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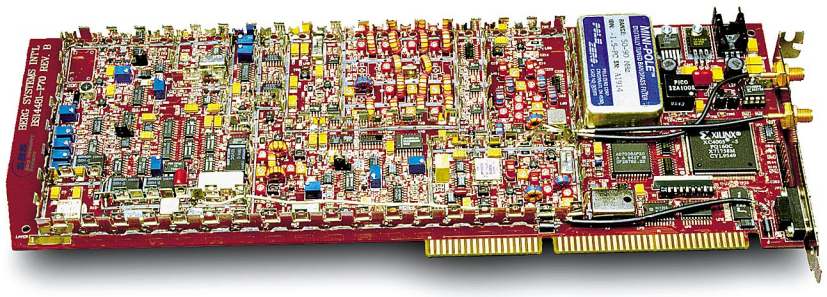
SBS Technologies, Inc.

# MODEL 4481-P70/Q
## IF Receiver

## Features:

- **Input Frequency 50 - 90 MHz (70 MHz Nominal)**
- **20 kHz Tuning Resolution**
- **-65 to -10 dBm Operating Input Dynamic Range**
- **Linear PM, BPSK & QPSK Demodulations On-board, Unbalanced QPSK Optional**
- **Five Selectable Data Filters, 1 kbps to 5 Mbps**
- **Four Selectable IF Filter Bandwidths up to 8 MHz**
- **Analog Signal Strength & Loop Stress Status**
- **Implementation Loss 1.0 dB Maximum**



*Model 4481-P70/Q* is a tunable IF telemetry receiver module for the ISA bus. When combined with SBS Technologies Model 4422-PCI Telemetry Module, all of the functions of a satellite ground station are provided in just two PC bus slots.

The receiver's tunable input pre-selector and superhetrodyne-based design yields superior rejection of image and spurious frequencies. The Model 4481-P70/Q features four software-selectable IF bandwidths to optimize operation with data rates up to 5.5 Mbps.

For satellite applications, SBS Technologies has incorporated a tracking loop into the Model 4481-P70/Q to compensate for anomalies such as Doppler Shift and Transponder Offset. To handle phase inversion ambiguities, the Model 4481-P70/Q offers a programmable feature that swaps and/or inverts the I and Q outputs of the receiver.

QPSK demodulation in the Model 4481-P70/Q is implemented via a Costas Loop design with 3 loop bandwidths for bit rates up to 5.5 Mbps and acquisition down to 8 dB $E_b/N_o$. BPSK demodulation on the Model 4481-P70/Q also employs a Costas Loop deisgn with 3 loop bandwidths for bit rates up to 5.5 Mbps and acquisition down to 3 dB $E_b/N_o$.

All setup parameters for the 4481-P70/Q, such as input frequency, IF bandwidth, filter bandwidths, ect. are programmable via the ISAbus. Readback of the synchesizer lock, demodulator lock, signal and loop stress are available on the same bus.

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# Model 4481-P70/Q Specifications

## Performance

| | |
|---|---|
| Input Frequency Range | 50.0 MHz to 90.0 MHz (70.0 MHz Nominal) |
| Tuning Resolution | 20 kHz increments (Finer resolution is optional) |
| Input Impedance | 50 Ohms |
| Input VSWR | $\leq$ 2.0 : 1 (Typically 1.5:1) |
| Noise Figure | Typically < 10 dB (12 dB Maximum) |
| Dynamic Range | -65 to -10 dBm Maximum |
| Overload Protection | Up to +10 dBm |
| Image Rejection | $\geq$ 60 dB |
| IF Rejection | $\geq$ 70 dB |
| Spurious Rejection | $\geq$ 60 dB |
| IF Bandwidths | 350 kHz, 700 kHz, 2 MHz & 8 MHz (Other IF Bandwidths available, Contact Factory) |
| AFC Range | Selectable from $\pm$ 10 kHz to $\pm$ 1.5 MHz with sweep-rate control |
| Baseband Filter Bandwidths | 100 kHz, 200 kHz, 260 kHz, 1.5 MHz & 3 MHz (Other band widths available, Contact Factory) |
| PM Demodulator | Linear with phase deviation range 0.2 to 2.0 radians (Gain programmable for 1 V p-p into 50 Ohms) |
| BPSK Demodulator | Costas Loop with 3 loop bandwidths for bit rates of 1 kbps to 5.5 Mbps & acquisition down to 3 dB $E_b/N_o$ (Nominal 1.5 V Output into 50 Ohms) |
| QPSK Demodulator | Costas Loop with 3 loop bandwidths for bit rates to 5.5 Mbps and acquisition to 8 dB $E_b/N_o$ (Nominal 1.5 V Output into 50 Ohms) |
| Implementation Loss | $\leq$ 1.0 dB |
| External 10 MHz Input Level | 0 dBm $\pm$ 10 dB |
| I/Q Swap & Invert Control | The I & Q outputs can be swapped and/or inverted under software control to assist in phase inversion ambiguity resolution |
| Programming | Via the ISA bus including: input source, input frequency, IF bandwidth, filter bandwidths, AFC, AGC time constant, demodulator mode (Phase, BPSK or QPSK), and PM detector output gain |
| Status Readback | Via the ISA bus including: synthesizer lock, demodulator lock, signal present, signal strength, loop stress & A/D (busy) |

## Mechanical

| | |
|---|---|
| Form Factor | Single full-size PC bus module |
| Connectors | SMA-type (for RF inputs & base-band outputs) |
| Technology | Hybrid of standard size components and Surface Mount Technology (SMT) |

## Environmental

| | |
|---|---|
| Operating Temperature | 0° to 50° C |
| Humitity | 0 to 90% (non-condensing) |
| Non-Operating Temperature (in proper packaging) | -25° to +70° C<br>Humidity Must prevent contact with moisture & contaminants |

## Options

| | |
|---|---|
| Option-X: | Narrow-band, 50 kHz Crystal (IF filter) |

SBS Technologies, Inc.

**Telemetry & Communications Products**

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*E-mail info.telemetry@sbs.com / Internet www.sbs.com*

Specifications subject to change without notice. Rev. 7/99

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