

Phase Matrix, Inc.

Instruments You Can Count On

25B 28B

Phase Matrix, Inc. EIP 25B and 28B Frequency Counters

High Performance in a Small Package



- Count Carrier and IF Frequencies From 10Hz to 26.5 GHz
- Measure Frequency and Power Level With A Single Connection
- Analyze Individual Signals In A Multi-Channel Spectrum
- 200 Watts Peak Input Protection
- Ideal For Field Maintenance and Bench-Top Applications
- World Wide Proven Reliablity

Phase Matrix / EIP 25B and 28B.... High Performance in a Small Package

The Ideal Communications Counters

The 25B and 28B CW frequency counters from Phase Matrix, Inc are the ideal counters for communications applications. These portable, rugged units combine durability and small size with high performance features typically found only in larger, bench-top instruments.

The 25B measures CW, FM and AM frequencies from 10 Hz to 20 GHz, and the 28B extends that range up to 26.5 GHz. With simultaneous power measurement capability, and options for a high stability time base and a protective transit case, these high performance counters are ideally suited for applications in:

Carrier signal measurement

Transmitter frequency verification

Channel specific signal measurements

- Microwave link testing
- Channel monitoring
- ATE

Unsurpassed Burnout Protection

Typically found in high performance spectrum analyzers; only Phase Matrix counters feature a YIG-preselected microwave input, which provides unparralled burnout protection, FM tolerance and frequency selectivity. The YIG preselector works like a tunable bandpass filter, preventing harmonics and other out-of-band spurious signals from interfering with measurement of the desired signal. It also protects the counter from accidental application of high level signals (up to 200 watts peak), reducing downtime and the associated high cost of repairing damaged microwave circuitry.

Selective Frequency and Power Measurements

With a single connection, the 25B and 28B can simultaneously measure and display the input signals frequency and power level in the microwave band, eliminating the need for a seperate microwave power meter. Within the 25MHz bandwidth of the YIG-preselector, only the selected signals frequency and power level are measured. Signals to be analyzed are selected by keystroke entry of an individual center frequency, or search a range between a low and high frquency limit. This signal selectivity, combined with 20MHz of FM tolerance at all rates up to 10MHz, allows the 25B and the 28B to make accurate frequency and power level measurements even while the input signal is carrying traffic; there is no need to take the transmitter, or adjacent channels, off the air for routine checks.



The 25B and 28B are ideal for frequency and power level testing of terrestrial microwave systems.



Only Phase Matrix counters offer the unique YIG-preselected heterodyne technique.



These useful counters are as capable on the bench as in the field. Their high performance matches or exceeds the best performance available in larger, benchtop instruments.

Phase Matrix / EIP 25B and 28B.... Field Proven Reliability



Easy to Read and Operate

Frequency and Power measurements can be made to a resolution of 1Hz and 0.1 dB, respectively. Easy keystroke entry of frequency and power offsets allows systemunder-test frequency translation devices and cable losses to be compensated for in the displayed measurement results.

Portable, Rugged Construction

The small size of the 25B and 28B, along with their convenient carrying handle and protective front cover, makes these units perfect for portable field maintence applications. Their rugged, durable construction will provide years of reliable operation under the roughest conditions. The units even feature an optional fast warm-up ovenized time base (Option 05) that delivers a reference frquency within 5x10⁻⁹ of the final value within 10 minutes of power-up. This ensures the best possible accuracy with minimum warm-up time delay.

Proven Reliability

The design of the 25B and 28B is based on the Phase Matrix / EIP 545B CW microwave frequency counter. This counter has become the standard in reliability, achieving over 26,000 hours (12.5 years) of field-proven MTBF. The high performance, economy and compact configuration of the 25B and 28B make them the ideal choice for your communications applications in the field and on the bench.



The frequency selective operation of the counters allows measurement of any individual signal's frquency and power in a multi-signal environment.



The Phase Matrix 25B/28B feature a convenient built-in carrying handle and protective front cover.

SPECIFICATIONS

| MODEL 25B and 28B | BAND 1 | BAND 2 | BAND 3 |
|-------------------------|----------------------------|----------------------------|--|
| Frequency Range | 10 Hz-100 MHz | 10 MHz-1 GHz | 1-20 GHz (25B) |
| Sensitivity | 25mV rms | -20dBm | -26.5 GHZ (28B) -30 dBm 1-12.4GHz -25 dBm 12.4GHz-20GHz -20 dBm 20GHz-26.5GHz |
| Impedance | 1MΩ/20pF | 50 Ohms | 50 Ohms |
| Connector | BNC (female) | BNC (female) | Precision Type N-female (25B) APC 3 5-female (28B) |
| Input Coupling | DC | AC | AC |
| Maximum Operating Level | 120 V rms* | +10 dBm | +10 dBm |
| Damage Level | 150 V rms* | +27 dBm | +45 dBm (30 watts) continuous +53 dBm (200 watts) peak pulsed (<1uS PW 0.1% duty) |
| Standard | NI/A | ~50mS | <200ms |
| Center Frequency Mode | N/A | N/A | <20ms |
| Automatic Amplitude | | | |
| Discrimination | N/A | N/A | 10 dB |
| FM Tolerance | Carrier remains in band | Carrier remains in band | 20 MHz P-P up to 10MHz rate |
| Maximum Tracking Speed | Carrier remains in | >800MHz/sec | >800MHz/sec typical |
| VSWR | N/A | 2.5:1 typical | 2.5:1 typical |
| Center Frequency Mode | N/A | N/A | Keyboard controlled. Unit will mea- sure signal within ± 5 MHz of entered frequency. Signals of equal amplitude must be seperated by 40 MHz |
| Frequency Limits | N/A | N/A | Keyboard controlled. Unit will mea- sure largest signal within set limits. Signals outside desired range must be seperated by ≥200 MHz (typical) from either limit. *Above 1KHz, decreases @ 6dB/ |
| | æ, | | octave down to 3.0 V rms |

SPECIFICATIONS

Power Measurement

| | Frequency Range | 1-20 GHz (25B) | |
|-------------------------------|--|--|--|
| | Accuracy | 1-26.5 GHz (28B) | |
| | Accuracy | $\pm 0.5 \text{ dB typical (0.10.50 C, input padded by 3 dB)}$ | |
| | Resolution | Power: ±0.1 dB | |
| | | Frequency: 100 kHz to 1 GHz (selectable) via GPIB 1 Hz to 1 GHz (selectable) via GPIB | |
| | Minimum Level | Equal to counter sensitivity | |
| | Display | Simultaneous frequency and power reading | |
| | Offset Range | -99.9 dB to +99.9 dB | |
| | Offset Input | U. I OB Kovhoard ar optional CDIP | |
| | Measurement Time | 1 Gate Time + 50ms + Freq Measurement Time | |
| | Measurement Window | 25 MHz nominal | |
| Time Base: Standard TCXO | | | |
| Crystal Frequency | 10 MHz | | |
| Stability | Aging Rate | <1x10 ⁻⁷ /month, <1x10 ⁻⁶ /year | |
| | Short Term | <1x10 ⁻⁹ rms for one sec. averaging time | |
| | Temperture | <1x10 ⁻⁶ , 0° to 50°C | |
| Output Frequency | Line Variation | <1x10 ⁻⁷ , ±10% line voltage | |
| External Time Base | TO INITZ Square wave, TA Poquiros 10 MHz, 1VP P | / P-P MIN INTO 50 52 P min into 3000 | |
| | Requires to writz, typ-p | 111111110 50022 | |
| GPIB (IEEE-488/1978) Programm | abilty | | |
| GPIB | Functions, special funct | ions and diagnostics are | |
| | panel Compatible IFFE | STD-488 SH1 AH1 T5 L3 | |
| | SR1, RL1, DC1 and DT1 i | mplimented. | |
| General | | · | |
| Warranty | 1 year Standard (Extendable | e to 3 years) | |
| Frequency Resolution | Selectable 0.1 Hz to 10 MHz | in band 1, 1 Hz to 1 GHz in bands 2 and 3. | |
| Display | kHz dBm |) Teau Ghz, Mhz, Khz, hz ŭr Ghz, Mhz, | |
| Frequency Accuracy | ± 1 count \pm time base error. | | |
| Test | Front panel selected service | e diagnostics and user information. | |
| Sample Rate | Varies time between measu | rements, from 0 sec to 10 sec. | |
| . . | HOLD freezes display indefine | nitely. | |
| Reset | Resets display to zero and li | 11(1ates new acquisition. | |
| Frequency Multiply | Displayed frequency is offset by the entered value to 1 Hz resolution. | | |
| requency multiply | displayed to 1 kHz resolution | n. OFFSET is added or subtracted to obtain | |
| | $y = mx \pm b$ result. | | |
| Computer Interface | GPIB (IEEE 488/1978) | | |
| Certifications | CE Certified for EMI/RFI to E | N50011 and EN50082-1 | |
| | Certified for Safety to IEC 10 | 110-1 (1990) | |
| Operating Temperature | $0 \ 100 \ 50 \ C.$ | $2 \pm 10\%$ EQ to 400 Hz; 60 V/A typical | |
| Net Weight | ~ 20 lbs (9.1 ka) | י ביט זט, גט נט 400 דוב, טט אא נאָטונמו. | |
| Shipping Weight | ~ 26 lbs. (11.8 kg). | | |
| Dimensions | 3.5" H x 8.125" W x 18.75" D | (89 mm H x 206 mm W x 476 mm D). | |
| Standard Accessories | Power cord, Operating man | ual, Protective front cover. | |
| | | | |

SPECIFICATIONS

| OPTION 05 | High Stability Ovenized Timebase | | |
|-----------|---|---|--|
| Stability | Aging Rate Short Term Temperture Line Variation Retrace Time base option utilize | <5x10 ⁻¹⁰ /day, (After 24 hour warm up). <1x10 ⁻¹⁰ rms for one sec. averaging time <3x10 ⁻⁸ , 0° to 50°C <2x10 ⁻¹⁰ , ±10% line voltage <5x10 ⁻⁹ of final value 10 minutes after counter is turned on at 25°C es a proportional control oven which is energized | |
| | when the unit is switch | ned off. | |

| ORDERING INFORMATION | | | | | |
|------------------------|--|---|--|--|--|
| MODEL 25B MODEL 28B | 10 Hz - 20 GHz Microwave Frequency Counter 10 Hz - 26.5 GHz Microwave Frequency Counter | | | | |
| Options | 05 | High Stability Ovenized Time Base | | | |
| | 15 | MIL-STD 45662 (ANSI Z540-1:94) | | | |
| Accessories | 011 | Rack Mount Kit without Handles | | | |
| | 016 | Chassis Slide Kit for 1 Unit | | | |
| | 018 | Front Panel Handle Kit | | | |
| | 021 | Suitcase Style Transit Case | | | |
| | 031 | Extra Operating Manual (one supplied at no cost) | | | |
| | 032 | Maintenance and Service Manual (includes operation information) | | | |
| | 042 | Service Kit | | | |

For More Information Contact:

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Specifications and ordering information subject to change without notice.

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