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SINCE 1975

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INSTRUCTIONS

MODEL AV-1015-C-N-UUB

-50 V, 10 MHz, 5 to 10 ns
PULSE GENERATOR

SERIAL NUMBER: _____

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

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

EC DECLARATION OF CONFORMITY

We

Avtech Electrosystems Ltd.
P.O. Box 5120, Stn. F
Ottawa, Ontario
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declare that the AV-1015-C pulse generator meets the intent of Directive 89/336/EEC for Electromagnetic Compatibility. Compliance pertains to the following specifications as listed in the official Journal of the European Communities:

EN 50081-1 Emission

EN 50082-1 Immunity



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SPECIFICATIONS

1

To: Hans Gerritsen
Subject: RE: Questions

March 25, 1999

TO: Dr. Hans Gerritsen
Utrecht University, Debye Institute
Molecular Biophysics
Princetonpl. 5,3584 CC Utrecht Netherlands

Fr: Avtech Electrosystems Ltd.

Dear Dr. Gerritsen:

Following your reply of March 25th, we requote as follows:

Quote no: 9251
Model designation: AV-1015-C-UUB-N
Pulse Amplitude: 0 to -50 Volts (to 50 Ohms). Note, unit is not bipolar as this would impose some insoluble packaging and cooling problems.
Offset: 0 to + or - 5 Volts via a one turn control (to yield a +5 to -45 Volt output waveform).
DC Pulse width: 5 ns to 10 ns. PW measured at 10% rise time so PW at FWHM will be less.
Rise, fall time: 0 to 10 Mhz
Max duty cycle: 10%
Other: See standard AV-1015-C page 13 Cat. 10 or www.avtechpulse.com/general.
Price: \$5998.00 US ExWorks
Delivery: 60 days after receipt of order.

Regards,

Dr. Walter Chudobiak
Chief Engineer

WC:cb

> -----Original Message-----

> From: Hans Gerritsen [mailto:H.C.Gerritsen@phys.uu.nl]

> Sent: March 25, 1999 11:31 AM

> To: info@avtechpulse.com

> Subject: RE: Questions

>

>

> Dear Dr. Chudobiak,

> We seem to get closer. There are some details left.

> 1) We will need a negative polarity. From the catalog I understand
> that it is switchable, so I presume this is also the case for the
> custom model that you are offering.

> 2) A small offset may be advantageous for our application. Can it
> be modified to produce +5 to -45 V pulses?

> Regards,

> Hans

>

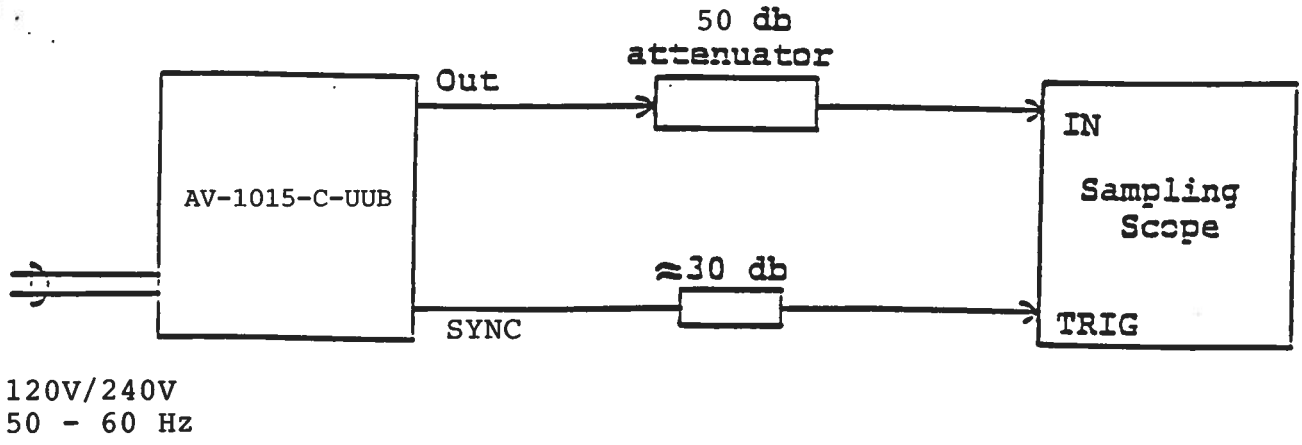
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> >

> > Dear Dr. Gerritsen:

FIG. 1: PULSE GENERATOR TEST ARRANGEMENT

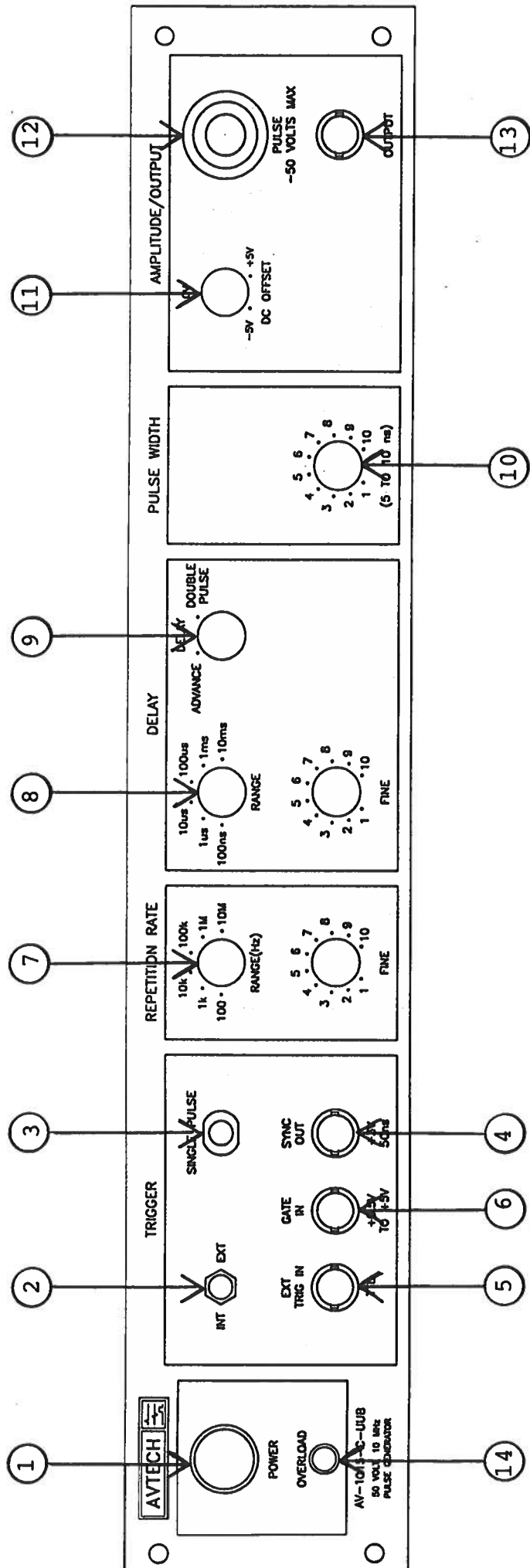


GENERAL OPERATING INSTRUCTIONS

- 1) The bandwidth capability of components and instruments used to display the pulse generator output signal (attenuators, cables, connectors, etc.) should exceed two gigahertz.
- 2) The use of 50 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. See page 10 for detailed instructions for operation at 10 MHz.
- 5) The output pulse width is controlled by means of the front panel one turn PW control. The control should initially be set maximum clockwise and the pulse width adjusted using an oscilloscope.
- 6) The output pulse amplitude is controlled by means of the front panel ten turn AMP control. The pulse width may change by several nanoseconds as the output amplitude is reduced from maximum to minimum. Therefore it is convenient to first set the desired amplitude and then set the desired pulse width. Rotation of the PW pot causes the position of the falling edge of the pulse to change.
- 7) Some properties of the output pulse may change as a function of the amplitude pot setting. For some demanding applications, it may be desirable to use a combination of external attenuators and the amplitude pot to achieve the desired output amplitude.
- 8) An external clock may be used to control the output PRF of the AV-1015-C unit by setting the front panel TRIG toggle switch in the EXT position and applying a 50 ns (or wider) TTL level pulse to the TRIG BNC connector input.
- 9) To voltage control the output amplitude, set the rear panel switch in the EXT position and apply 0 to +10V to connector B ($R_{IN} \geq 10K$). (EA option).

- 10) The monitor output (-M) provides a 20 db attenuated coincident replica of the main output. (Option).
- 11) For units with the OT offset option, the output DC offset level is varied from -5 to +5V (to 50 Ohm) by the front panel OFFSET one turn control. The DC offset may be turned off using the rear panel OS ON-OFF toggle switch.
- 12) 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.
- 13) For additional assistance:
Tel: (613) 226-5772
Fax: (613) 226-2802

FIG. 2: FRONT PANEL CONTROLS



FRONT PANEL CONTROLS

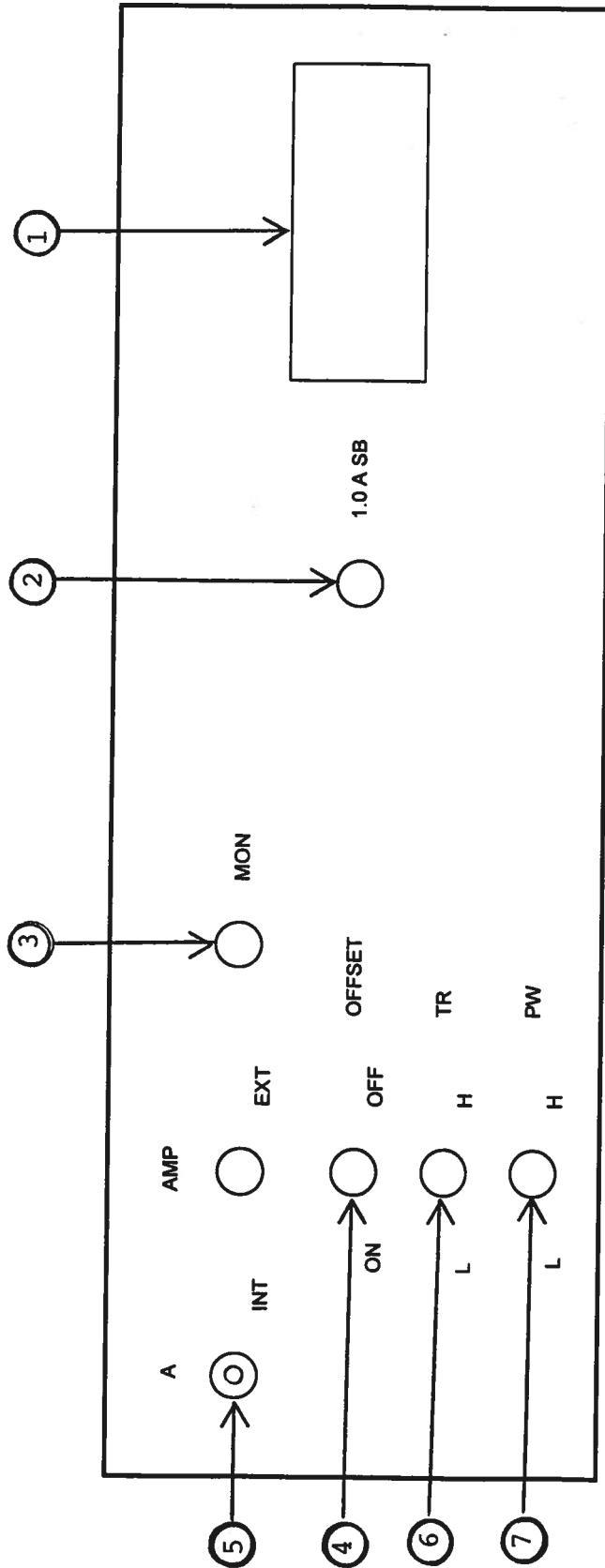
- 1) POWER Switch. The POWER push button switch applies AC prime power to the primaries of the transformer, turning the instrument on. The push button lamp (#382 type) is connected to the +15V DC supply.
- 2) INT/EXT Switch. In the "INT" position the instrument is internally triggered and the "SYNC OUT" connector provides a SYNC output which allows one to trigger other instruments, such as oscilloscopes. In the "EXT" position the instrument is triggered by a +5V 50 ns (or wider) input pulse on the "TRIG IN" connector, or by pressing the "SINGLE PULSE" push button.
- 3) SINGLE PULSE Push Button. The "SINGLE PULSE" push button will trigger the instrument manually for one cycle of output, when the "INT/EXT" switch is in the "EXT" position. Otherwise, the push button has no effect.
- 4) SYNC OUT. When the "INT/EXT" switch is in the "INT" position, this connector supplies a SYNC output that can be used to trigger other equipment, particularly oscilloscopes. This signal leads, or lags, the main output by a duration set by the "DELAY" controls and has an approximate amplitude of +3 Volts to $R_L > 1K$ with a pulse width of about 50 ns.
- 5) TRIG IN. When the "INT/EXT" switch is in the "EXT" position, the external trigger (+5 Volts, PW 50 ns) is applied to this connector. This input presents a high impedance (1 M Ohm).
- 6) GATE Input. The GATE input will suppress the triggering of the instrument if taken to a TTL HIGH level (i.e. 0.5 to 5.0V). If it is left open or taken to a TTL LOW, normal triggering will occur ($R_{IN} = 1K$).
- 7) REPETITION RATE Controls. The rotary switch marked "RANGE" selects the pulse repetition rate for the internally triggered mode. The vernier (labeled "MIN-MAX") provides continuously variable control of each range. There are six ranges and the instrument is set to the rate indicated on the front panel when the vernier is in the "MAX" position.
 - 10 Hz - 100 Hz
 - 100 Hz - 1 kHz
 - 1 kHz - 10 kHz
 - 10 kHz - 100 kHz
 - 100 kHz - 1.0 MHz
 - 1.0 MHz - 10 MHz
- 8) DELAY Controls. The rotary switch selects one of six ranges and the vernier provides continuously variable control of each range. The instrument is set to the delay indicated on the front panel when the vernier is in the "MAX" position.

20 ns - 100 ns
 100 ns - 1 us
 1 us - 10 us
 10 us - 100 us
 100 us - 1 ms
 1 ms - 10 ms

- 9) ADVANCE, DELAY, DOUBLE PULSE. With this three position switch in the ADVANCE position, the leading edge of the output pulse precedes the leading edge of the SYNC output. When in the DELAY position, the leading edge of the SYNC output precedes the leading edge of the main output. When in the DOUBLE PULSE position, the main output provides two successive output pulses having a separation determined by the DELAY (8) controls.
- 10) PULSE WIDTH Controls. One turn control varies the output pulse width from 5 to 10 ns.
- 11) DC OFFSET. For units with the OT offset option, the output DC offset level is varied from -5 to +5V (to 50 Ohm) by the front panel OFFSET one turn control. The DC offset may be turned off using the rear panel OS ON-OFF toggle switch.
- 12) AMPLITUDE. The ten turn amplitude vernier provides continuously variable control of the peak amplitude of the main output from 0 Volts -50 Volts (to 50 Ohms).
- 13) OUT. BNC connector provides output to load impedance of 50 Ohms.
- 14) OVERLOAD. An automatic overload protective circuit controls the front panel overload light. If the unit is overloaded (by operating at an exceedingly high duty cycle or by operating into a very low impedance), 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:
 - a) Reducing PRF (i.e. switch to a lower range)
 - b) Reducing pulse width (i.e. switch to a lower range)
 - c) Removing output low load impedance (if any)
 - d) Reducing the output amplitude (i.e. switch to a lower range)

The overload light may illuminate when the prime power is first applied. The light will extinguish after a few seconds and the unit will then operate normally. Note that the output stage will safely withstand a short circuited load condition.

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 (1.0 Amp).
- 2) 1.0 A FUSE. This fuse protects the output stage if the output duty cycle rating is exceeded.
- 3) MONITOR OUT M. Provides an attenuated (x10) coincident replica of the main positive output pulse to fifty Ohms (option).
- 4) Two position switch which turns output DC offset ON or OFF. (OT option).
- 5) AMP. To voltage control the output amplitude, set the switch in the EXT position and apply 0 to +10 Volts between terminal A and ground ($R_{IN} > 10K$). The front panel control is still active in this mode.
- 6) TR. Setting this two position switch in the "H" position serves to increase the output amplitude but decreases the output pulse width for low PRF operation (≈ 1 MHz). This switch is normally in the "H" position. Position at 10 MHz not critical.
- 7) PW. In the "H" position this switch causes the maximum pulse width to increase. At 10 MHz 5ns, the switch should be in the "L" position but for 10 ns it must be in the "H" position.

TOP COVER REMOVAL

The top cover may be removed by removing the 4 Phillips screws on the top of the instrument. The top cover may then be slid back and off.

10 MHz TEST PROCEDURE

- 1) Connect "OUT" connector (13) to 50 Ohm load (such as a 50 db attenuator connected to a scope input).
- 2) Connect the "SYNC OUT" ④ to the scope time base and set the "INT-EXT" switch ② on the "INT" position.
- 3) Set the "PRF Range Switch" ⑦ on the 10 MHz position and set the "Fine Control" fully clockwise.
- 4) Set the "Delay Range Switch" ⑧ in the 100 ns position and the "Delay Fine Control" near the CCW position. Set the 3 position "Delay Selector" switch ⑨ in the "Delay" position.
- 5) Set the "Pulse Width" control ⑩ mid range.
- 6) Set the "Rear Panel" switches as follows:

⑤	AMP:	INT
④	OFFSET:	Either position
⑥	TR:	H
⑦	PW:	L
- 7) Apply prime power and confirm that the scope is being triggered. Set the scope time base on 50 ns/DIV.
- 8) Rotate the ten turn amplitude to mid range and confirm that a CRT display is obtained. It will probably be necessary to adjust the "Delay Fine" control (and the scope triggering controls) to obtain a sample jitter free display. Expand the time base to 5 ns/DIV and further adjust the delay control. Note that at 10 MHz the delay control setting is critically important in obtaining a jitter free display.
- 9) Adjust the "Amplitude" and "Pulse Width" controls as required. To obtain a 10 ns pulse width change the "TR" switch to the "L" position and the "PW" switch to the "H" position.