Test with Confidence™

MI-750 Receiver

THE MI-750 ADVANCED DIGITAL RECEIVER BRINGS TOGETHER THE BEST OF TODAY'S MICROWAVE RECEIVER TECHNOLOGIES TO OFFER A POWERFUL MEASUREMENT SYSTEM SOLUTION. THIS UNIQUE PRODUCT PROVIDES A SIGNIFICANT UPGRADE TO EXISTING RECEIVER SUBSYSTEMS WITH A THREEFOLD OFFERING OF PERFORMANCE, FLEXIBILITY AND BACKWARDS COMPATIBILITY.

- Industry leading performance with up to 4 M samples per second
- 135 dB dynamic range and -150 dBm sensitivity
- Selectable digital filtering for enhanced range performance
- Wide frequency range from 10 MHz to 110 GHz
- Smooth upgrade path for MI-1797 and other receivers
- Flexible modular architecture for system configurability and supportability

Performance

The MI-750 has been designed with the latest technology to be the fastest system receiver in the industry. With measurement speeds of 4,000,000 samples/second and built-in data management features, this advanced digital receiver has the throughput capacity to get detailed measurement results that earlier may have been prohibitively slow. Combined with this sampling performance is a world-class RF design offering receiver sensitivity to -150 dBm and enabling a high dynamic range of 135 dB. Even at full speed, useful performance is available with -84 dBm sensitivity at 4 M samples/second and a dynamic range of 69 dB. Accuracy is maintained with high amplitude and phase linearity, while broad RF power management features provide expanded system configurations. For more information about these performance enhancements, see the specifications table inside.

Flexibility

The MI-750 has been designed to maximize flexibility across a broad range of applications. For example, the addition of advanced DSP algorithms offer a choice of several digital filter types. These digital filters can optimize the receiver for high dynamic range or best selectivity or improved interference rejection. There is also more flexibility to trade-off the high speed of the instrument for increased dynamic range. A choice of 41 sample rates offers steps of 1.5dB sensitivity. Dynamic LO power equalization provides more versatility in selecting RF cables to remote mixers without requiring LO extenders. Ethernet interfaces for data and control create more options in equipment location and system optimization without sacrificing performance.

The MI-750 Receiver brings together the best of today's microwave receiver technologies to offer a powerful measurement system solution. This unique product provides a significant upgrade to existing receiver subsystems with a threefold offering of Performance, Flexibility and Backwards Compatibility.

The MI-750 Receiver

The MI-750 offers a modular design increasing system configuration options. There are five primary module types used in an MI-750 configuration:

0.1-26.5 GHz Module	Remote Mixing Module	Advanced Remote Mixing Module	Low Frequency Module	Local Oscillator Module
Provides built-in RF capability without external mixing from 0.1 to 26.5 GHz.	*Provides an external mixer interface for low-loss frequency coverage from 100MHz to 110GHz.*	*Provides dynamic LO power equalization for maximum remote mixing performance and flexibility.*	*Provides very low frequency capability, 10-150 MHz.*	*Provides a built-in LO source.*

These configuration options allow a wide variety of performance and the ability to maximize instrument value to meet the goals of a given measurement system. Common configurations include:

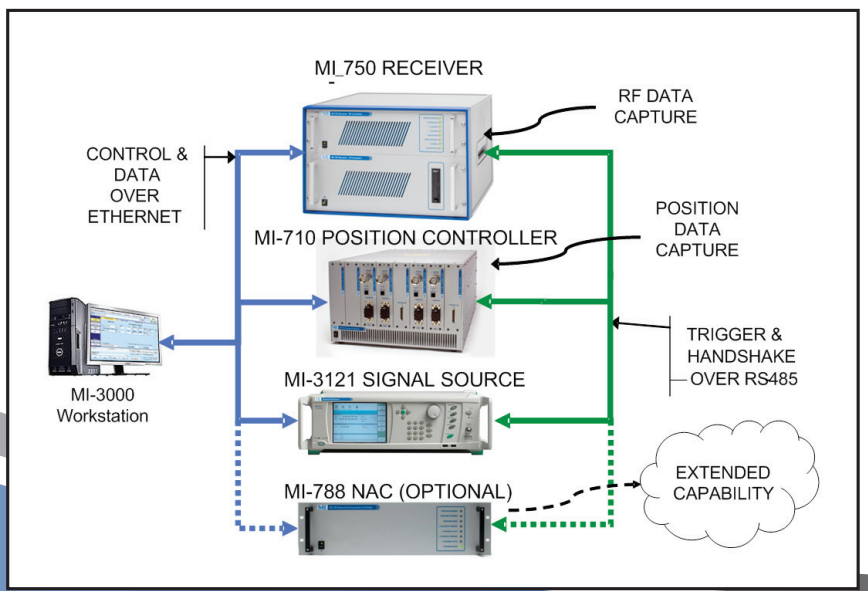
Model Number	Description
MI-750-R1	Receiver, Remote Mixing
MI-750-R2	Receiver, Remote Mixing, Low Frequency
MI-750-H1	Receiver, Advanced Remote Mixing
MI-750-H2	Receiver, Advanced Remote Mixing, Low Frequency
MI-750-L1	Receiver, 0.1-26.5 GHz
MI-750-L2	Receiver, 0.01-26.5 GHz (Low Frequency)

The above modules assume an external local oscillator source or:
-LO Include internal local oscillator source module instead of external
-LO-E Include internal local oscillator source module with 1ms switching for export

Backwards Compatibility

The MI-750 was designed to maximize compatibility with existing MI-1797 receiver systems. Functionality is retained with virtually all the MI-1797 accessories. This maintains the value of prior investment in MI equipment and allows for a smooth transition path to the best technology and performance available in the latest MI-750 offering.
The MI-750 is designed to work seamlessly with:

- MI-3100 Synthesized Signal Sources (both TX and LO)
- MI-3340 and MI-3350 Family of Mixers
- MI-3320 Family of Multiplexers
- MI-3393 LO Extender



Applications

The inherent high performance of the MI-750 Receiver, combined with the flexibility of its features and design modularity, allows for the widest possible range of test applications. Some of these include:

High-speed Near-field Antenna Measurements

Planar, cylindrical and spherical near-field measurements all share a common need for processing vast quantities of accurate data. Regardless of the coordinate system, the MI-750 comes with the performance to deliver near-field data at a speed and accuracy that can dramatically change test throughput expectations. The full 4 M samples/sec performance of the MI-750 still offers a measurement dynamic range of 69 dB, so rich and detailed insight into antenna systems can be delivered fast!

High Interference Test Environments

Outdoor Far-Field test ranges have to deal with a dense spectral environment in which measurements must be made. Signals from external emitters must be prevented from causing interference with the measurement, and the outdoor range must not cause interference with other nearby systems. These criteria oppose each other in that if range transmit power is increased sufficiently to limit the effects of interference on the measurement, the range may cause interference to other systems. If low power is used in the range to avoid causing interference to others, system sensitivity drops and measurement performance suffers. The MI-750 is designed to manage this scenario with flexible digital filtering for high selectivity. This allows:

- Lower susceptibility to spurious signals that interfere with the measurement
- Extended system dynamic range
- Reduced measurement uncertainties

Automated Multi-port, Multi-frequency Antenna Testing

Efficient testing of multi-port antennas requires a receiver that supports multiple measurement channels with fast switching between channels. The MI-750 Receiver has the capacity to drive up to two optional MI-3320 Multiplexers, deployed in the transmit or receive signal path, to test up to 16 signal combinations. The MI-750 Receiver's rapid multiplexer switching is essential in maximizing measurement speed for Multi-port or Multi-frequency antenna testing applications.

Radar, RCS and Pulsed Systems

Several features of the MI-750 have been designed to maintain or enhance system effectiveness for pulse and pulse profile applications. Active Phased Arrays are the most common antenna measurement application with significant pulsed signaling, while radar and RCS testing are also supported.
Some of the receiver's pulsed features include:

- 4 MHz Sample rate
- Averaging across the pulse width
- Multiple Pulse Averaging
- External Trigger to start sampling

Specifications

Parameter	*MI-750 Receiver*
Frequency Range *Standard* *Optional*	 *0.1 - 26.5 GHz* *0.01 - 110 GHz*
Sample Rate	*1Hz to 4 MHz*
Average Data Throughput	*110K samples/sec*
IF Noise Bandwidth	*Sample rate x 3*
Dynamic Range *4 M samples/sec* *1 M samples/sec* *10 K samples/sec* *100 samples/sec* *1 sample/sec*	 *69 dB* *75 dB* *95 dB* *115 dB* *135 dB*
Sensitivity *1 sample/sec*	 *-150 dBm*
Linearity *Phase* *Amplitude*	 *0.4 deg/10dB* *0.05 dB/10dB*
Frequency switching speed	*200 µs or 1000 µs*
Frequency list size	*1024 max.*
Multi-channel measurement speed	*1/sample rate + mux switching time*
Modes	*CW, Pulsed, Tracking*
Pulse width minimum	*240 ns*
Pulse repetition frequency	*15 Hz to 4 MHz*

ISO 9001:2008 MI Technologies ACCREDITED

MI-750 RF

MI-750 IF

Frequency Range

As part of its configuration flexibility The MI-750 offers a choice of internal or external mixers. Internal mixer configurations offer a frequency range from 10MHz to 26.5 GHz and this choice can significantly reduce overall complexity for short-range systems. The -R2 -L2 and -H2 option add the 10MHZ band. In this band, the receiver performs direct conversion of the receiver signal.

When using external mixing, the MI-3340 Mixer family is an integral component of the MI-750 Receiver, and the chosen mixers define the frequency range of the receiver. Additional frequency ranges can be covered by reconfiguring with appropriate mixers from the MI-3340 Mixer family. Options are available to cover any frequency range from 10 MHz to 110 GHz. Custom solutions can also be provided beyond 110 GHz.

Some key performance parameters of the MI-750 Microwave Receiver are dependent on the MI-3340 Mixer used and the choice of harmonic number. The receiver dynamic range and sensitivity can vary for both a single sample measurement and the best achievable performance when multiple samples are averaged. System performance will differ from receiver performance depending on the type of range, antennas used, cabling, and other factors.

Local Oscillator (LO) Signal Source

The MI-750 can be configured with an internal LO source to eliminate the usual external LO signal source. This internal LO provides a 100 MHz to 18 GHz signal that is built-into the RF signal path of the MI-750. Using this compact, field replaceable LO can reduce cabling, rack space and the number of total instruments for a simpler and more economical system configuration, often without sacrificing system performance.

When making multi-frequency measurements, the signal source frequency switching time adds to the measurement time of the MI-750 Receiver to affect the overall measure-ment speed of the system. The MI-3121 and MI-3122 Synthesized Signal Sources should be used to achieve the fastest system measurement speed.

Dynamic LO Power Equalization

The MI-750 Receiver provides programmable LO output power control. This dynamic equalization compensates for RF cable slope and is variable with frequency. Independent controls for reference and signal channels are provided for maximum flexibility. Dynamic LO Power Equalization is most commonly used to quickly compensate for changing cable configurations. This capability not only simplifies system set-up and range configuration but also allows considerably longer mixer distances than earlier receiver solutions. Performance can be maintained up to 90 feet (27 meters) from the MI-750. In most cases this eliminates the need for the optional MI-3393 LO Extender, although the MI-750 is still compatible with this option. This feature is available with the -H1 and -H2 options.

Enclosures

Outdoor enclosures with HVAC units can be provided at special request, depending on environment.

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