

HBR-2502 IF VIDEO MODULES HBR-IF



The IPITEK HBR-2502 IF analog-to-digital (A/D) and digital-to-analog (D/A) modules are used to digitally transport IF-modulated carriers via the HBR-2502 digital transport platform.

These high-performance IF modules allow the transport of traditional analog IF signals and QAM signals into the standard IF passband throughout the network. They offer cable MSOs significant cost savings by centralizing expensive equipment such as MPEG codecs, video scramblers, QAM/VSB modulators at the main headend. Hub locations utilize less expensive channel upconverters.

HBR-2502 IF modules provide precision, uncompressed linear Pulse Code Modulation (PCM) conversion of IF-modulated carriers to data streams suitable for digital fiber-optic transmission.

FEATURES & BENEFITS

- Single Module Transports Video IF, QAM 64 or QAM 256
- Transports Intermediate Frequency Modulated Carriers
- North American NTSC-M and European/Asian PAL B/G Versions
- Scrambling Options
- QAM, QPSK and VSB Modulation Schemes Available
- 0 Hz Frequency Offset Error
- Signal Monitoring Capabilities
- Selectable Gain and Mute
- Hot-Swappable
- Automatic Gain Control for Maximum CNR

Each module is capable of transporting a single high quality IF channel.

Front panel connectors provide convenient monitoring of the applied IF signal. The IF monitor is 75-ohm impedance and can be used with local measuring equipment.

Alarm and status monitoring are included with the modules. Front panel LEDs indicate signal state and module health while detailed status and configuration controls are accessed via the HBR terminal's Node Management System. In addition to adjustable gain and mute, the IF channel has termination functions.

The HBR-2502 IF modules include non-volatile memory containing module identification and tracking information.

SPECIFICATIONS

Parameter	NTSC-M	PAL-B/G
Intermediate Frequency		
Bandpass:	41.0 - 46.5 MHz	32.65 - 39.6 MHz
Bandpass ripple:	± 0.5 dB	± 0.5 dB
Bandwidth (-3dB):	40.6 - 46.8 MHz	32.125 - 40.125 MHz
Band edge attenuation:	-60 dB/decade	-60 dB/decade
Frequency offset error:	0 kHz	0 kHz
Phase noise @ 10 kHz offset:	< -105 dBc/Hz	< -105 dBc/Hz
Spurious 920 kHz triple beat:	≤ 60 dBc	≤ 60 dBc
Delay ripple:	≤ 40 nsec p-p @ 3.58 MHz	≤ 40 nsec p-p @ 4.43 MHz
Video (using precision mod/demod)		
SNR (shallow ramp):	≥ 60 dB min.	≥ 59 dB min.
Luminance bar amplitude:	≤ 1%	≤ 1%
Luminance non linearity:	≤ 1%	≤ 1%
K Factor (2T):	≤ 2%	≤ 2%
Chroma-luma delay:	± 25 ns (12.5T)	± 25 ns (20T)
Chroma-luma gain:	100 ± 5% (12.5T)	100 ± 5% (20T)
Chroma-luma intermod. distortion:	≤ 1%	≤ 1%
Differential gain:	≤ 1%	≤ 1%
Differential phase:	≤ 1°	≤ 1°

Encoder Module

Input level:	+30 to +45 dBmV	+30 to +45 dBmV
QAM Video Carrier:	+20 to +30 dBmV	+20 to +30 dBmV
Input coupling:	AC coupled	AC coupled
Connector:	BNC, 75 ohms	BNC, 75 ohms
Input return loss:	≥ 24 dB	≥ 24 dB
Spurious products at input:	≤ -20 dBmV	≤ -20 dBmV
Front panel monitor output:	+55 dBmV, nominal	+55 dBmV, nominal
Front panel monitor connector:	BNC, 75 ohms	BNC, 75 ohms

Decoder Module

Output level:	+40 dBmV, adj. ± 2 dB	+40 dBmV, adj. ± 2 dB
QAM Video Carrier:	+30 dBmV, adj. ± 2 dB	+30 dBmV, adj. ± 2 dB
Output coupling:	AC coupled	AC coupled
Connector:	BNC, 75 ohms	BNC, 75 ohms
Output return loss:	≥ 16 dB	≥ 16 dB
Front panel monitor output:	-20 dB relative to IF output	-20 dB relative to IF output
Front panel monitor connector:	BNC, 75 ohms	BNC, 75 ohms

10-bit Digital Transport

256 QAM EVM Contribution:	1% max
256 QAM MER:	>36 dB
64 QAM EVM Contribution:	1% max
64 QAM MER:	>36 dB

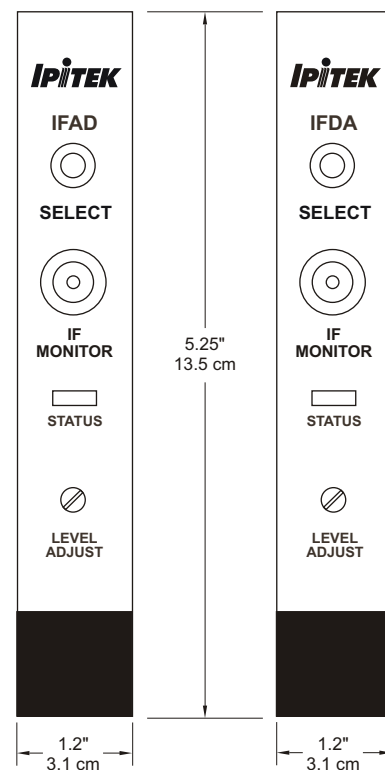
Analog

CNR(4 MHz BW):	59 dB min.
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Environmental

Operating Temperature:	0°C - 50°C
Storage Temperature:	-55°C - 75°C, 24 hrs
Operating Humidity:	to 90%, non-condensing
Dimensions:	5.25"H x 1.2" W x 8.58"D (13.5cm x 3.1cm x 22 cm)

MECHANICAL



ORDERING INFORMATION

HBR	-	IF	-	XXXX
HBR-250X Series Compatible		Type Intermediate Frequency Personality Module		Option 1051 = IF Encoder, 10-bit linear PCM, 5 MHz, NTSC-M, 41.0 - 46.5 MHz 1052 = IF Decoder, 10-bit linear PCM, 5 MHz, NTSC-M, 41.0 - 46.5 MHz 1071 = IF Encoder, 10-bit linear PCM, 7 MHz, PAL-B/G, 32.6 - 39.6 MHz 1072 = IF Decoder, 10-bit linear PCM, 7 MHz, PAL-B/G, 32.6 - 39.6 MHz



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IPITEK reserves the right to modify product specifications without prior notification.

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