1.1.4 AutoCal®/DIAGNOSTICS

The Model 2500A utilizes a unique Auto Cal® routine to perform a quick and easy almost completely automatic self-calibration. A key is simply inserted into the key-lock located on the rear panel and at turn on the instrument will present the operator with the first in a series of menus to perform the AutoCal® routine or any of the other 19 user diagnostics supplied with the unit.

1.1.5 STORED SETTINGS

Nonvolatile memory locations allow up to 64 complete front panel settings to be stored and recalled in any order. This storage permits fast and accurate recall of frequently used settings. The parameters stored in location number 15 may be recalled with one keystroke.

The 2500A powers up with the same settings present when power was removed, except the RF output will be off.

1.1.6 ERROR INDICATORS

The front panel displays for the 2500A indicate the following error conditions:

- An unlocked condition in the phase locked loop circuitry
- An unleveled condition in the RF output leveler circuitry
- A tripped RF circuit breaker
- FM overmodulation

1.2 SPECIFICATIONS

1.2.1 FREQUENCY

Range	.2 - 1100 MHz
Resolution	10 Hz
Frequency Stability/Temp	±2.5 ppm (±.00025%), 0-50° C
Frequency Stability (Aging)	<1 ppm/yr.
Switching Speed	Typically 200 mSec

1.2.2 RF OUTPUT

Impedance	50Ω (VSWR <1.5:1; typ <1.4:1 at <-7 dBm output)
Output Connector	Type "N"
Calibrated Level Range	+13 to -137 dBm
Level Resolution	.1 dB
Level Accuracy	±1.0 dB (>1 MHz) ±1.5 dB (<1 MHz)
Flatness	±1 dB
Leakage	<0.5 µV into a 2-turn 1 inch diameter loop at 1100 MHz Conforms to MIL-STD-461, Class B, Sections CS01, CS02, CS06, RE02, RS03 (to 1 GHz); VDE 0871, Class B.

1.2.3 SPECTRAL PURITY

Harmonics	<-30 dBc
Sub-Harmonics (550 MHz - 1100 MHz)	<-25 dBc
Non-Harmonics (Spurs) (>5 kHz from carrier)	<-50 dBc for carrier frequencies <137.5 MHz <-60 dBc for carrier frequencies >137.5 MHz;
(<5 kHz from carrier)	<-70 dB typically <-50 dBc, typically

1.2.4 PHASE NOISE @ 500 MHz

10 kHz offset	<-107 dBc/Hz guaranteed (Typ -110 dBc/Hz)
20 kHz offset	Typ <-115 dBc/Hz

1.2.5 RESIDUAL AM

(.05 - 15 kHz PDBW)	<-65 dBc

1.2.6 RESIDUAL FM

(.05 - 15 kHz PDBW)	<30 Hz rms (.4 - 137.49999 MHz) <10 Hz rms (137.5 - 274.99999 MHz) <20 Hz rms (275 - 550 MHz) <40 Hz rms (>550 MHz)
(.3 - 3 kHz PDBW)	<15 Hz rms typical (.4 - 137.49999 MHz) < 7 Hz rms typical (137.5 - 274.99999 MHz) <10 Hz rms typical (275 - 550 MHz) <20 Hz rms typical (>550 MHz)

1.2.7 MODULATION

Modes	AM, FM, COMPLEX (EXT AM and INT FM; EXT FM and INT AM)
Internal Source	400 Hz, 1 kHz; derived from frequency standard
External Source	AM Mode: DC to 20 kHz, 600 Ω input FM Mode: 20 Hz to 100 kHz, 600 Ω input

1.2.7.1 AM CHARACTERISTICS

AM Frequency Response	DC to 15 kHz (Typ to 20 kHz), (3 dB BW, 50% modulation)
AM Resolution	.1%
AM Range	0 - 99.9% (+3 dBm max output at 99.9% modulation)
Modulation Accuracy, AM (0 - 90%)	±1% + (±5% of indicated setting) at internal rates
AM Distortion	<1.5%, below 30% modulation <3%, 30% to 70% modulation <5%, 70% to 90% modulation

1.2.7.2 FM CHARACTERISTICS

FM Resolution	10 Hz (deviations <10 kHz) 100 Hz (deviations <100 kHz) 1 kHz (deviations <1 MHz)
FM Rate	20 Hz - 100 kHz (3 dB BW)
FM Deviation Range for 1 kHz Rate	1 MHz peak (3-137.49999 & >275 MHz) 500 kHz peak (137.5 - 275 MHz) 100 kHz peak (1 - 3 MHz) 10 kHz peak (.2 - 1 MHz)
Modulation Accuracy, FM	At internal rates, ±6% of indicated setting, excluding residual FM
FM Distortion	<2% at internal rates for deviation <100 kHz

1.2.8 FRONT PANEL CONTROL

Type	Push-buttons, Spin-Knob

1.2.9 REVERSE POWER PROTECTION

Max RF Power	50 W
Trip Level	~ .7 W
Trip Time	Typically <1 mSec
Max DC Voltage	50 V

1.2.10 STORED SETTINGS

64 total, non-volatile; complete front panel settings stored

1.2.11 EXTERNAL REFERENCE INPUT (REAR PANEL)

Frequency	1, 5, or 10 MHz
Required Input Level/Impedance	1-5 Vp-p, into 50 Ω
Waveform	Sine or Square Wave

1.2.12 INTERNAL REFERENCE OUTPUT (REAR PANEL)

Frequency	10 MHz
Voltage Out/Impedance	100 mVp-p, into 50 Ω
Waveform	Square Wave

1.2.13 GENERAL

Dimensions	14 cm (5.5 in.) High; 31.8 cm (12.5 in.) Wide; 53.3 cm (21 in.) Deep
Weight	12.57 kg (27.7 lbs.) net; 14.38 kg (31.7 lbs.) shipping
Power	100 or 120, 220 or 240 VAC; 50-400 Hz; 75 W

1.2.14 OPTIONS

1.2.14.1 GPIB GPIB	The GPIB Option gives the 2500A remote programming of front panel functions via GPIB. Command codes conform to TEK codes and formats Tektronix Standard 80009, Rev. C, 1979.
Interface	GPIB IEEE-488-1978
Control	All functions except On/Off, AutoCal® and Diagnostics
Functions	T6, L4, SH1, AH1, RL1, DC1, DT1, E2, SR1, TE0, LE0, PP0, C0
1.2.14.2 R01 0.5 PPM Reference	The R01 Option meets requirements for many communications applications. A TCXO is used to maintain stability over the 0 to 50°C range.
Frequency Stability	0.5 ppm
Aging	1 ppm/year
1.2.14.3 R02 0.05 PPM Reference	The R02 Option uses a new DCXO (Digitally Compensated Crystal Oscillator) which improves the stability over normal TCXO's. There is also no warmup time as in ovenized oscillators.
Frequency Stability	0.05 ppm
Aging	0.5 ppm/year
1.2.14.4 NA No Attenuator	The NA Option is cost-saving and used when levels between +13 and -7 dBm only are needed. Reverse Power Protection is removed from the instrument.
RF Output	
SWR	<2.0:1
Level Range	-7 to +13 dBm
Resolution	0.1 dB
Accuracy and Flatness	±1.2 dB
Reverse Power Protection	None; No DC Block

1.2.14.5 FSK FSK Modulation

The FSK Option provides symmetrical, DC coupled, binary carrier frequency shift keying for the 2500A. The system is an optimal hybrid of digital and analog modulation techniques, virtually eliminating the loop lock transient which inevitably results from simple synthesizer-based FSK. The advantages of analog FM systems are retained (reproduction of code waveshape), but with no waveform tilt. The frequency drift associated with conventional DC FM systems is eliminated, and the frequency stability is solely a function of the instrument frequency reference. The system features an internal "return to center frequency" (RTC) function which inhibits the FSK mode and returns the synthesizer to center frequency. The RTC function is compatible with Motorola's Universal Encoder system and enables the sequential transmission of FSK and analog voice or tone information without requiring external mode switching.

Deviation	±4.95 kHz max
Resolution	10 Hz
Baud Rate	0 – 20 Kbps
Tilt	Zero – can dwell indefinitely on mark or space
Waveshape	User-defined
Deviation Accuracy	±5% of setting with ±1 VP code input
Carrier Frequency Stability	Same as frequency reference
Analog FM Frequency Response	20 Hz – 100 kHz
Analog FM Deviation	If external FM + FSK is used, the sum of the peak deviations of each must not exceed 9.99 kHz.
FSK Modes	
Symmetrical	+1 V = shift up −1 V = shift down 0 V = center frequency
Code Input	±1 V; 0 ±10 mV Zero state 600 ohms unbalanced
Miscellaneous	No FSK + Internal FM FSK + External FM is available No FSK + External AM

1.2.14.6 PHM Phase Modulation	The PHM Option gives the 2500A the ability to do phase modulation. Phase modulation is enabled by a switch on the rear panel. With phase modulation enabled, the modulating signal can be connected to MOD IN on the front panel. The angle is controlled on the front panel using the FM keys. The deviation displayed is related to the phase angle by a formula.
Peak Phase Modulation	20 rad (3 - 173.5 MHz) 10 rad (137.5 - 275 MHz) 20 rad (275 - 1100 MHz)
Bandwidth	20 Hz - 50 kHz
Accuracy	±6%
1.2.14.7 PUL Pulse Modulation	The PUL Option adds a pulse modulator to the 2500A. The modulator is a unique combination of hybrid and GaAs FET technologies to provide an excellent on/off ratio and repetition rate.
RF Output	+10 dBm to -137 dBm
On/Off Ratio	80 dB minimum
Rise and Fall Time	25 nsec
Pulse Enable	TTL: +5 V "ON"
Modulating Pulse Levels	TTL: +5 V = "ON" state (switches at 1.5 V) 0 V = "OFF" state (switches at 1.4 V) Negative drive available; contact factory.
1.2.14.8 RPC Rear Panel Connectors	The RPC Option moves the front panel RF Out and Mod In connectors to the rear panel.
1.2.14.9 K-0278 Rack Mount K-0279 Rack Mount with Slides	The K-0278 option is used to mount the 2500A in a fixed position in a standard 17 inch rack. The K-0279 option is used to mount the 2500A on slides in a standard 17 inch rack. With the slides extended, the unit can be tilted to several different angles for easy servicing.
1.2.14.10 COV	Front Panel Cover