MANUAL
OF
INSTRUCTION

MODEL:DF1641B SERIES

FUNCTION GENERATOR

NDN INSTRUMEN

The unit of this series is a function generator with versatility and high stability .It is designed by LSI monolithic function generator for creating waveforms and sweeps, a monolithic computer is for controls .The display of frequency and amplitude of output signal is by LED numerical displays. Some LEDs are as function indicators.

It is with novel construction, fine applications, easy for use and service, so it gets wide applications.

1. Specifications

1.1 Frequency range:

0.3Hz~3MHz in 7 steps, 5 digits LED display

1.2 Waveform: sine, triangular, square, pulse and ramp

1.2.1 Symmetry setting range: 80:20~20:80

1.3 Sine

1.3.1 Distortion: $\leqslant$1.5%, (10Hz~30Hz) $\leqslant$1%, (30Hz~100KHz)

1.3.2 Frequency response: $\leqslant \pm$0.5dB (F<100KHz)

$\leqslant \pm$1dB (100KHz$\leqslant$F$\leqslant$3MHz)

1.4 Rise and fall time of square:≤100ns

1.5 TTL output

1.5.1 Level: H≥2.4V, L≤0.4V, 20TTL load capability

1.5.2 Rise time: ≤30ns

1.6 Output

1.6.1 Impedance: 50Ω ±10%

1.6.2 Amplitude: ≥20Vp-p (loadless), 3 digit LED display

1.6.3 Attenuation: 20dB/40dB/60dB

1.6.4 DC offset: 0~±10V, adjustable

1.6.5 Amplitude display error: ±10%±2 words(output >1/10 max output)

1.7 Power output

1.7.1 Amplitude: ≥20Vp-p

1.7.2 Output power: ≥5W

1.8 VCF input

1.8.1 Input voltage: -5V~0V

1.8.2 Max VCF ratio: 100:1

1.8.3 Input signal: DC~1KHz

1.9 Sweep

1.9.1 Mode: linear, logarithmic

1.9.2 Speed: 5s~10ms

1.9.3 Width: more than

1.9.4 Seep output amplitude: 6Vp-p

1.9.5 Seep output Impedance: 600 Ω

1.10 Counter

1.10.1 Test range: 10Hz~20MHz

1.10.2 Input impedance: 1M Ω /20PF

1.10.3 Sensitivity: 100mVrms

1.10.4 Max input: 150V(AC+DC)(with attenuator)

1.10.5 Input attenuation: 20dB

1.10.6 LPF: 100KHz

1.10.7 Accuracy: $\leqslant 3\times10^{-5}\pm1$ word

1.11 Power supply

1.11.1 Voltage: 220Vac±10%

1.11.2 Frequency: 50Hz±2Hz

1.11.3 Power: 25VA

1.12 Environment

1.12.1 Temperature: 0℃~40℃

1.12.2 Humidity: <90%RH

1.12.3 Pressure: 86~104Kpa

1.13 Size: 280mm×255mm×100mm(l×b×h)

2. Principle

The block diagram of this unit is shown in Fig.1.

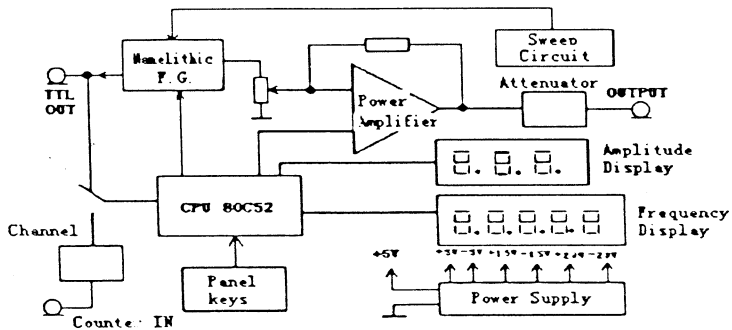

Fig.1 Block Diagram

2.1 Generator

It is a monolithic function generator MAX038 which waveform, frequency and duty cycle are controlled by a monolithic CPU 80C52.

2.2 monolithic computer controller

It consists of 80C52, keys of panel, displays and indicators. It controls the waveform,

frequency of the generator, displays frequency and amplitude of output signal, measures and displays frequency of the external input signal.

2.3 Counting channel

It consists of wide band amplifier and shaper. When at external frequency test it amplifies and shapes the input signal.

2.4 Power amplifier

It is a combined amplifier to get very high slew rate and good stability. Entire circuit has reversed character.

2.5 Power supply

There are four groups dc supply of $\pm$23V, $\pm$15V, $\pm$5V and +5V, $\pm$23V is for power amplifier; $\pm$15V, $\pm$5V for generator; +5V for 80C52.

3. Construction

A compete metal construction makes this unit firm. The components are installed on two PCBs and the adjustable parts are located at obvious positions when make calibrating and servicing remove two screw under the frame of rear panel then remove top and bottom

covers to open this unit.

4. Operation and maintenance

4.1 Front panel

Exposition of the panel see Table 1 and Fig.2.

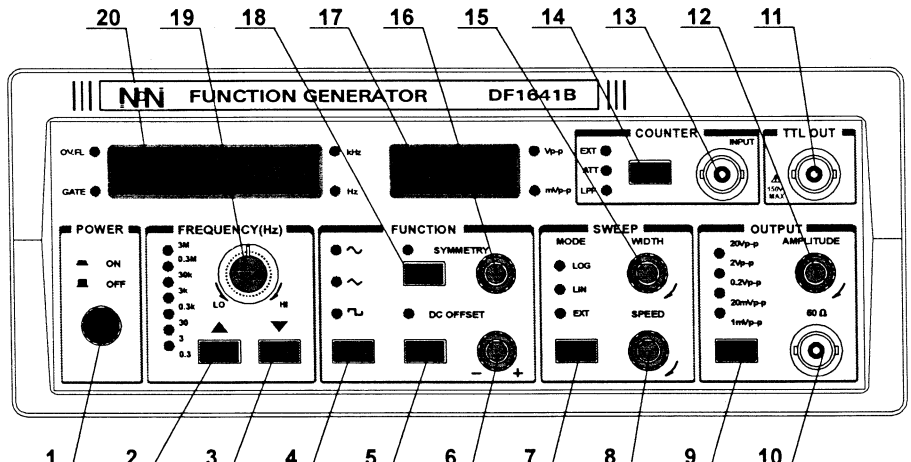

Fig.2 Front Panel

Table 1

No	Mark	Name	Function
1	POWER	Power Switch	Depressed "ON", released "OFF"
2	△	Frequency Ranging Key	Press this key to change the frequency range from low to high and release it to get the range is shining. Cooperate with "19" to set a frequency.
3	▽	Frequency Range key	Press this key to change the frequency range from high to low high and release it to get the range is shining. Cooperate with "19" to set a frequency.
4		Waveform Setting Key	Press this key to set sine or triangular or square waveform when the corresponding LED is shining. Cooperate with "16" and "18" to get ramps or pulses.

5	DC OFFSET	DC Offset Key	DC offset setting key for output signal, press this key to make DC offset be valid when the corresponding LED is shining.
6		DC Offset Setting Knob	When DC offset is valid set this knob to change the DC offset from –10V to +10V(output amplitude is 5Vp-p).
7	MODE	Sweep Mode LOG/LIN/EXT Key	Press this key to set linear or logarithmic or exterior sweep mode.
8	SPEED	Sweep Speed Setting Knob	To set sweep speed
9		Output Attenuation Key	Press this key to set 0,20,40,or 60dB for output attenuation, the shining LED indicates the valid one.
10	50Ω	Output Connector	Signal voltage output terminal, 50Ω impedance, max 20Vp-p.

11	TTL OUT	TTL Output Connector	TTL level output terminal, 50Ω impedance.
12	AMPLITUDE	Output Amplitude Setting Knob	Cooperate with "9" to set output signal amplitude.
13	INPUT	Counter Input Connector	external frequency test
14	EXT/ATT/LPF	INT/EXT Attenuation Lowpass Filter Key	Press this key to select external signal for counter; to attenuate the EXT signal in 20dB; to connect an 100KHz LPF for EXT signal. These states are indicated by corresponding shining LEDs. If there is no EXT signal at"13", display "20" display 0 after 20 seconds.
15	WIDTH	Sweep Width Setting Knob	For setting frequency sweep width.
16		Symmetry Setting Knob	When the SYMMETRY LED is shining set this knob to change the symmetry of output waveform.

17		Amplitude Display	For displaying output signal frequency or external tested frequency. When the counter is working the GATE LED is flashing, when frequency is more than 20MHz the OVFL LED is shining. The Hz and KHz are unit LEDs, the shining one is valid.
18	SYMMETRY	Symmetry Key	Press this key when the LED is shining the "16" is valid for setting waveform symmetry from 20:80 to 80:20
19		Frequency Setting Knob	Set it clockwise to make frequency up and counterclockwise down.
20		Frequency Display	For displaying output signal frequency or external tested frequency. When the counter is working the GATE LED is flashing, when frequency is more then 20MHz the OVFL LED is shining. The Hz and KHz are unit LEDs, the shining one is valid.

4.2 Rear paned

See Fig.3

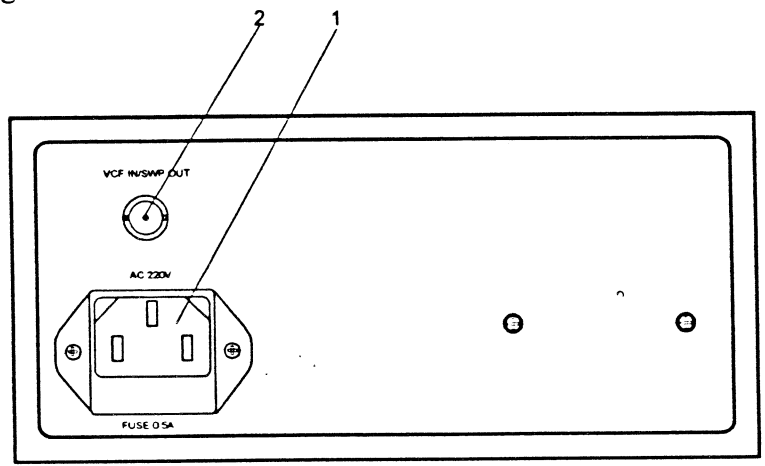

Fig.3 Rear panel

(1) Power socket with fuse holder: for AC 200V input and holding 0.5A fuse

(2) VCF IN/SWP OUT connector:

a) External VCF input (0~-5V)

b) Sweep signal output when sweep mode is set.

4.3 Calibration and Service

Suggest to make a calibrating every three months, to keep good performance of the unit.

4.3.1 Distortion calibrating

Output signal is sine waveform, 1KHz with max amplitude, use a distortion meter for test, adjust RP102 to make the distortion meet the specification.

4.3.2 Amplitude calibrating

Output signal is same as 4.3.1, use an oscilloscope to test peak to peak amplitude, adjust RP601 to make the output display meet the specification.

4.3.3 Counter calibrating

Set counter in "EXT" mode, connect an exact 10MHz signal to INPUT of counter, adjust C607 to make the frequency display "20" show 9999.9KHz. Then set the amplitude of 10MHz signal to 100mVrms and adjust RP401 to make display 9999.9KHz yet.

4.4 Servicing

If some trouble is occurred, should service by qualified personnel.

5. Accessories

Instruction Manual	1
Test Cable	1
Fuse (0.5A)	2
Power Cord	1
Product Certificate	1