Digital Multi-Band RF Receiver
Single/Dual/Quad Channel

Features

- Up to 4 Channels per 2U Box
- Diversity Combiner*: Pre-D* & Post-D*
- **4-Input Diversity Combiner ***
- Form Factor
  - 2U Rack-Mountable Chassis (1U*)
- Noise Figure
  - < 4 dB Typ
- Wide Dynamic Range
  - > 90dB
- RF Frequencies
  - S- Band 2185 MHz to 2485 MHz (Std)
  - UL-Band 1700 MHz to 1850 MHz (Std)
  - LL-Band 1427 MHz to 1545 MHz (Std)
  - CIF (P) -Band 100 MHz to 1150 MHz *
  - C-Band 4400 MHz to 5250 MHz *
  - IF 100Hz to 80 MHz*
  - Others Frequencies Available
- Multi-Waveform Demodulation
  - PCM/FM (ARTM Tier 0)- (Std)
  - SOQPSK (ARTM Tier 1) - (Std)
  - CPM (ARTM Tier 2)*
  - BPSK/QPSK/OQPSK
  - UQPSK*, AQPSK*
- 3 Demodulators (Per Channel)
  - 1 RF, 2 SC* (Per Channel)
  - PCM / PSK*
- 2 Bit Synchronizers (Per Channel)*
  - Independent Bit Sync Input/Outputs
  - 50 bps to 10 Mbps BPSK (20 Mbps*)
  - 5 bps to 10 Mbps PCM/FM (20 Mbps*)
  - 50 bps to 20 Mbps QPSK (40 Mbps *)
- Forward Error Correction (FEC)
  - 2 Viterbi Decoders *
    $\Rightarrow$ R=1/2, 1/3*, 2/3*, 3/4*, 5/6*, 7/8*
  - Reed-Solomon -CCSDS*
  - LDPC- IRIG/CCSDS*
    $\Rightarrow$ R=1/2, 1/3*, 2/3*, 3/4*, 5/6*, 7/8*
- 3 Frame Synchronizers per Channel
- Byte Aligned Ethernet Data Output
- Best Source Selector Compatible Output*
- DQE/DQM Output Modes for BSS*
- 70 MHz, IF Inputs & Outputs
- Tape (IRIG 106) Inputs & Outputs
- AM/AGC Antenna Control
- Tracking Antenna Control Support
  - Envelope / Coherent AM
  - SNR
- IRIG-B
  - Input, Output
- Space Time Code (STC)*
- Adaptive Equalization– All waveforms*
- Auto AGC/DQ Combining
- SLE (Support for Space Applications)*
- CCSDS (Support for Space Applications)*
- IRIG Chapter 10/11 Compatible Output*
- IRIG Chapter 7 Support*
- IRIG 218 –2010 & 2020 Compatible Output
- Remote Control
  - Ethernet

* OPTIONAL Features

General Description

The Model 4426 Digital RF Receiver is state-of-the art receiver provides: a compact, cost competitive, flexible solution to a wide variety of communications link scenarios. The 2U Rack Mountable Chassis is available in in single, dual or quad channel configurations. Each channel is completely independent and is able to acquire on three (3) RF Bands: S Band; Upper L Band, Lower L Band, or optional C Band or P (UHF) Band. Other Multi-Band options are available.

The demodulation process, as well as the baseband bit synchronization process, is totally performed in the digital domain. Signal acquisition is performed by scanning the IF within the programmed acquisition band centered about the selected Carrier frequency. The Input Waveform is additionally scanned for acquisition at the subcarrier frequenices. Once signal acquisition is complete, synchronized signal tracking is performed whereby continuous validation of the lock state is maintained.
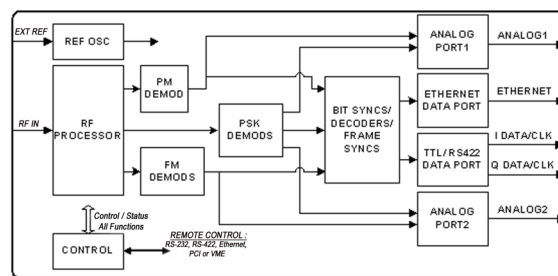
LINK Improvements & Noise Mitigation

A variety of optional FEC decoders are available and two fully programmable frame synchronizers (pattern detection) are provided with the bit synchronizer option. The MD4426 receiver can specifically be configured to mitigate noisy / congested environments through the use of

- Low Density Parity Check (LDPC*) coding to improve link margin while using less bandwidth,
- Adaptive Equalization (AEQ*) to mitigate multipath distortion.
- Advanced Diversity Combiner Functions (AGC & Data Quality) for superior performance in the presence of multi-path
- 4 Input Diversity Combiner Function

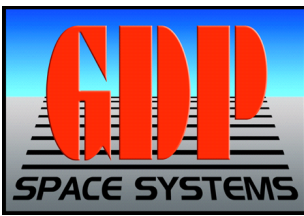An Encapsulated data and data-quality output may be included that supports the GDP Best Source Selector products.

Network Direct Mode!

The MD4426 Receiver can optionally be configured to accept your IRIG Chapter 7* downlink, bit/Frame synchronize and output your IRIG Chapter 10/11* UDP packet to your favorite Analysis package or our Acroamatics Decoms or MD3500 Network recorder simultaneously. IRIG 218 can also be accommodated directly. UDP/IP transport is provided for raw data or byte aligned data output.

Typical Channel (CH 1, CH 2 & Combined*)

Channel Specifications

Input:

RF Frequency	LL, UL, LS, US, C & CIF Bands - see features on front page for details
Noise Figure	< 4 dB typ
IF Filters	Selectable filter bandwidths (Standard set provided)
Dynamic Range	> 100 dB
Input Impedance	50 Ohms
VSWR	< 2:1

Demodulation:

IF Acquisition / Tracking Range	± 255 kHz
Loop Bandwidth	0.01% to 1% of Bit Rate (Analog PM 2 Hz to 20 kHz)
PM Demodulator	
Frequency Response	100 Hz to 15 MHz
Modulation Index	0 to 3.0 Radians
PSK Demodulators	
Types	1 IF, 2 SC *
Modulation Waveforms	BPSK, QPSK, OQPSK, UQPSK *, AQPSK *, GMSK *, SOQOSK ARTM Tier 1
Locking Threshold	6 dB Eb/No
PCM/FM Demodulator *	
Data Rate	10 bps to 10 Mbps– Standard (20 Mbps *)
Multi-H (ARTM Tier 2)*	

Bit Synchronizer(s):

Bit Rate	50 bps to 10 Mbps PCM/FM & BPSK (20 Mbps *)
	100 bps to 20 Mbps QPSK/SOQPSK (40 Mbps *)
Input Codes	NRZ-L/M/S; BiƟ-L/M/S, RNRZ (Other codes available as needed)*
Output Codes	NRZ-L/M/S; BiƟ-L/M/S, RNRZ (Other codes available as needed)*
Decoders *	Viterbi Rate 1/2, 1/3*, 2/3*, 3/4*, 5/6*, 7/8* ; Reed Solomon*, LDPC*
Descrambler	V.35 / V.36 (CCITT/ Intelsat)

Data Output
- Analog
- TTL, RS422 (Standard)
- Ethernet Data Output (IRIG 218, IRIG-106 Ch-10*, HDLC/AX.25*)
- Encapsulated Data & Quality that supports GDP Best Source Selector *

Control Interface:
- Ethernet (Standard)

Environment:
- Temperature 10°C to 40°C Operational; -40°C to 70°C Storage (Extended bit rates available)

Status Output:
- Signal Present, Carrier Lock, Bit Synchronization Lock, Viterbi Lock, Frame Lock, Doppler

* **Optional**
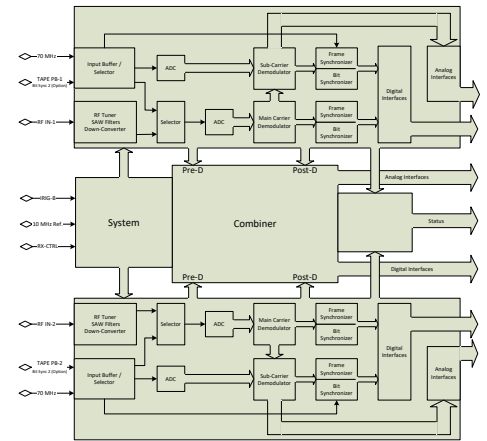
2-Channels with Combiner

Ordering Information

MD4426-M01	Basic Unit (Single Channel)		OP4426-66	BSS DQE/DQM (GDP & RCC)
MD4426-M02	Basic Unit (Dual Channel)		OP4426-67	Ethernet CH 7 Decoding
MD4426-M02C1	Dual Channel with Diversity		OP4426-68	Adaptive Equalization
OP4426-04	Viterbi (R 3/4..)		OP4426-69	STC
OP4426-225	LDPC (IRIG 106 Codes + 7/8)		OP4426-81	CIF (P)-Band (180 to 1100 MHz)
OP4426-07	PM/PSK		OP4426-82	L/S/C-Bands
OP4426-08	GMSK		OP4426-83	L/S/C/P(CIF) - Bands
OP4426-09	A/UQPSK w/Ambiguity Resolution		OP4426-84	L/S/CIF(P) - Bands
OP4426-15	CPM		OP4426-8X	Special Bands
OP4426-41	Extended Bit Rate (20 Mbps BPSK, 40 Mbps QPSK)		OP4426-93	Reed Solomon
OP4426-44	2nd Independent Bit Sync Input per Channel		OP4426-95	Diversity Combiner (one per dual channel)
OP4426-65	Ethernet Chapter 10/11 Output		OP4426-VI	Remote Control VI Software (Included)