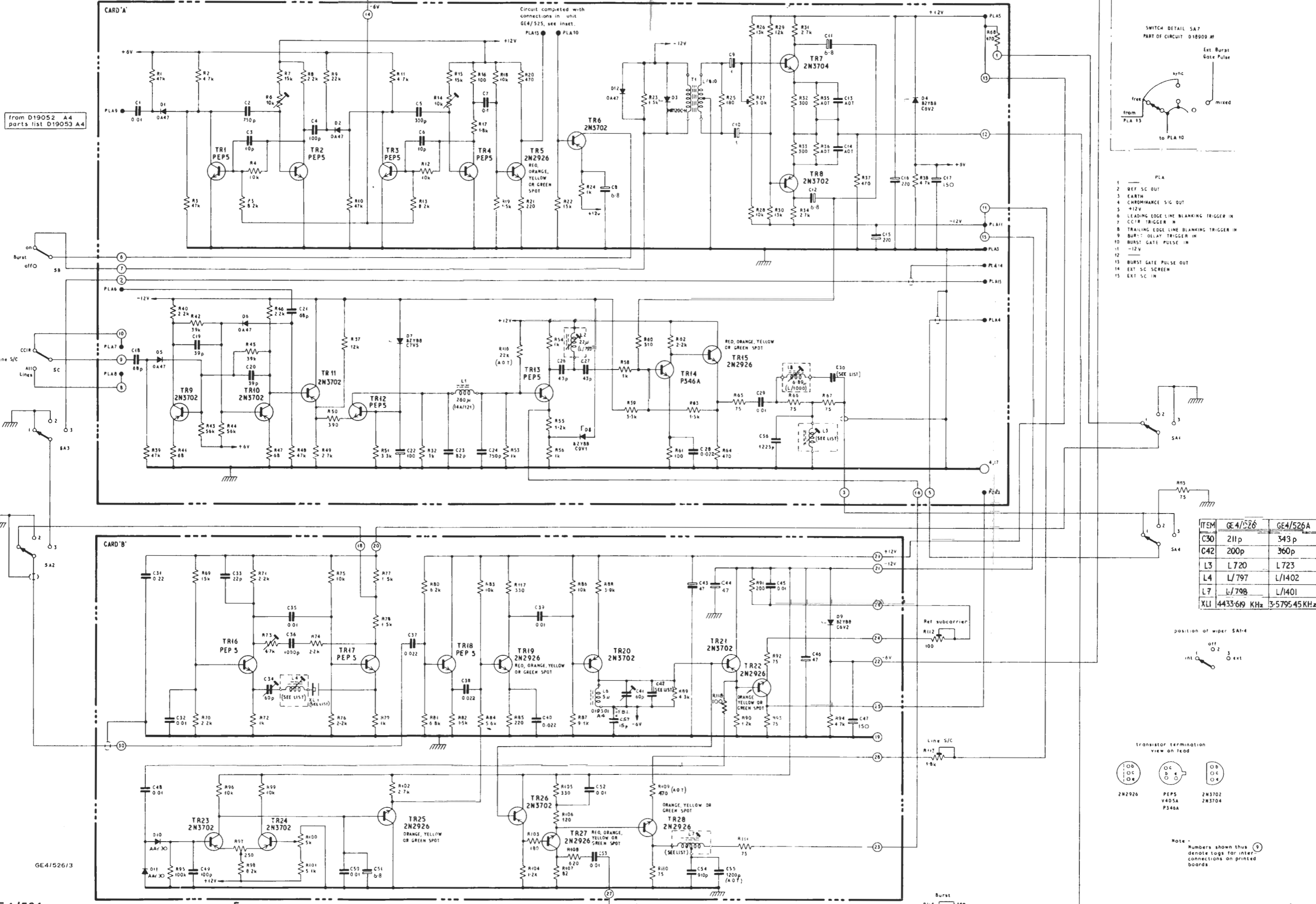
Feed of 1.0-volt p-p colour subcarrier signal.

Extender Board.

#### Test Procedure

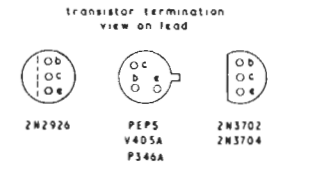
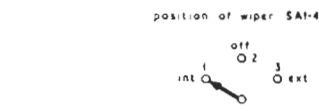
1. Plug the GE4/526 into the GE4/520 using the extender board. Set the *Burst* switch to *On*. Switch the trigger mode switch on the GE4/525 to *Free*.  
Observe the waveform at pin 6.  
Adjust variable resistor R6 to set the leading edge of the burst gating pulse at  $5.5 \pm 0.1 \mu\text{s}$  with respect to the leading edges of the line sync pulses.  
Adjust variable resistor R14 to give a burst gating-pulse duration of  $2.3 \pm 0.2 \mu\text{s}$ .
2. Set the *Subcarrier Source* switch to *Off*. Observe the waveform at the junction of capacitor C12 and resistor R60.  
Adjust variable resistor R27 to balance out the residual burst gating pulse.
3. Check that the amplitude of the external subcarrier signal on pin 1 is 1.0 volt p-p.  
Observe the waveform at the emitter of transistor TR18 and switch between *Internal* and *External* subcarrier sources.  
Adjust variable resistor R73 to give the same amplitude of *Internal* subcarrier at this point as *External* subcarrier.
4. Observe the waveform at the reference subcarrier output.  
Set variable resistor R112 to its mid-position.  
Adjust variable resistor R100 to give an amplitude of 1.0 volt p-p.
5. Observe the waveform at the output of the GE4/520.  
Adjust variable resistor R113 to give 0.14 volts p-p of line subcarrier.  
Adjust variable resistor R114 to give 0.3 volts p-p of colour reference burst.

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- 1 PLA
- 2 REF. SC OUT
- 3 EARTH
- 4 CHROMINANCE SIG OUT
- 5 +12V
- 6 LEADING EDGE LINE BLANKING TRIGGER IN
- 7 CCR TRIGGER IN
- 8 TRAILING EDGE LINE BLANKING TRIGGER IN
- 9 BURST DELAY TRIGGER IN
- 10 BURST GATE PULSE IN
- 11 -12V
- 12
- 13 BURST GATE PULSE OUT
- 14 EXT. SC SCREEN
- 15 EXT. SC IN

ITEM	GE4/526	GE4/526A
C30	211p	343p
C42	200p	360p
L3	L720	L723
L4	L797	L1402
L7	L798	L1401
XLI	4433-619 KHz	3-5795-45 KHz



Note - Numbers shown thus  $\text{\textcircled{9}}$  denote logs for inter-connections on printed boards