New Anritsu synthesizer technology permits frequency to be set with a resolution of 0.01 Hz across the full frequency range. And the non-harmonic spurious is better than –100 dBc for reliable measurement at any frequency.

A unique low-noise YIG oscillator produces a high-purity signal with SSB phase noise of better than –130 dBc/Hz (1 GHz, 20 kHz offset) making these signal generators for interference testing of radio receivers and as sources for various local and reference signals.

Features
- 0.01 Hz, 0.01 dB setting resolution
- High signal purity (–100 dBc spurious)
- Versatile modulation functions

Performance
- High-stable carrier frequency
  Carrier frequency is produced by a high-stability crystal oscillator. Furthermore, the carrier frequency remains phase locked even at frequency modulation. Then frequency calibration for testing FSK modulation receivers such as paging system is not necessary.

- High output
  A stable signal with an output of +17 dBm can be output across the full frequency range to drive a variety of local signal sources and power amplifiers. In addition, an overdrive level up to +23 dBm can be set so as to make full use of the internal amplifier capability. In case the amplifier’s output power comes up to the limitation and output power does not reach the set value, a status message is displayed. This is useful for confirming the output limits.
Various modulation types
Up to three internal AF signal sources can be incorporated by adding options to the standard sine-wave oscillator (1 kHz, 400 Hz). The AF synthesizer (Option 21) is a digital synthesizer for generating sine-wave, triangular, square and sawtooth waveforms; it can also be used as a function generator in addition to a modulation signal source. In addition to permitting simultaneous one route AM and two routes FM modulation, the modulation factor and polarity can be set independently. High-speed pulse modulation (Option 11) is possible using an external modulation signal (TTL level). The output can be used for various burst signals with an ON/OFF ratio of more than 80 dB, as well as a pseudo-random signal for radar.

GPIB Only-Mode linked operation
Two sets of MG3641A/3642A can be linked and operated without an external controller using the Frequency and Output Level Only Modes. The Frequency Only Mode in the frequency offset functions is used for evaluating the characteristics of mixers. The Level Only Mode is useful for evaluating the cross-modulation characteristics of non-linear devices such as amplifiers.
### Specifications

**MG3641A/3642A (main frame)**

#### Carrier frequency

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy: Reference oscillator accuracy</th>
<th>Frequency</th>
<th>Aging rate</th>
<th>Start-up characteristics</th>
<th>Temperature stability</th>
<th>External reference input:</th>
<th>Buffer output:</th>
<th>Switching time</th>
</tr>
</thead>
<tbody>
<tr>
<td>125 kHz to 1040 MHz (MG3641A)</td>
<td>0.01 Hz</td>
<td>±(0.3% of FM setting deviation + 5 Hz)</td>
<td>10 MHz</td>
<td>±5 x 10⁻⁹/day</td>
<td>1 x 10⁻⁷/10 min (for 24 h after power on)</td>
<td>±3 x 10⁻⁷ (0° to 50°C)</td>
<td>±0.7 Vp-p/50Ω (AC coupling)</td>
<td>10 MHz, TTL level</td>
<td>&lt;40 ms (external control)</td>
</tr>
</tbody>
</table>

#### Output

| Range              | Resolution | Accuracy: Pulse modulation on/off | Frequency | Impedance | Switching time | Safety mode: Prevent spike signal generation when operating mechanical-type attenuator | Interference radiation | Distortion | Residual AM | Residual FM (CW mode) | Spurious (CW mode, 20 kHz of fset) | Harmonics: Non-harmonic: SSB phase noise (CW Mode, 20 kHz offset): Residual FM (CW mode): 300 Hz to 15 kHz demodulation band: 50 Hz to 15 kHz demodulation band: 50 Hz to 10 kHz deviation: 50 Hz to 5 kHz deviation: 50 Hz to 1 kHz deviation: 50 Hz to 200 Hz deviation: 50 Hz to 20 kHz deviation: 50 Hz to 2 kHz deviation: 50 Hz to 0.4 MHz deviation: DC: 20 Hz: Lower limit frequency |
|--------------------|------------|-----------------------------------|-----------|------------|----------------|------------------------------------------------|----------------------|------------|-------------|----------------------|--------------------------------|-----------------------------------------|------------------------------------------------|-----|
| <143 dBm (settable range: <143 to +23 dBm) | 0.01 dB | ±(0.5 dB, ±1.0 dB (pulse modulation on/off)) | 10 Hz (4.01 to 10 kHz deviation) | ±3 dB (+12 dBm, ±3 dB (<127 dBm)) | ±50 ms (±3 dB) | <100 ms (level safety mode), <10 ms (continuous mode) | ±1.5 µV (at output frequency) | <–45 dB | ±10 Hz | ±10 Hz | ±10 Hz | ±10 Hz |

#### Signal purity

| Range              | Resolution | Accuracy: ±(5% of set value + 2%) | Frequency | Impedance: 50 Ω (N connector), VSWR: 16 MHz, 22.5 kHz deviation, source: Int 1 (1 kHz) | Switching time: ±(50% of set value + 10%) | Frequency characteristics (at 0 dBm): ±0.5 dB | Frequency: 10 MHz, source: external DC coupling mode, modulation rate: 20 Hz: Upper limit frequency Lower limit frequency Carrier frequency |
|--------------------|------------|-----------------------------------|-----------|--------------------------|------------------------------------------------|-------------------------------|----------------------|------------------|-----------------|-----------------|------------------|------------------|
| ±7 dBm             | 0.1%       | ±0.4 MHz, ±7 dBm, ±90% AM, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band | ±30%      | ±0.4 MHz (30% AM), ±30 dB (90% AM) | ±0.4 MHz, ±7 dBm, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band | ±2 kHz (±1 dB bandwidth) | ±0.4 MHz, ±7 dBm, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band | ±30% AM: 30% AM: 90% AM, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band | ±0.4 MHz, ±7 dBm, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band | ±10 Hz | ±0.4 MHz, ±7 dBm, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band | ±0.4 MHz, ±7 dBm, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band |

#### Amplitude modulation

<table>
<thead>
<tr>
<th>Carrier frequency</th>
<th>Upper limit frequency</th>
<th>Lower limit frequency</th>
<th>Distortion: ±40 dB (30% AM), ±30 dB (90% AM)</th>
<th>±0.4 MHz, ±7 dBm, source: Int 1 (1 kHz)</th>
<th>±0.4 MHz, ±7 dBm, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band</th>
<th>Modulation signal polarity: Positive/negative switchable</th>
</tr>
</thead>
<tbody>
<tr>
<td>±7 dBm</td>
<td>±30% AM: 30% AM: 90% AM, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band</td>
<td>±10 Hz</td>
<td>±0.4 MHz, ±7 dBm, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band</td>
<td>±0.4 MHz, ±7 dBm, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band</td>
<td>±0.4 MHz, ±7 dBm, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band</td>
<td>±0.4 MHz, ±7 dBm, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band</td>
</tr>
</tbody>
</table>

#### Frequency modulation

<table>
<thead>
<tr>
<th>Frequency deviation</th>
<th>Resolution</th>
<th>Accuracy: ±(5% of set value + 2%)</th>
<th>Frequency characteristics (at 0 dBm): ±0.5 dB</th>
<th>±0.4 MHz, ±7 dBm, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band</th>
<th>±0.4 MHz, ±7 dBm, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band</th>
<th>±0.4 MHz, ±7 dBm, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band</th>
</tr>
</thead>
<tbody>
<tr>
<td>±50 kHz (5.0 to 5 kHz deviation)</td>
<td>±0.4 MHz, ±7 dBm, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band</td>
<td>±0.4 MHz, ±7 dBm, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band</td>
<td>±0.4 MHz, ±7 dBm, source: Int 1 (1 kHz), 300 Hz to 3 kHz demodulation band</td>
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</tr>
</tbody>
</table>

### Pulse modulation

According to option specifications

Continued on next page
### Modulation signal source

| Internal modulation (Int 1) | Frequency: 400 Hz, 1 kHz  
|                           | Accuracy: Same as reference oscillator accuracy  
| Internal modulation (Int 2, Int 3): According to option specifications  
| External modulation (Ext 1, Ext 2): Proper input level: 2 Vp-p approx.  
|                            | Input impedance: 600 Ω, BNC connector  
| Coupling: DC/AC switchable |

### AF output

| Output signal source: One of internal (Int 1, Int 2, Int 3), and external (Ext 1, Ext 2)  
| Output level: 0 to 4 Vp-p  
| Output level resolution: 1 mVp-p  
| Output level accuracy: ±(5% of setting level + 2 mVp-p)  
| Source: Int 1 (1 kHz)  
| Impedance: 600 Ω, BNC connector

### Simultaneous modulation

Excluding amplitude modulation and pulse modulation\(^*\) combination, simultaneous modulation, modulation rate, deviation independently settable.

### Sweep function

| Sweep parameters: Frequency, output level, memory  
| Frequency sweep (start/stop): Linear (specified step size and number of points), Log (multiplying factor: 1%)  
| Frequency sweep (center/span): Linear (specified step size and number of points)  
| Level sweep (start/stop, center/span): dB (specified step size and number of points)  
| Sweep mode: Start/stop  
| Sweep mode: Auto, single, manual  
| Sweep time  
| Setting range: 1 ms to 600 s/point  
| Resolution: 10 μs/point  
| Auxiliary output  
| X-Out: Ramp waveform (sweep start point: 0 V, sweep end point: +10 V), BNC connector (rear panel)  
| Z-Out: TTL level (H-level at sweeping), BNC connector (rear panel)  
| Blank-Out: TTL level (L-level at switching), BNC connector (rear panel)  
| Maker-Out: TTL level (H-level at marker match), BNC connector (rear panel)

### Functions

| Relative display: Carrier frequency, output level  
| Offset display: Carrier frequency, output level  
| Memory: Saves/recalls 1000 panel settings; recall contents: panel, frequency, frequency/output level selection  
| Trigger: An external trigger signal (rear panel BNC connector, TTL level) can be used to execute a previously programmed operation sequence (except power switch, preset key, local key, rotary knob operation). Max. number of sequence steps of trigger program: 20 steps  
| Back-up: The panel settings before power-off are back-upped and displayed again at power-on, except data-input contents, GPIB data contents, remote settings, RPP operations  
| GPIB control: All functions, except power switch, local key, rotary knobs, and resolution keys (Interface: SH1, AH1, T5, L3, TE0, SR1, RL1, PP0, DC1, DT1, C0, E2)

### Reverse power protection

Max. reverse input power: \( \leq 50 \) W (\( \leq 1040 \) MHz), \( \leq 25 \) W (>1040 MHz, MG3642A only), \( \pm 50 \) Vdc

### Power supply

\( **2\) Vac (+10%, −15%), 47.5 to 63/380 to 420 Hz, \( \leq 200 \) VA

### Temperature

Operating: 0º to +50ºC, Storage: −30º to +71ºC

### Dimensions and mass

320 (W) x 177 (H) x 451 (D) mm, \( \leq 20 \) kg

### EMC

EN55011: 1991, Group 1, Class A  
EN50082-1: 1992  
Harmonic current emissions EN61000-3-2: 1995 Class D

### Safety

EN61010-1: 1993 (Installation Category II, Pollution Degree II)

\(*1\): Can be changed to \( 5 \times 10^{-10} \)/day using reference crystal oscillator (Option 01)  
\(*2\): Only with pulse modulator (Option 11) installed  
\(*3\): External DC coupling; DC, External AC coupling: 20 Hz  
\(*4\): Specify a nominal voltage of either 100 V and 240 V when ordering; the maximum operating voltage is 250 V.
### Options

| Option 01: Reference oscillator | Frequency: 10 MHz  
Aging rate: $5 \times 10^{-10}$/day  
Temperature stability: ±5 x $10^{-9}$ (0˚ to 50˚C) |
| Option 11: Pulse modulator | Frequency: 125 kHz to 2080 MHz  
On/off ratio: >80 dB  
Rise/fall time: <100 ns  
Min. pulse width: <500 ns  
Pulse repetition rate: DC to 1 MHz  
Max. delay time: <100 ns  
Overshoot, ringing: <20%  
Video feed-through: <20%  
Pulse modulation input: 50/600 Ω, TTL (positive logic), BNC connector (rear panel) |
| Option 21: AF synthesizer | Frequency: 0.01 Hz to 400 kHz (sine-wave), 0.01 Hz to 50 kHz (triangular, square and sawtooth waveforms)  
Resolution: 0.01 Hz  
Waveform: Sine-wave, triangular, square and sawtooth waveforms  
Frequency accuracy: Same as reference oscillator accuracy |
| Option 22: FSK encoder | Frequency shift  
(Data 2₁, Data 2₀) = (0, 0): –frequency deviation setting  
(Data 2₁, Data 2₀) = (0, 1): –frequency deviation setting/3  
(Data 2₁, Data 2₀) = (1, 0): +frequency deviation setting  
(Data 2₁, Data 2₀) = (1, 1): +frequency deviation setting/3  
Frequency decision  
Free: Frequency shift simultaneously with data input  
Rise trigger: Frequency shift at external clock rise time  
Fall trigger: Frequency shift at external clock fall time  
Baseband filter  
Filter type: 10-th order Bessel filter  
Cut-off frequency: 100 Hz to 30 kHz (~3 dB)  
Setting resolution: Upper 2 digits  
Frequency deviation accuracy: Depends on frequency modulation deviation accuracy of main frame (at by-pass to baseband filter)  
External modulation input  
Data 2₁/2₀: TTL level (pull-down), BNC connector (rear panel)  
External clock input: TTL level (pull-up), BNC connector (rear panel) |

### Ordering information

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

<table>
<thead>
<tr>
<th>Model/Order No.</th>
<th>Name</th>
</tr>
</thead>
</table>
| MG3641A       | Main frame  
Synthesized Signal Generator |
| MG3642A       | Synthesized Signal Generator |
| J0017F        | Power cord, 2.5 m:  
1 pc |
| B0325         | GPIB connector shielded cap:  
1 pc |
| F0013         | Fuse, 5 A (for 100 Vac mains):  
2 pcs |
| F0012         | Fuse, 3.15 A (for 200 Vac mains):  
2 pcs |
| W1137AE       | MG3641A/3642A operation manual:  
1 copy |
| W1137BE       | MG3641A/3642A service manual:  
1 copy |
| MG3641A-[A-01] | Reference oscillator (aging rate: $5 \times 10^{-10}$/day) |
| MG3641A-[A-11] | Pulse modulator (pulse repetition rate: DC to 1 MHz) |
| MG3641A-[A-21] | AF synthesizer (0.01 Hz to 400 kHz, resolution: 0.01 Hz) |
| MG3641A-[A-22] | FSK encoder (2 or 4 levels FSK) |
| J0576B        | Coaxial cord (N-P•5D-2W•N-P), 1 m |
| J0127B        | Coaxial cord (BNC-P•RG58A/U•BNC-P), 1 m |
| J0007         | GPIB cable, 1 m |
| J0008         | GPIB cable, 2 m |
| MP51A         | Pad |
| MP52A         | Pad |
| MA1612A       | Four-Point Junction Pad |
| MP721[ ]      | Attenuator (DC to 12.4 GHz) |
| B0395C        | Rack mount kit (EIA/IEC) |
| B0329G        | Front cover |
| B0412A        | Carrying case (with casters and B0329G front cover) |
| B0330B        | Tilt bail |