



Radio/Telephone Interface Unit



- A Unique Phone Patch Using DSP Technology.
- Eliminates Oscillation in Full Duplex Circuits.
- Eliminates False VOX Tripping.
- Eliminates Time-Consuming Set Up.
- Automatic Adaptive Hybrid Balance: No Hybrid Adjustments.
- Automatically Adapts to Changing Phone Lines.
- Designed For Full Duplex, Half-Duplex, or Simplex Operation.
- Compact Desk-Top Package Fits Under A Standard Telephone Set.

The RTU-250 Radio/Telephone Interface Unit (Phone Patch) interfaces the transmitter and receiver of a radio system to a telephone network so that phone calls may be relayed over a radio link.

The RTU-250 uses a unique adaptive hybrid to convert the four-wire audio from the transmitter and receiver to two-wire audio for the phone line. This hybrid represents a true technological breakthrough to the problem of interfacing a radio to a telephone system.

Conventional hybrids used in all existing phone patches can provide good balance at only one frequency into a complex impedance such as a telephone line. As a result, signals leak across conventional hybrids at all other frequencies causing oscillation in full duplex systems and unreliable VOX (Voice Operated Xmit) operation in half-duplex systems.

The RTU-250 solves these problems by using an adaptive hybrid implemented via Digital Signal Processing (DSP); it automatically matches any phone line at all voice frequencies simultaneously to provide a broadband null. The result is no signal leakage, giving reliable VOX operation with no oscillation in full duplex systems.

Furthermore, the phone line is continually checked by the unit so that changing line impedances due to weather or other factors are automatically compensated.

The radio transmitter may be keyed either manually with a front-panel switch, or automatically by phone line voice signals via built-in VOX circuit. The RTU-250's VOX is a DSP voice recognition-type which offers high sensitivity to voice signals, has excellent reliability and does not clip the first syllable.

The unit has been designed to be easy to set up and use. Neither the VOX nor the hybrid require any adjustments. Setting the radio interface levels requires no external equipment, with a convenient set-up mode and a peak level indicator located on the front panel.

The local telephone set connected to the RTU-250 allows the operator to make a call, then place the RTU-250 on the line with its Connect/Disconnect switch. The progress of the call is then monitored with the local telephone set.

The unit is packaged in a compact desk-top enclosure designed to fit under a standard telephone set so that no additional desk space is occupied. Front panel switches are widely-spaced to allow easy one-hand operation; front panel indicators make the RTU-250's operational status simple to monitor. All connections to the radio system and telephone line are made via the unit's rear panel connectors.

RTU-250 Specifications

Telephone Line Interface	
Output Level to Phone Line	Nominally -9dBm (adjustable -12 to -6dBm in 3dB steps)
Input Level from Phone Line	Nominally -9dBm (adjustable -12 to -6dBm in 3dB steps)
Frequency Response	300 to 3200 Hz \pm 2dB
Output Impedance to Phone Line	600 ohms
VOX Sensitivity	16 \pm 2dB below phone line input level setting (-25 dBm @ -9 dBm level setting, for example)
VOX Hang Time	1 second or 1.5 seconds, internally adjustable
Hybrid Balance/Adaptation Speed	-30dB over 300 to 3200 Hz bandwidth within 1.25 seconds; measured with a white noise source into 600 ohms
Ultimate Hybrid Balance	-50dB measured with a single tone
Hybrid Impedance Matching Capability	0 to ∞ ohms complex impedance
Phone Line Connections	RJ-11C connector terminal block
Radio Interface	
Input Impedance	Balanced 600 ohms or 50k ohms
Input Level	-20 to + 10dBm, front panel adjustable
Output Impedance	600 ohms, balanced
Output Level	-20 to + 10dBm, front panel adjustable
Frequency Response	300 to 3200 Hz \pm 2dB
VOX Key Output	Low level relay contacts, 60VA maximum. Switching speed 5 msec.
TX Audio Delay (Standard)	12 msec.
General	
Local Telephone Set Connections	RJ-11C connector
Indicators	Power On, Peak Level, Keyed, Ready
Front Panel Controls	VOX/Manual Switch, Key Switch, Connect/Disconnect Switch, Power On/Off Switch
Input Power	+ 11 to + 15VDC (12VDC nominal)
Input Current	200mA @ + 12.6V input
Size	1.70" x 7" x 9" (HxWxD) (4.3 x 17.8 x 22.9 cm)
Weight	4 lbs. (1.8 kg)
Environmental	
Operating Temperature	-20 degrees C to + 55 degrees C
Storage Temperature	-40 degrees C to + 85 degrees C
Humidity	Up to 95% @ 55 degrees C
Shock	MIL-STD-810D, method 516.3 Procedure VI
Vibration	MIL-STD-810D, method 514.3 Category I

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