



FEATURES

- Wide Frequency Coverage (100 MHz to 18 GHz)
- Scan and Synthesized Tuning
- Up to 64 Tuners May be Configured in One System
- Low SSB Phase Noise
- RFI Shielded
- Low Differential Group Delay
- Built-In-Test (BITE)
- High NPR

DESCRIPTION

The SMR-1629 Tuners are a family of wide-band and octave-band synthesized tuners capable of operating over the frequency range of 100 MHz to 18 GHz. Each of the units contains a Motorola 68000 sixteen bit microprocessor, RF converter, an IF amplifier strip, synthesizer and internal power supply in a compact package. They are capable of operating in a linearly swept or synthesized fixed frequency mode providing the ability to address either "set-on" or "scan" requirements.

The SMR-1629 Tuners may be configured in a large multi-channel system or used as stand-alone units. Stand-alone applications may involve control directly from an external computer via the RS-422 interface. This provides an inexpensive solution to signal down conversion.

The system flexibility is enhanced with the ability to mix and match tuners covering different frequency ranges. These may even be placed at

locations up to 1000 feet removed from the main system. The synthesizer has the flexibility of working with an external 5 MHz reference or may use its own internal ovenized crystal oscillator. Switching is accomplished automatically when an external source is connected to the tuner.

Several different tuners are available, each covering different frequency ranges. This allows a system to be configured with any combination of broadband tuners and octave bandwidth tuners. The IF's may be selected at 160 MHz or 250 MHz. Low noise preamplifiers may also be specified to reduce noise figure.

PERFORMANCE

The tuners were designed to provide the ultimate in performance with low SSB phase noise, high noise power ratio (NPR) and low differential group delay in a small package. Phase noise is typically less than 2 degrees RMS up to 18 GHz and greater than -82 dBc/Hz (10kHz offset from the carrier) maximizing system performance for digital reception requirements. The low differential group delay and low phase noise of the synthesizer help to insure a high NPR (typically 45 dB at high signal levels).

Frequency tracked preselection (Option 2) makes new strides in performance when utilizing wide IF bandwidths. This technique locks a broadband YIG filter to the local oscillator to permit excellent centering within the filter passband. This allows the user to take full advantage of the wide IF bandwidths.

CONTROL

The SMR-1615 System Interface Unit acts as the communications link between the system components and the SMR-1611 Controller. When the SMR-1615 is used in the system, the tuner(s) may be controlled either by the SMR-1611 Controller or by an external computer via the IEEE-488 or RS-232C interface bus. If the SMR-1615 Interface unit is not used in the system, the tuner(s) may be controlled via the RS-422 serial interface.

All of the SMR-1629 tuner functions are controllable (except power on/off) including:

- Frequency
- Sweep Rate
- Sweep Limits
- Modes
- Step Size
- F1-F2
- Test Oscillator
- FO
- On/Off (BITE)
- Full Band
- Marker Frequency
- Fixed Frequency

A variety of different scan modes are available to optimize swept performance.

F1-F2: Allows scan limits to be set anywhere within the tuner frequency range. Sweep rate is adjustable from 0.1 to 25 Hz. Up to four separate F1-F2 sweeps can be programmed to be swept and optionally displayed on the SMR-1641 Digitally Refreshed Display.

Δ FO: The receiver sweeps about the selected frequency at a rate of 0.1 to 25 Hz, at selectable scan widths.

FULL BAND: The receiver scans the full frequency range of the tuner at a scan rate adjustable between 0.1 and 25 Hz.

SERVICEABILITY

The SMR-1629 Tuner Family was designed for optimum reliability and serviceability. Extensive use of the Built-In-Test (BITE) permits expeditious instrument check-out and provides for easy fault isolation in the event of an instrument failure.

The BITE testing includes the ability to verify that the phase lock loops are functional, measure the six power supply voltages, and monitor the internal temperature of the tuner. Any out-of-limits condition will be reported in the form of system error messages allowing the operator to take action to remedy the problem.

A test oscillator, internal to the tuner, may be exercised to provide a first IF signal. This allows the entire IF in the tuner to be tested. This IF signal may even be used to test video and audio performance of the SMR-1635 and SMR-1638 demodulators.

Another built-in feature provides the ability to monitor and log actual operating hours through the resident microprocessor. This permits easy verification of usage and system reliability data.

SMR-1629 PERFORMANCE SPECIFICATIONS AND OPTIONS

STANDARD TUNER SPECIFICATIONS

Preselection	Multi-stage YIG filter
Frequency Resolution	10 kHz synthesized
Internal Reference Stability	0.3 ppm from 0 to 55° C
Internal Reference Accuracy	1 part per million
External Reference	5 MHz >1Vpp or TTL auto switching
Noise Figure	18 dB typ(90% of band), 20 dB, maximum
Tuner Bandwidth	30 MHz, minimum (40 MHz with Opt. 22 and 23)
Image Rejection	>75 dB, typical; 60 dB, minimum
LO Radiation	-70 dBm, maximum
IF Rejection	80 dB, minimum
Tuning Resolution	10 kHz, standard; 1 kHz, (Option 10)
SSB Phase Noise, Offset	

	Standard Values	Values w/Option 10
	100 Hz	-55 dBc/Hz
	1 kHz	-70 dBc/Hz
	10 kHz	-82 dBc/Hz
	100 kHz	-100 dBc/Hz
	1 MHz	-110 dBc/Hz
RF Differential Group Delay	20 nsec., maximum, over 80% of RF Bandwidth	
RF Input Imp.	50 ohms	
Input VSWR	2.5:1, maximum	
RF-IF Gain	15 dB, nominal	
1 dB Compression	+12 dB, referenced to output	
3rd Order Intercept	+5 dBm typ. +3 dBm, minimum	
System Interface	RS-422 (Serial)	
AC Power	115/230 Vac ± 10%; 47-420 Hz; 150 watts, maximum	
Cooling	Forced Air	
Size	5.25"(H) × 8.5"(W) × 22"(D) (1/2 rack)	

SMR-1629 TUNERS

FREQUENCY COVERAGE OPTION FOR NARROWBAND IF TUNERS

Option Number	Frequency Range	Option Number	Frequency Range
30	0.1-18 GHz	37	2-12 GHz
31	0.1-12 GHz	38	2-4 GHz
32	0.1-4 GHz	39	4-18 GHz
33	0.5-18 GHz	40	4-12 GHz
34	0.5-12 GHz	41	12-18 GHz
35	0.5-4 GHz	42	0.5-2 GHz
36	2-18 GHz	43	0.1-2 GHz

SMR-1629 SYNTHESIZED TUNER

OPTION LIST

Option Number	Option Description
100	Standard SMR-1629 Tuner with the following: Frequency coverage of 0.5-18 GHz (opt. 33) Scan Display capability (opt. 1) 160 MHz IF center frequency, 30 MHz bandwidth (opt. 20)

Tuner Options

1	Scan Display and Autostop Capability
2	Frequency-Tracked Pre-Selectors
3	SMA Type Antenna Connectors
4	Low Noise Pre-Amplifiers (Noise Figure = 12 dB/3rd order intercept = 5 dB reference to input)
5	Slide Mounts
6	Common Antenna Input (standard is separate inputs for 2 GHz and below/2 GHz and above)
10	1 kHz Tuning Resolution

IF Center Frequency Options (Select only ONE)

20	160 MHz center frequency 30 MHz wide IF bandwidth
21	250 MHz center frequency 30 MHz wide IF bandwidth
22	160 MHz center frequency 40 MHz wide IF bandwidth
23	250 MHz center frequency 40 MHz wide IF bandwidth

NOTE: Opt. 22 and 23 require Opt. 2 (Frequency tracked preselectors)

WARRANTY

All Micro-Tel products are unconditionally warranted for a period of one year except for physical damage, provided the equipment is returned to the plant in Hunt Valley.

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