



**INSTRUCTION MANUAL**

**VAGC-100**

**VIDEO AUTOMATIC GAIN, EQ & CHROMA  
DISTRIBUTION AMPLIFIER**

**MULTIDYNE Electronics, Inc.**

*Innovations in Television Testing & distribution*

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This product was designed and manufactured in the  
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## INTRODUCTION

The MULTIDYNE VAGC-100 is a high precision, automatic gain, equalization and chroma distribution amplifier. The amplifier will restore proper video level from an input range of less than 0.4 Volts to more than 2 Volts. It will also compensate or equalize the input video due to cable losses from 1' to over 4000' with a precision of less than 0.05dB. This is achieved while maintaining a linearity of better than 0.2 degrees differential phase, 0.2% differential gain at a signal to noise ratio higher than 72dB. The amplifier provides for the equalization of two different cable types. It also has a fixed 1000' pre-equalizer and a 2000' to 3000' maximum variable automatic equalizer. The VAGC-100 stand-alone version operates from 100 to 240 VAC with an integral power transformer and from a 12 Volt BP90 type battery using and extremely low noise internal DC to DC power converter. The noise and distortion specifications do not change for AC or battery operation. In AC operation the common mode rejection is 66dB. The units are ideal for field and master control use, where fast breaking news or erratic level fluctuation do not allow video monitoring and careful level settings. Additional applications include cable television head-ends, fiber optic and satellite transport systems, ENG/SNG, helicopter feeds and sporting events where video signal levels may erratically fluctuate. The VAGC-100 is a stand-alone unit with an internal AC and DC power supply. For more permanent applications, up to 3 units can be converted to rack-mount.

## OPERATION

The amplifier achieves its automatic gain and equalization control features by precisely measuring sync and burst levels at the amplifier's output after accurately clamping the input signal. A complex servo mechanism then adjusts a modulator block for proper sync and burst amplitudes. If the video source started as standard signal before the attenuation the original parameters would be restored after the attenuation. The system measures the luminance peak white flag to set a gain limit of 100 IRE. If the sync level is low or clipped for some reason, the amplifier will not over compensate with too much gain. The peak white flag will always be limited to 100 IRE.

## INPUT CONNECTIONS

The VAGC-100 has a loop-through input with 2 BNC connectors labeled **INPUT** on the rear panel. The high impedance, loop-through input allows several instruments to be looped together. The user can feed a video signal to one of the BNC input connectors and then feed the second input BNC connector to another piece of equipment. The end of the looping cable should be terminated into 75 Ohms.

## OUTPUT CONNECTIONS

The six BNC video outputs are labeled **1** through **6** on the rear panel. The outputs are source terminated at 75 Ohms. Each output has precisely the same gain and phase characteristic. The video outputs are designed to drive 75 Ohm video cables.

## POWER REQUIREMENTS

The VAGC-100 operates from 110 and 220 VAC and 12VDC. The unit is factory set to operate from 110 VAC. An optional 110 or 220 VAC front panel power selector switch is available. An external wall mount power supply is not required. The AC power cord is an integral part of the amplifier. The **POWER** LED will glow green when the unit is powered up and operating properly. If the unit is plugged into an active outlet and the **POWER** LED does not glow, check the internal fuse. **If the fuse is blown, replace it with a 1/4 Amp fuse.**

### !!!!!!!!!! WARNING !!!!!!!!!!!

**DO NOT OPERATE THE UNIT AT 230 VAC.** The power supply is factory set to operate at 115 Volts AC. See the section POWER SETTING on page 7.

## NOTE

Use only a 1/4 Amp replacement fuse for 115 VAC operation. Use only a 1/8 Amp replacement fuse for 230 VAC operation.

**FRONT PANEL CONTROLS and INDICATORS, VAGC-100**

During normal operation the technician should be aware of the cable type in use and select it using the front panel switch. When setting the equalization first turn the **EQ BOOST** switch on. If the cable being equalized is shorter than 1000 feet, the **VIDEO LED** will glow red indicating over equalization and that the fixed equalizer **EQ BOOST** should be turned off. The front panel **GAIN** and **EQ** controls are for fine adjustments of video level and equalization. During operation with an external battery the AC power supply will be bypassed.

**DISASSEMBLY**

**!!!!!!!!!! CAUTION !!!!!!!!!!**  
**HIGH VOLTAGES INSIDE. USE EXTREME CAUTION WITH THE UNIT OPEN.**  
**SERVICE ONLY TO BE PERFORMED BY QUALIFIED PERSONNEL.**  
**UN-PLUG POWER CORD BEFORE OPENING UNIT.**

The disassembly process is basically the same for both portable and rack-mount units. **First, remove the power cord from the AC outlet.** Remove the screw in the center of the front panel. Next locate the 2 screws on the rear panel closest to the left and right edges. Please remove both screws. At this point the rear panel and bezel will slide out with the main board connected. **Be careful not to provide excess strain to the connecting wires and coax.** The unit can now be powered up on the bench without the chassis. Please take special care when working near the power fuse. **High Voltage is present near the fuse. Use extreme caution!**

**RE-ASSEMBLY**

The re-assembly process is very simple. Slide the main board into to groves of the chassis. Do not bend the wires more than necessary. The control and LEDs may need slight adjustment for alignment with the front panel holes. Replace the screw in the center of the front panel fastening the bracket on the main board. Next, secure the rear panel and bezel with the 2 screws on the left and right edges.

**CALIBRATION**

**!!!!!!!!!! CAUTION !!!!!!!!!!**  
**HIGH VOLTAGES INSIDE. USE EXTREME CAUTION WITH THE UNIT OPEN.**  
**SERVICE ONLY TO BE PERFORMED BY QUALIFIED PERSONNEL.**  
**UN-PLUG POWER CORD BEFORE OPENING UNIT.**

For all calibration procedures, the VPDA-100 requires disassembly. Please see the section **DISASSEMBLY** on page 5. The unit can now be powered up on the bench without the chassis. Please take special care when working near the power fuse. **High Voltage is present near the fuse. Use extreme caution!**

Remove the instruments front panel or put the card on an extender for the plug in version and proceed as follows. Connect a source of NTC7 composite to the input and terminate it at 75 Ohm. Adjust R33, front panel gain

calibration, for 100 IRE units. Switch the signal generator to multiburst and adjust C85 for a flat response. Short the vide input terminals and connect an audio signal generator between the shorted inputs and the instrument's ground (the shell of an output connector). Adjust the generator's frequency for 60Hz and its amplitude for 20VPP. Adjust R4 for minimum 60Hz output at U1 pin 6.

Connect a 1000' of Belden 9259 or 8281 between the generator and the instrument. Set appropriately the front panel cable type selector SW2 and turn on the fixed equalizer by moving SW1 slider to the right. Turn R68, front panel equalization calibrator, all the way CCW to kill the automatic equalizer. Adjust R7, fixed equalizer control for a flat response on the monitor. Switch the fixed equalizer off. Slowly turn R44 CW until the video is precisely equalized on the monitor. Overpeak the video 1 or 2 % and adjust R90, overpeak threshold until PL2 turns pink. Readjust R44 for a flat display and observe R44 turning green. Remove the video input and observe PL2 go off. PL1 is normally green when power is present and turns pink when the external battery falls below 9.5V. Turn R33 CW to achieve 105 IRE units. Turn R73 CCW to bring the video down to 102 IRE units. R73's circuit prevents the video AGC from going off scale if incoming video sync is too low.

Set the generator for multiburst. connect now 3000' of Belden 9259 to the instrument and with the fixed equalizer on and SW2 to the left adjust R50 for minimum overshoot on the white flag. Repeat the operation with 3000' of 8281 cable and SW2 to the right adjust R95 for minimum overshoot on the white flag. At this point the instrument is fully calibrated and can be reassembled.

External DC power has to be ungrounded, simply a free standing battery with a coaxial connector wired for negative center. Anything else will damage the instrument and void its warranty. Maximum DC input level can only be 14 Volts. Anything higher will damage the instrument.

## POWER SETTINGS

**!!!!!!!!!! CAUTION !!!!!!!!!!**  
**HIGH VOLTAGES INSIDE. USE EXTREME CAUTION WITH UNIT OPEN.**  
**SERVICE ONLY TO BE PERFORMED BY QUALIFIED PERSONNEL.**  
**UN-PLUG POWER CORD BEFORE OPENING UNIT.**

### CHANGE FROM 115 VAC to 230 VAC

The VPDA-100 is factory set to operate from 115 VAC. **Remove the power cord from the AC power outlet!** To change the input AC Voltage from 115 VAC to 230 VAC, the amplifier must first be opened. Please go to the **DISASSEMBLY** section on page 5. Once the unit is open, it will take several steps to make the voltage change.

First locate the fuse in the rear left corner. Please remove the fuse. Next locate the jumper holes labeled E4, E5, E6 and E7 just below the fuse. Cut the copper connection between E4 and E5. Also, cut the connection between E6 and E7. Using a short piece of wire solder a jumper into place between E5 and E6. Replace the fuse with a 1/8 Amp fuse. The VPDA-100 is now ready for 230 VAC operation. Please lable the unit for 230 VAC operation.

### CHANGE FROM 230 VAC to 115 VAC

If the VPDA-100 operates on 230 VAC a modification was performed at some point. **Remove the power cord from the AC power outlet!** The procedure below will undo that modification. To change the input AC Voltage from 230 VAC to 115 VAC, the amplifier must first be opened. Please go to the **DISASSEMBLY** section on page 5. Once the unit is open, it will take several steps to make the voltage change.

First locate the fuse in the rear left corner. Please remove the fuse. Next locate the jumper holes labeled E4, E5, E6 and E7 just below the fuse. Remove the jumper between E5 and E6. Using a short piece of wire solder

a small jumper between E4 and E5. Also solder a jumper between E6 and E7. Replace the fuse with a 1/4 Amp fuse. The DA is now ready for 115 VAC operation. Please lable the unit for 115 VAC operation.

**SPECIFICATIONS**

Input video level range .....	0.35 to 2 Volts
Gain accuracy automatic.....	+/-0.05 dB
Chrominance burst amplitude accuracy .....	+/-0.05 dB
Clamp type.....	Back-porch, sampling, feedback
Equalization Max. Range 8281 type cable.....	> 4000 ft automatic
Equalization Max. Range RG-59U type cable.....	> 3000 ft automatic
Chrominance adjustment range.....	> +/- 9 dB
Differential Gain .....	< 0.2 %
Differential Phase.....	< 0.2 °
Line or Field Tilt .....	< 0.5 %
Signal to Noise.....	> 72 dB
Common Mode Rejection (60 Hz) .....	> 66 dB
Return Loss, to 5 MHz.....	> 42 dB
Power consumption, MAX. ....	< 2 Watts

**DRAWINGS**

**VAGC-100 Main Board Assembly Drawing**

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