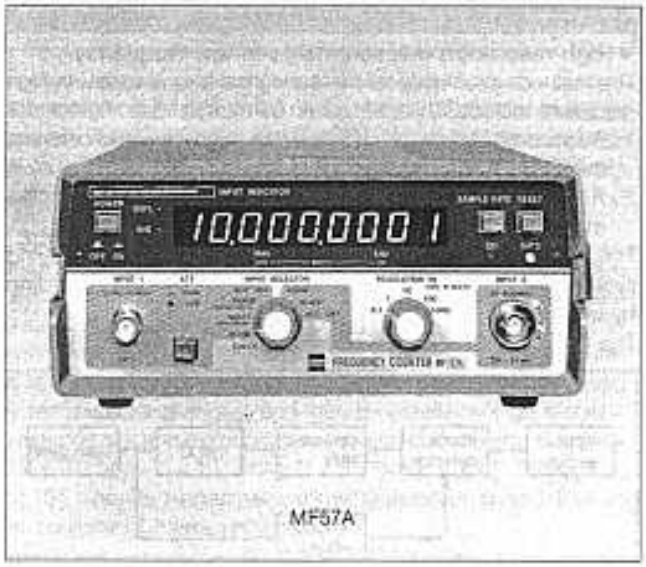
ELECTRONIC COUNTERS

FREQUENCY COUNTERS

MF57A/58A, MF63A/64A

10 Hz to 600 MHz, 10 Hz to 1 GHz



MF57A

The MF57A/58A and MF63A/64A are special frequency counters designed for a wide range of applications, in addition to ordinary frequency measurement, with provision of the BURST position for measurement of intermittent frequencies and of the MULTI position for measurement of low frequencies with a resolution of 0.0001 Hz.
Its high-reliability design includes the use of special LSIs and LED displays.

Features

- Wideband:
  MF57A, MF58A (10 Hz to 600 MHz) direct counting
  MF63A, MF64A (10 Hz to 1000 MHz) direct reading
- High sensitivity design: 10 mV
- Burst signal measurement
- High resolution measurement of audio frequencies
- Input indicator
- Super-high reliability design with unique LSI
- Robust die-cast cabinet
- Crystal oscillator of high stability (5×10^{-10}/day)(option)
- Reduced time needed for counting
  For obtaining resolution of 1 Hz, only 1 second is needed at 30 to 600 MHz in input frequency with the MF57A/MF58A, and only 4 seconds at 30 to 1000 MHz in input frequency with the MF63A/MF64A.
- Three types of power supply (AC, DC or rechargeable batteries) can be used for operation (MF58A, MF64A)

Performance

• Large green LED display

A green, large LED (light emitting diode) with a light emitting spectrum close to the human-eye luminosity curve is used as the standard component.
Although red is conspicuous, watching it for a long time on a production line causes eye fatigue.

• Decimal point indication at two points

Two decimal points enable easy reading of the display: the two points correspond to MHz and kHz, and to kHz and Hz under high resolution measurement of low frequencies.

• Non-reflective filter

A special non-reflective filter, prevents eye-strain due to reflections.

• High sensitivity design

MF57A/MF58A: 10 mV (10 Hz to 600 MHz), MF63A/MF64A: 10 mV (10 Hz to 30 MHz, 50 to 700 MHz)/25 mV (30 to 1000 MHz).
This counter series is capable of stable measurement of low-level input signals.
The input impedance at Input 1 (10 Hz to 60 MHz) is high at over 1 MΩ shunted by less than 25 pF, so that measurement has a minimum effect on the circuit under measurement. For a high impedance circuit, high signal level, or high noise level environment, it is convenient to use a probe for the oscilloscope.

• Perfect input protective circuit

The high frequency input circuit is protected by a high frequency fuse against high level signals. If the fuse is blown by accident or error, it can be easily replaced by removing the input connector from the front panel.

• Convenient input indicator

A LED 10-point system indicator is provided. This counter is designed to operate correctly if one point of the input indicator is alight. The input indicator displays the input level simultaneously with the frequency measurement on a production line.

• Five crystal oscillator types

There is a selection of five types of crystal oscillators:

Type	Stability	Remarks
Standard	$\leq 2 \times 10^{-9}$/day	Mounted on MF57A/MF58A/ MF63A/MF64A
Option 01	$\leq 5 \times 10^{-9}$/day	
Option 02	$\leq 2 \times 10^{-9}$/day	
Option 03	$\leq 5 \times 10^{-10}$/day	The highest stability in this class
Option 04	$\leq 7 \times 10^{-7}$/month	TCXO*1 usable upon turning on the power supply

*1 Temperature compensated crystal oscillator

The crystal oscillator generating the measurement reference time is the heart of the frequency counter. Anritsu crystal oscillators are high grade. The standard crystal oscillator is highly stable at $\leq 2 \times 10^{-9}$/day in aging rate. The stability of this oscillator after one week, one month, and one year is $\leq 4 \times 10^{-8}$/week, $\leq 8 \times 10^{-8}$/month and $\leq 1 \times 10^{-7}$/year, respectively.
The amount of variation after one week, one month, and one year is not 7 times, 30 times and 365 times daily variation. Thus the crystal oscillator used is really excellent in performance.
Moreover, its starting characteristic after 5 minutes is less than 3×10^{-8}/day, as can be seen from the graph.

• Switching between internal and external reference time
Oscillators of 2×10^{-8}/day, 5×10^{-9}/day, 2×10^{-9}/day, 5×10^{-10}/day and 7×10^{-7}/month (TCXO) stability are provided as the internal reference oscillator. The frequency counter can also be operated with an external reference signal. If measurement of higher accuracy is needed, the switch on the back can be used.

• High resolution measurement of audio frequencies (Multiplication function making the use of an audio frequency counter dispensable)
A frequency multiplication circuit using phase-lock loop technology is used. An input signal of 50 to 10 Hz is multiplied by 1000 times, so a display of 50.000 Hz to 10.000000 kHz can be obtained in one second and thus, measurement of high resolution of 0.001 Hz can be performed. This can be utilized for adjustment and inspection of a paging system, telemeter, low frequency filter, etc.

• Burst signal measurement
Conventional frequency counters are inadequate for measuring frequencies of discontinuous waveforms such as pulse-modulated signals.
The conventional frequency counter opens the gate by self-timing so there is no guarantee of the gate opening while the signal exists.
The present frequency counter opens the gate in synchronization with the beginning of the signal by confirming the existence of the signal, so that it is capable of accurately measuring the frequency of an intermittent signal.*2 At the same time, the signal lamp lights.
Consequently, this frequency counter is suitable for measuring the frequency of an intermittent signal sent by a telemeter or for confirming such a signal.

*2: Only when the signal exists continuously over the gate time.

• AGC ON-OFF function
The AGC is suitable for measuring a poor S/N signal but it may hinder measuring amplitude-modulated signals. For measuring amplitude-modulated signals, the function of turning off the AGC is added to expand the range of objects of measurement.

• Constant effort for realizing high reliability
Anritsu led the measuring instrument industry by initially developing the vacuum tube, transistorized, and IC frequency counters in Japan. Anritsu pioneers research and development to improve reliability.
The reliability of the frequency counter has improved markedly as vacuum tubes have been superceded by transistorized and IC types. To further improve reliability, Anritsu has integrated 3,500 elements into one LSI, which is the largest size in the world for frequency counters.

• Robust die-cast cabinet
The die-cast cabinet which was popular in the former LSI frequency counter series is also used for this series. The cabinet is so robust that it will not break even if dropped.

• Remote control
This series is remotely controllable for all functions.
Each function is controlled by sending the signal to the corresponding control terminal.
These frequency counters can be controlled with a personal computer via a GP-IB (IEEE-488/IEC 625-1, 24 pins) bus in conjunction with the MH037A BCD Converter.

Specifications

Model			MF67A	MF58A	MF63A	MF64A
Frequency range			10 Hz to 600 MHz		10 Hz to 1000 MHz	
Frequency range	Input 1	NORMAL, AGC OFF positions	10 Hz to 60 MHz			
		MULTI position	50 Hz to 10 kHz			
		BURST position	100 kHz to 60 MHz			
	Input 2	Whole functions	30 to 600 MHz		30 to 1000 MHz	
Input voltage range	Input 1	NORMAL, AGC OFF and BURST positions	At 0 dB in ATT setting: 10 mV to 10 Vrms 10 mV to 1 Vrms 25 mV to 1 Vrms	At 20 dB in ATT setting: 100 mV to 100 Vrms (10 Hz to 10 kHz) 100 mV to 10 Vrms (10 kHz to 30 MHz) 250 mV to 10 Vrms (30 to 60 MHz)		
		MULTI position	At 0 dB in ATT setting: 100 mV to 1 Vrms	At 20 dB in ATT setting: 1 to 100 Vrms		
	Input 2	NORMAL position	10 mV to 5 Vrms		10 mV to 5 Vrms (50 to 700 MHz) 25 mV to 5 Vrms (30 to 1000 MHz)	
		BURST, AGC OFF positions	10 mV to 1 Vrms		10 mV to 1 Vrms (50 to 700 MHz) 25 mV to 1 Vrms (30 to 1000 MHz)	

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Input impedance	INPUT 1		≧1 MΩ shunted by ≦25 pF			
	INPUT 2		50 Ω			
Resolution	NORMAL, AGC OFF, BURST positions		0.1 Hz, 1 Hz, 10 Hz, 100 Hz, 1 kHz			
	MULTI position		0.0001 Hz, 0.001 Hz, 0.01 Hz This range is used for MULTI position			
Gate time	NORMAL, AGC OFF, BURST positions		10 s, 1 s, 0.1 s, 10 ms, 1 ms	10 s, 1 s, 0.1 s, 10 ms, 1 ms (INPUT 1) 40 s, 4 s, 0.4 s, 40 ms, 4 ms (INPUT 2)		
	MULTI position		10 s, 1 s, 0.1 s			
Unit indication	NORMAL, AGC OFF, BURST positions		Two decimal points are lit at positions corresponding to MHz and kHz.			
	MULTI position		Two decimal points are lit at positions corresponding to kHz and Hz.			
Accuracy			±1 count ± time base accuracy			
Digit			9 digits			
Display			7-segment LED, zero-blanking, memory display			
Sample rate			Approximately 0.08 s, 0.8 s, 2 s and ∞ (when set at ∞, it is held till resetting)			
Reference crystal oscillator	Frequency stability	Warm up	≦5 × 10⁻⁸/day after 30 min. warm-up			
		Aging rate	≦2 × 10⁻⁸/day			
		Temperature characteristic (25° ± 35°C)	±5 × 10⁻⁸			
	Output	Frequency	10 MHz			
		Voltage	≧2 Vp-p (emf)			
		Impedance	≦300 Ω			
Power	AC 90 to 140 V, AC 180 to 250 V, 50/60 Hz		≦33 VA at starting, and ≦28 VA in steady state (100/200 V)			
	DC		–	+10 to +30 V	–	+10 to +30 V
Ambient temperature, rated range of use			0° to 45°C			
Dimensions			85H × 205W × 260D mm			
Weight			≦4 kg	≦4.3 kg	≦4 kg	≦4.3 kg
Accessories supplied			One coaxial cable (3CA-P2-RG58A/U-3CA-P2): 1 m			

The aging rate of the standard type crystal oscillator is ≦4 × 10⁻⁸/week, ≦8 × 10⁻⁸/month, and ≦1 × 10⁻⁷/year.

Options

Option No.	Item	Remarks			
01	Crystal oscillator	Aging rate	≦5 × 10⁻⁹/day	Temperature characteristics (25° ± 35°C)	±5 × 10⁻⁸
02			≦2 × 10⁻⁹/day		±1.5 × 10⁻⁸
03			≦5 × 10⁻¹⁰/day		±5 × 10⁻⁹
04			≦7 × 10⁻⁷/month		±1 × 10⁻⁸
05	BCD output				
06	Remote control				

Optional accessories

Item		Order number	Remarks
Probe		J0001	This probe is used for measuring high level frequencies such as transmitter output signals. Transmitter output range: 1 to 200 W Frequency range: 10 kHz to 30 MHz
Battery Pack MZ30B		–	Mount this pack in the lower part of the counter body. An overdischarge protection circuit is provided.
Battery Charger MZ31B		–	Use to recharge the battery in the Battery Pack MZ30B.
Carrying Bag	Large type	B0003	For counter only
	Small type	B0002	For counter with battery pack
Fuse Element MP513A		–	One set has five fuses.
Digital Printer MH014A		–	8 digits, 3 lines/s. Dimensions: 177H × 216W × 337D mm
Battery for MZ30B		Z0016	One set has four batteries.
Power Cord for Car Battery		J0067	3 m
Cord for Digital Output		J0068	With 50 poles, 57-30500 connectors on both ends
Cord for Remote Control		J0069	With 36 poles, 57-30360 connectors on both ends

Ordering information

Please specify model/order number, name and quantity when ordering.

Model number/ Order number	Name		Remarks
	Main frame		
MF57A	Frequency Counter		10 Hz to 600 MHz
MF58A	Frequency Counter		10 Hz to 600 MHz
MF63A	Frequency Counter		10 Hz to 1 GHz
MF64A	Frequency Counter		10 Hz to 1 GHz
	Standard accessories (common)		
J0133A	Coaxial Cord, 1 m:	1 pc	3CA-P2-RG-58A/U-3CA-P2
	Fuse for MF□□A, 1 A:	1 pc	MF61NN250V1AAC05
	Fuse for MF□□A, 1 A:	1 pc	MF51NN250V1AAC05
	Fuse for MF□□A, 2 A:	1 pc	MF51NN250V2ADC01
	Fuse for MF□□A, 0.5 A:	1 pc	MF51NN250V0.5ADC01
	MF57A/58A/63A/64A Operation Manual:	1 copy	
	Standard accessories of the MF58A/MF64A		
J0138	AC Power Cord:	1 pc	
J0303	DC Power Cord:	1 pc	
	Fuse for MF58A/64A, 3.15 A:		MF61NN250V3.15AAC05
	Options		
MF□□A-01	Crystal Oscillator		Aging rate: $\leq 5 \times 10^{-9}$/day
MF□□A-02	Crystal Oscillator		Aging rate: $\leq 2 \times 10^{-9}$/day
MF□□A-03	Crystal Oscillator		Aging rate: $\leq 5 \times 10^{-10}$/day
MF□□A-04	Crystal Oscillator		Aging rate: $\leq 7 \times 10^{-7}$/month
MF□□A-05	BCD Output		
MF□□A-06	Remote Control		
	Application equipment		
MH014A	Digital Printer		Opt-05 required
MH648A	Pre-amplifier		0.1 to 1200 MHz
MZ30B	Battery Pack		For MF58A, MF64A
MZ31B	Battery Charger		For MZ30B
	Application units		
MP613A	Fuse Element		5 pcs/set
J0001	Probe		For transmitter, 10 kHz to 30 MHz
B0002	Carrying Case (small)		For counter alone
B0003	Carrying Case (large)		For counter, with battery pack
Z0016	Battery for MZ30B		4 batteries/set
J0067	Power Cord for car battery		3 m
J0068A	Cable for digital output, 1 m:		50-pole, 57-30500 connectors on both ends
J0069A	Cable for remote control, 1 m:		36-pole, 57-30360 connectors on both ends