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SINCE 1975

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INSTRUCTIONS

MODEL AVX-FD2-PS-IP-BNLA

**0 to 100 MHz FREQUENCY DIVIDER
WITH AN ADJUSTABLE
DIVISION FACTOR OF 2 TO 255
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 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

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INTRODUCTION

The Model AVX-FD2-PS-IP-BNLA digital frequency divider will divide the pulse repetition frequency of an input pulse train by an adjustable factor (N), which is variable from 2 to 255. The instrument will operate at input frequencies of up to 100 MHz. The AVX-FD2-PS-IP-BNLA is designed to work with TTL logic-level signals. The input impedance may be set at either 50 Ω or 1 k Ω by means of a two-position switch. The output pulse width for Model AVX-FD2-PS-IP-BNLA is controlled by a 3-position range switch and a one-turn fine control, and is variable from 5 ns to 5.0 μ s.

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 -BNLA option adds a "RESET" input to the instrument. A logic-high level on this TTL input resets the internal counters to a default state. This input is useful for synchronization purposes.

SPECIFICATIONS

Model:	AVX-FD2-PS-IP-BNLA
Input frequency:	0 - 100 MHz
Division factor (N):	2 to 255
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 k Ω 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:	5 ns to 5.0 μ s
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

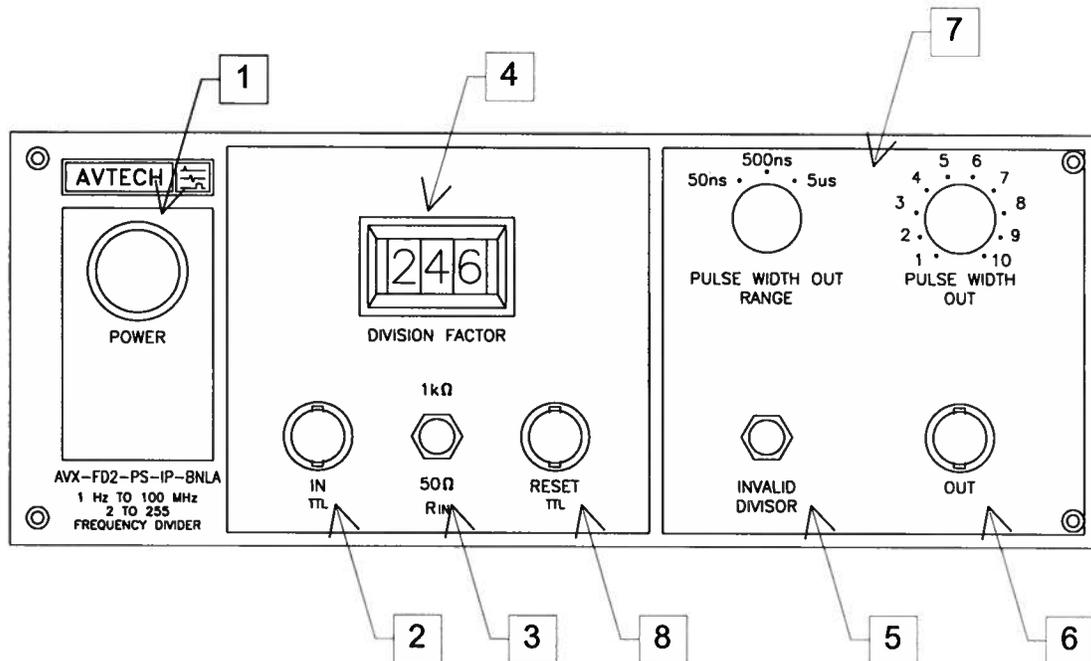
VISUAL CHECK

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



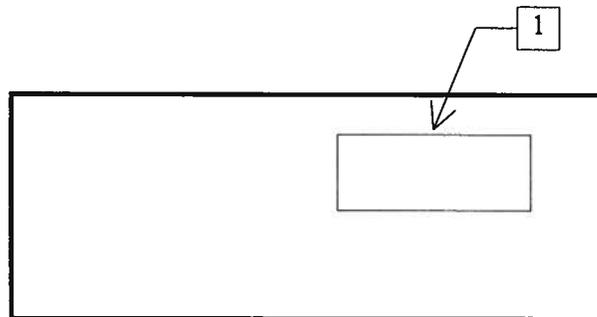
1. **POWER Switch.** The POWER push button switch applies AC prime power to the primaries of the transformer, turning the instrument on. The push button lamp (#382 type) is connected to the +15V DC supply.
2. **IN CONNECTOR.** The input signal is applied to this BNC connector. Standard models expect 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. INVALID DIVISOR INDICATOR. This indicator will light if N is set outside the allowed range.
6. OUT CONNECTOR. 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 .
7. PULSE WIDTH RANGE and FINE CONTROLS. This range switch and fine control are used to set the output pulse width.
8. RESET CONNECTOR. A TTL-level pulse on this input will reset the internal counters to a default state. This can be used for synchronisation purposes.

REAR PANEL CONTROLS



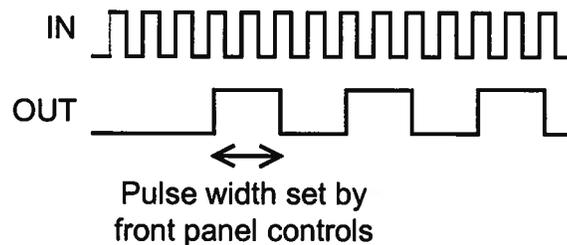
1. AC POWER INPUT. A three-pronged recessed male connector is provided on the back panel for AC power connection to the instrument. Also contained in this assembly is a 1/2A slow blow fuse and a removable card that can be removed and repositioned to switch between 120V AC in and 240V AC in.

GENERAL INFORMATION

BASIC TIMING CONTROL

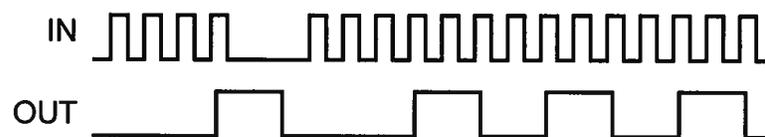
This instrument operates by counting the number of input pulses, and generating an output pulse for every N input pulses. N is set by the thumbwheel switches on the front panel.

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



Basic Operation

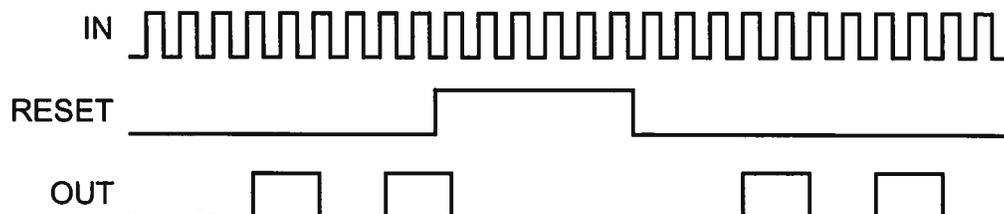
Note that if the input signal is non-periodic, the output signal will also be non-periodic:



Basic Operation for Non-Periodic Inputs

-BNLA OPTION

The "-BNLA" option adds a reset input 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 $50\ \Omega$. This feature is inoperative if the input impedance switch is set to $1\ \text{k}\Omega$.

DIVISOR VALUES

The frequency divisor may be set at any value between 2 and 255, inclusive, for normal operation. The divisor may also be set to zero, in which case a constant logic-low output is generated.

The divisor may also be set for $N=1$, in which case the output frequency equals the output frequency, but the maximum operating frequency will be reduced to approximately 50 MHz (compared to 100 MHz for the 2 to 255 range.) In this mode, the instrument essentially acts as a pulse-stretcher or "one-shot", since the output pulse width is controlled from the front panel.

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 $50\ \Omega$ loads using shielded $50\ \Omega$ coaxial cables. Unused outputs should be terminated with shielded $50\ \Omega$ 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