



AVTECH ELECTROSYSTEMS LTD.

NANOSECOND WAVEFORM ELECTRONICS
SINCE 1975

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INSTRUCTIONS

MODEL AVR-G1-C-CPIB PULSE GENERATOR

S.N.:

WARRANTY

Avtech Electrosystems Ltd. warrants products of its manufacture to be free from defects in material and workmanship under conditions of normal use. If, within one year after delivery to the original owner, and after prepaid return by the original owner, this Avtech product is found to be defective, Avtech shall at its option repair or replace said defective item. This warranty does not apply to units which have been disassembled, modified or subjected to conditions exceeding the applicable specifications or ratings. This warranty is the extent of the obligation assumed by Avtech with respect to this product and no other warranty or guarantee is either expressed or implied.

TECHNICAL SUPPORT

Phone: 613-226-5772 or 1-800-265-6681

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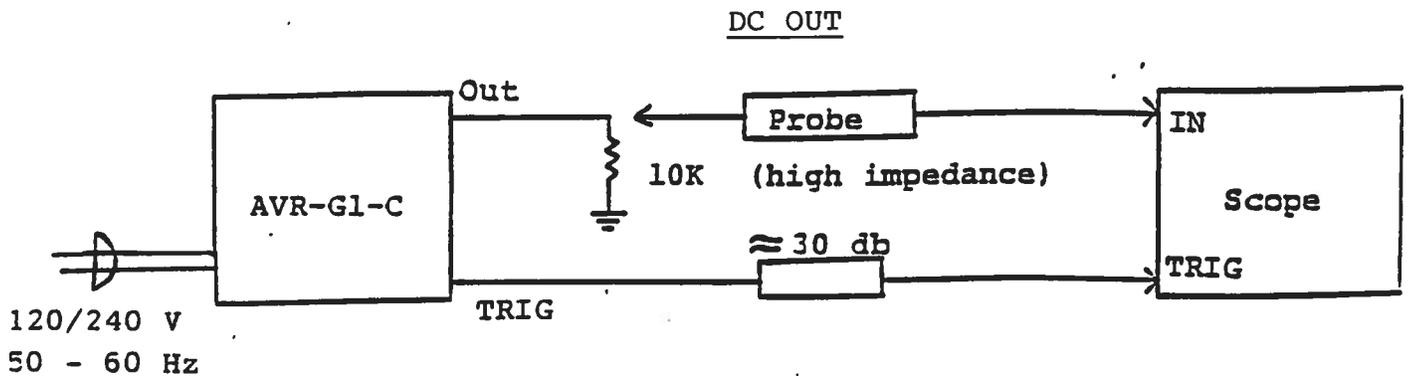
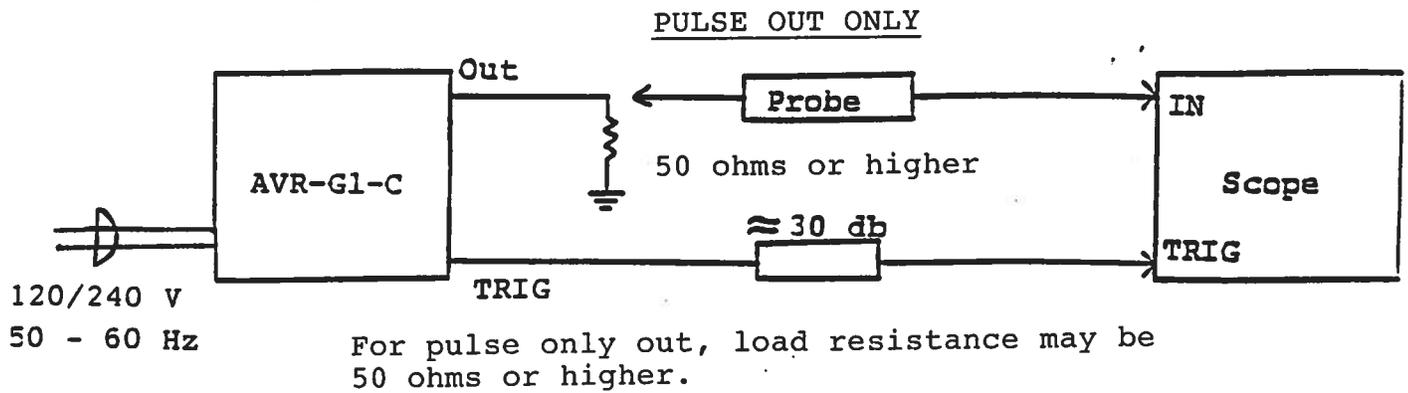
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TABLE OF CONTENTS

WARRANTY	2
TABLE OF CONTENTS	3
FIG. 1: PULSE GENERATOR TEST ARRANGEMENT	4
GENERAL OPERATING INSTRUCTIONS	5
FIG. 2: FRONT PANELS CONTROLS	7
FRONT PANEL CONTROLS.....	8
Fig. 3: BACK PANEL CONTROLS	11
BACK PANEL CONTROLS	12
Fig. 4a POWER SUPPLY.....	14
SYSTEM DESCRIPTION AND REPAIR PROCEDURE.....	15
PERFORMANCE CHECK	16

FIG. 1: PULSE GENERATOR TEST ARRANGEMENT



GENERAL OPERATING INSTRUCTIONS

- 1) The bandwidth capability of components and instruments used to display the pulse generator output signal (attenuators, cables, connectors, etc.) should exceed 100 MHz.
- 2) The TRIG output channel provides TTL level signals. To avoid overdriving the TRIG input channel of some scopes, a 30 dB attenuator should be placed at the input to the scope trigger channel. The TRIG output precedes the main output when the front panel ADVANCE-DELAY switch is in the ADVANCE position. The TRIG output lags the main output when the switch is in the DELAY position.

The DELAY control controls the relative delay between the reference output pulse provided at the TRIG output and the main output. This delay is variable over the range of 100 ns to 10 us:

	MIN	MAX
Range 1	0.1 us	1.0 us
Range 2	1.0 us	10 us

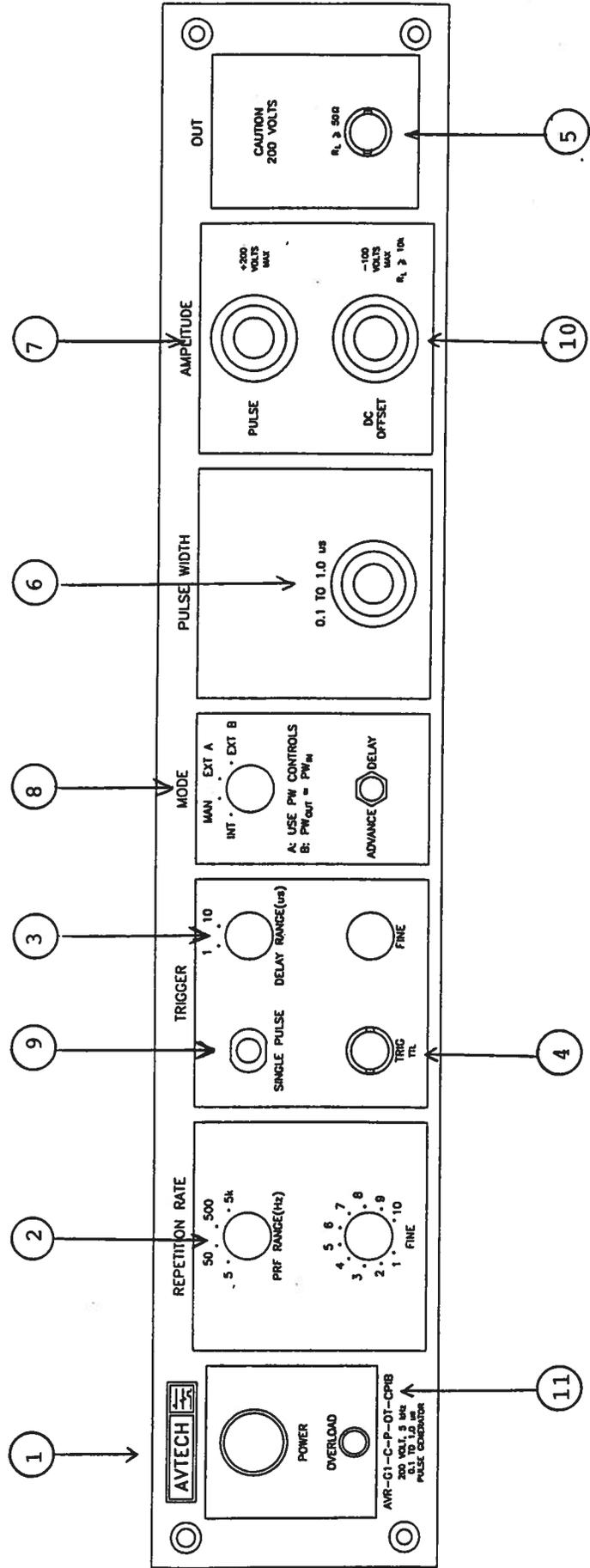
- 3) The output pulse width is controlled by means of the front panel ten turn PW control. Note that the MODE switch must be in the INT position.
- 4) To obtain a stable output display the PRF control on the front panel should be set mid range. The front panel INT-EXT toggle switch should be in the INT position. The DELAY controls and the scope triggering controls are then adjusted to obtain a stable output. The scope may then be used to set the desired PRF by rotating the PRF and PRF FINE controls.
- 5) The output pulse amplitude is controlled by means of the front panel ten turn AMP control. Note that for a pulse output, the load impedance may be 50 ohms or higher. The pulse output will source at least four Amps.
- 6) The output DC offset is controlled by means of a front panel ten turn control. Note that for the DC offset, the average load resistance must exceed 10K. If operating into a 50 ohm load impedance, the overload function will be triggered.
- 7) An external clock may be used to control the output PRF of the AVR unit by setting the front panel Mode switch in the EXT A or Ext B position and applying a 50 ns (or wider) TTL level pulse to the TRIG BNC connector input. With the MODE switch in the Ext A position, the output pulse width will be controlled by

the front panel PW controls. If the switch is in the Ext B position, the output pulse width equals the input trigger pulse width.

- 8) For single pulse manual operation, set the front panel INT-EXT-MAN switch in the MAN position and push the SINGLE PULSE button.
- 9) **CAUTION:** The output stage is protected against overload condition by a 0.5 A slow blow fuse on the main frame back panel. However, the output switching elements may fail if the unit is triggered at a PRF exceeding 5 kHz or at duty cycles exceeding 0.5%. Heating and subsequent likely failure of the output stage is reduced if the following action is taken where possible:
 - a) PRF is kept to a minimum, i.e. operate in a low PRF range when possible rather than in a high PRF range.
 - b) Keep the output PW to a minimum.
- 10) **OVERLOAD INDICATOR.** AVR-G-C units with a serial number higher than 5600 are protected by an automatic overload protective circuit which controls the front panel overload light. If the unit is overloaded (by operating at an exceedingly high duty cycle or by operating into a short circuit), the protective circuit will turn the output of the instrument OFF and turn the indicator light ON. The light will stay ON (i.e. output OFF) for about 5 seconds after which the instrument will attempt to turn ON (i.e. light OFF) for about 1 second. If the overload condition persists, the instrument will turn OFF again (i.e. light ON) for another 5 seconds. If the overload condition has been removed, the instrument will turn on and resume normal operation. Overload conditions may be removed by:
 - 1) Reducing PRF (i.e. switch to a lower range)
 - 2) Reducing pulse width (i.e. switch to a lower range)
 - 3) Removing output load short circuit (if any)
- 11) The unit can be converted from 120 to 240V 50-60 Hz operation by adjusting the voltage selector card in the rear panel fused voltage selector cable connector assembly.
- 12) For further assistance:

Tel: 613-226-5772
Fax: 613-226-2802

FIG. 2: FRONT PANELS CONTROLS



FRONT PANEL CONTROLS

- (1) ON-OFF Switch. Applies basic prime power to all stages.
- (2) PRF Control. Varies PRF from 0.5 Hz to 5 kHz as follows:
- | | | | |
|---------|-----|-----------|-----|
| Range 1 | 0.5 | Hz to 5 | Hz |
| Range 2 | 5 | Hz to 50 | Hz |
| Range 3 | 50 | Hz to 500 | Hz |
| Range 4 | 500 | Hz to 5 | kHz |
- (3) DELAY Control. Controls the relative delay between the reference output pulse provided at the TRIG output (4) and the main output (5). This delay is variable over the range of 0.1 to about 10 us. Delay LEADS or LAGS depending on the position of the ADVANCE-DELAY switch.
- | | MIN | MAX |
|---------|--------|--------|
| Range 1 | 0.1 us | 1.0 us |
| Range 2 | 1.0 us | 10 us |
- (4) TRIG Output. This output is used to trigger the scope time base. The output is a TTL level 100 ns (approx.) pulse capable of driving a fifty Ohm load. This output precedes the output at (5) if the two-position ADVANCE-DELAY switch is in the ADVANCE position. This output follows the output at (5) if the switch is in the DELAY position. The delay range is variable from 0.1 us to 10 us. The external trigger signal is applied at this input when the EXT-INT toggle switch is in the EXT position.
- (5) OUT Connector. BNC connector provides output to a 50 ohm (or higher) load for the pulse output and to 10K (or higher) for the DC offset output.
- (6) PW Control. A ten turn control which varies the positive output pulse width from 0.1 us to 1.0 us (when the MODE switch is in the INT or EXT A position).
- (7) AMP Control. A ten turn control which varies the output pulse amplitude from 0 to 200 Volts to 50 ohms or higher .
- (8) EXT-INT-MAN Control. With this toggle switch in the INT position, the PRF of the AVR unit is controlled via an internal clock which in turn is controlled by the PRF control. With the toggle switch in the EXT position, the AVR unit requires a 50 ns (or wider) TTL level pulse applied at the TRIG input in order to trigger the output stages. In addition, in this mode, the scope time base must be triggered

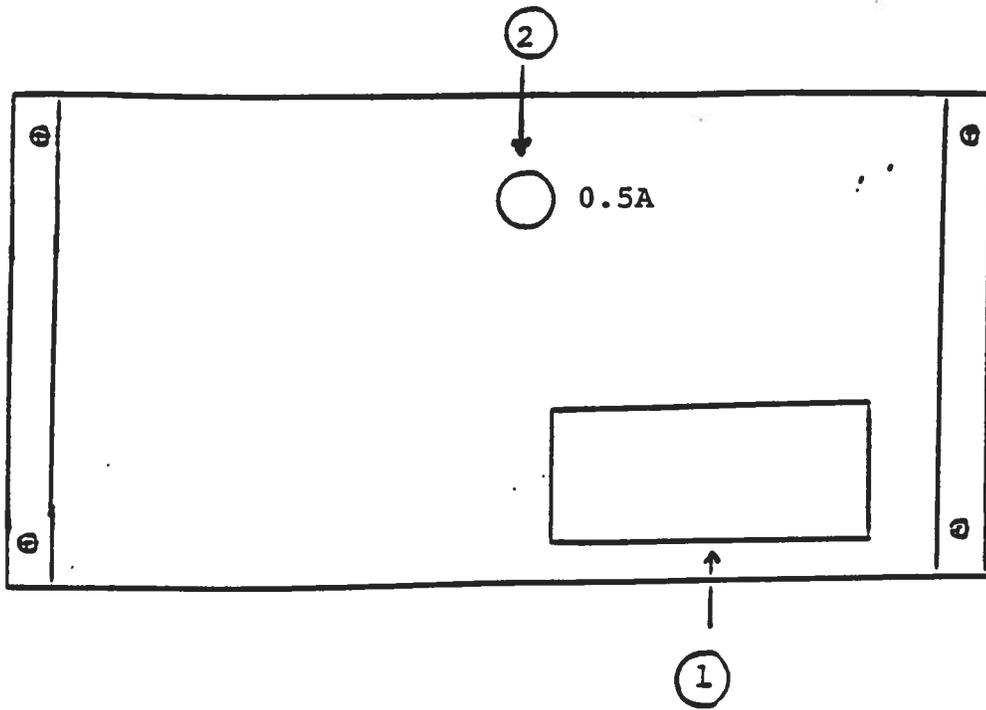
by the external trigger source. With the MODE switch in the Ext A position the output pulse width is controlled by the PW controls. With the MODE switch in the Ext B position, the output pulse width equals the input trigger pulse width. For single pulse operation, set the INT-EXT-MAN switch in the MAN position.

- (9) SINGLE PULSE. For single pulse manual operation, set the front panel Int-EXT-MAN switch in the MAN position and push the SINGLE PULSE button.
- (10) DC OFFSET. Ten turn control varies the DC Offset from 0 to -100 volts to 10K or higher.
- (11) OVERLOAD INDICATOR. AVR units with a serial number higher than 5600 are protected by an automatic overload protective circuit which controls the front panel overload light. If the unit is overloaded (by operating at an exceedingly high duty cycle or by operating into a short circuit), the protective circuit will turn the output of the instrument OFF and turn the indicator light ON. The light will stay ON (i.e. output OFF) for about 5 seconds after which the instrument will attempt to turn ON (i.e. light OFF) for about 1 second. If the overload condition persists, the instrument will turn OFF again (i.e. light ON) for another 5 seconds. If the overload condition has been removed, the instrument will turn on and resume normal operation. Overload conditions may be removed by:
 - 1) Reducing PRF (i.e. switch to a lower range)
 - 2) Reducing pulse width (i.e. switch to a lower range)
 - 3) Removing output load short circuit (if any) or remove 50 ohm load if DC offset employed or turn offset down to zero.

TOP COVER REMOVAL AND RACK MOUNTING

- 1) The interior of the instrument may be accessed by removing the four Phillips screws on the top panel. With the four screws removed, the top cover may be slid back (and off).
- 2) The -R rack mount kit may be installed after first removing the one Phillips screw on the side panel adjacent to the front handle.

Fig. 3: BACK PANEL CONTROLS



BACK PANEL CONTROLS

- (1) FUSED CONNECTOR, VOLTAGE SELECTOR. The detachable power cord is connected at this point. In addition, the removable cord is adjusted to select the desired input operating voltage. The unit also contains the main power fuse (0.5 A SB).
- (2) 0.5A SB. Fuse which protects the output stage if the output duty cycle rating is exceeded.

Fig. 4a POWER SUPPLY

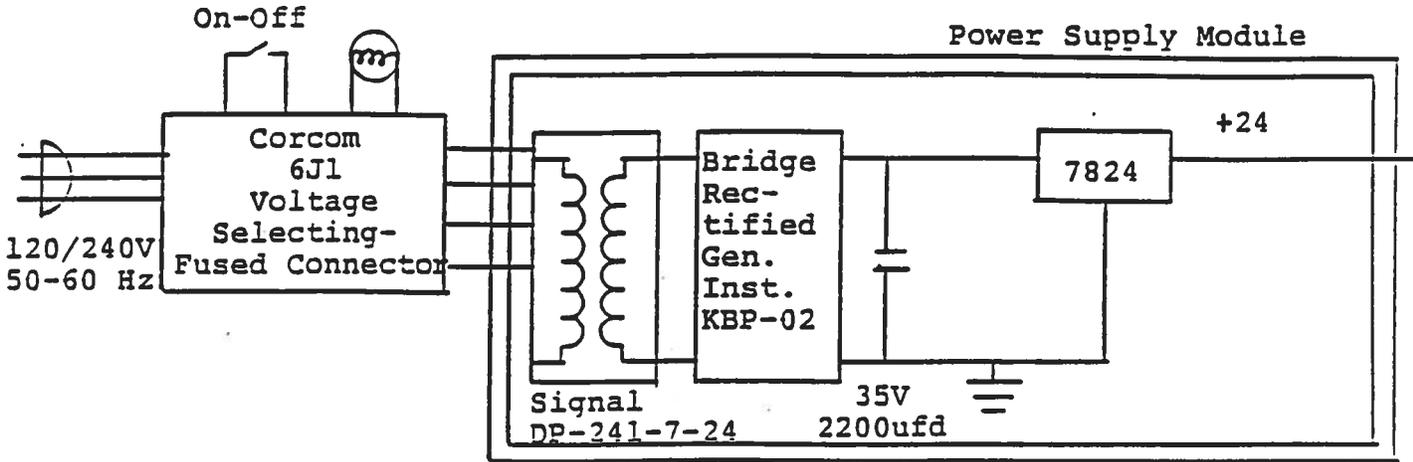


Fig. 4b

SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVR-G1-C consists of the following basic modules:

- 1) AVR-G1-PG pulse generator module
- 2) AVR-G1-CL clock module
- 3) +24V power supply board
- 4) AVR-G1-PS power supply module
- 5) AVR-G1-PW pulse width module
- 6) AVR-OL overload module

The modules are interconnected as shown in Fig. 4. The clock module controls the output PRF and the relative delay between the main output and the SYNC outputs. The PG pulse generator modules generate the output pulse. The PS module generates 0 to +250 Volts to power the pulse generator module. The PW module controls the output pulse width. In the event of an instrument malfunction, it is most likely that the rear panel 1.0A SB fuse or some of the output switching elements (SL22T) may have failed due to an output short circuit condition or to a high duty cycle condition. The switching elements may be accessed by removing the cover plate on the bottom side of the instrument. NOTE: First turn off the prime power. CAUTION: Briefly ground the SL22 tabs to discharge the 250 Volts power supply potential. The elements may be removed from their sockets by means of a needle nosed pliers. The SL22 is a selected VMOS power transistor in a TO 220 package and may be checked on a curve tracer. If defective, replacement units should be ordered directly from Avtech. When replacing the SL22 switching elements, take care to insure that the short lead (of the three leads) is adjacent to the back of the chassis. If the switching elements are not defective, then the four Phillips screws on the back panel should be removed. The top cover may then be slid off and operation of the clock and power supply modules should be checked. The clock module is functioning properly if:

- a) 0.1 us TTL level outputs are observed at pins 2 and 3.
- b) The PRF of the outputs can be varied over the range of 1 Hz to 1 kHz using the PRF controls.
- c) The relative delay between the pin 2 and 3 outputs can be varied by at least 0.1 us to 1.0 us by the DELAY controls.

Q1284



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To:	<u>Communications & Power Industries</u> <u>San Carlos, CA</u>	Receiver's Phone:	<u>650-594-4118</u>
Attn:	<u>Jim Ramos</u>	Date:	<u>April 9, 1999</u>
Subject:	<u>Price and Delivery Quotation</u>	Number of pages:	<u>4</u>

Following your recent phone request, I enclose a copy of the specifications and quotation for Model AVR-G1-C-P-OT-CPIB. As you may recall your company ordered this unit on February 25th (PO # 54UHMO18171) and then cancelled the order on March 18th, 1999. You also ordered a model AVR-G1-C-P-OT-CPIA on January 6th, 1999 (PO# 54UHF021540) and this item was shipped on March 18th. We now understand that you would like to have the AVR-G1-C-P-OT-CPIA modified to perform as a Model AVR-G1-C-P-OT-CPIB. We therefore quote as follows:

Quote Number:	9289
Function:	Convert Model AVR-G1-C-P-OT-CPIA (S.N.8772) to meet the specifications of Model AVR-G1-C-P-OT-CPIB.
Price:	\$1198.00 US FOB destination
Delivery:	3 weeks after receipt of order.

This quote will become valid only after payment in full is received for Model AVR-G1-C-P-OT-CPIA (Invoice No. 55283). Upon receipt of this payment and your purchase order Avtech will issue an R.A.N. and provide the necessary shipping instructions.

Regards,

Dr. Walter Chudobiak
Chief Engineer

WC:cb
cc: Jeana Murga > copies sent
ccc: Fariza Kahn

904



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Fax Ref. No:	<u>4163</u>	From:	Avtech Electrosystems Ltd.
To:	<u>Communications & Power Industries</u>	Our Fax No:	<u>(613) 226-2802</u>
	<u>San Carlos, CA</u>	Date:	<u>December 1, 1998</u>
Attn:	<u>Jim Ramos</u>	Receivers Fax No:	<u>650-594-4182</u>
Phone:	<u>650-594-4118</u>	No. of pages:	<u>3</u>
Subject:	<u>Quotation</u>	C.C.	<u></u>

Following our telephone conversation of December 1st, I am pleased to provide the following revised quotations:

Quote No:	9047A
Model designation:	AVR-G1-C-P-OT-CPIB
Typical output waveform:	See attached drawing
Pulse amplitude:	0 to +200 Volts (ten turn control). Will source upto 4 Amp for positive output voltages. Short circuit protection acts at 5 Amps.
DC offset: ($R_L \geq 10\text{ K}$)	0 to -100 Volts (ten turn control)
Pulse width:	100 ns to 1us (ten turn control).
Rise, fall time:	$\leq 20\text{ ns}$
PRF:	0 to 5 KHz
Other:	See standard Model AVR-G1-C, pages 48 & 49, Catalog No. 10

Price: \$4,903.00 US each, FOB destination
Delivery: 60 days

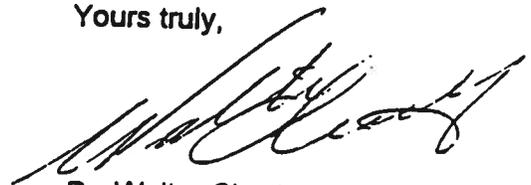
In addition, we offer the following quotation in case GPIB control is required.

Quote No: 9047B
Model designation: AVR-G1-B-P-OT-CPIB
GPIB control: Yes, see page 8, Catalog No. 10
Pulse amplitude: 0 to +200 Volts. Will source up to 4 Amps for positive output voltages. Short circuit protection acts at 5 Amps.
DC offset: 0 to -100 Volts
(RL \geq 10 K)
Pulse width: 100 ns to 1 us
Rise, fall time: \leq 20 ns
PRF: 0 to 5 KHz
Other: See standard Model AVR-G1-B, pages 48 & 49, Catalog No. 10
Price: \$7,401.00 US each, FOB destination
Delivery: 60 days

For both models, A field-replaceable MOSFET output stage is employed and 200 Volt Zener diodes are provided to protect against high voltage transients.

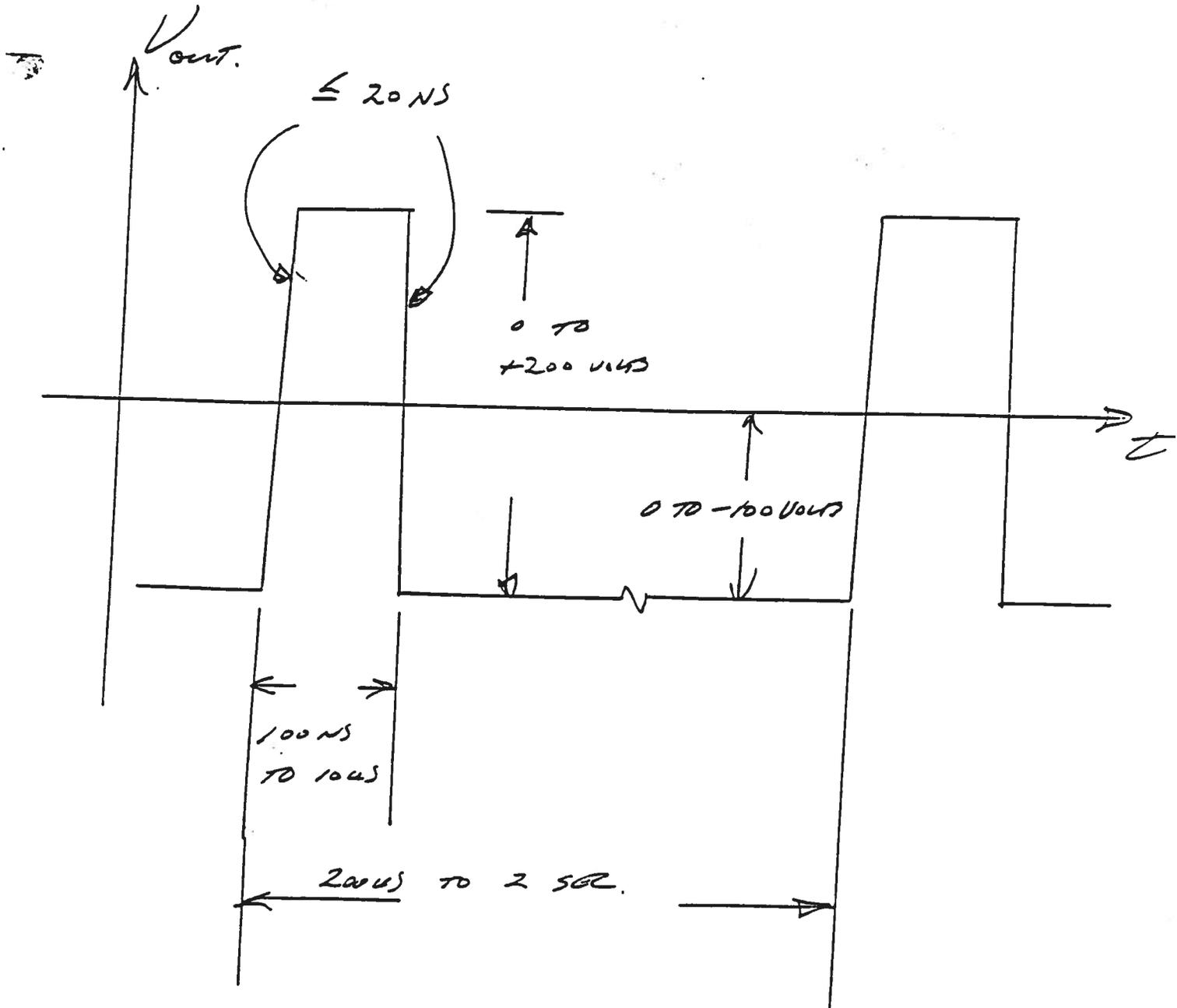
Thank you for your interest in our products. Please do not hesitate to call me (1-800-265-6681) if you require any additional information.

Yours truly,



Dr. Walter Chudobiak
Chief Engineer

WC:dg
Encl.



MODEL AVR-61-P-C-OT-CPIB
 &
 AVR-61-P-B-OT-CPIB
 OUTPUT WAVE FORM