AVTECH

AVTECH ELECTROSYSTEMS LTD.

NANOSECOND WAVEFORM ELECTRONICS
SINCE 1975

☐ P.O. BOX 265
OGDENSBURG, NY
U.S.A. 13669-0265
TEL: (315) 472-5270
FAX: (613) 226-2802

TEL: 1-800-265-6681
FAX: 1-800-561-1970

e-mail: info@avtechpulse.com
http://www.avtechpulse.com

☐ P.O. BOX 5120 STN. F
OTTAWA, ONTARIO
CANADA K2C 3H4
TEL: (613) 226-5772
FAX: (613) 226-2802

INSTRUCTIONS

MODEL AVX-FD1-PS-EP-IP-BNLB

0 to 10 MHz FREQUENCY DIVIDER
WITH AN ADJUSTABLE
DIVISION FACTOR OF 0 TO 999
AND RESET INPUT

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 dissembled, 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
World Wide Web: http://www.avtechpulse.com

TABLE OF CONTENTS

Manual Reference: Q:\office\instructword\Avx-fd\AVX-FD1-PS-EP-IP-BNLB.doc, created August 10, 2000

INTRODUCTION

The Model AVX-FD1-PS-EP-IP-BNLB digital frequency divider will divide the pulse repetition frequency of an input pulse train by an adjustable factor (N), which is variable from 0 to 999. The instrument will operate at input frequencies of up to 10 MHz.
The AVX-FD1-PS-EP-IP-BNLB is designed to work with TTL logic-level signals. The input impedance may be set at either 50 Ω or 1 kΩ by means of a two-position switch. The output pulse width for Model AVX-FD1-PS-EP-IP-BNLB is controlled by a 3-position range switch and a one-turn fine control, and is variable from 50 ns to 50 μs.

The -IP option allows the instrument to also accept pulse or sine wave inputs with amplitudes from 0.1 to 5.0 Volts peak to peak as a trigger signal.

The -EP option provides complementary output pulses.

The -BNLB option adds a TTL "RESET" input and an OPERATE/RESET switch to the instrument. A logic-high level on the TTL input resets the internal counters to a default state. This input is useful for synchronization purposes. The OPERATE/RESET switch performs a similar function when it is set to the RESET position.

SPECIFICATIONS

Model:	AVX-FD1-PS-EP-IP-BNLB
Input frequency:	0 - 10 MHz
Division factor (N):	2 to 999
Input level:	TTL (0 and 3-5V), or a pulse or sinewave signal with 0.1 to 5 V peak-to-peak amplitude
Input termination:	50 Ω or 1 kΩ to ground, switchable
Input pulse width:	≥ 10 ns
Output level:	TTL (0 and 3-5V)
Outputs:	Main Output: $f_{OUT} = f_{IN}/N$
Output pulse width:	50 ns to 50 μs
Jitter:	≤ 100 ps
Connectors:	BNC
Prime power:	120/240 Volts, 50 - 60 Hz
Dimensions (H x W x D):	102 mm x 203 mm x 305 mm (4" x 8" x 12")
Temperature range:	+ 10° to + 40° C

INSTALLATION

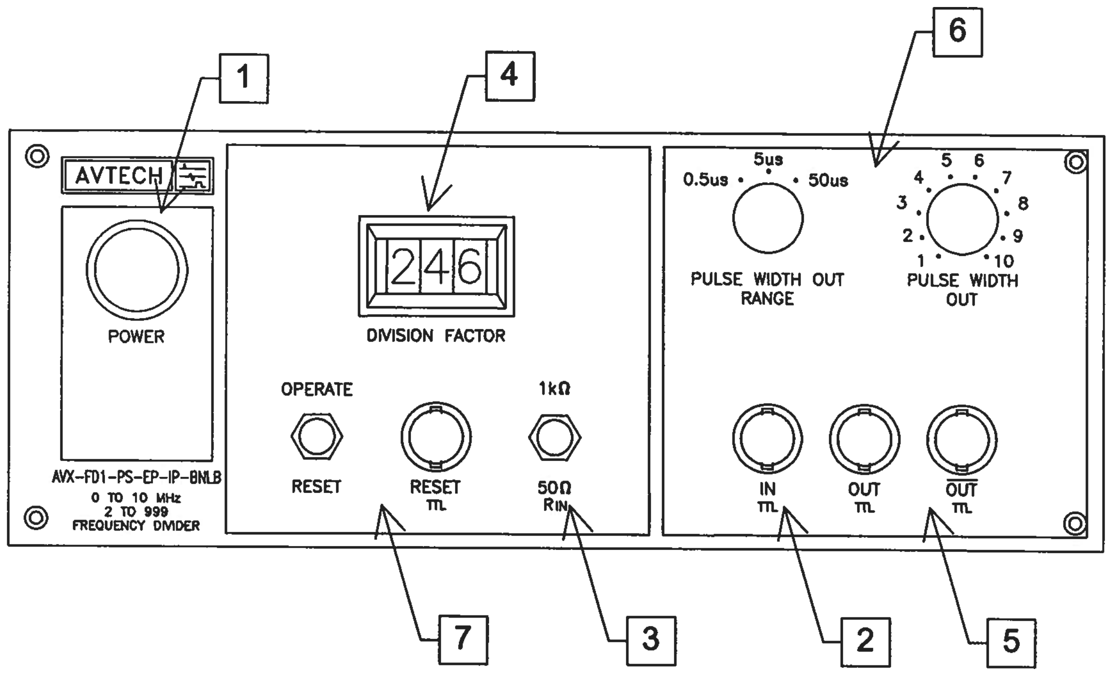
VISUAL CHECK

After unpacking the instrument, examine to ensure that it has not been damaged in shipment. Visually inspect all connectors, knobs, and handles. Confirm that a power cord is with the instrument. If the instrument has been damaged, file a claim immediately with the company that transported the instrument.

PLUGGING IN THE INSTRUMENT

Examine the rear of the instrument. There will be a male power receptacle, a fuse holder and the edge of the power selector card visible. Confirm that the power selector is in the correct orientation - it should be marked either 120 or 240, indicating whether it expects 120V AC or 240V AC. If it is not set for the proper voltage, remove the fuse and then grasp the card with a pair of pliers and remove it. Rotate horizontally through 180 degrees. Reinstall the card and the correct fuse. In the 120V setting, a 1/2A slow blow fuse is required. In the 240V setting, a 1/4A slow blow fuse is required.

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. IN CONNECTOR. The input signal is applied to this BNC connector. Standard models expect TTL-level inputs (i.e. logic low = 0V, logic high = 3 to 5V).

   Models with the "-IP" option will accept logic-level inputs, but will also trigger from a pulse or sine wave input from 0.1 to 5.0 Volts peak to peak, when the input impedance switch is set to 50Ω.

3. R_{IN} (INPUT IMPEDANCE) SWITCH. This switch determines the input impedance of the IN connector (either 50Ω or 1kΩ). If the trigger source attached to the IN connector will drive a 50Ω load, the 50Ω setting should be used, as well as 50Ω coaxial cabling. This will minimize ringing and other waveform distortions on the input. The 1kΩ setting is useful when triggering the instrument from an unbuffered TTL IC output.

4. DIVISION FACTOR THUMBWHEEL SWITCH. This switch determines the division factor, N. The input and output pulse repetition frequencies (f_{in} and f_{out}) are related by: $f_{out} = f_{in} / N$.

5. OUT CONNECTORS. The output signal is provided on this connector. Standard models generate TTL-level outputs (i.e. logic low = 0V, logic high = 3 to 5V), which will drive loads as low as 50Ω.

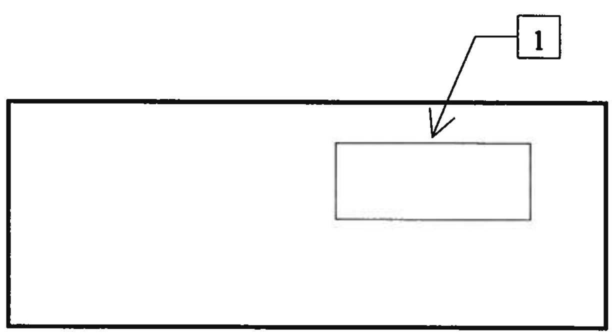
   The $\overline{OUT}$ connector provides the logical complement of the main output.

6. PULSE WIDTH RANGE and FINE CONTROLS. This range switch and fine control are used to set the output pulse width.

7. RESET CONNECTOR. A TTL-level pulse on the RESET connector will reset the internal counters to a default state. This can be used for synchronisation purposes. The connector may be left unconnected without interfering with normal operation.

   The OPERATE/RESET switch can be used to achieve this function manually. That is, setting this switch to the "RESET" position will reset the internal counters to a default state.

REAR PANEL CONTROLS



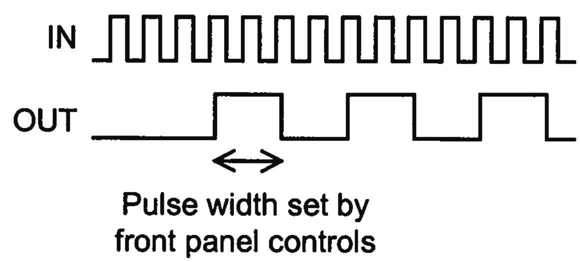
1. AC POWER INPUT. A three-pronged recessed male connector is provided on the back panel for AC power connection to the instrument. Also contained in this assembly is a 1/2A slow blow fuse and a removable card that can be removed and repositioned to switch between 120V AC in and 240V AC in.

GENERAL INFORMATION

BASIC TIMING CONTROL

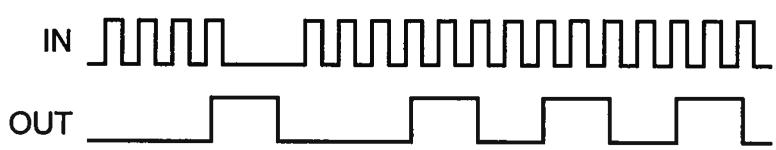
This instrument operates by counting the number of input pulses, and generating an output pulse for every N input pulses. N is set by the thumbwheel switches on the front panel.

This function is illustrated below, assuming that N=4.



Basic Operation

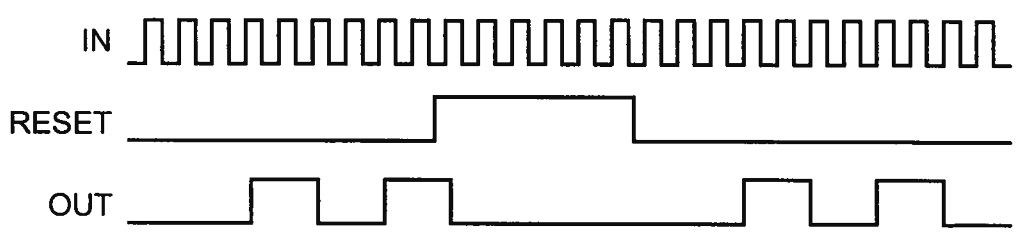
Note that if the input signal is non-periodic, the output signal will also be non-periodic:



Basic Operation for Non-Periodic Inputs

-BNLB OPTION

The "-BNLB" option adds a reset input and switch to the front panel, which can be used for synchronization, as shown below:



In this example, N=4. When the reset input is TTL high, the internal counter are reset to zero and are held at zero until the reset input switches to TTL low. An output pulse is generated on the fourth input pulse after the reset line returns to TTL low.

"-IP" OPTION

Models with the "-IP" option will accept logic-level signal on the main input, but will also trigger from a pulse or sine wave input with amplitudes from 0.1 to 5.0 Volts peak to peak, when the input impedance switch is set to 50 Ω. This feature is inoperative if the input impedance switch is set to 1 kΩ.

DIVISOR VALUES

The frequency divisor may be set at any value between 0 and 999, inclusive, for normal operation. The divisor may also be set to zero, in which case a constant logic-low output is generated.

TOP COVER REMOVAL

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).

ELECTROMAGNETIC INTERFERENCE

To prevent electromagnetic interference with other equipment, all used outputs should be connected to shielded 50Ω loads using shielded 50Ω coaxial cables. Unused outputs should be terminated with shielded 50Ω BNC terminators or with shielded BNC dust caps, to prevent unintentional electromagnetic radiation. All cords and cables should be less than 3m in length.

PERFORMANCE CHECK SHEET