

**MODULAR MICROWAVE  
SIGNAL GENERATORS  
MODEL 1605E-F-W-T-J  
AND 1105E-F-W-T-J  
MODEL 1606E-F-W-T-J  
AND 1106E-F-W-T-J**

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DECEMBER 1981

## MODULAR MICROWAVE SIGNAL GENERATORS

### MODEL 1605E-FWTJ MODEL 1606E-FTWJ

The Models 1605E-FWTJ and 1606E-FWTJ are Microwave Signal Generators that are modified versions of the Polarad Models 1605E and 1606E Signal Generators. This manual consists of the Model 1605E and 1606E Manual with the addendum sheets which describe the added options which result in the Model 1605E-FWTJ and 1606E-FTWJ Signal Generator versions. The following table is a list of the contents of this manual with addendums describing the options.

Models and Options Title	Description
Model 1605E-T and 1606E-T (Option)	T-Option addendum describing the addition of reverse power protection to the Model 1105E/1106E.
Model 1605E and 1606E	Standard section describing Models 1605E and 1606E which includes Models 1105E/1106E and 1020A
"F" Option Addendum Sheet	Addition of 400 cycle line input capability to Model 1105E/1106E
Model 1105E/1106E	Description of Standard Modular Microwave Signal Generators
Model 1020-T (Option)	"W" Option to the Modulator which includes 3 preset pulse width positions.
Model 1020A	Manual for standard Model 1020A Modulator.

**Note:** The "J" Option consists of a special transit case used for shipment and storage of the Signal Generators.

## INSTRUCTION MANUAL CHANGE BULLETIN

### THIS BULLETIN APPLIES TO:

**MODEL(S):** 1605E-FWTJ and 1606E-FWTJ  
**SERIAL NO.:** All  
**ISSUE DATE:** December 1981

### MODULAR MICROWAVE SIGNAL GENERATORS MODELS 1605E-FWTJ AND 1606E-FWTJ

Modular Microwave Signal Generators Models 1605E-FWTJ and 1606E-FWTJ are modified versions of Polarad Models 1605E and 1606E Signal Generators. The modification consists of reverse power protection, addition of a 400 cycle line input capability to the Signal Generator, the addition of three pre-set pulse positions to the Modulator, change of the frequency range for Model 1606E-FWTJ, and special transit cases for shipment and storage.

Except for the differences listed in this change bulletin, the Models 1605E-FWTJ and 1606E-FWTJ are identical to Polarad Models 1605E and 1606E.

TABLE 1-1. EQUIPMENT SUPPLIED

Qty	Name	Polarad Model or Part No.
1	Modular Microwave Signal Generator, consisting of:	1605E-FWTJ or 1606E-FWTJ
1	Modular Microwave Modulator	1020-T
1	Modular Microwave Signal Generator	1105E-FWT or 1106E-FWT
1	Power Cable	B160833
1	Power Jumper Cord	B160826
1	R.F.Cable Assembly	B12551
1	Spanner Wrench	AP15550
1	Test Connector	A713772
2	Video Cable Assembly	C147363
1	Operating and Maintenance Instructions	
1	1/8 Amp Fuse (230 VAC)	
1	1/4 Amp Fuse (115 VAC)	
1	Transit Case	166846-6

This bulletin should be carefully examined since it contains information vital for updating this manual and for incorporating changes made after publication date. Bulletins are issued to insure that the manual contains current information and reflects the characteristics of the instrument for which it is intended.

For additional information, please contact Polarad's instrument application specialists for maintenance assistance, or our Customer Service Department.

**TABLE 1-2. EQUIPMENT SPECIFICATIONS MODELS 1605E-FWTJ AND 1606E-FWTJ**

Characteristic	Specifications*
Frequency Range	1605E-FWTJ: 0.8 to 2.4 GHz 1606E-FWTJ: 1.8 to 4.5 GHz
ΔF Control	1.0 MHz, minimum range
Frequency Accuracy	1605E-FWTJ: ±0.5% or ±5 MHz (digital readout) whichever is greater at ≤0 dBm output 1606E-FWTJ: ±0.5% (digital readout) at ≤0 dBm output
Frequency Stability	0.0003% per volt change in line voltage ±0.008% per degree C ambient (0° to 50°C)
Calibrated Output	+3dBm to -127 dBm
Power Monitor Range	-3 dBm to +3 dBm
Attenuator Dial Range	+3 dBm (0.310 volt) to -127 dBm (0.1 microvolts)
Uncalibrated Power Output	-10 dBm, minimum
Reverse Power Protection (R.F. Output Port)	1605E-FWTJ: 2 watts avg. (CW), 1000 watts peak 1606E-FWTJ: 5 watts avg. (CW), 1000 watts peak
Output	
Impedance	50 ohms, nominal
VSWR	2:1 maximum
Output Power Connector	Type "N"
Maximum R.F. Output	≥+9.0 dBm at rated frequency range
Types of Output Available	CW, square wave, pulse, and FM
Modulation – Generated with Model 1020-T	
Internal Modulation, Internally or Externally Synchronized	
Square Wave Frequency	10 Hz to 10,000 Hz, continually adjustable
Pulse Width	10 Hz to 10,000 Hz, continually adjustable
Preset Pulse Widths	0.5 to 400 μsec, continuously adjustable Position A: 0.5 to 2 μsec Position B: 2 to 20 μsec Position C: 20 to 400 μsec
FM	
Type	Sawtooth
Frequency	10 Hz to 10,000 Hz, continuously adjustable
Sweep Width	0 to 0.5 MHz, continuously adjustable

\* All specifications are based upon clockwise rotation of controls.

TABLE 1-2. EQUIPMENT SPECIFICATIONS MODELS 1605E-FWTJ AND 1606E-FWTJ (Cont'd)

Characteristic	Specifications*
External Pulse Modulation (EXT input of Model 1020-T Repetition Rate Pulse Width Polarity Input Amplitude	10 to 10,000 pps 0.5 to 2500 $\mu$ sec Positive or negative 20 to 70 volt peak
Synchronization  Sync Output, Delayed and Undelayed (Separate Outputs) Repetition Rate Amplitude Delay	10 to 10,000 pps $\geq$ 25 volt peak into 1K ohm load 0.3 to 2000 $\mu$ sec, continuously adjustable
External Sinewave Input Sync. Frequency Amplitude	10 to 10,000 Hz 5 to 50 vrms
External Pulse Sync. Input Repetition Rate Amplitude Polarity Pulse Width Rise Time	10 to 10,000 pps 5 to 50 volt peak Positive or negative 0.5 to 5 $\mu$ sec 0.1 to 1 $\mu$ sec
Modulation Generated with Signal Generators (Model 1020-T not used)	
Internal Square Wave Rate On-Off Ratio Synchronization	950 to 1050 Hz, minimum Infinite Internal
Internal FM Rate Sweep Width Horizontal Sweep Output Horizontal Sweep Phase	Power line frequency Continuously adjustable to 10 MHz 2 volts, minimum Adjustable to 90°, minimum
External Pulse Modulation (EXT input of Signal Generators) Input Modulating Pulse Amplitude Width	20 to 70 volts peak, positive 0.5 to 2500 $\mu$ sec

\*All specifications are based upon clockwise rotation of controls.

TABLE 1-2. EQUIPMENT SPECIFICATIONS MODELS 1605E-FWTJ AND 1606E-FWTJ (Cont'd)

Characteristic	Specifications*
RF Output Pulse Width Rise Time Delay Time Rate	0.5 to 2500 $\mu$ sec 0.15 $\mu$ sec, max. 0.35 $\mu$ sec, max. 10 to 10,000 pps
External FM Modulation Type and Rate Sweep Width (2X Deviation)	Any wave shape having components between 0 and 5 MHz 0 to 10 MHz, typical
Power Requirements	115/230 $\pm$ 10% vac; 50,60 and 400 Hz, 110 watts
Dimensions	7"(17.8 cm) H x 16 $\frac{1}{4}$ "(42.5 cm) W x 19"(48.3 cm) D
Weight	60 pounds (31.4 kg), excluding transit case

\* All specifications are based upon clockwise rotation of controls.

## INSTRUCTION MANUAL DIFFERENCE DATA ADDENDUM

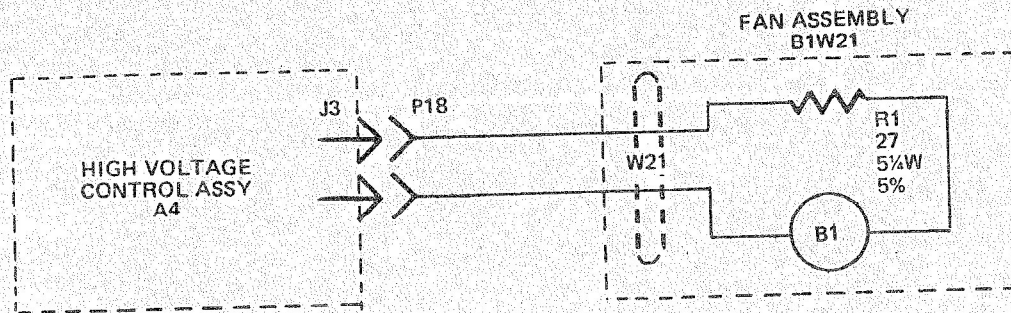
**THIS BULLETIN APPLIES TO:**  
**MODEL(S):** E Series Signal Generators and Signal Sources  
**SERIAL NO.:** All  
**ISSUE DATE:** May 1982

### "F" OPTION ADDENDUM

The F-Option enables all Polarad E Series Signal Generators and Signal Sources to operate from a 50 to 400 Hz AC Power Source.

Modify the schematic diagram as follows:

- Remove Cable Assembly W1.
- Replace Fan B1 with Fan Assembly B1W21, Polarad Part No. C161698.
- Connect Fan Assembly B1W21 to High Voltage Control Assembly A4 as shown below.



- Replace Resistor A4R10 on the High Voltage Control Assembly with a jumper.

Change the Parts List as follows:

- Delete Cable Assembly W1, Fan B1 and Resistor A4R10.
- Add Fan Assembly B1W21 to the Parts List as shown below:

REF SYMBOL	DESCRIPTION	MFR. PART NO.	MFR. CODE	QTY
B1W21	FAN ASSEMBLY	C161698	82199	1
B1W21B1	FAN, DC	A162072	82199	1
B1W21P18	CONNECTOR, PLUG	1-480698-0	00779	1
B1W21R1	RESISTOR, FIXED, WW, 27 OHMS, 5%W, 5%	2856	44655	1

\*Note: The Modulators used in the Series 1600 Signal Generators do not require this change.

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