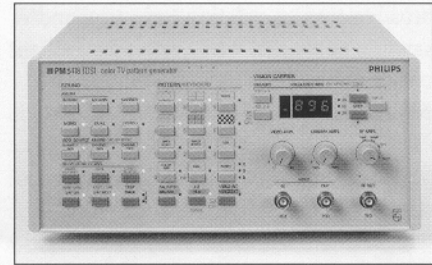
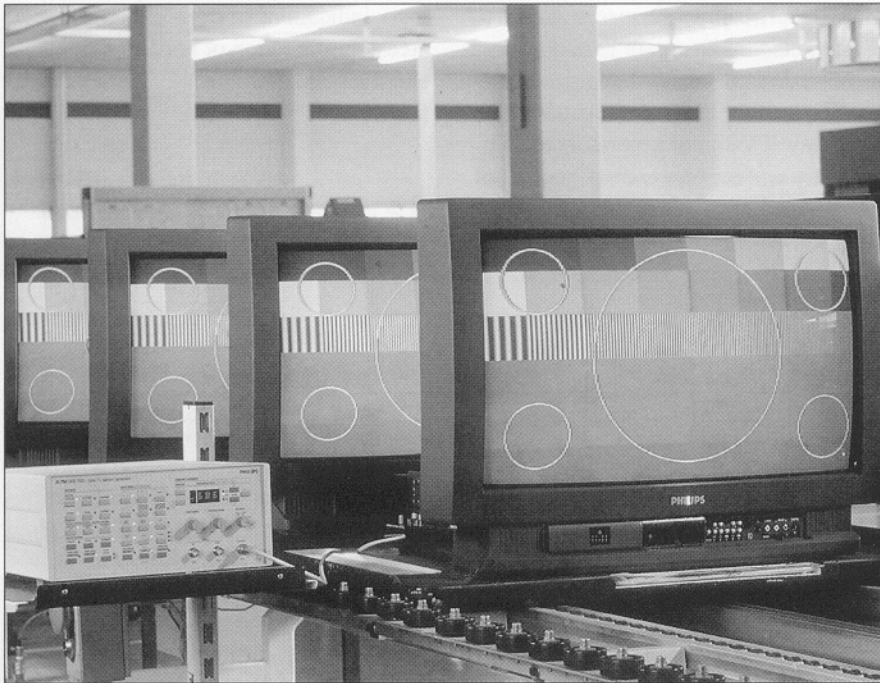


Widescreen TV presents new testing demands.

TV signal generators have built-in 16:9 and 4:3 aspect ratio testing facilities.



The new trend in TV broadcasting is widescreen, with its more natural, panoramic field of view. Widescreen equipment like TV receivers and video cassette recorders means new testing requirements in

both the manufacturing and service environments. A cost-effective way to meet these requirements is offered by a new range of compact, integrated TV signal generators.

Widescreen TV presents new testing demands

Widescreen TV offers consumers the benefit of cinema-style viewing in their own homes, with a lifelike, panoramic picture that offers a more natural field of view corresponding closely to that of the human eye.

Although discussions about the TV standards of the future are still in progress, one thing is already sure: the selected standards are sure to have widescreen compatibility, supporting the 16:9 aspect ratio which has already gained worldwide acceptance as the TV format of the future. For example PAL-Plus, which is gaining increasing support in countries using the present PAL standard, will enable widescreen broadcasting on existing terrestrial and satellite networks, while retaining full compatibility with today's 4:3 environment.

In some countries, the D2MAC standard is currently used for widescreen transmissions by satellite, for example the Nordic countries, France and Germany.

TV manufacturers are already introducing sets with the 16:9 screen format, as well as the ability to offer enhanced viewing of conventional 4:3 transmissions using a variety of 'movie expand' techniques to enable a full-screen display. Video recorders, too, increasingly incorporate the ability to handle both conventional and widescreen broadcasts, often with automatic switching between the two formats according to the transmission received.

Increasing widescreen penetration

The result is a rapid increase in the penetration of widescreen-capable equipment in the marketplace, creating the requirement for cost-effective service capabilities to handle these new-generation products. Next to service, manufacturers will also need testing facilities to enable them to handle the increasing flow of widescreen sets

emerging from their production lines.

The range of Fluke TV signal generators - initially developed by Philips Test & Measurement, which was recently acquired by Fluke, and incorporating Philips' extensive know-how in the field of TV manufacturing and broadcasting - have gained a well established market position due to their ability to provide all the required test signals for TV receivers, monitors and video cassette recorders from a choice of compact and economically priced instruments. Among the enhancements that have been added to the latest generation of these instruments are a 16:9 widescreen aspect ratio capability, while the present 4:3 format is of course also retained.

The built-in aspect ratio capabilities of the new TV signal generators enable geometry and convergence alignment of both 4:3 and 16:9 format picture tubes, using a wide choice of test patterns.

Over a hundred instantly selectable preset test patterns and combinations are available, each one accessible at the touch of a button. All test patterns are supported in both formats, and the 16:9 or 4:3 aspect ratio is selected just by pressing a single button on the instrument.

The black-and-white test patterns are digitally generated by a new digital video module, ensuring high accuracy and stability and enabling high-precision geometry alignment. Black-and-white patterns can be modified in accordance with customers' requirements, or even for custom test patterns to be generated such as a black-and-white company logo, indications of over- and underscan areas, modification of border castellation and many others.

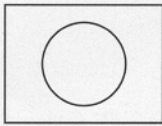
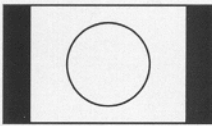
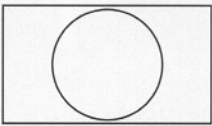
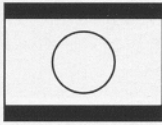
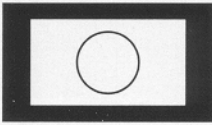
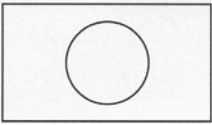
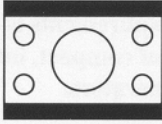
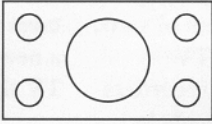
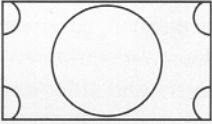
| | 4:3 | 16:9 | 16:9 + movie expand |
|---|---|--|---|
| A |  |  |  |
| B |  |  |  |
| C |  |  |  |

Fig. 1: Possible transmission formats and how they are displayed on both 4:3 and 16:9 TV receivers.

a) Standard 4:3 transmissions

b) Transmission of a 35 mm movie (Cinemascope) in 4:3 'letterbox' format.

c) Transmission in 16:9 aspect ratio.

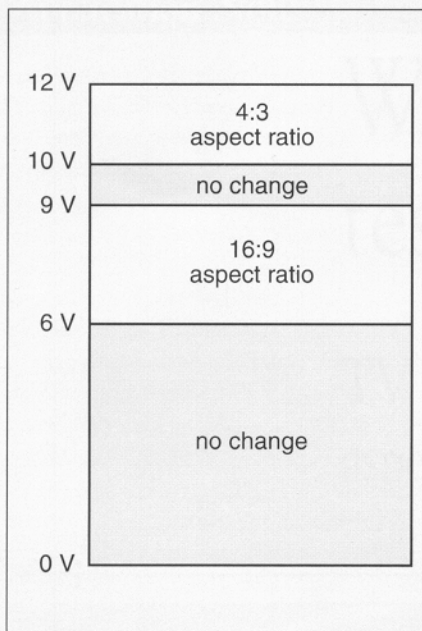


Fig. 2: Status voltages on the SCART connector

Different display modes

At present there are two types of 4:3 transmissions, as Fig. 1 shows: material in the standard 4:3 format, and original 16:9 material transmitted in 4:3 'letterbox' format. Both of these types of transmissions can be displayed on either 4:3 or 16:9 sets, with varying results as shown in Fig. 1. The 'letterbox' transmission displays on a standard 4:3 set with black bands at top and bottom, while on a 16:9 set it normally displays with a black border all round.

However, widescreen sets can expand this 'letterbox' transmission to a complete, full-screen picture without borders by means of their 'Movie Expand' feature by changing the deflection parameters of the tube (see Fig. 1b). This feature can usually be selected manually, or can be switched by the status voltage signal on the SCART connector. The status voltages corresponding to the various display modes are shown in Fig. 2.

A 16:9 transmission can be displayed in 'letterbox' format on a standard receiver (see Fig. 1c).

The status pin on the SCART can be used to indicate either a 4:3 or 16:9 transmission. Specific generators in the Fluke range, the PM 5415 and PM 5418, provide the correct status voltage at the SCART connector. This means that a widescreen TV under test will automatically switch to the correct format when a test pattern with a different aspect ratio is selected.

The normal 4:3 mode and the Movie Expand feature can be aligned using the 4:3 test patterns provided by the signal generator, while the wide-screen mode of the picture tube can be aligned using the special 16:9 test patterns.

The difference between the 4:3 and 16:9 aspect ratio test patterns is the different timings of the signals which

are transmitted. The timing differences are shown in Fig. 3. While the total time used for the visible part of a video line remains the same (52 μ s), more information must be present in a 16:9 video line to allow true squares to be displayed.

The 4:3 checkerboard pattern consists of 8 x 6 squares, while the 16:9 checkerboard consists of 11 x 6 squares. The same differences can be seen in the other black-and-white test patterns. The stability and accuracy of these test patterns is ensured by a new digital video module, which generates the luminance signal.

Meeting today's and tomorrow's test requirements

This built-in widescreen capability enables the Fluke TV signal generators to handle virtually all testing requirements on today's and tomorrow's sets, both standard and widescreen. As well as widescreen testing, other new

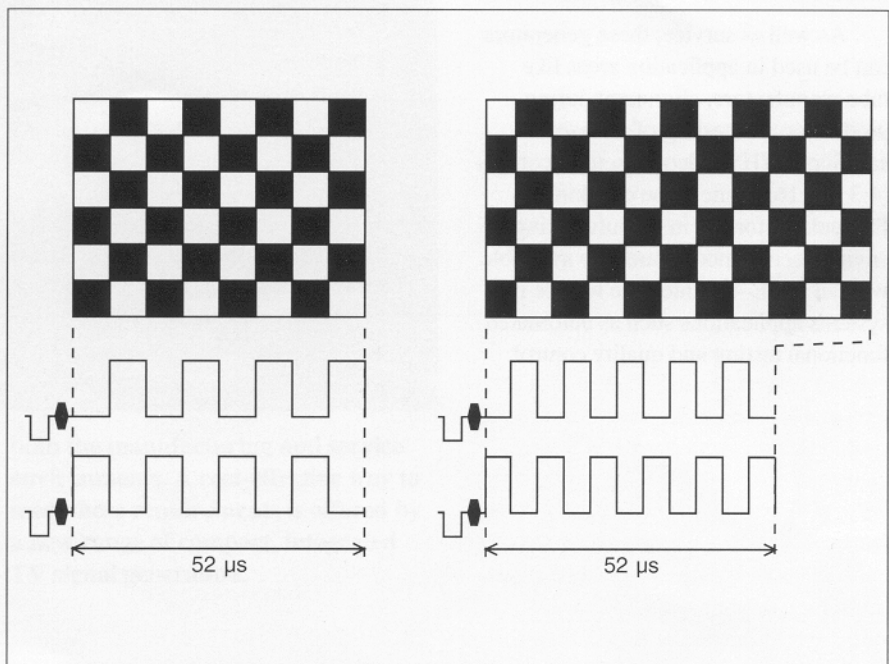


Fig. 3: Video lines of 4:3 and 16:9 aspect ratio test patterns.

Application Note

Widescreen TV presents new testing demands

functions have also been added to these instruments to keep pace with the latest developments in TV receivers and video cassette recorders. These include Y/C outputs as used in Super-VHS and Hi-8 video recorders and satellite receivers; VPS (Video Programming System) and PDC (Program Delivery Control) functions for testing automated video recorder operation; teletext (including TOP and FLOF), CC (Closed Caption), NICAM digital sound, and BTSC sound (MTS stereo + SAP).

With their multistandard operation, these instruments cover every TV transmission standard in use today, making them ideal for use in service environments where a wide variety of equipment types has to be handled. A wide choice of models and options is available, enabling users to select the configuration that best meets their own testing requirements, both in terms of TV standards and special system functions.

As well as service, these generators can be used in application areas like tube manufacture, alignment during production and testing of widescreen and Super-VHS video cassette recorders (4:3 and 16:9 sync pulse checking). Particularly for use in manufacturing environments, models are also available with an IEEE-488 interface for use in systems applications such as automated functional testing and quality control.

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