

**Low cost microwave pulse generator and modulator for simplifying the testing of aircraft early warning and radar systems**



- **70 MHz to 18 GHz modulation**
- **Complex pulse patterns**
- **100 ns - 100 ms pulse parameters**
- **External trigger function**
- **Simple user interface**
- **Easy installation to 6200B**

The IFR 6148 Pulse Generator and Modulator is an adapter unit which works in conjunction with the 6200B Microwave Test Set (MTS). It allows the user to generate pulsed microwave signals.

The 6148 comprises two parts - a pulse generator and a pulse modulator, which are located in the adapter unit situated under the 6200B MTS. The MTS acts as the system controller, RF source and user interface.

The 6148 is connected to the MTS through power and data connections at the rear, and RF input at the front. The RF output connector is located on the front of the adapter unit for connection to the user test system. In addition, pulse sync and video outputs are provided on the rear of the 6148, for visual inspection of pulse patterns using an oscilloscope.

#### Features

- 70 MHz to 18 GHz operation
- Simple to use user interface
- Up to 256 user defined pulses in a single pattern
- 100 ms pulse PRI's
- 100 ns edge placement resolution
- Second pattern allows simulation of jitter and dropped pulses
- External Trigger function
- Store/Recall of pulse patterns on separate memory card

#### Benefits

- Easy to operate
- Allows emulation of complex waveforms
- Can simulate pulse jitter and drop-out
- Can test aircraft EW systems without having to take the aircraft into the air
- Low cost approach to EW system testing
- Accurate RF levels
- Secure information on memory card

#### Applications

- Threat simulator to test Radar Early Warning Systems on an aircraft while still on the ground
- Radar component testing
- Partial radar system testing

## Operation

The Pulse Generator/Modulator is accessed as an application on a memory card for the 6200B. Once the application is loaded (or permanently installed in the MTS memory) the card can be removed, allowing the use of a separate memory card for store/recall functions.

The main applications screen describes the Pulse Pattern which is defined as a series of pulses in a table. Each entry represents a separate pulse in the pattern and comprises a pulse width (PW) and a pulse repetition interval (PRI). A maximum of 256 entries is allowed.

A Sync Pulse is also generated at the beginning of each pattern output, which can be used to trigger other equipment from the 6148. Alternatively, each pulse pattern can be triggered by an External Trigger, selectable for TTL/ECL level and positive/negative edge.

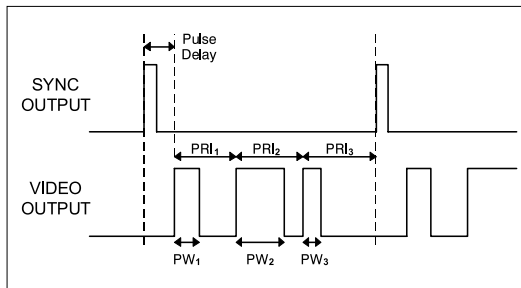


Figure 1 - Internal Trigger Operation

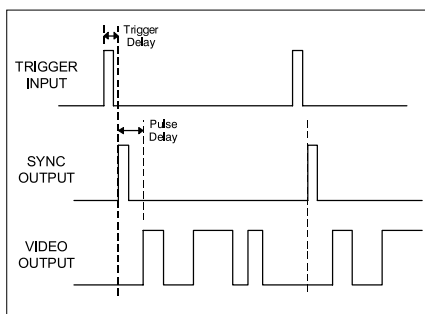


Figure 2 - External Trigger Operation

Up to 256 separate pulses can be specified in the pattern, with a maximum PRI for each pulse of 100 ms. As shown in figures 1 & 2, the pulse pattern can also be offset from the sync pulse by a user-variable pulse delay.

The user can select an auto-download function, where data is updated as each parameter is changed, or use a master download key, to update major changes in one block.

A second pulse pattern can also be utilized, which alternates with the first pattern, and can be separately edited by the user. By offsetting the timing of the second pattern to the first, the effects of jitter or dropped pulses could be seen.

If required, the pulse generator can be disabled and the external

trigger input configured as a pulse input. The user can then pulse modulate the RF independently with their own pulse generator, if required.

## SPECIFICATION

### VIDEO OUTPUT (REAR PANEL BNC)

#### Pulse Mode

Up to 256 user defined pulses

#### Pulse Width (separately variable)

100 ns - 100 ms, resolution 100 ns

#### Pulse Repetition Interval (separately variable)

200 ns - 100 ms, resolution 100 ns

#### Pulse delay (from SYNC)

0 - 100 ms, resolution 100 ns

#### Timing Accuracy

As for 6200B frequency standard

#### Level

Pseudo TTL (Typ. 0 to 5 V, 0 to 2.5 V into 50  $\Omega$ )

#### Rise/Fall time

<10 ns Typical

### SYNC OUTPUT (REAR PANEL BNC)

#### Pulse Width

400 ns Typical

#### Level

Pseudo TTL (Typ. 0 to 5 V, 0 to 2.5 V into 50  $\Omega$ )

#### Rise/Fall Time

<10 ns Typical

### EXTERNAL TRIGGER (PULSE INPUT)

#### Characteristics

Selectable positive or negative edge, ECL or TTL level into high impedance.

Minimum Pulse Width 10 ns.

#### Trigger to SYNC Delay

Less than 100 ns

#### Trigger to SYNC Jitter

Less than 50 ns

### PULSE MODULATOR

#### Frequency Range

70 MHz to 18 GHz

#### ON/OFF Ratio

>35 dB 70 MHz to 200 MHz  
>60 dB 200 MHz to 500 MHz  
>70 dB 500 MHz to 18 GHz

**Rise/Fall Time**

<5 ns

**Video Breakthrough**

<200 mV pk-pk 70 MHz to 500 MHz  
<150 mV pk-pk 500 MHz to 18 GHz

**Switch Generated RF**

<-35 dBm 70 MHz to 500 MHz  
<-50 dBm 500 MHz to 1 GHz  
<-70 dBm 1 GHz to 18 GHz

**Harmonics**

<-15 dBc Typical

**RF OUTPUT****Frequency**

70 MHz to 18 GHz

**Minimum Output Power at 23°C**

(when used with standard 6200B)

≥+2 dBm 70 MHz to 18 GHz  
+7 dBm Typical

**Return Loss**

>19 dB 70 MHz to 6 GHz Typical  
>12 dB 6 GHz to 18 GHz Typical

**Reverse Power Damage Level**

+20 dBm, ±42 V DC

**ELECTROMAGNETIC COMPATIBILITY** (when used with standard 6200B)

Conforms with the protection requirements of the EEC Council Directive 89/336/EEC. Conforms with the limits specified in the following standards:  
IEC/EN61326-1 : 1997, RF Emission Class B, Immunity Table 1, Performance Criteria B

**SAFETY** (when used with standard 6200B)

Conforms with the requirements of EEC Council Directive 73/23/EEC and Standard IEC/EN 61010-1 : 1993  
Conforms with the protection requirements of the EEC Council Directive 73/23/EEC. Complies with the following standards:  
EN61010-1:1993 (IEC1010-1:1990)

**Dimensions and Weight**

46 mm high, 325 mm wide, 450 mm deep.  
3.8 kg (including interconnecting cables and fixing kit).

**RATED RANGE OF USE**

Temperature - 0 to +50°C  
Humidity - Up to 93% humidity at +40°C

**VERSIONS AND ACCESSORIES**

When ordering please quote the full ordering number information.

**Ordering Numbers**

6148 70 MHz to 18 GHz Pulse Generator & Modulator

**Supplied with**

59000/326 Application Software & User Manual  
46884/738 Installation Kit

**Optional Accessories**

59000/182 128 k Blank Memory Card  
59000/186 512 k Blank Memory Card

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#### **CHINA**

Tel: [+86] (10) 6467 2823

Fax: [+86] (10) 6467 2821

#### **EUROPE NORTH**

Tel: [+44] (0) 1438 742200

Fax: [+44] (0) 1438 727601

#### **EUROPE SOUTH**

Tel: [+44] (0) 1438 742200

Fax: [+44] (0) 1438 727601

#### **FRANCE**

Tel: [+33] 1 60 79 96 00

Fax: [+33] 1 60 77 69 22

#### **GERMANY**

Tel: [+49] (8131) 29260

Fax: [+49] (8131) 2926130

#### **HONG KONG**

Tel: [+852] 2832 7988

Fax: [+852] 2834 5364

#### **LATIN AMERICA**

Tel: [+1] (972) 899 5150

Fax: [+1] (972) 899 5154

#### **SCANDINAVIA**

Tel: [+45] 9614 0045

Fax: [+45] 9614 0047

#### **SPAIN**

Tel: [+34] (91) 640 11 34

Fax: [+34] (91) 640 06 40

#### **UNITED KINGDOM**

Tel: [+44] (0) 1438 742200

Toll Free: [+44] (0800) 282 388 (UK only)

Fax: [+44] (0) 1438 727601

#### **USA**

Tel: [+1] (316) 522 4981

Toll Free: [+1] (800) 835 2352 (US only)

Fax: [+1] (316) 522 1360

email **[info@ifrsys.com](mailto:info@ifrsys.com)**

web **[www.ifrsys.com](http://www.ifrsys.com)**

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