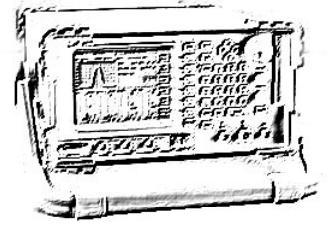




2975



Special Features

WWW.P25.COM

800-835-2352

◆ Powerful Features

- 2.7 GHz full span frequency coverage
- 1 Hz Frequency Resolution
- 0.01 PPM High Stability Oscillator
- High resolution Spectrum Analyzer (Full 2.7 GHz Span)
 - +10 dBm Tracking Generator *Standard*
- Dual Channel Digital Storage Scope
- View Scope and Analyzer simultaneously
- Ethernet Interface
 - Redirect keyboard and display to a remote computer
- IP Addressable
- Protected RF Ports
- Software upgradeable digital platform

◆ APCO 25

- C4FM (FDMA) Modulation
- Type III (DES OFB) Encryption / Decryption
- IMBE Vocoder (Encode / Decode)
- Embedded Speech Patterns
- C4FM RMS Error Vector Meter
- Decode P25 Uplink data
- Programmable Downlink Encoding

◆ Designed for the future

- All digital design
- Modular Software design
- Developed with TCL/TK, a standard programming language

◆ Legacy Support

- Power Meter (Wide and Narrow band)
- Deviation, Distortion, SINAD meters
- RF and Audio Counters
- CTCSS / DCS / DTMF (Encode / Decode) / Tone Remote
- Quad Function Generators
- FM / AM / C4FM Modulation Meters
- 600 ohm Balanced / Unbalanced audio input / output



2975 Unique Features

- *2.7 GHz operation*
- *1 Hz Synthesizer Resolution*
- *0.01 PPM OCXO (Standard)*
- *Full Cross-band Duplex (1 Hz Resolution)*
- *Dual channel Storage Scope*
- *Network Connectivity*
- *IP Addressable*
- *Simultaneous display of Scope and Spectrum Analyzer*
- *C4FM RMS Error Vector Meter*
- *Embedded P25 IMBE Speech patterns*
- *Full 2.7 GHz Span Spectrum Analyzer*
- *+10 dBm Tracking Generator (Standard)*
 - *Selectable Video Filters*
 - *Independent RBW control*
- *Sunlight Readable Color LCD Display*
- *Hard and Floppy drive storage*
- *User Configurable Interface*
- *All Digital design*
- *20V Peak-Peak audio output*

➤ **2.7 GHz full span frequency coverage**

The 2975 can operate up to 2.7 GHz. This range applies to all features, Generate, Receive and Spectrum Analyzer. Extended frequency range offers the ability to view 2nd and 3rd harmonics that could not be seen by a 1 GHz service monitor when working with 800 MHz radio systems. 900 MHz radios can have 2nd harmonics that interfere with cellular PCS systems. There are also applications in the 2.4 GHz region where signal monitoring can be useful.

➤ **1 Hz Frequency Resolution**

The 2975 has 1 Hz Frequency resolution for all RF modes. With narrow band radio systems or previous service monitors offered only 100 Hz resolution that was too coarse. The 2975 does not have this limitation.

➤ **0.01 PPM High Stability Oscillator**

The 2975 comes standard with a 0.01 ppm High Stability oscillator. The Generate and Receive functions should be within approximately 10 Hz at 1 GHz. This is the highest accuracy time base available in any service monitor.

➤ **High resolution Spectrum Analyzer (Full 2.7 GHz Span)**

The vertical resolution on the spectrum analyzer is approximately 0.01 dB per pixel. The COM-120B has 0.3 dB per pixel resolution. This becomes an advantage when trying to measure the insertion loss of a cable for example.

➤ **+10 dBm Tracking Generator *Standard***

The Standard Tracking Generator is capable of sweeping the entire 2.7 GHz range and has a high output level as well. When tuning filters or duplexers it is necessary to have high dynamic range. This can be accomplished by providing extended vertical range through two methods. First provide a High signal level i.e. +10 dBm to the device under test and Second, provide a low noise floor (approximately -114 dBm). Additionally the 2975 offers a video filter to minimize noise even further. All of these functions added together results in the ability to make some of the most demanding measurements required.

➤ **Dual Channel Digital Storage Scope**

Not one but two channels for the external inputs on the digitized storage scope. Additionally receiver demod or other signals can be routed to the scope display. The user may configure as desired. The scope can be viewed as a small view on the Receive or Generate screens or can be expanded to take up the full screen. The Spectrum Analyzer offers a full screen display mode as well.

➤ **View Scope and Analyzer simultaneously**

The advanced operator interface allows the user to configure test screens with any available meter displayed. This includes the ability to place both a Spectrum Analyzer and a Scope on the display at the same time. This is a unique feature and is not found on any other service monitor.

➤ **Ethernet Interface**

➤ **Redirect keyboard and display to a remote computer**

➤ **IP Addressable**

Truly remote applications can be accomplished with this feature. Network connectivity provides full access to the instrument's features. When connected, the front panel display can be routed to any computer on a network. In addition, the instruments front panel keypad can be mapped to the keyboard of any computer on the network. This combination provides powerful remote control and monitoring capabilities. With remote access to the internal hard drive, automatic test results could be examined from a 2975 that is on the network. There are many possibilities to explore here.

➤ **Protected RF Ports**

Both the Antenna and Auxiliary Generate RF Ports are protected to 10 Watts in case of accidental application of power. This will help keep the instrument from requiring maintenance in the event a transmitter is accidentally keyed into either of these ports. An audible alarm is emitted if one of these RF ports senses power being applied.

➤ **Motorola SmartNet / SmartZone [available soon].**

APCO 25

➤ C4FM Modulation

Project 25 digital radios operate with C4FM (FDMA) modulation scheme. This 4 level FSK modulation scheme is supported by the 2975 and is a necessary feature to enable testing of P25 digital radios. A variety of test tones are available as modulation sources from the standard 1011 tone to Embedded Speech patterns.

➤ Type III Encryption / Decryption

Project 25 supports DES OFB (Type III) encryption. The 2975 supports Encryption and Decryption of this type. This enables the encryption algorithm to be verified on the radio under test.

➤ IMBE Vocoder (Encode / Decode)

Project 25 requires use of an IMBE vocoder to encode and decode P25 data for digital to analog conversion. The 2975 includes this vocoder to allow encoding and decoding of information on the P25 signal.

➤ Embedded Speech Patterns

In addition to a standard 1011 tone, Silence tone, Calibration tone and internal tone modulation sources, the 2975 adds the unique feature of Embedded Speech Patterns. These speech patterns can be used to evaluate a receiver in a real life type environment. The IMBE vocoder was developed to pass speech or voice information as opposed to test tones. The Embedded Speech patterns allow testing without putting a radio's receiver into special test modes.

➤ C4FM Modulation Quality Meter

Another unique feature of the 2975 is the C4FM Error Vector meter. This meter can be used to quickly evaluate the modulation accuracy of a P25 modulated transmitter. The 4 level FSK signal is analyzed the average deviation error is displayed without putting the radio into a test mode.

➤ Decode P25 Uplink data and Programmable Downlink Encoding

The 2975 provides an Uplink data screen that decodes the data stream on the P25 modulated signal. Quick determination of radio programming can be made as the Talk Group ID, System ID and Network Access Code are decoded and displayed. Many other elements can be examined with this screen including the Emergency bit. The complementary Downlink screen provides a means to send this information back to the radio's receiver.

➤ P25 Trunking (*Future option*)

This feature is expected to be available by Fall 2002.

Designed for the future

➤ All digital design

The all-digital design of the 2975 allows new features, measurement functions and signal processing to be handled through software. Since the signal processing is handled through use of DSP design, measurement accuracies are greatly increased and reliable. This capability also lends itself to software upgrades. A web site is provided for easy access to current software versions.

➤ Modular Software design

The unique operator interface used by the 2975 allows reconfiguration of test screens. Meters can be added or removed as desired to allow configuration of the ultimate test screen. Up to 6 bar graph meters can be simultaneously displayed. A scope and spectrum analyzer can be displayed also. The operator has the ability to place meters on the screen where he chooses to allow total customization. The “Windows like” environment makes the 2975 very easy to operate with a familiar environment. Point and click operations are supported if a mouse is connected.

➤ Developed with TCL/TK, a standard programming language

The operating environment was developed with the TCL/TK programming language. The user may write specific applications to reside inside the instrument with this off the shelf language. There are many books and tools already in public domain to support this kind of development.

Legacy Support

➤ Power Meter (Wide and Narrow band)

The 2975 provides a Wide and Narrow band power meter. In Wide band mode, the 2975 will indicate the total power with a broadband peak detector. The Narrow band power meter is frequency tuned and restricts the reading to the power that is within the 2975's receiver band pass.

➤ Deviation, Distortion, SINAD meters

Standard Deviation, Distortion and SINAD meters are provided to support legacy analog systems. Meters show both bar graph and numeric displays. The meters also support averaging.

➤ RF and Audio Counters

The RF and Audio counters can be used to evaluate frequency accuracy of transmitter RF and Audio systems.

➤ CTCSS / DCS / DTMF (Encode / Decode) / Tone Remote

Tone signaling is provided to support legacy analog systems.

➤ Quad Function Generators

Quad function generators are provided to allow external stimulus to transmitters as well as a modulation source for the 2975's RF signal generator. Two are available as modulation sources while two others are available to provide transmitter stimulus.

➤ FM / C4FM Modulation Meters

Both FM deviation and C4FM modulation meters are provided to evaluate the modulation characteristics of either a conventional FM or a digital P25 transmitter.

➤ 600 Ohm Balanced / Unbalanced audio input / output

The 2975 supports 600-Ohm audio systems with 600 ohm balanced or unbalanced outputs. Output levels to 20V Pk-Pk can be achieved.