



Escort EGC-3236A

Sweep Function Generator

User Manual

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Safety

Review the following safety precautions to avoid injury and prevent damage to this instrument or any instruments connected to it.

- Read this manual carefully to ensure your personal safety and to prevent damage either to the instruments or to equipment connected to them.
- Before applying power, ensure that the line selector is in the proper position for power source being used.
- Make sure that the power cord and the fuse type / rating is specified for this product before use.
- This product is grounding through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground.
- Before making any connections to the input terminals of the products, ensure that the properly grounded.
- To avoid personal injury, never operate the instrument without covers or panels removed.
- To prevent product overheating, provide proper ventilation.
- Do not operate this product in wet, damp or explosive atmosphere.
- Marking on the instruments:



Caution, Refer to manual for detailed instructions



Protective Conductor Terminated

Introduction

The instrument is a versatile, high performance function generator. It provides sine, square and triangle wave outputs over the frequency range from 0.01 Hz to 10 MHz in eight overlapping ranges. It is a rugged, easy to operate, with high stability and excellent heat dissipation. An auxiliary TTL output at the generator frequency is available to synchronize external devices. The output voltage can be varied from 0V to 10V peak-to-peak into 50 ohms or to 20V into open circuit. The DC level of the output can be adjusted using the offset control. Two front panel pushbuttons can attenuate the output by 20 dB or 40 dB (60 dB in cascade operation). You can also directly control amplitude and DC offset.

The instrument frequency is set with a front panel knob, measured with a built-in counter and displayed using five LED digits. Additionally, the internal counter can be used to measure an external signal, up to 50 MHz, with up to 6-digit resolution. It provides high input impedance and good sensitivity. The symmetry function allows the user to vary the duty of frequency. When you push the switch of symmetry ON, the output waveform symmetry is adjustable. The sweep-IN function provides external voltage source to control the output frequency. The output frequency can be swept above or below the selected frequency to a maximum of 100:1, depending on the amplitude of input and the selected output frequency. The output waveform can be internally linear or logarithmic swept over three decades. The start and stop frequencies can be separately adjusted and displayed. The output waveform can be internally or externally modulated in amplitude or in frequency. The internal modulation signal is a 1 KHz sine wave. The AM level can be adjusted from 0 to 100%.

The exceptional accuracy, its portability and stackable design makes this valuable instrument for using by the electronic engineer, the communication's technician, schools and laboratories.

Specification

General Specifications

Display Mode	6 Digits of Seven Segment LED
Output	Sine, Triangle, Square, Ramp, Pulse, TTL
Input	Sweep, External counter and Modulation
Warm-up Time	At least two hours
Operating Temperature	0°C-40°C (32°F to 104°F)
Storage Temperature	-10°C to 60°C
Altitude	Up to 2000 M
Relative Humidity	Up to 80% for 0°C to 28°C Up to 70% for 28°C to 40°C
Dimensions	261 x 71 x 211mm
Weight	1.8kg
Line Voltage	AC 100V/120V ($\pm 10\%$) 50/60Hz, FUSE:0.4A/250V AC 220V/240 ($\pm 10\%$) 50/60Hz, FUSE: 0.2A/250V
Power Consumption	40VA maximum
Ventilation	Always keep the back of instrument far away the wall for better ventilation, and nothing at among.
Standard Accessories	User Manual in CD-ROM/ Power cord
Safety	Designed in compliance with EN61010-1 (IEC1010-1) Installation Category II, Pollution Degree 2 Environment
EMC	Designed in compliance with EN61326

Electrical Specifications

The accuracy is given as \pm (% of span + No. of least significant counts) at 23°C \pm 5°C with relative humidity less than 80% R.H.

Main Output

Range (Sine/Triangle/Square Waves)

Output Range		Display Resolution	Accuracy
Minimum	Maximum		
10mHz	1Hz	1mHz	Not Specified
100mHz	10Hz	10mHz	$\pm(3\%+2)$
1Hz	100Hz	100mHz	
10Hz	1kHz	1Hz	$\pm(0.3\%+1)$
100Hz	10kHz	1Hz or 0.001kHz	$\pm(0.03\%+1)$
1kHz	100kHz	0.001kHz or 0.01kHz	
10kHz	1MHz	0.01kHz or 0.1kHz	
100kHz	10MHz	0.1kHz or 0.001MHz	

Notes:

1. The specification is specified within 10% to 100% of maximum output range, and the waveform characteristics are limited to the specified range also.
2. The display resolution and accuracy is relative to the span of internal counter.
3. Symmetry is specified within 2% at 1Hz-100kHz.

Waveform Characteristics

Triangle Wave Linearity

Frequency	Linearity
1Hz ~100kHz	> 98%
>100 KHz	Not Specified

Sine Wave Distortion

Distortion	Harmonic Ratio	
	100kHz ~1MHz	1MHz ~10MHz
10Hz ~ 100kHz	<-30dB	<-20dB
<2%	<-30dB	<-20dB

Notes:

1. The distortion isn't specified for less than 10 Hz.

Square Wave

Transition time	Aberration
< 30ns	< 5% of P-P amplitude +/- 50 mV

Output Characteristics

Amplitude

Distortion	Minimum (CCW)	Maximum (CCW)	Flatness	
			< 1MHz	1MHz - 10MHz
No Load	$\geq 2Vp-p$	$\geq 20Vp-p$	$\pm 1dB$	$\pm 3dB$
50 Ω	$\geq Vp-p$	$\geq 10Vp-p$		

Notes:

- Output impedance is $50\Omega \pm 10\%$ @ 100kHz.
- The amplitude should consider additional tolerance of flatness.
- FCCW: Full counterclockwise, FCW: Full clockwise.
- Output protection: The generator main output is non-destructively protected against short circuit to ground or to any voltage practically available in electronic laboratories. specification is specified within 10% to 100% of maximum output range, and the waveform characteristics are limited to the specified range also.

Attenuator

Attenuator Switch		Attenuator	@ 1kHz
-20dB	-40dB		
ON	OFF	-20dB	$\pm 2\%$
OFF	ON	-40dB	
ON	ON	-60dB	

DC Offset

Load	DC Offset Knob - see Note 1		Ripple- see Note 2
	FCCW	FCW	
No Load	< -10V	> +10V	$\geq 10mVp-p$
50 Ω	< -5V	> +5V	

Notes:

- Set the switch of DC OFFSET to ON position, and set the function switches of Sine, Triangle and Square to OFF position. Then test the DC offset.
- Before testing ripple, set the frequency range to lowest range and turn frequency knob to MIN position and be sure to set Amplitude Knob at FCCW. Otherwise, it will induce noise around 50mVp-p based on different frequency.

Other Inputs and Outputs

Synchronous Output

Output Impedance	Output level	Transition time	Fan out *2
50 Ω typical *1	TTL level, > 3V @ open circuit	< 20 ns	Typical 20 TTL loads

Notes:

- The output Impedance is measured at 1k Ω load or above.
- The capability of fan out depends on different TTL logics and the level is greater than 2V

Symmetry

Range	Symmetry Knob	
	FCCW	FCW
Up to 1MHz	$\leq 10\%$	$\geq 90\%$

Notes:

- Symmetry from 10% to 90% at full output amplitude terminated into 50 Ω

External Sweep-IN

Impedance	Sweep Range	Sweep Ratio- see Note 1
14K Ω typical	0.2Hz-100Hz	1:100

Notes:

- The frequency output will be proportional to the level of SWEEP-IN connector. 0-5V input for up to 100:1 frequency change approximately. To avoid damage to this instrument, ensure that the maximum voltage into this BNC is no more than ± 10 Vp.
- Turn off the Sweep ON switch.

Internal Sweep/Sweep-OUT

Impedance	Sweep Rate		Output Level - see Note 1	
	Minimum	Maximum	Minimum	Maximum
600 Ω typical	>5s	<10 ms	>0.3V	<4.5V

Notes:

1. The output level of SWEEP-OUT BNC is proportional to the knob of STOP FREQ.
2. The frequency knob is set to full CCW for start frequency, and set the knob of stop frequency to full CW. The STOP switch is used to indicate stop sweep frequency. The sweep width is variable up to 100:1 frequency change approximately.

Sweep-OUT (Linear/Logarithmic Selection)

Impedance	Sweep Rate		Output Level - see Note 1	
	Minimum	Maximum	Minimum	Maximum
600 Ω typical	>5s	<10 ms	>0.3V	<4.5V

Notes:

1. The output level of SWEEP-OUT BNC is proportional to the knob of LEVEL STOP.
2. The frequency knob is set to full CCW for start frequency, and Set the knob of LEVEL STOP to full CW. The STOP switch is used to indicate stop sweep frequency. The sweep width is variable up to 100:1 frequency change approximately.
3. Turn SWEEP switch ON and Modulation Switch to off.

Modulation IN-OUT

AM Modulation

INT/EXT	Impedance (Typical)	Depth	Modulation Kob	Mod. BNC
EXT	0.6-10k Ω - see Note 3	0-100%	FCCW-FCW	DC-20kHz- see Note 2
INT	600 Ω	0%	FCCW	1.06kHz \pm 10%
		100%	FCW	1.06kHz \pm 10%

Notes:

1. The SWEEP Switch is set to OFF state and Modulation switch ON. The internal modulation frequency is 1.06kHz \pm 10%.
2. To avoid damaging this instrument, ensure that the maximum voltage into this BNC is no more than \pm 10 Vp. A 4 Vp-p minimum signal is required for maximum modulation (FCW). Otherwise the input level is proportional to modulation knob. For greater than 20 kHz signal, can be used but not specified.
3. The input impedance is 10 k Ω approximate at FCCW of modulation knob, and 600 Ω approximate at FCW of modulation knob.
4. The Internal AM mode generates an amplitude modulated signal of fixed carrier frequency. An internally-generated sinusoid is used as a modulating signal to vary the amplitude of a carrier sinusoid. The modulation waveform is not suppressed carrier; i.e. a fixed amount of carrier power is always present in the modulated signal. The External AM mode generates an amplitude modulated signal of fixed carrier frequency. An externally-supplied signal on the MOD-IN BNC is used as a modulating signal to vary the amplitude of a carrier sinusoid. The modulation waveform is not suppressed carrier; i.e. a fixed amount of carrier power is always present in the modulated signal

FM Modulation

INT/EXT	Impedance (Typical)	Deviation - see Note 2	Modulation Kob	Mod. BNC
EXT	6-10k Ω - see Note 4	0- \pm 10%	FCCW-FCW	DC-20kHz- see Note 3
INT	600 Ω	0- \pm 10%	FCCW-FCW	1.06kHz \pm 10%

Notes:

1. The SWEEP Switch is set to OFF state and Modulation switch ON. The internal modulation frequency is 1.06kHz \pm 10%.
2. Deviation is proportional at carrier frequency of 1 KHz and the frequency Knob is fixed.
3. To avoid damaging this instrument, ensure that the maximum voltage into this BNC is no more than \pm 10 Vp. A 4 Vp-p minimum signal is required for maximum modulation (FCW). Additional deviation is proportional to the signal level, but the level shall be less than the limitation. For greater than 20 kHz signal, can be used but not specified.
4. The input impedance is 10k Ω approximate at FCCW of modulation knob, and 6k Ω approximate at FCW of modulation knob.
5. The Internal FM mode generates a frequency-modulated signal of fixed amplitude. An internally generated sinusoid is used as a modulating signal to vary the frequency of a carrier sinusoid. The External FM mode generates a frequency-modulated signal of fixed amplitude. An externally supplied signal on the MOD-IN BNC is used to vary the frequency of a carrier sinusoid.

Counter Characteristics IN-OUT

Internal Counter

Range	Display Resolution- see Note 1	Accuracy
10mHz-1000mHz	1mHz	Not Specified
1.00Hz-10.00Hz	0.01Hz	± (3%+2)
10.0Hz-100.0 Hz	0.1Hz	
1- 999 Hz	1 Hz	± (0.3% +1)
1.000-9.999 kHz	0.001 kHz	± (0.03% +1)
10.00-99.99 kHz	0.01kHz	
100.0-999.9 kHz	0.1 kHz	
1.000-10.000 MHz	0.001MHz	

Notes:

1. The display resolution of internal counter is according to the ranges of main output setting.

External Counter

Load	DC Offset Knob - see Note 1		Ripple- see Note 2
5 ~ 999 Hz	1 Hz	±(Time base error +3 counts)	20mV RMS
1 ~ 999.999 kHz	0.001 kHz		
1 -20.0000 MHz	0.0001 MHz	±(Time base error +1 count)	60 mV RMS
>20 ~ 50 MHz	0.0001 MHz		

Notes:

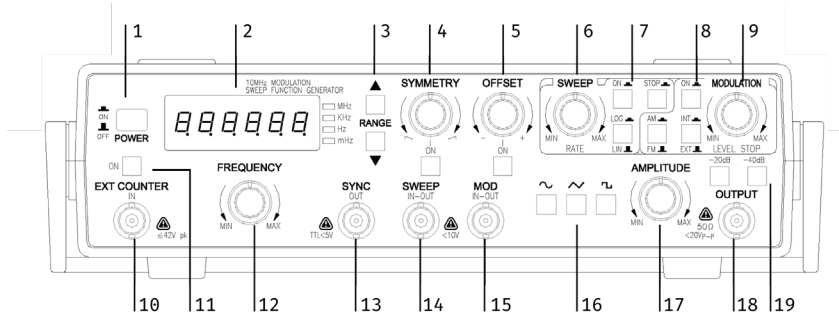
1. Time base: 10 MHz
2. Time base error: 10 PPM at (23 ± 5 °C)
3. Input impedance: 1MΩ typical
4. The counter display will be 0 Hz with 50Ω load on no signal input.
5. The maximum input voltage: < 42Vpk

Getting Started

Electrical Specifications

Front Panel

Figure 1 shows the front panel controls, connectors and indicators.

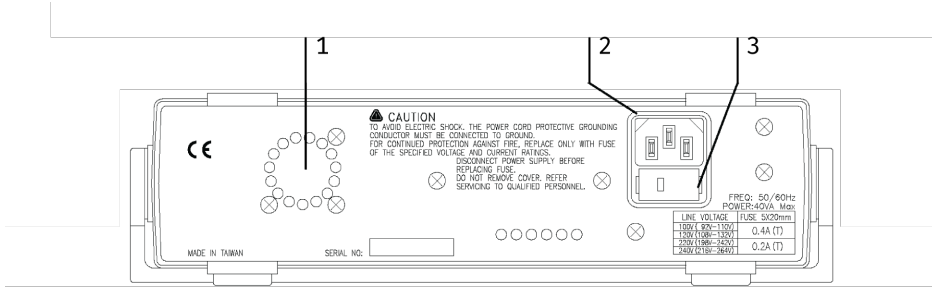


- POWER SWITCH:** To toggle instrument power ON and OFF.
- Counter READOUT:** A six-digit display that shows frequency generator or external counter. The LED indicates the frequency units of MHz, KHz, Hz or mHz for the counter readout. The decimal point and unit is automatically placed in the appropriate position.
- RANGE BUTTONS:** Push buttons of UP/DOWN to set the frequency range of the output signal. The frequency range will be 10 times difference on each step.
- SYMMETRY KNOB/SWITCH:** The knob is used to vary either positive pulse/ramp or negative pulse/ramp. Push the symmetry switch to "ON" before rotating this knob.
- DC OFFSET KNOB/SWITCH:** The switch is set at OFF position for normal operation. The knob sets the DC level and therefore the polarity of the OUTPUT signal after the switch ON.
- SWEEP RATE:** Rotate the Knob to adjust the sweep rate. Adjusts how often the frequency sweep reiterates.
- SWEEP SWITCHES:** The ON switch is used to enable sweep function. The STOP switch is used to set the stop frequency. The LIN/LOG switch is used to select linear or logarithmic sweep, SW OFF is LIN and ON is LOG.
- MODULATION SWITCHES:** The ON switch is used to enable the modulation function. The EXT/INT switch is used select modulation signal, switch ON for internal and OFF for external. The AM/FM switch is used select modulation type, switch ON for AM and OFF for FM. Ensure the ON switch of sweep is set to OFF state for the AM/FM modulation function.
- MODULATION / LEVEL STOP KNOB:** For sweep function, this knob is used to adjust the sweep width.
- EXT-COUNTER INPUT:** BNC connector is used for the external signal frequency measurement. The input frequency is from 5Hz to 50MHz.
- EXT-COUNTER SWITCH:** Push the switch to ON for external counter.
- FREQUENCY KNOB:** Rotate this knob to set the desired frequency output from the generator.
- SYNC OUT BNC:** This connector sends out a synchronous signal TTL level, the output frequency is same as MAIN output.
- SWEEP IN-OUT BNC:** Sweep signal output and input connector. The SWEEP IN-OUT BNC will be an output connector when you push the switch of SWEEP ON; otherwise it is an input connector.
- MODULATION IN-OUT:** Modulation signal output and input connector. In the internal modulation mode, a 1-KHz sine wave is available on this BNC connector for external synchronization. In the external modulation mode, an input signal applied here will modulate the output. A 4V peak-to-peak signal is required for 100% AM modulation.
- WAVE SELECTOR:** Push the switch to select the output waveforms.
- AMPLITUDE KNOB:** Adjust the voltage within the presently selected range. Rotate this knob to adjust the voltage level of main output signal (OUTPUT BNC).
- OUTPUT BNC:** Main output of function generator.
- ATTENUATORS:** Push the switch to turn attenuator ON. Attenuates the amplitude of the selected output waveform in 20-dB steps to a maximum of 60 dB when both pressed.

Electrical Specifications

Rear Panel

In addition to line voltage selector, fuse and power cord receptacle



1. VENTILATION FAN: Always keep nothing on the front of fan for better ventilation.
2. POWER CORD SOCKET
3. LINE VOLTAGE SELECTOR AND FUSE HOLDER: To select line voltage and fuse replacement.

Preparing For Use

Precautions

In order to avoid damaging this instrument, make sure that the unit is set to the correct line voltage for your area. Also make sure that the correct fuse is used for the line voltage. These line voltages are 100V, 120V, 220V and 240V at 50/60HZ.

Warning

To avoid damage the equipment use only specified fuse when change the power line voltage. Please refer to following table:

SELECTOR	LINE VOLTAGE	FUSE
100V	92-110V 50/60Hz	0.4A
120V	108-132V 50/60Hz	0.4A
220V	198-242V 50/60Hz	0.2A
240V	216-264V 50/60Hz	0.2A

Avoid touching the rear panel of the instrument during operation. The heat sink is nearby the rear panel, contacting it could result in skin burns. Avoid using the function generator in ambient temperatures above specified.

Always keep sufficient air space between the rear of instrument and wall to prevent internal heat build-up.

Although the function generator is protected against reverse polarity damage the circuit being powered may not include such protection. Always carefully observe polarity incorrect polarity may damage the equipment under test.

Do not exceed the voltage rating of the circuit being powered.

Reference Operation

This section describes several advanced functions. The variety of swept available from the function generator make it especially useful for such applications as test servo-system or amplifier response, distortion and stability. It can use for FM generator, frequency multiplication, or as a variable, beat-frequency oscillator. The synchronous and sweep outputs can be used as a source for TTL logic or to synchronize as external device, such as an oscilloscope.

Main output

1. Connect the Main output connector to the input BNC connector on an oscilloscope.
2. Switch off the external counter button.
3. Select the waveform by pushing function selector.
4. Push UP/DOWN to select a range of frequency output.
5. Turn the frequency knob to adjust the frequency output. The output value will be indicated on the display
6. Turn the amplitude knob to adjust the output level. The attenuator switch can be pushed to attenuate the output level for -20 dB if necessary.
7. Push DC offset switch to the ON position, an additional DC level will be used to shift output level. The knob of DC offset is used to adjust DC level.

Symmetry

1. Follow the operation of Main output, but with the symmetry button switched ON.
2. The frequency will be divided ten from the original frequency output around.
3. Turn the knob of symmetry to adjust duty cycle from 10% to 90 %.
4. Observe the results on the oscilloscope.

SYNC. OUTPUT

1. Connect the SYNC output connector to the input BNC connector on an oscilloscope.
2. The level and symmetry will be a constant value, but the frequency will follow the Main output. Please refer to main output for frequency change.
3. The knobs for DC offset and amplitude do not affect the output.
4. Observe the results on the oscilloscope

Internal Sweep/Sweep-OUT

1. Connect the Main output connector to the CH1 BNC connector on the oscilloscope.
2. Connect the SWEEP in-out BNC to the CH2 BNC connector on the oscilloscope.
3. Turn the frequency knob to set desired sweep start frequency.
4. Push the sweep switch to the ON position.
5. Turn the LEVEL STOP knob to set stop frequency. Push the STOP switch to the ON position to see the stop sweep frequency on the display. Turn off the STOP switch once you finished the setting.
6. The main output will sweep the desired range of frequencies and the SWEEP in-out BNC is output a linear level.
7. Turn the sweep rate knob to set how often the frequency sweep reiterates.
8. Observe the results on the oscilloscope.

Sweep-IN

1. Push the sweep switch to the OFF position.
2. Connect the Main output connector to the CH1 BNC connector on the oscilloscope.
3. Connect the SWEEP in-out BNC to another function generator.
4. Turn the frequency knob to set desired sweep start frequency.
5. The main output will sweep the desired range of frequencies according to the input level of SWEEP in-out BNC.
6. Observe the results on the oscilloscope.

AM Modulation

1. Connect the Main output connector to the CH1 BNC connector on the oscilloscope.
2. Push the sweep switch to the OFF position.
3. Push the modulation switch to the ON position.
4. Push AM/FM switch to the ON position for AM modulation.
5. Push INT/EXT switch to the ON position for internal modulation.
6. Turn the frequency knob to set desired carrier frequency.
7. Turn the modulation knob to set modulation amplitude.
8. Observe the results on the oscilloscope.

FM Modulation

1. Connect the Main output connector to the CH1 BNC connector on the oscilloscope.
2. Push the sweep switch to the OFF position.
3. Push the modulation switch to the ON position.
4. Push AM/FM switch to the OFF position for FM modulation.
5. Push INT/EXT switch to the ON position for internal modulation.
6. Turn the frequency knob to set desired carrier frequency.
7. Turn the modulation knob to set how many deviations for frequency modulation.
8. Observe the results on the oscilloscope.

Maintenance

Warning!

To avoid electrical shock or damaging this instrument, never get water into the meter.

Cleaning

Before cleaning this instrument, make sure the power is switched in OFF position and the power cord is disconnected from the AC outlet. To clean the meter, wipe the dirty parts with gauze or soft cloth soaked with diluted neutral detergent. Avoid getting the instrument too wet to prevent the detergent from penetrating into inside parts and causing damages. After cleaning, leave the instrument until it dries completely. Don't use chemicals containing benzene, toluene, xylene, acetone or similar solvents.

Warning!

The following instructions are for qualified personnel only. To avoid electrical shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.

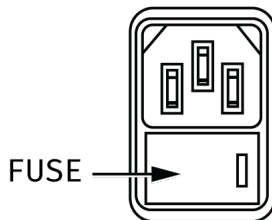
When servicing, use only specified replacement parts as described hereinafter.

To avoid electric shock, disconnect the power cord from the unit before changing fuse or input voltage selector.

Selecting different input voltage & protection fuse replacement

To select different input voltage level of AC 100V, 120V 220V or 240V, simply switch to the selected voltage, so the desired voltage is displayed in the window. Please make sure that the protection fuse rating matches.

When replacing fuse or selecting the input voltage, please use fuse ratings as specified.



Adjustment Procedures

Caution

The following instructions are for qualified service personnel only. To avoid electrical shock, do not perform any servicing other than contained in the operation instructions unless you are qualified to do so. Before calibrating and adjusting, make sure that the instrument has warmed up for at least 2 hours.

Required Test Equipment

The following Table lists the test equipment necessary to perform the adjustments and the maintenance of this instrument. Any equipment that satisfies the critical specifications given in the table may be substituted for the recommended model.

Instrument Type	Required Specifications
Oscilloscope	100 MHz bandwidth, dual channel
DVM	4.5 digits, true RMS
Counter	100 MHz, 2 CH, time interval capability
Distortion Analyser	10 Hz – 100 KHz, $\pm 0.1\%$
Function Generator	10 MHz frequency
Termination	Feed through termination 50 ohm
Cable Assembly	BNC-BNC, 50 ohms, RG-58
BNC Adapters	BNC to banana, BNC tees

Adjustments

A: Frequency Counter and Oscillator Adjustments

1. Press EXT-COUNTER switch on front panel. Connect external source (sine waveform, 10MHz, amplitude of 10 mV rms). Connect a probe to TP600 and to the scope. Adjust R610 for a square wave display on the scope.
2. Remove the probe from TP600, then adjust C104 for counter reading to 10.0000-10.0002 MHz.

B: Function adjustment of Triangle wave

1. Set the controls as follows:

FUNCTION	TRIANGLE
AMPLITUDE	MAX
DC OFFSET	OFF
FREQUENCY	10 KHz
SYMMETRY	OFF
SWEEP	OFF

2. Adjust R225 for a symmetrical around zero waveform.
3. Press MODE switch to TRIG. Adjust R220 for a zero base line (0V ± 10 mV) on the oscilloscope.

C: Function adjustment of Square wave

1. Set the controls as follows:

FUNCTION	SQUARE
AMPLITUDE	MAX
DC OFFSET	OFF
FREQUENCY	10 KHz
SYMMETRY	OFF

2. Adjust R340 for a symmetrical square wave around zero.

D: Frequency Adjustment

1. Connect the OUTPUT to an external counter.
2. Set the controls as follows:

FUNCTION	TRIANGLE
AMPLITUDE	MIDDLE
DC OFFSET	OFF
3. Turn the FREQUENCY control knobs to full CW and select the proper RANGE for a reading of > 1 KHz on the display.
4. Adjust R259 for a 50% symmetry waveform.
5. Turn the FREQUENCY control knob CCW and set the frequency to 100 Hz on the display counter. It is important to stay in the same range.
6. Adjust R249 for a 50% symmetry waveform.
7. Repeat steps 5 and 6 for best results on both ends.
8. Select the Frequency range from 10Hz to 100.0Hz.
9. Connect the output to an external counter. Turn the frequency knob to full CW position. Adjust R211 for a frequency reading to 102.0Hz on the external counter
10. Turn the frequency knob for an internal counter reading to 90.0Hz. Adjust R637 for a display of 90.0 ±0.2Hz.
11. Turn the frequency knob to 10Hz reading on the counter. Adjust R638 for a display reading of 10.0Hz ±0.2Hz.
12. Repeat steps 10 and 11 for best result on both ends.
13. Select the Frequency Range to 10MHz. Rotate the frequency knob to full CW. Adjust C217 for a reading >10.3MHz.
14. Turn the frequency knob to full CCW, and then adjust R262 for a reading of 50±5 KHz.

E: Output amplitude Adjustment

1. Terminate the output in 50 ohms and connect an oscilloscope and a multi-meter to the output.
2. With all function pushbuttons out and the knob of AMPLITUDE control at full CCW position, and then adjust R401 for output of 0V ±10 mV.
3. Turn AMPLITUDE control to full CW and adjust R450 for 0V ±10 mV.
4. Set the amplitude control to full CW position and select triangle waveform. Check for a peak amplitude of >10.6V.
5. Set frequency to 10KHz and adjust R225 for a symmetrical around zero waveform.

F: Function adjustment of Sine wave.

1. Connect a distortion analyzer through a 50 ohms termination to the OUTPUT and monitor with an oscilloscope also.
2. Set the FG controls as follows:

FUNCTION	SINE
AMPLITUDE	MAX
DC OFFSET	OFF
FREQUENCY	100 KHz
SYMMETRY	OFF
3. Set frequency range to 100kHz and FREQ. Knob for 100kHz output.
4. Adjust R309 and R320 for minimum distortion and <0.9%.
5. Set frequency range to 100Hz, and FREQ. Knob for 100 Hz output.
6. Adjust R309 for minimum distortion that should be as close as to prior value on 100kHz.
7. To check frequency range for 100kHz. If the distortion > 0.9%, to adjust steps 3~ 7 again.
8. Adjust R359/R360 for a round sine waveform of top and bottom without any peak.
9. Adjust R314 for a symmetrical waveform around zero.

G: Sweep OUT (LOG) adjustment

10. Connect the Sweep OUT to an oscillator.
11. Set the FG controls as follows:

Modulation Knob	FCW
Modulation switch	OFF
SWEEP Knob	FCW
Sweep switch	OFF
LIN/LOG ON	(LOG)

12. Adjust R533 for a 7V log waveform display.



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