## **Test Equipment Solutions Datasheet**

Test Equipment Solutions Ltd specialise in the second user sale, rental and distribution of quality test & measurement (T&M) equipment. We stock all major equipment types such as spectrum analyzers, signal generators, oscilloscopes, power meters, logic analysers etc from all the major suppliers such as Agilent, Tektronix, Anritsu and Rohde & Schwarz.

We are focused at the professional end of the marketplace, primarily working with customers for whom high performance, quality and service are key, whilst realising the cost savings that second user equipment offers. As such, we fully test & refurbish equipment in our in-house, traceable Lab. Items are supplied with manuals, accessories and typically a full no-quibble 1 year warranty. Our staff have extensive backgrounds in T&M, totalling over 150 years of combined experience, which enables us to deliver industry-leading service and support. We endeavour to be customer focused in every way right down to the detail, such as offering free delivery on sales, presenting flexible technical + commercial solutions and supplying a loan unit during warranty repair, if available.

As well as the headline benefit of cost saving, second user offers shorter lead times, higher reliability and multivendor solutions. Rental, of course, is ideal for shorter term needs and offers fast delivery, flexibility, try-before-you-buy, zero capital expenditure, lower risk and off balance sheet accounting. Both second user and rental improve the key business measure of Return On Capital Employed.

We are based at Aldermaston in the UK from where we supply test equipment worldwide. Our facility incorporates Sales, Support, Admin, Logistics and our own in-house Lab.

All products supplied by Test Equipment Solutions include:

- No-quibble parts & labour warranty (we provide transport for UK mainland addresses).
- Free loan equipment during warranty repair, if available.
- Full electrical, mechanical and safety refurbishment in our 40GHz in-house Lab.
- Certificate of Conformance (calibration available on request).
- Manuals and accessories required for normal operation.
- Free insured delivery to your UK mainland address (sales).
- Support from our team of seasoned Test & Measurement engineers.
- ISO9001 quality assurance.

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# VG-849C / VG-849C-A



## Further evolutionary changes unveil a new generation of video signal generators. **HDMI TV dedicated VG-849C arrives!**

Arrival of the latest TV system equipped with HDMI 1.3a (not including SACD) output.

VG-849C is the most significant analog/digital output type programmable video signal generator. Supports analog RGB/ YPbPr signal switching and conforms to HDTV system timing. SDTV standard signals like NTSC/PAL/SECAM are also supported. Standard unit offers TMDS signal digital output with added HDCP function. Dual link output (to 300MHz) is possible with custom modification. Can support an ultra-high-density display surpassing QXGA (2048 × 1536). Internal 450 sample programs are easy to be recalled. HDMI (High-Definition Multimedia Interface:EIA/CEA-861D, interface standards for next generation TV).

#### **Features**

#### Wideband Dot Clock

A Dot clock with 5 - 300 MHz analog output, 25 - 300 MHz (DVI dual link) \* 25-225MHz HDMI output supports a wide range including broadband. 1KHz accuracy allows more precise settings.

#### HDMI 1.3a supported

 ${\tt HDMI function}\ is\ provided\ for\ transmitting\ high-resolution\ (HDTV)\ video\ and\ multi-channel\ audio\ without$ compression that could result in quality deterioration

Complies with "HDCP (High-bandwidth Digital Contents Protection)," with AV-MUTE ON/OFF function. The latest HDM1 standard 1.3a supported.

#### • Ethernet adopted for outside interface

Ethernet and RS-232C have been adopted for external interface. By supporting Ethernet, the signal generator is now capable of performing batch control of multiple VG units.

#### CEC control function

CEC (Consumer Electronics Control) command simulation function supported.



#### • Equipped with scroll and simple animation imaging functions

Equipped with a 1-dot level horizontal and vertical display pattern scroll function. It can also be used to store multiple animation images with respect to resolution and display them by moving a display start coordinate control.

- Editing via PC Card is possible
- Corresponding full color output
- It corresponds to closed caption, teletext, V chip, and macro vision as an option.
- Supports next generation audio (standard for VG-849C-A)

Capable of generating test signals for the following: next generation audio (Blu-Ray disc and HD-DVD applications) Dolby TrueHD, Dolby Digital Plus, DTS-HD Master Audio, and DTS-HD High Resolution Audio, as well as DSD (One Bit Audio) applied in SACD.

#### Next generation audio digital input (option for VG-849C-A)

 $Using \ 12S \times 4 ch input, this \ option \ can \ output \ Dolby \ TrueHD, Dolby \ Digital \ Plus, DTS-HD \ Master \ Audio, DTS-HD \ High \ Plus, DTS-HD \ Master \ Audio, DTS-HD \ Master \ M$ Resolution Audio in HDMI.

- HDMI 1.3a Deep color(10/12 bit) mode supported 1024/4096 level ramp pattern for testing 10/12 bit supported as an option.
- HDMI 1.3a xvYcc, Lipsynctest function

### specifications

| Digital DVI: 25 to 165MHz (pixel clock: 25 to 165MHz) / 1KHz steps   |  |                             | 1,00   |                   |  |
|--|--|-----------------------------|--|-------------------|--|
| Digital HDMI : 25 to 165MHz / 1KHz steps (Transmission rate 225MHz)  | Output specifications  | Dot clock frequency/step    | Analog: 5 to 300MHz / 1KHz steps   |                   |  |
| Horizontal frequency / Idea   Hori   |  |                             | Digital DVI: 25 to 165MHz (pixel clock: 25 to 165MHz)                                      | / 1KHz steps      |  |
| Vertical frequency / line   Video memory   HDMI : 4k × 4k × 36 bits (RGB 12 bit each)   Analog / DVI : 4k × 4k × 24 bits (RGB 8 bit each)  |  |                             | Digital HDMI: 25 to 165MHz / 1KHz steps (Transmission rate 225MHz)                         |                   |  |
| Video memory Analog output Output signal RNG, Dsub-15, D5-terminal, DVI-1) Video peak level Video peak level Video peak level Video on Sync Level RNG, Dsub-15, D5-terminal, DVI-1) Setup level O to 0.25V (75Ω) Video On Sync Level RNSC/PAL/SECAM Output Video: NTSC/PAL/SECAM Output Video: Output Vi |  | Horizontal frequency / dot  | 10 to 300KHz (Max. 8192 dot) 1 dot accuracy for full range (Analog output only)            |                   |  |
| Analog output    Output signal   R · G · B/Y · R.Y · B.Y · H.S · VS · CS   |  | Vertical frequency / line   | 15.6 to 200Hz (Max. 8192 lines)  |                   |  |
| Video on Sync Level    | Video memory   |                             | HDMI: 4k × 4k × 36 bits (RGB 12 bit each) Analog / DVI: 4k × 4k × 24 bits (RGB 8 bit each) |                   |  |
| Setup level  Video On Sync Level  Sync Level(H5, V5, C5)  Scan Mode  NTSC/PAL/SECAM  Output Video: OFF/R • G • B/Y • R.Y • B.Y  Output Mode  NTSC/PAL/SECAM  Output Mode  RGB/YCDC/4-4.4 8, 10, 12bit YCbCr4:2:2 8, 10, 12bit  Internal Audio  External input audio  Digital: COAX, TOSLINK Analog: 2ch  Audio Sampling Frequency  Version  Optional Audio  Optional Audio  Output Single Link RGB 8-bit each, HDCP supporting  RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Optional Audio Output  Optional Audio Output  Optional Audio Output  Optional Audio Output  Optional Frequency  RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Optional Audio Output  Optional Audio Output  Optional Frequency  RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Optional Audio Output  Optional Audio Output  Optional Frequency  RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Optional Audio Output  Optional Frequency  RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Optional Audio Output  Optional Frequency  RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Optional Audio Output  Optional Audio Output  Optional Frequency  RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Optional Audio Output  Optional Frequency  RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Optional Audio Output  RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Optional Audio Output  RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Power consumption  RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Audio Sampling Frequency  RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Power consumption  RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Audio Sampling Frequency  Brown Connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Audio Sampling Frequency  Brown Connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Audio Sampling Frequency  Brown Connector × 2ch 0 to 20KHz (Sinusoidal mono-sou  | Analog output  | Output signal               | R • G • B/Y • R-Y • B-Y • HS • VS • CS   |                   |  |
| Video On Sync Level   Sync Level(HS, VS, CS)   HS VS More than 2V (75Ω) (0 to ±0.6V at trilevel output)  | (BNC, Dsub-15, D5-terminal, DV                                 | I-I) Video peak level       | I 0.3 to 1.2V (75Ω)  |                   |  |
| Sync Level(HS, VS, CS) Scan Mode NTSC/PAL/SECAM Composite, S-Video(S1, S2), SCART(Optional) (Timing and Level are fixed) Vchip, Closed Caption, Teletext, Macro vision(optional) Vchip, Closed Caption |  | Setup level                 | 0 to 0.25V (75Ω)   |                   |  |
| Scan Mode NTSC/PAL/SECAM Output Vchip, Closed Caption, Teletext, Macro vision(optional) Output Vldeo: OFF/R-G-B/Y-R-Y-B-Y Output Mode Back Internal Audio External Input audio Audio Sampling Frequency Version Optional Audio Optional | Sync Level(HS, VS, CS) Scan Mode NTSC/PAL/SECAM                |                             | 0 to 0.6V (75 $\Omega$ ) (0 to ±0.6V at trilevel output)                                   |                   |  |
| NTSC/PAL/SECAM Composite, S-Video(S1, S2), SCART(Optional) (Timing and Level are fixed) Vchip, Closed Caption, Teletext, Macro vision(optional)  Output Video: OFF/R • G • B/Y • R-Y • B-Y Sync: OFF/bilevel/trilevel  HDMI output  RGB/YCbCr4:4:4 8, 10, 12bit YCbCr4:2:2 8, 10, 12bit  Betternal input audio Audio Sampling Frequency Version Optional Audio Output RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  IES × 4ch (TTLlevel) Optional Audio Output Optional  |  |                             | HS.VS: More than 2V (75 $\Omega$ ) CS: 0.3V (±0.3V at trilevel output) (75 $\Omega$ )      |                   |  |
| Vchip, Closed Caption, Teletext, Macro vision(optional)  Output Video: OFF/R • G • B/Y • R-Y • B-Y Sync: OFF/bilevel/trilevel  HDMI output Output Mode Internal Audio Seh/Clor4:4:4 8, 10, 12bit YCbCr4:2:2 8, 10, 12bit Sch(Sinusoidal mono-sound, Sweep)  External input audio Digital: COAX, TOSLINK Analog: 2ch  Audio Sampling Frequency Version Optional Audio Output Optional Audio Dolby TrueHD, Dolby Digital Plus, Dolby Digital, DTS-HD Master Audio, DTS-HD High Resolution Audio, DTS Digital Output Single Link RGB 8-bit each, HDCP supporting  Analog Audio Output Sch Card(ATA) RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Data Storage Device PC card(ATA) Compact Flash Power consumption Max. 80W  Power consumption Max. 80W  Operating temperature range Operating humidity range Dimensions 430(W) × 88(H) × 350(D) mm (excluding projected parts)  |  |                             | Interlace, Non-interlace   |                   |  |
| Output Video : OFF/R • G • B/Y • R-Y • B-Y Sync : OFF/bilevel/trilevel  HDMI output  Output Mode RGB/YCbCr4:4:4 8, 10, 12bit YCbCr4:2:2 8, 10, 12bit  Internal Audio Sch(Sinusoidal mono-sound, Sweep)  External input audio Digital : COAX, TOSLINK Analog : 2ch  Audio Sampling Frequency Version Dolby TrueHD, Dolby Digital Plus, Dolby Digital, DTS-HD Master Audio, DTS-HD High Resolution Audio, DTS Digital Output Single Link RGB 8-bit each, HDCP supporting  Analog Audio Output Sector Section RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Data Storage Device PC card(ATA) Compact Flash RS232C, 10/100BASE-T/TX, Remote BOX  Action to 120V / Ac200 to 240V 50/60Hz  Power consumption Max. 80W  Operating temperature range Power Operating temperature range Operating humidity range Dimensions  Dimensions  Output Video : OFF/R • G • B/Y • R-Y • B-Y Sync : OFF/bilevel/trilevel RSB/YCbCr4:2:2 8, 10, 12bit VCbCr4:2:2 8, 10, 12bit VCbCT4:2:2 8, 10, 12bit VC |  |                             | Composite, S-Video(S1, S2), SCART(Optional) (Timing and Level are fixed)                   |                   |  |
| HDMI output Output Mode Internal Audio Bech(Sinusoidal mono-sound, Sweep)  External input audio Digital : COAX, TOSLINK Analog : 2ch  Audio Sampling Frequency Version Optional Audio Diby TrueHD, Dolby Digital Plus, Dolby Digital, DTS-HD Master Audio, DTS-HD High Resolution Audio, DTS DIVI Digital Output Single Link RGB 8-bit each, HDCP supporting Analog Audio Output Data Storage Device Control Interface General specifications Voltage Power consumption Operating temperature range Operating humidity range Dimensions Voltage Operating humidity range Operating humidity range Dimensions Voltage Operating humidity range Operating humidity ran |  |                             | Vchip, Closed Caption, Teletext, Macro vision(optional)                                    |                   |  |
| Internal Audio External input audio Digital: COAX, TOSLINK Analog: 2ch Audio Sampling Frequency Version Optional Audio Output Optional Audio Output Optional Audio Output Data Storage Device Control Interface General specifications Voltage Power consumption Operating temperature range Operating humidity range Dimensions Voltage Operating humidity range Dimensions Optional Audio Option (excluding projected parts) Digital COAX, TOSLINK Analog: 2ch Audio Sampling Frequency 32 to 192KHz (max, 8ch) Dolby TrueHD, Dolby Digital Plus, Dolby Digital, DTS-HD Master Audio, DTS-HD High Resolution Audio, DTS Digital Surround, DSD (max8ch) Single Link RGB 8-bit each, HDCP supporting RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  ISS × 4ch (TTLlevel) Data Storage Device PC card(ATA) Compact Flash RS232C, 10/100BASE-T/TX, Remote BOX AC100 to 120V / AC200 to 240V 50/60Hz Ac200 to 240V 50/60Hz Rear View VG-849C  Rear View VG-849C   |  |                             | Video : OFF/R • G • B/Y • R-Y • B-Y Sync : OFF/bilevel/trilevel                            |                   |  |
| Digital : COAX, TOSLINK Analog : 2ch  Audio Sampling Frequency Version  Optional Audio  Optional Audio Output  Optional Audio Output  Data Storage Device  Control Interface  General specifications  Voltage Power consumption Operating temperature range Operating humidity range Dimensions  Dimensions  Dimensions  Digital : COAX, TOSLINK Analog : 2ch 32 to 192KHz (max, 8ch)  HDMI Ver.1.3a  Dolby TrueHD, Dolby Digital Plus, Dolby Digital, DTS-HD Master Audio, DTS-HD High Resolution Audio, DTS  Digital Surround, DSD (max8ch)  Single Link RGB 8-bit each, HDCP supporting  RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Optional Audio Output  I2S × 4ch (TTLlevel)  Compact Flash  Sulvi output supports up to 300 MHz by purpose built modification. However, no HDCP function available.  * DVI output supports up to 300 MHz by purpose built modification. However, no HDCP function available.  Rear View  VG-849C  * Rear View  VG-849C  | HDMI output  | Output Mode                 | RGB/YCbCr4:4:4 8, 10, 12bit YCbCr4:2:2 8, 10, 12bit  |                   |  |
| Audio Sampling Frequency Version Version Optional Audio Output Single Link RGB 8-bit each, HDCP supporting RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Optional Audio Output Data Storage Device Control Interface General specifications Voltage Power consumption Operating temperature range Operating humidity range Dimensions Optional Audio Output Action 120V / Ac200 to 240V 50/60Hz Power consumption Operating temperature range Operating humidity range Dimensions Optional Audio Output Action 120V / Ac200 to 240V 50/60Hz Power consumption Operating temperature range Operating humidity range Operating humi |  | Internal Audio              | 8ch(Sinusoidal mono-sound, Sweep)  |                   |  |
| Version Optional Audio Optional Audio Optional Audio Optional Audio Optional Audio Output Single Link RGB 8-bit each, HDCP supporting RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Optional Audio Output I2S × 4ch (TTLlevel)  Data Storage Device PC card(ATA) Compact Flash Control Interface RS232C, 10/100BASE-T/TX, Remote BOX Operating temperature range Operating temperature range Operating humidity range Dimensions  Voltage New Condensation)  Dimensions  HDMI Ver.1.3a Dolby Digital Plus, Dolby Digital, DTS-HD Master Audio, DTS-HD High Resolution Audio, DTS Digital Plus, Dolby Digital, DTS-HD Master Audio, DTS-HD High Resolution Audio, DTS Digital Plus, Dolby Digital Plus, Dolby Digital, DTS-HD Master Audio, DTS-HD High Resolution Audio, DTS Digital Surround, DSD (max8ch)  Single Link RGB 8-bit each, HDCP supporting RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  I2S × 4ch (TTLlevel)  PVI output supports up to 300 MHz by purpose built modification. However, no HDCP function available.  * DVI output supports up to 300 MHz by purpose built modification. However, no HDCP function available.  * Rear View VG-849C  * Rear View VG-849C  | Audio Sampling Frequency<br>Version                            |                             | Digital : COAX, TOSLINK Analog : 2ch   |                   |  |
| Optional Audio Optional Audio Optional Audio Optional Audio Output Single Link RGB 8-bit each, HDCP supporting RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  12S × 4ch (TTLlevel) Data Storage Device Control Interface RS232C, 10/100BASE-T/TX, Remote BOX Operating temperature range Operating humidity range Dimensions Optional Audio Optional Audio Output  Voltage Power consumption Operating temperature range Operating humidity range Dimensions Optional Audio Operating humidity range Operating humidity r |  |                             | 32 to 192KHz (max, 8ch)  |                   |  |
| Digital Surround, DSD (max8ch)  Single Link RGB 8-bit each, HDCP supporting  Analog Audio Output  RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  Defional Audio Output  Data Storage Device  PC card(ATA)  Compact Flash  RS232C, 10/100BASE-T/TX, Remote BOX  General specifications  Voltage Power consumption Operating temperature range Operating humidity range Dimensions  Dimensions  Dimensions  Dimensions  Dimensions  Single Link RGB 8-bit each, HDCP supporting  RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  * DVI output supports up to 300 MHz by purpose built modification. However, no HDCP function available.  * POWI output supports up to 300 MHz by purpose built modification. However, no HDCP function available.  * Rear View  VG-849C  * Rear View  VG-849C  |  |                             |  |                   |  |
| Analog Audio Output  PC card(ATA)  Compact Flash Control Interface  General specifications  Voltage Power consumption Operating temperature range Operating humidity range Dimensions  Ac A connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)  PC card(ATA)  Compact Flash RS232C, 10/100BASE-T/TX, Remote BOX AC100 to 120V / AC200 to 240V 50/60Hz Rear View  VG-849C  Rear View  VG-849C  Rear View  VG-849C  |  |                             |  |                   |  |
| Data Storage Device PC card(ATA) Compact Flash RS232C, 10/100BASE-T/TX, Remote BOX General specifications Voltage Power consumption Operating temperature range Operating humidity range Dimensions Voltage Normal Max. 80W  Operating humidity range  | DVI Digital Output Single Link RGB 8-bit each, HDCP supporting |                             |  |                   |  |
| Data Storage Device PC card(ATA) Compact Flash RS232C, 10/100BASE-T/TX, Remote BOX General specifications Voltage Power consumption Operating temperature range Operating humidity range Dimensions Voltage Power consumption Operating semperature range Operating humidity range Operating humidity range Operating semperature range Operating semperatu | Analog Audio Output  |                             | RCA connector × 2ch 0 to 20KHz (Sinusoidal mono-sound, Sweep)                              |                   |  |
| Control Interface  RS232C, 10/100BASE-T/TX, Remote BOX  Voltage Power consumption Operating temperature range Operating humidity range Dimensions  Voltage Operating humidity range Operating humidi | Optional Audio Output  |                             | I2S × 4ch (TTLlevel)   |                   |  |
| General specifications  Voltage Power consumption Operating temperature range Operating humidity range Dimensions  Voltage AC100 to 120V / AC200 to 240V 50/60Hz  Max. 80W  +5 to 40°C  30 to 80% RH (no condensation)  Dimensions  Voltage AC100 to 120V / AC200 to 240V 50/60Hz  Rear View VG-849C   | Data Storage Device  | PC card(ATA)                | Compact Flash  |                   |  |
| Power consumption Max. 80W  Operating temperature range  | Control Interface  |                             | RS232C, 10/100BASE-T/TX, Remote BOX  |                   |  |
| Power consumption Max. 80W  Operating temperature range +5 to 40°C  Operating humidity range 30 to 80% RH (no condensation)  Dimensions 430(W) × 88(H) × 350(D) mm (excluding projected parts)   | General specifications   | Voltage                     | AC100 to 120V / AC200 to 240V 50/60Hz  | Rear View VG-849C |  |
| Operating humidity range 30 to 80% RH (no condensation)  Dimensions 430(W) × 88(H) × 350(D) mm (excluding projected parts)   |  | Power consumption           | Max. 80W   |                   |  |
| Dimensions 430(W) × 88(H) × 350(D) mm (excluding projected parts)  |  | Operating temperature range | +5 to 40°C   |                   |  |
|  |  | Operating humidity range    | 30 to 80% RH (no condensation)   |                   |  |
| Weight Approx. 4kg   |  | Dimensions                  | $430(W) \times 88(H) \times 350(D)$ mm (excluding projected parts)                         |                   |  |
|  |  | Weight                      | Approx. 4kg  | 9                 |  |