



QM1006-25M-20G | 25 MHz to 20 GHz PLL-based Synthesizer

Typical Applications

- Microwave/RF Frequency Source
- Automated Test Equipment (ATE)
- Laboratory Test Equipment
- OEM System Component
- Communication systems, SATCOM
- Radar systems
- LO Reference Source
- Phase-locked multi-channel applications
- Low cost

RF Frequency Range

QM1006-25M-20G 25 MHz to 20 GHz

Output Power

>10 dBm Base unit

Attenuation Range

30 dB 1 dB steps

Switching Speed

~ 10 ms Base unit
~ 2 us Fast tuning option

Features

- 25 MHz to 20 GHz Phased-Locked Loop (PLL) based synthesizer
- Frequency agile across entire tunable band
- Stable internal OCXO frequency reference
- External frequency reference input/output for phase-locking multiple sources
- TCP/IP and USB control via external GUI or VISA commands
- Low cost design

Form-Factor

- 1U 19" Rack module
- Stackable



QM1006-25M-20G 1U 19" Rack-Mount

General Description

The QM1006-25M-20G PLL-based frequency synthesizer is a frequency agile microwave/RF synthesizer source capable of sweeping over approximately three decades of bandwidth from 25 MHz to 20 GHz. This 19" rack-mount synthesizer builds off of our line of low-cost QM2010 USB frequency synthesizers, but greatly expands the frequency tuning range in a single box, adds a stable internal oven-controlled crystal oscillator (OCXO) frequency reference source, and adds a TCP/IP interface to the existing USB control available with the QM2010 synthesizers. Synchronization and phase locking with external test equipment or additional synthesizer units is greatly simplified with both 10 MHz and 100 MHz frequency reference outputs, as well as a frequency reference input which may be specified and provided anywhere from 10 MHz to 100 MHz.

In addition to the wider tuning bandwidth and stable internal OCXO reference compared to the QM2010 synthesizers, the QM1006-25M-20G allows for the possibility of additional filtering and power conditioning to match customer requirements, where space for the additional components required to meet this performance is generally not an issue inside the 19" rack box. Cost of the unit is therefore commensurate with the desired customer specs. We also now have the ability to provide an optional fast-tune capability (~2 us) across the entire band via an external DB-37 rear-panel TTL interface.

For price, delivery, and to place orders, please contact Quonset Microwave:
315 Commerce Park Road, Unit 3, North Kingstown, RI 02852 Phone: 401-295-0062



Quonset Microwave
www.quonsetmicrowave.com

QM1006-25M-20G
25 MHz-20 GHz
PLL Synthesizer

The QM1006-25M-20G is controlled via USB or TCP/IP and uses VISA control drivers with the USBTMC protocol, enabling seamless integration into Windows®, Linux®, and Macintosh® environments. A Windows® GUI is provided.

All QM1006 Series specifications are customizable upon request. Please contact sales@quonsetmicrowave.com for more information. Detailed performance specifications are also available upon request.

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Electrical Specifications Base Unit

Parameter	Min.	Typ.	Max.	Units
RF Output Frequency Range	25 MHz		20 GHz	
Phase Noise, 1 KHz Offset	-82	-78	-72	dBc/Hz
Phase Noise, 10 KHz Offset	-81	-80	-77	dBc/Hz
Phase Noise, 100 KHz Offset	-79	-77	-76	dBc/Hz
Phase Noise, 1 MHz Offset	-103	-106	-106	dBc/Hz
Phase Noise, 10 MHz Offset	-120	-120	-119	dBc/Hz
Harmonics, 25 MHz - 2 GHz		-20		dBc
Harmonics, 2-20 GHz output		-40		dBc
In-Band Spurious, +/- 250 MHz		-60	-50	dBc
Wideband Spurious, 2-18 GHz		-50		dBc

Common Specifications

Parameter	Min.	Typ.	Max.	Units
Operating Voltage		+12		VDC
Current Draw			5	Amps
Tune Frequency Step Size				
Integer Mode*		400		MHz
Fractional Mode		100		KHz
External Reference Input	10		100	MHz
External Reference 1 Output		100		MHz
External Reference 2 Output		10		MHz

* With use of the internal 20 MHz reference with a reference divider of 1



QM1006 Series System Block Diagrams

Figure 1 depicts the system elements for the Base System. The system is controlled digitally via a microcontroller, which interfaces to a PC through USB or TCP/IP. The microcontroller outputs basic status messages on a 32 character Liquid Crystal Display (LCD) mounted on the faceplate of the unit.

The wide output bandwidth is provided through multiple synthesizers (Synth #1, Synth #2, Synth #3, etc.) which are phase-locked together and combined via an RF switch at the output. An internal low phase noise 20 MHz reference clock is phase-locked to all of the internal the synthesizers, with a BNC-F connector providing the option to lock to a user-provided external reference in the range of 10-100 MHz. The second and third BNC-F connectors output internally-generated 10 MHz and 100 MHz reference sources which may be used for daisy chaining multiple pieces of equipment or synchronizing multiple identical synthesizers. Switching between the internal and external reference clocks is controlled by the microcontroller and a reference selector switch. A DB-37 connector is provided on the back panel for optional fast-tuning that is controlled by an external TTL signal.

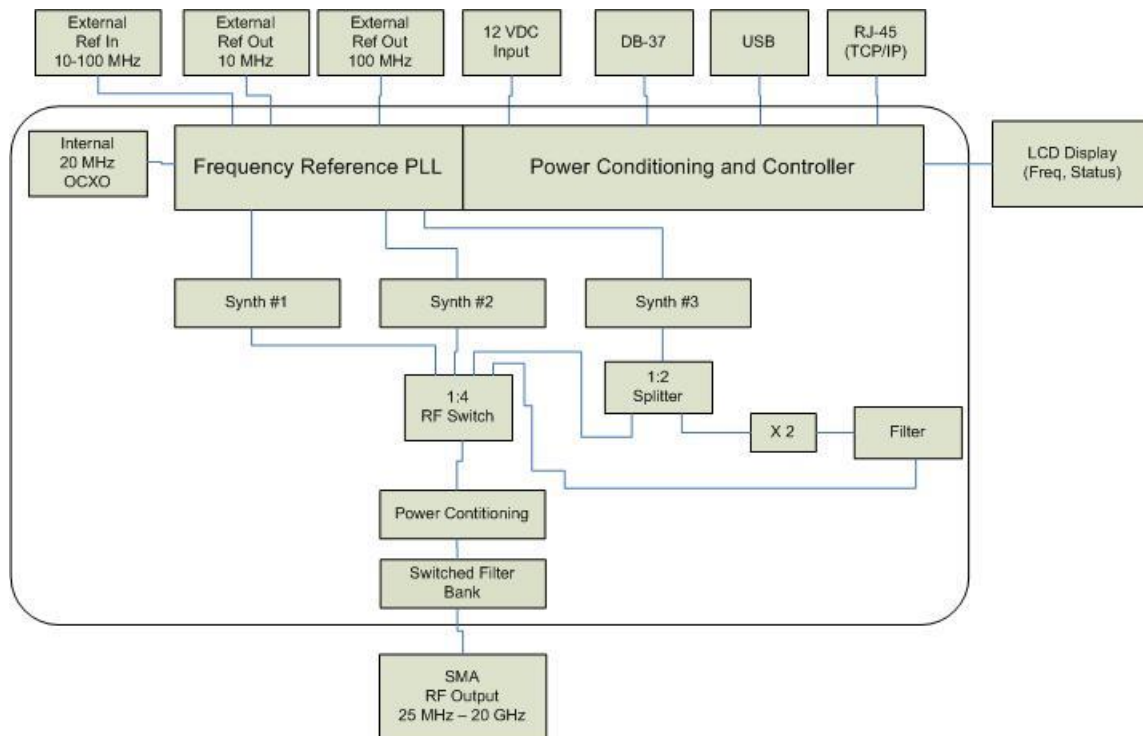


Figure 1. QM1006-25M-20G block diagram for the Base System.

Controlling QM1006 Synthesizer

QM1006 rack mount synthesizers have been designed to be VISA and USBTMC compliant. Any PC and operating system with Virtual Instrument Software Architecture (VISA) drivers installed should be able to communicate with QM1006 units. VISA drivers are provided by many Test and Measurement companies,



including Agilent Technologies, National Instruments, and Tektronix. USB and TCP/IP communication and command structure is discussed in detail in the frequency conversion programming manual. A lightweight GUI, supported in Windows®, will be provided for units with internal LOs, providing control of all commonly used commands.

Interface Connections

The necessary front and back panel input/output connections on a QM1006 Series frequency converter are summarized in Table 1. The front-panel connections are shown in Figure 2 while the rear-panel connections are shown in Figure 3. Interface connections for the optional Outdoor Unit are similar.

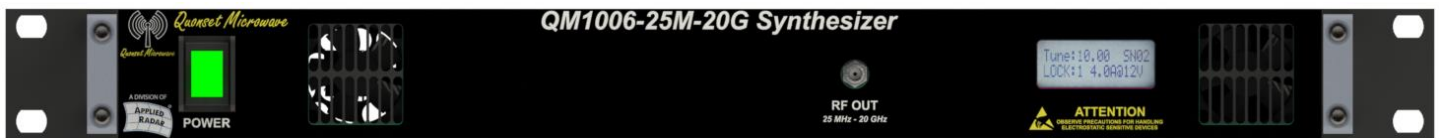


Figure 2. Front panel connections to QM1006-25M-20G.



Figure 3. Rear-panel connections to QM1006-25M-20G.

Table 1. Input and output connections for QM1004-25M-20G (19" Rack-Mount Form-Factor)

Parameter	Connector Style	Type	Location
RF Output	SMA	Female	Front Panel
Reference Input (10-100 MHz)	BNC	Female	Rear Panel
Reference 1 Output (100 MHz)	BNC	Female	Rear Panel
Reference 2 Output (10 MHz)	BNC	Female	Rear Panel
Int/Ext Ref Switch	Toggle	SPDT Switch	Rear Panel
USB/Ethernet Combined	RJ-45 (Ethernet) Type-A (USB)	Female	Rear Panel
Power Jack	2.1 mm Barrel (Opt 900) Or AC Adapter (Opt 901/902)		Rear Panel
TTL Input (Frequency Tuning, Attenuation Control, Lock Status)	DB-37	Female	Rear Panel

Power Interface

The QM1006 synthesizer has several options for power input. With Option 900, a DC input voltage of 15V applied at the 5.5mm power jack (2.5mm barrel) on the back panel of the instrument. An AC-DC power adapter is supplied with the unit. With Option 901, a 120 VAC input is supplied, and with Option 902, a 240 VAC input is supplied at the rear of the unit.

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QM1006-25M-20G
25 MHz-20 GHz
PLL Synthesizer

Absolute Maximums

Operating Temperature	+40 °C
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ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Ordering Information

QM1006-25M-20G-[Options]

where
Options= 901,902

Options

Various ordering options are described in the table below.

Option	Description
900	15 VDC power input with external AC/DC adapter
901	120 VAC, 60 Hz power input
902	230 VAC, 50 Hz power input

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