PM 5410 family of TV Signal Generators

Multi-standard for the world’s needs

All the signals you need for TV, VCR and monitor testing

Select the configuration that matches your test needs and budget

- Over 100 video test patterns for PAL, NTSC and SECAM video standards
- High-precision, digitally generated patterns for geometry alignment
- 16:9 and 4:3 aspect ratio patterns
- Special patterns for VCR and 100 Hz IDTV (Improved Definition TV) testing
- Mono, Stereo, NICAM and MTS Stereo plus SAP (BTSC) sound test signals
- Teletext TOP/FLOF, VPT and Antiope test signals
- Easily programmable PDC (Program Delivery Control) and VPS test signals
- Closed Caption test signals
- Full RF coverage from 32 to 900 MHz with int./ext. modulation
- RGB, Y/C (S-VHS/Hi-8), CVBS and audio outputs
- IEEE-488 programmable
The PM 5410 family from Fluke offers today’s widest choice of TV and video test signals from a range of compact instruments. These versatile generators incorporate leading-edge expertise in TV technology, together with state-of-the-art know-how in electronic instrumentation and test equipment.

The family comprises multistandard basic generators for TV, VCR and monitor testing in all the PAL, NTSC and SECAM standards. In addition, dedicated test signals for all special TV functions can be specified as options, such as teletext TOP/FLOF, Closed Caption, stereo sound including NICAM and MTS Stereo/SAP. Dedicated signals are also available for testing and aligning VCRs, including programmable data signals for PDC and VPS.

The basic functionality of the PM 5410 family generators includes all test patterns and capabilities needed to test and align the total signal paths for video, audio and teletext – be it using baseband signals directly or through an RF carrier. Overall and specific tests are included for picture geometry, for both 4:3 and wide screen 16:9 aspect ratios, as well as high-voltage stability, beam current, static and dynamic convergence, picture resolution, color purity and color reproduction, and all vision and sound demodulators. Special test patterns for additional requirements like VCR and 100 Hz TV make these today’s most versatile generators in terms of test patterns and functions.

The cost-effective, modular design of these instruments offers the flexibility to select the optimum configuration to match your application requirements, but avoiding the cost of features you do not need. The multistandard, multifunction capability of these instruments, together with the wide range of options, means that there is always a model to match any dedicated set of requirements, whether it is in R&D, manufacturing, quality assurance, installation, service or training.

The compact size of these generators provides an unmatched capability for one compact and easily portable instrument to meet a complete set of test requirements. The Fluke PM 5410 family is well suited for maintenance work by
central service workshops that need to have access to all TV and VCR functions. Their portability also makes them ideal for servicing high-end wide screen and projection TV receivers, of which size and weight necessitate on-site field service. On the other hand, the IEEE-488 GPIB-programmable PM 5418TDSI model is perfect for automated production-line testing, where high throughput speed is essential.

On the last page of this document, a selection guide is included that gives an overview of the test functionality per model.

**RF selection**
All models with RF output cover the entire frequency range from 32 to 900 MHz, including IF and all TV transmission bands, as well as all S- and hyperband cable TV channels. Selection of the synthesized RF frequency within these bands is done electronically via the keyboard. The step function enables fine adjustment and RF tuning. The RF carrier can also be switched off at intervals of approximately 10 seconds to test the synchronization circuitry.

**Memory**
Up to ten front panel settings for different test situations can be stored in memory for later recall. In this set-up data, the channel selection can be defined as frequency in MHz or as channel number.

**Teletext**
The growth of electronic communications has seen a rapid increase in the introduction of text transmission. The –TX and –TDS(I) configurations have been specially developed to meet the highly specialized requirements for the checking and alignment of teletext receivers and decoders in PAL B, G and I systems. Both these instruments offer a selection of over ten teletext pages with special contents for decoder testing. The DIDON ANTIPOE teletext signal is also available as standard. Selection of DIDON ANTIPOE or UK Teletext is by a rear-panel switch.

**FLOF, TOP and VPT**
The test facilities of the PM 5415 and PM 5418 teletext versions have been extended by a selection of teletext pages including normal teletext, FLOF (Full Level One Features), TOP (Table Of Pages) and VPT (Video Programming by Teletext). FLOF is used in the UK, while TOP is used in Germany, Switzerland and Austria, as well as via cable distribution systems in the Netherlands. TOP and FLOF also feature extra country characters. Selection of TOP or FLOF is by a rear panel switch. VPT provides a menu that makes VCR programming simple, allowing programs to be selected by setting the start and stop time.

**Y/C + RGB option PM 9553G adds S-VHS/Hi-8 capability**
An optional Y/C + RGB module gives the Fluke PM 5415 and PM 5418 range of TV signal generators the separate luminance and chroma (Y/C) outputs needed by S-VHS / Hi-8 video recorders and Y/C monitors. By separately recording the Y and C signals, these VCRs eliminate cross-color effects to give dramatically improved color reproduction. The PM 9553G Y/C + RGB module can be retrofitted to any of the PM 5414 V, PM 5415 and PM 5418 TV signal generators, and provides output signals to the S-VHS / Hi-8 VCR or Y/C monitor via a special connector. RGB signals and a SYNC and subcarrier facility are available to meet the rapid advances in computer graphics techniques, for example in the servicing of color video monitors. Color subcarrier and sync signals are supplied as standard (BNC connectors) for PAL and NTSC systems.

**NICAM digital sound**
Specific benefits of the NICAM generators include the ability to select more than 55 digital sound test signals instantly at any time, thereby speeding and simplifying operation. NICAM, now also available in SECAM L, is compatible with the existing PAL types B, G and I terrestrial TV and cable TV standards, and adds two high-quality digital sound channels. Suitable TV sets can receive two mono channels for simultaneous translation of foreign-language programs, stereo signals or transparent transmission of data. The two digital sound channels have selectable low- or high-amplitude signals to test the expander of the TV receiver. Standard 1 kHz tones check the sound channels, and a 3 kHz tone on channel 1 can test the stereo or dual-sound performance of the TV. Three special test signals (Data 1, 2 and 3) are available to check the operation of the demodulator and decoder. An RSSF (Reserve Sound Switching Flag) is high/low selectable to indicate that the analog and digital sound carriers are transmitting different information, or to indicate faults in the digital transmission.
**MTS Stereo and SAP**  
(BTSC sound)

Generation of BTSC sound signals, Multi-channel Television Sound (MTS), is available in combination with NTSC M and PAL M TV standards. As well as mono and stereo sound, a Secondary Audio Program (SAP) is also available. The various combinations can be selected directly from the front panel. Testmodes 1 to 3, special test signals, are very useful for easy functional testing of the stereo and SAP decoder. The sound signals are digitally generated which ensures high stability, and are available at the RF output or via baseband processing at the precision MPX output.

**PDC/VPS test facilities**

PDC and VPS use control information transmitted by the broadcaster, and are used to synchronize recording on a VCR with the transmitted program. Complete testing of video cassette recorders equipped with PDC / VPS under the PAL B, G, H, I, D and N standards is offered. A maximum of 9 coded PDC / VPS signals are available. With PDC, the PIL (date & time), CNI (country & network) PTY and PTL are programmable. Special signals such as timer control code, recording inhibit/terminate code, interruption code and continuation code can also be selected. In VPS mode, information on date, transmission time, country indication, TV channel, stereo/dual/mono sound and adult/general is present. Special signals such as LEER code, program interrupt and system status can also be selected.

PDC / VPS data is shown in a 1/6 screen height horizontal bar which can be combined with any test pattern and displayed in six positions, either on- or off-screen. A unique feature of PDC / VPS instruments is on-screen display of codes, and programming of the generator to set codes locally if required.

**Closed Caption**

Closed Caption is used to provide a visual depiction of information simultaneously being provided on the audio portion of a television signal. TV receivers with a screen size of 13” or larger, sold in the USA after July 1993, have to be equipped with a Closed Caption decoder. The PM 5415 and PM 5418 offer both Caption and Text modes in either of two operating channels. The Closed Caption information is present in line 21 of the NTSC video signal. The –TDS[I] version offers factory pre-coded Closed Caption information with a selection of 8 different types of information. Additionally, memory 9 is an automatic Closed Caption sequence of memories 1 to 8, so all modes can be tested easily.

**IEEE-488 version**

For use in systems applications, the PM 5418TDSI model is equipped with an IEEE-488 interface. All the available TV and sound modulation standards can be selected remotely, and “bus learn mode” as well as “identification mode” are included.

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**Every test pattern you need, at the touch of a button**

**Circle** on a black background for checking the overall linearity and geometry. The white circle changes automatically to black when used with the white pattern and is useful for checking reflections. In 16:9 Aspect Ratio format, small circles are present in the corners of the screen.

**Checkerboard** pattern of six times eight (4:3) or six times eleven (16:9) columns of squares provides a visual standard for basic picture tube alignments, for example: centering, focus, horizontal and vertical deflection and linearity.

**Center Cross / Border castellations** are ideal for centering TV monitors and TV screens, for checking the deflection linearity and for pincushion correction.

**White 100%** with swinging burst is designed for setting white D and for an overall check of purity. Also for beam current adjustment. White D is the correct white, necessary for a natural color reproduction.

**Grey scale** Full-screen linear staircase signal with 8 equal steps from black to white is used to locate faulty linearity of the video amplifier or gray-scale setting.

**Multiburst** contains eight full-screen vertical bars of definition lines in the frequency ranges 0.8, 1.8, 2.8, 3.0, 3.2, 3.4, 3.8 and 4.8 MHz. This checks the
bandwidth of the video or luminance amplifier in black and white or color TV as well as the resolution of monitors and video recorders.

**Cross hatch / Center Indication / Top-Left Indication** with either 17 (4:3) or 21 (16:9) vertical and 11 horizontal lines are used for checking and re-aligning dynamic and corner convergence. The advantage is that there is no interlacing which would normally tire the eyes. If interlacing is required this can be achieved by superimposing another pattern such as center cross, circle or dots.

**Dot pattern** is mainly used for static convergence. The screen should contain pure white dots.

**VCR** is a specially-designed test pattern to check the bandwidth, linearity, sensitivity and AGC of the chroma amplifiers in color video recorders. This combined test pattern is divided into 4 horizontal segments:
- 24 lines of 100% white level.
- Eight bars of resolution of which 2.8 - 3.0 - 3.2 - 3.4 MHz are used to align the high-pass filter for a maximum resolution in VCR bandwidth.
- Eight steps of decreasing linear levels of saturation from 100 to 0% to check the chroma amplifier linearity and color AGC circuitry.
- A black horizontal bar with a moving white field to check moving pictures on video recorders.

**Purity** with a choice of the three primary colors is clearly indicated by LEDs. The red pattern is used for checking color purity. The green pattern provides a purity check for three-in-line tubes. Blue is also available to check color performance. The three complementary colors magenta, yellow and cyan can also be displayed by selection, as can white and black. Combinations with circle and/or center cross are easy to select.

**Color bar** standard bar pattern. The vertical bars are white D, yellow, cyan, green, magenta, red, blue and black. Since they are dependent on the TV system selected, the luminance contents are automatically corrected for each setting. The color bar pattern therefore provides sufficient information for a good overall check of color performance, including checks on burst keying, subcarrier regeneration, RGB amplifiers, the delay color versus B/W signal and saturation.

**DEM-Pattern.** Demodulator is a combined test pattern which, divided into 4 sections, contains information to make on-screens checks and alignments of the color demodulators and subcarrier frequency. For PAL it is used to check the chroma delay line for amplitude and phase (‘venetian blinds’). For the NTSC system, the pattern is according to the NTSC requirements and contains 7 color bars, -I and +Q signals and a black and white reference field.

**Test pattern combinations.** Over 100 test pattern combinations can be selected to meet special requirements.
**Technical Specifications**

The technical specifications shown here are valid over a temperature range from +5 °C to +50 °C. Specifications apply with outputs terminated into 75 Ω, unless stated otherwise. Stated tolerances apply after a warming-up time of 30 minutes and a recalibration interval of 12 months.

**VIDEO CARRIER**

**FREQUENCY (PM 5415, PM 5418)**

Range: 32 to 900 MHz, without interruption, covering VHF, UHF, S- and Hyperbands

Selection: Keyboard

Fine tuning: ± 250 kHz steps for TV frequencies, ± 100 kHz steps for IF frequencies (32 to 44.9 MHz)

Frequency tuning: Tuning speed is automatically increased when step button is continuously pressed

Storage: a) Possibility for 10 different RF frequencies
b) As a), indicated as TV channel numbers

Indication: 4-digit display
a) First digit: memory, store and recall position 0 to 9
b) Digits 2-4 plus separate LEDs for frequency indication with 250 kHz display resolution.
c) Keyboard-selectable TV channel numbers (e.g. C21 or C70)

**RF OUTPUT (PM 5415, PM 5418)**

RF output: BNC connector on front panel

Impedance: 75 Ω

Output voltage: 10 mV ± 2 mV

Attenuation: 60 dB, continuously variable

**VIDEO**

**VIDEO MODULATION (PM 5415, PM 5418)**

Modulation: AM internal/external source selectable

Polarity: Negative (except SECAM L); positive for SECAM L

**VIDEO INPUT (PM 5415, PM 5418)**

Video input: BNC connector (front panel)

Input voltage (Vpp): 1 V Max.

Permissible input voltage: ± 5 V

Impedance: 75 Ω

Polarity: White level positive

Coupling: DC (clamping on sync.)

**VIDEO OUTPUTS**

Video output: a) BNC connector
b) SCART connector (Euro-AV connector), pin 19 (rear)

Impedance: 75 Ω

Voltage (Vpp): a) 1 V fixed
b) Continuously variable, 0 to 1.5 V into 75 Ω

Polarity: White level positive

Coupling: DC

**CHROMA**

**CHROMA NTSC/PAL**

Chroma standards: NTSC according to system M (switchable)

PAL according to system B, D, G, H, I, (M, N)

Selection:
Rear panel thumbwheel system switch

Subcarrier frequency: 3.979545 MHz for NTSC
4.433619 MHz for PAL B, D, G, H, I;
3.582056 MHz for PAL N;

Subcarrier frequencies coupled to line frequency according to selected standard

Tolerance: ≤ 30 ppm

Burst: Position, number of cycles and phase according to selected standard

Amplitude: Chroma with burst
a) Fixed (100%)
b) Continuously variable from 0 to 150%

Chroma vectors inaccuracy: Phase ≤ 3°, amplitude ≤ 5% relative to luminance amplitude

**CHROMA SECAM**

Chroma standards: SECAM B, D, G, H, K, K1 and L

Selection: Rear panel thumbwheel system switches

Chrominance subcarrier:
for = 4.250000 MHz
for = 4.406250 MHz

Tolerance: < 2 kHz

Type of chrominance subcarrier modulation: Frequency modulation

Transmitted chrominance information: Line-sequential D’r and D’b

Signals:
D’r = -1.9 (E’r - E’y)
D’b = 1.5 (E’b - E’y)

Amplitude: a) Fixed, according to standard
b) Continuously variable from 0 to 150%

Frequency deviation of chrominance subcarrier: According to TV standard

Video pre-emphasis: Low frequency pre-correction and high-frequency bell filter according to TV standard

Bell center frequency: 4.286 MHz

Tolerances: ≤ 20 kHz

**SYNCHRONIZATION**

Line frequency: 15,734 Hz (RTMA), 15,625 Hz (CCIR),

Frequency tolerance: ≤ 0.4 Hz

Number of lines: 525 (RTMA), 625 (CCIR),
Field frequency: 60 Hz (RTMA), 50 Hz (CCIR),

Line and frame sync.: According to TV standard, interlacing

Output: BNC connector (on front)

Trigger signal: Combined signal contains line and field synchronization pulses of different amplitude

Voltage (open-circuit): 2.6 V for line pulse, 5.0 V for field pulse

Impedance: 6 kΩ

Polarity: Negative
SYNCHRONIZATION SECAM
Identification: According to TV system in line and frame
Frame identification: Position in lines 7 to 15 of odd fields, in lines 320 to 328 of even fields.
Line identification: By burst (chrominance subcarrier reference signal) on the back porch according to TV standard (SECAM B, D, G, H, K, K1, L)
Amplitude: Line and frame identification according to TV standard, but also variable between 0 and 150% together with chroma information

SOUND CARRIER AND MODULATION (PM 5415, PM 5418)
MONO
Sound carrier: On/off switchable
Sound carrier frequency: 4.5 MHz for standard M, N; 5.5 MHz for standard B, G, H; 6.0 MHz for standard I; 6.5 MHz for standard D, K, K1 and L
Tolerance: ≤ 30 ppm
Sound modulation: FM, internal and external, on/off switchable; AM for SECAM L
Pre-emphasis: 50 µs for standard B, D, G, H, I, K, K1; 75 µs for standard M, N
Internal
Frequency deviation: ± 30 kHz, standard B, G, H; ± 15 kHz, standard M, N; ± 31 kHz, standard I; ± 27 kHz, standard D, K, K1
Modulation depth: 50% for standard SECAM L
External
0.4 V will give the same deviation or modulation depth as with internal modulation
Input: DIN connector, pin 3 + 5 (rear panel)
Impedance: 0.5 MΩ
Bandwidth: 40 Hz to 15 kHz
Max input voltage: ± 40 V
Output: SCART connector (Euro-AV connector), pin 1 + 3 (rear panel)
Impedance: 1 kΩ
Voltage: 0.4 V rms (open circuit)
Operating Mode Detection
Pilot frequency: 54.6875 kHz (3.5 x fH )
Tolerance: < 30 ppm
Modulation: AM
Identification frequencies: 117.5 Hz (fH /133) for stereo mode; 274.1 Hz (fH /57) for dual-channel mode
Deviation of 2nd sound carrier: ± 2.5 kHz by modulation of carrier with unmodulated pilot

STEREO
Sound Section for Stereo and Second Sound Channel
Transmission for –TX and –TDS / TDSI Versions
Standards: B, G
Sound carriers:
Carrier 1: 5.5 MHz;
Carrier 2: 5.7421875 MHz
Vision / sound carrier ratio:
Carrier 1: 13 dB;
Carrier 2: 20 dB
Frequency tolerance: < 30 ppm
Modulation: FM, internal and external on/off switchable
Pre-emphasis: 50 µs
Internal
FM Sound channel 1: 1 kHz or 3 kHz sinewave, on/off switchable
Deviation: ±30 kHz in mono/dual-channel
±15 kHz in stereo, right channel switched off

For standards D, I, M, N, all stereo versions also offer all mono facilities.

NICAM
Sound Section for NICAM Digital Sound Transmission (PM 5418 TDS / TDSI)
AM/FM sound: As for –TX-models
MONO, DUAL, STEREO: As for –TX-models with the following additions and changes:
Modulation of the AM/FM sound carrier with NICAM off: As for –TX-models
Modulation of the AM/FM sound carrier with NICAM on: AM/FM MONO carrier remains; FM STEREO carrier off

DIGITAL SOUND SECTION NICAM
Sound carrier: On/off switchable by selecting/deselecting the NICAM modes MONO, DUAL, STEREO, TEST
Frequency: Related to bit-rate clock. Automatically
matched to chosen TV system: System B, G, L: 5.85 MHz; System I: 6.552 MHz

Tolerance: 3 ppm
Aging: 2 ppm/year
Amplitude: –20 dBc (related to video carrier)
Tolerance: ± 2 dB
Modulation: Quadrature phase shift keying (QPSK)
Modes: MONO, DUAL, STEREO, TEST selectable

Internal Sources
Channel 1: 1 kHz or 3 kHz sinewave, on/off switchable
Channel 2: 1 kHz sinewave, on/off switchable
Amplitude: Two different amplitudes selectable by AMPL LOW key; FM deviation of MONO carrier remains at ± 30 kHz
Amplitude high: Reference is the maximum encodable amplitude at 15 kHz, 1 kHz and 3 kHz amplitudes are attenuated relative to this level according to pre-emphasis CCITT Rec. J17
Amplitude low: 1/3 of high amplitude
Reserve sound switching flag (RSSF): High/low selectable by RSSF LOW key.

Test 1: NICAM demodulator test
Test 2: NICAM decoder test
Test 3: Unmodulated NICAM carrier

Sound coding: 10 bits/sample and 32 samples/block according to NICAM-728
Bit rate: 728 kbit/s ± 3 ppm
Pre-emphasis: CCITT Rec. J17
Spectrum shaping: System B, G: 40% cosine roll-off; System I: 100% cosine roll-off
NICAM data output: BNC rear panel
Data format: According to NICAM-728
Data level (Vpp): 1V into 75Ω
Output impedance: 75Ω
NICAM clock output: BNC (rear panel)
Frequency: 728 kHz ± 3 ppm
Clock amplitude (Vpp): 1V into 75Ω
Output impedance: 75Ω

Analog sound section (NICAM)

Analog output: Euro-AV connector (SCART) rear panel
Impedance: 1 kΩ
Output voltage (rms): 0.4V (open circuit)
Internal Modulation: Pin 3 Contents of channel 1, Pin 1 Contents of channel 2
For RSSF flag low (both pins): Modulation contents of the FM MONO channel
External modulation of FM carrier combined with NICAM sound: RSSF (Reserve Sound Switching Flag) automatically set to LOW
Pin 3: Signal supplied to pin 3 of the AUDIO IN connector
Pin 1: Signal supplied to pin 5 of the AUDIO IN connector

Internal Sources
Sound channel 1: 1 kHz or 3 kHz sinewave, on/off switchable
Sound channel 2: 1 kHz sinewave, on/off switchable
SAP channel: 5 kHz sinewave, on/off switchable
Test 1: Channel separation test/alignment
Test 2: Channel separation quality check
Test 3: Audio level test/alignment

MPX output: BNC connector on rear panel
Impedance: 50Ω
Voltage (rms): 0.32V (into 50Ω)
Channel separation: > 36 dB

Sound channel 1 & 2: SCART connector (Euro-AV connector)
Contacts: Pin 3 Sound channel 1, Pin 1 Sound channel 2
Impedance: 1 kΩ
Voltage (rms): 0.36V for 54% modulation

TELETEXT FOR –TX, –TDS / TDSI VERSIONS

TXT

Data synchronization frequency: PAL B,G,I: 6.9375 MHz (444 x fH); SECAM L: 6.203125 MHz (397 x fH)
Data coding: According to standards (TOP, FLOF, Antiope)
Signal levels: PAL: ‘1’ = 66% of white level, ‘0’ = black level; SECAM: ‘1’ = 100% of white level, ‘0’ = black level
Signal shaping: Cos2 filter
Data lines: 20, 21, 233, 234
Additional lines for –TDS / TDSI in PAL system: 13, 14, 326, 327
Data contents: Text pages with special contents for decoder testing for each standard
Normal working mode: Combinations possible with all test patterns

SIGNAL OUTPUT

Teletext signal combined with video signal: All CVBS outputs
Modulated RF signal: RF output, RF from basic unit

PDC / VPS FOR –TDS / TDSI VERSIONS

PDC

Program Delivery Control is a data broadcasting system which carries program related information for exploitation by suitably-equipped video recorders according to the EBU specification SPB 459 Revision 2
Data synchronization frequency: 6.9375 MHz
Modulation: Binary NRZ

MTS Stereo plus SAP (BTSC sound)

Sound Section for –TDS/TDSI Versions. MTS Stereo and SAP
Data coding: According to standard
Location of data: Lines 13, 14, 20, 21, 326, 327, 333, 334
Signal levels: ‘0’ = OV, ‘1’ = 66% of white level
Signal shaping: Cos² filter
Data contents: 9 different sets of PDC data of which 4 are freely programmable
Normal operating mode: Combination possible with all (except cross hatch) test patterns and teletext; on/off switchable
Programming: Via keyboard and text strip inserted in the test pattern
Text strip: 6 different positions or not visible

**VPS**

Video Programming System for pre-programmed recording with home video recorders according to German broadcasting organizations ARD, ZDF and ZVEI

Data synchronization
- Frequency: 5 MHz
- Bit length: 400 ns
- Modulation: Bi-phase modulation
- Data coding: According to the guideline issued by ARD, ZDF and ZVEI

Signal levels: ‘0’ = black level, ‘1’ = 71.4% of white level
Signal shaping: Cos² filter
Location of data: Line 16 (VPS system)
Data contents: 9 different, freely programmable non-volatile sets of VPS data preset at factory
Normal operating mode: Combination possible with all (except cross hatch) test patterns and teletext; on/off switchable
Programming: Via keyboard and text strip inserted in the test pattern
Text strip: 6 different positions, or not visible

**CLOSED CAPTION FOR –TDS / TDSI VERSIONS**

Closed Caption is a subtitling system mainly used in the USA (NTSC M).

Data synchronization
- Frequency: 503.4965 kHz (32 * fH)
- Data coding: Binary NRZ
- Signal levels: ‘0’ = blanking level; ‘1’ = 50 IRE level
- Signal shaping: filtered to a 2T response
- Location of data: line 16 of field 1 in the NTSC M system
- Data contents: 7 cycle sine wave clock run-in burst, start bit and 16 data bits
- Display modes: Pop On, Roll Up, Paint On and Text Mode
- Second language: Available
- Data information: 8 pre-defined Closed Caption data sets, non-programmable; 1 sequence of these 8 pre-defined data sets is possible

**IEEE-488 INTERFACE [PM5418 TDSI]**

IEEE

Allows selection and control of all functions, except video-, chroma- and RF amplitudes.

**Y/C + RGB OPTION PM 9553 G (optional for all models)**

**RGB**

- RGB outputs: BNC connectors (rear)
- Output Voltage (Vpp): 0.7V into 75Ω
- Impedance: 75Ω
- Subcarrier output: BNC connector (rear), only for PAL and NTSC systems

- Output Voltage (Vpp): 2V into 75Ω
- Impedance: 75Ω
- Sync. output: BNC connector (rear)
- Output Voltage (Vpp): 2V into 75Ω
- Impedance: 75Ω

**Y/C SIGNAL**

- Y/C Output: 4-pin S-connector (rear panel)
- Y Signal (luminance): Y signal at pin 3, G ground at pin 1
- Impedance: 75Ω
- Nominal output level: 1 Vpp (into 75Ω)
- Tolerance: 10%

- For Standards B, D, G, H, I, N, K, L:
  - Sync. level: –43% ± 3%
  - Blanking level: 0%
  - Black level: 0%
  - White level: 100%

- For Standard M:
  - Sync. level: –40% ± 3%
  - Blanking level: 0%
  - Black level: 7.5% ± 2.5%
  - White level: 100%

- C signal (chroma): Complete chroma signal including color burst of CVBS signal
  - C signal at pin 4; G ground at pin 2
- Impedance: 75Ω
- Output level into 75Ω: Normal value 100% ± 10% in stop position
- Setting value: 0 to 150% continuously variable (PM 5415 and PM 5418), 0 or 100% switchable (PM 5414 V)

**UNIVERSAL PAL / NTSC CHROMA MODULE (= Optional PM 9546)**

**UNIVERSAL CHROMA**

- NTSC systems: M
- PAL systems: B, D, G, H, I, M, N

**GENERAL SPECIFICATIONS (all models)**

**ENVIRONMENTAL CONDITIONS:**

- Temperature
  - Operating: +5°C to +50°C
  - Non-operating: –40°C to +70°C
- Humidity
  - Acc. to MIL-T-28800D:
    - +5°C to 10°C is not controlled,
    - +11°C to 30°C is 95%,
    - +31°C to 40°C is 75%,
    - +41°C to 50°C is 45%
- Reliability:
  - MTBF = 20,000 hours (calculated value)
- Safety: IEC 1010-1 Class I; CSA-C22.2 No 231
- EMC: EN 55011, VDE 0871 Level B; FCC Part 15J Class A

**POWER REQUIREMENTS:**

- Selectable: 100 V, 120 V, 220 V, 240 V ± 10%; 50 Hz / 60 Hz ± 5%; 35 VA to 57 VA depending on model and installed options

**DIMENSIONS AND WEIGHT:**

- Width: 300 mm (11.8 in)
- Height: 140 mm (5.5 in)
- Depth: 400 mm (15.7 in)
- Weight: Net 6.5 kg to 8.6 kg (14.4 lb to 19.0 lb)
  - Shipping 10 kg to 12.7 kg (22.2 lb to 28.0 lb) depending on model and installed options
**Selection Guide**

| Model          | PAL B | D | G | H | I | PAL M | N (option PM 9546) | NTSC M | SECAM B | D | G | H | K | L | RF | 16:9 | Analog stereo sound | MTS stereo+ SAP sound | NICAM stereo sound | Tele-text | PDC/VPS | CC | IEEE | Y/C+ RGB |
|----------------|------|---|---|---|---|------|-------------------|--------|--------|---|---|---|---|---|-----|------|-------------------|-------------------|-----------------|----------|--------|------|-------|
| PM 5414 V     | •    | opt | • |   |   |      |                   |        |        |   |   |   |   |   |     |      |                   |                   |                |          |       |       |
| PM 5414 V+Y/C | •    | opt | • |   |   |      |                   |        |        |   |   |   |   |   |     |      |                   |                   |                |          |       |       |
| PM 5415       | •    | opt | • |   |   | •    |                   |        |        |   |   |   |   |   |     |      |                   |                   |                |          |       |       |
| PM 5415 +Y/C  | •    | opt | • |   |   | •    |                   |        |        |   |   |   |   |   |     |      |                   |                   |                |          |       |       |
| PM 5415 TX    | •    | opt | • |   |   | •    |                   |        |        |   |   |   |   |   |     |      |                   |                   |                |          |       |       |
| PM 5415 TX +Y/C | •   | opt | • |   |   | •    |                   |        |        |   |   |   |   |   |     |      |                   |                   |                |          |       |       |
| PM 5418       | •    | opt | • |   |   | •    |                   |        |        |   |   |   |   |   |     |      |                   |                   |                |          |       |       |
| PM 5418 + Y/C | •    | opt | • |   |   | •    |                   |        |        |   |   |   |   |   |     |      |                   |                   |                |          |       |       |
| PM 5418 TX    | •    | opt | • |   |   | •    |                   |        |        |   |   |   |   |   |     |      |                   |                   |                |          |       |       |
| PM 5418 TX +Y/C | •   | opt | • |   |   | •    |                   |        |        |   |   |   |   |   |     |      |                   |                   |                |          |       |       |
| PM 5418 TDS   | •    | opt | • |   |   | •    |                   |        |        |   |   |   |   |   |     |      |                   |                   |                |          |       |       |
| PM 5418 TDS + Y/C | •  | opt | • |   |   | •    |                   |        |        |   |   |   |   |   |     |      |                   |                   |                |          |       |       |
| PM 5418 TDSI + Y/C | • | opt | • |   |   | •    |                   |        |        |   |   |   |   |   |     |      |                   |                   |                |          |       |       |

- = Standard in instrument  
opt=requires the optionally available unit PM 9546, Universal PAL/NTSC chroma module, to be ordered with the main instrument

**ORDERING INFORMATION**
**BASIC MODELS**
- PM 5414 V: Video Pattern Generator
- PM 5415: NTSC / PAL TV Signal Generator
- PM 5418: NTSC / PAL / SECAM TV Signal Generator

Refer to Selection Guide for complete overview of configurations.

**ACCESSORIES INCLUDED WITH INSTRUMENT**
- PM 9538 RF cable BNC TV connector 75Ω  
- Power cord  
- Operating manual

**ACCESSORIES**
- PM 9075 75Ω BNC-BNC Cable (1 m / 3 ft)  
- Service manual  
- PM 9546** Universal Chroma Unit  
- PM 9553G** Y/C + RGB Output  
- PM 9561G 19” Rackmount (retrofittable)

** Factory and Service Center installable only

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