



# AVTECH ELECTROSYSTEMS LTD.

NANOSECOND WAVEFORM ELECTRONICS  
SINCE 1975

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## INSTRUCTIONS

MODEL AVB2-TC-C-CCF2 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

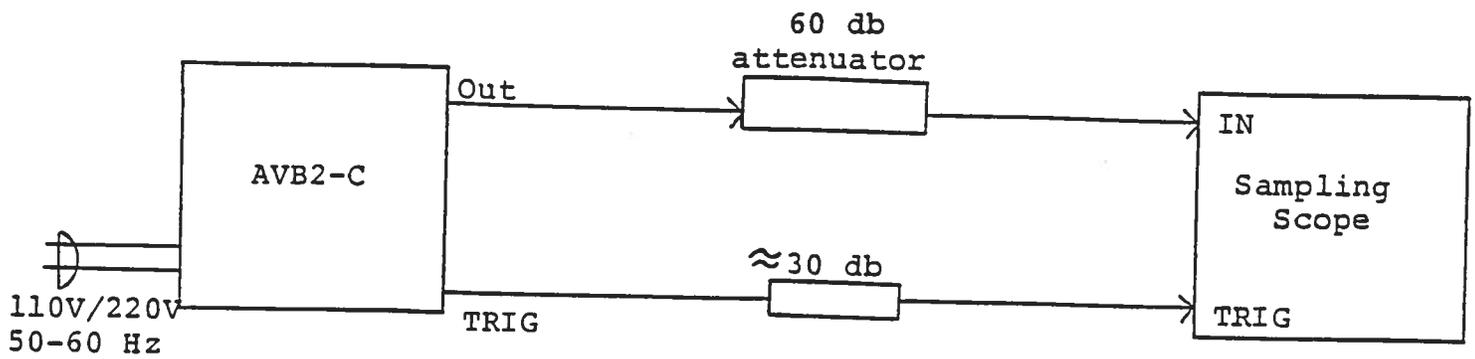
Fax: 613-226-2802 or 1-800-561-1970

E-mail: [info@avtechpulse.com](mailto:info@avtechpulse.com)

World Wide Web: <http://www.avtechpulse.com>

Fig. 1

PULSE GENERATOR TEST ARRANGEMENT



Notes:

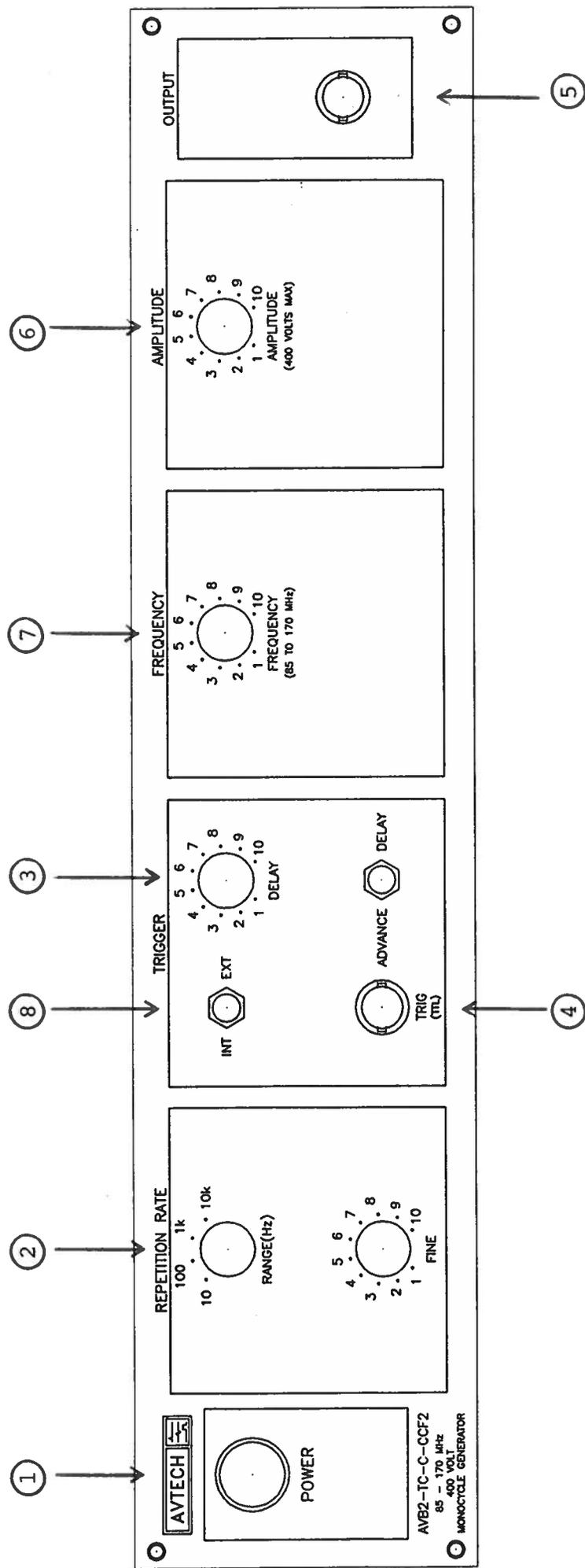
- 1) The bandwidth capability of components and instruments used to display the pulse generator output signal (attenuators, cables, connectors, etc.) should exceed one gigahertz.
- 2) The use of 60 db attenuator at the sampling scope vertical input channel will insure a peak input signal to the sampling scope of less than one volt.
- 3) The TRIG output channel provides TTL level signals. To avoid overdriving the TRIG input channel of some sampling scopes, a 30 db attenuator should be placed at the input to the sampling scope trigger channel.
- 4) To obtain a stable output display the PRF control on the front panel should be set mid-range while the PRF range switch may be in either range. The front panel TRIG toggle switch should be in the INT position. The front panel 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 control and by means of the PRF range switch.
- 5) The output frequency is controlled by the front panel one turn FREQUENCY control. Clockwise rotation of the control increases the frequency of the output monocycle (or decreases the pulse width of the output waveform).
- 6) The output pulse amplitude is controlled by means of the one turn potentiometer (AMP). The output amplitude may be varied from about 150 to 400 Volts peak to peak. For lower output amplitudes (and for lower spurious at reduced amplitudes) it is recommended that external attenuators be used.
- 7) MONITOR Output. The front panel monitor output provides an attenuated replica (20 db down) of the output. The monitor output is designed to operate into a 50 ohm load. (option).

8) 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.

9) For additional information:

Tel: (613) 226-5772

Fax: (613) 226-2802



FRONT PANEL CONTROLS

Fig. 2

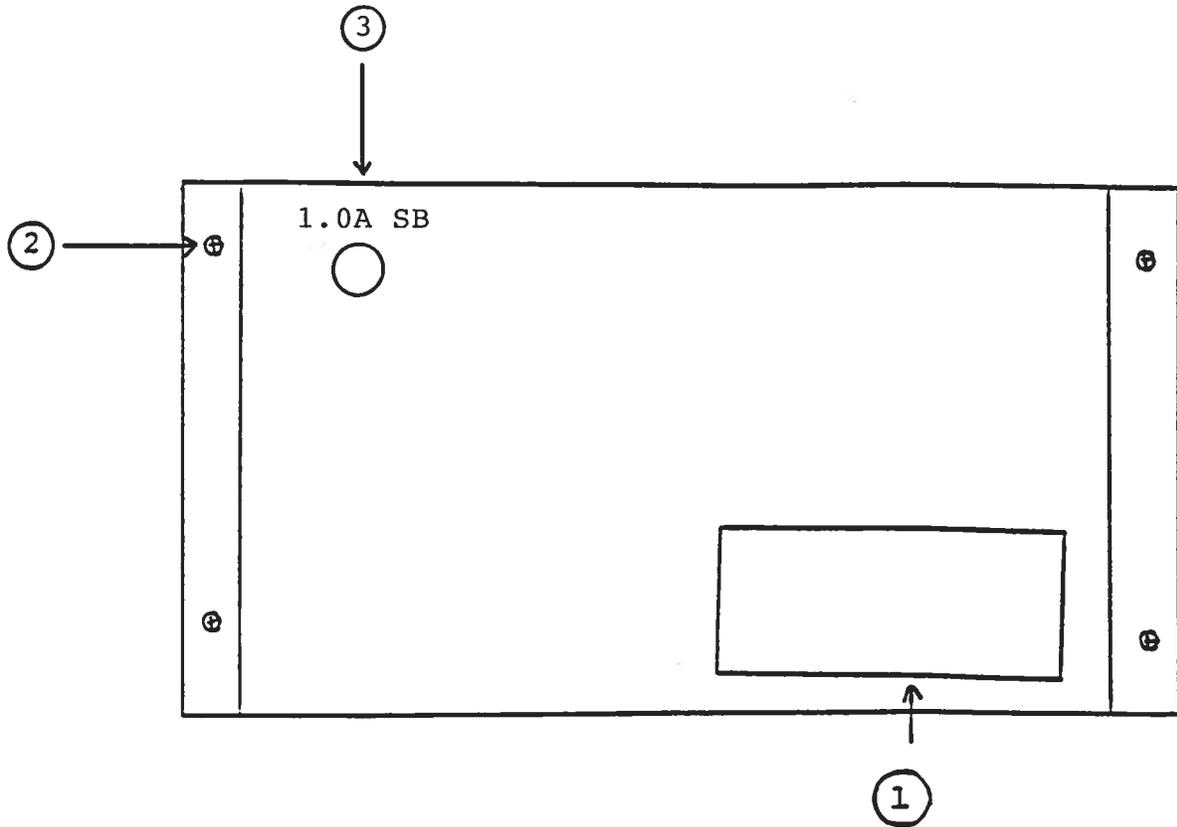
- (1) ON-OFF Switch. Applies basic prime power to all stages.
- (2) PRF Control. The PRF RANGE and PRF controls determine output PRF as follows:

	PRF MIN	PRF MAX
Range 1	1 Hz	10 Hz
Range 2	10 Hz	100 kHz
Range 3	100 Hz	1 kHz
Range 4	1 kHz	10 kHz

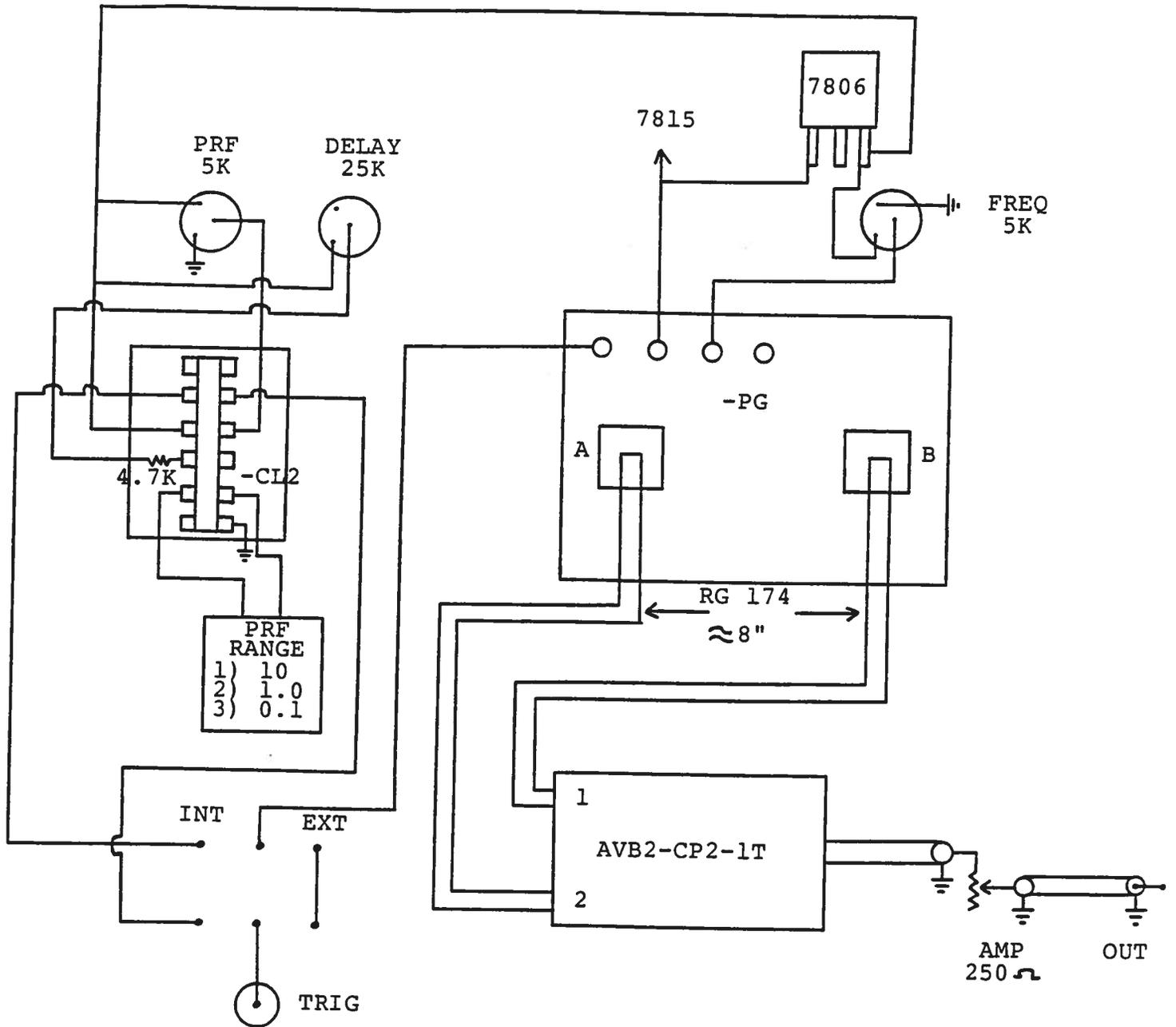
- (3) DELAY Control. Controls the relative delay between the reference output pulse provided at the TRIG output (4) the main output (5). This delay is variable over the range of 0 to about 500 ns. Delay LEADS and LAGS depending on the position of the ADVANCE-DELAY switch.
- (4) TRIG Output. This output 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 external trigger signal is applied at this input when the EXT-INT toggle switch is in the EXT position.
- (5) OUT. BNC connector applies output to 50 ohm load.
- (6) AMP Control. The output pulse amplitude is controlled by means of the one turn potentiometer (AMP) over the range of about 150 volts to 400 volts.
- (7) FREQUENCY: One turn control varies the frequency from 85 to 170 MHz.
- (8) EXT-INT Control. With this toggle switch in the INT position, the PRF of the AVB2 unit is controlled via an internal clock which in turn is controlled by the PRF controls. With the toggle switch in the EXT position, the AVB2 unit requires a 500 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.

Fig. 3

BACK PANEL CONTROLS

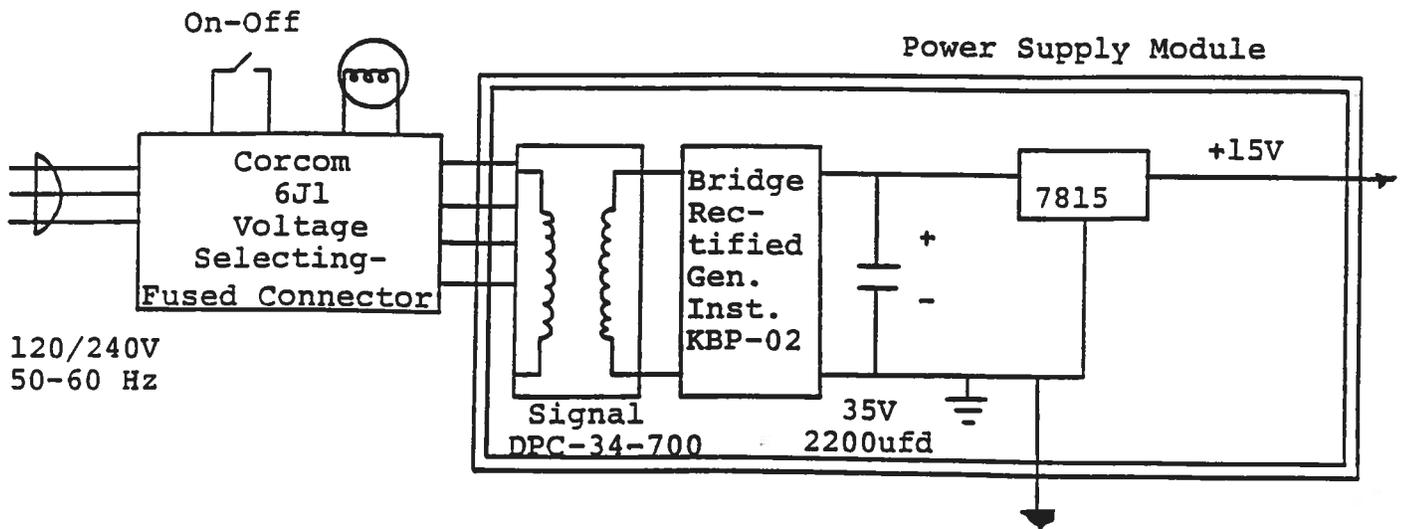


- (1) FUSED CONNECTOR, VOLTAGE SELECTOR. The detachable power cord is connected at this point. In addition, the removable cord is adjusted to select the desired input operating voltage. The unit also contains the main power fuse (0.50 A SB).
- (2) TOP COVER REMOVAL. Remove the 4 Phillips screws on the back cover. The top cover may then be slid back (and off).
- (3) 1.0A SB. Slow blow fuse to protect the output stage.



AVB2-TC-C BLOCK DIAGRAM

POWER SUPPLY



## SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVB2-C consists of a pulse generator module (AVB2-PG), a power combiner module (AVB2-CPL-1T) and a clock module and a power supply board which supplies +15 volts (600 mA max) to the pulse generator module. In the event that the unit malfunctions, remove the instrument cover by removing the four Phillips screws on the back panel of the unit. The top cover may then be slid off. Measure the voltage at the +15 V pin of the PG module. If this voltage is substantially less than +15 volts, unsolder the line connecting the power supply and PG modules and connect 100 ohm 10 W load to the PS output. The voltage across this load should be about +15V DC. If this voltage is substantially less than 15 volts the PS module is defective and should be repaired or replaced. If the voltage across the resistor is near 15 volts, then the PG module should be replaced or repaired. The sealed PG module must be returned to Avtech for repair (or replacement). The clock module provides a 0.1 usec TTL level trigger pulse at Pin 2 to trigger the PG module and a 0.1 usec TTL level sync pulse at Pin 3 to trigger the sampling scope display device. The output at Pin 3 precedes the output at Pin 2 by almost 0 to 100 nsec depending on the DELAY control setting. The clock module is powered by +5.8 V supplied by the 7806. With the INT-EXT switch in the EXT position, the clock module is disconnected from the PG module. 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 10 Hz to 10 kHz using the PRF and PRF RANGE controls.
- c) The relative delay between the Pin 2 and 3 outputs can be varied by at least 500 ns by the DELAY control.

The sealed clock module must be returned to Avtech for repair or replacement if the above conditions are not observed.



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September 18, 1997.

Geoff Lockwood, MS WB3  
Cleveland Clinic Foundation  
Dept. of Biomedical Engineering  
9500 Euclid Avenue  
Cleveland, OH 44195  
T: 216-445-9323  
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Dear Geoff:

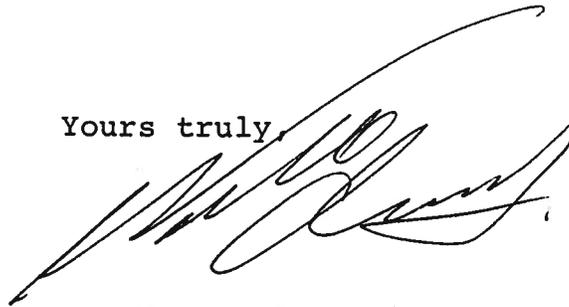
Following our telephone conversation of September 18th, I am pleased to provide a price and delivery quotation for a special purpose monocyte generator meeting the following specifications:

Model designation: AVB2-TC-C-CCF2.  
Frequency: 85 to 170 MHz (one turn control).  
Amplitude: 0 to 400 Volts peak to peak.  
PRF: Int clock: 10 Hz to 10 kHz.  
Ext trigger: 0 to 10 kHz.  
Chassis size: 4" x 16" x 12".  
Output connector: SMA.  
Other: See standard AVB2-TC-C, page 92, Cat. No. 9.  
Price: \$4,679.00 US each, FOB destination.  
Note that this price includes our standard 5% academic discount.  
Delivery: 60 days ARO.

.../2

Thank you for your continuing interest in our products.  
Please call me again (1-800-265-6681) if you require any  
additional information.

Yours truly,

A handwritten signature in black ink, appearing to read 'Walter Chudobiak', written in a cursive style.

Dr. Walter Chudobiak  
Chief Engineer

WC:mhd

March 12/98

File: c:\w\INSTR\AVA+B\TCCCCF2.INS