

## HFT1B Wideband HF Digital Tuner Module



### DESCRIPTION

The HFT1B is a high dynamic range HF tuner covering the frequency range of 500 kHz to 30 MHz (usable 200 kHz to 32 MHz). The HFT1B provides a 14-bit digital output while the HFT1B-1 provides a high-level analog output. The unit occupies a single 3U-size CompactPCI slot. The HFT1B is designed to work with DRT's 3<sup>rd</sup>-generation chassis, encompassing various available platforms (DRT11xxC, DRT12xxC, DRT23xxC, as well as others). The digital output works seamlessly with existing DRT software and WPM3 modules.

The HFT1B provides the following capabilities:

- Digitizes entire HF spectrum
- 90-dB typical dynamic range
- Variety of software-selectable lowpass, fixed bandpass, and tunable bandpass filters
- Two independently tunable, constant-width notch filters tuning 1.6 to 32 MHz
- Two software-selectable antenna inputs
- Fast scan control for all filter, attenuation, and HF input settings
- HF and Aux HF input protection up to 1 watt
- Multiple power modes, to trim power consumption based on functions used
- Internal BIT that can identify failures at the functional circuit block level

# Specifications

## HF Inputs

### Main HF Input and Auxiliary HF Input

These two ports are functionally the same. The control software selects which port is connected to the RF path. The Aux HF Input is typically attached to an adjacent tuner's HF Daisy-chain Output port, to allow reception from a single antenna.

- |                                      |  |
|--------------------------------------|--|
| • Input Frequency Range              | 0.2 to 32 MHz  |
| • VSWR (50 ohms)                     | 1.5:1 typ, 1.8:1 max   |
| • Maximum Linear Input Level         | +10 dBm  |
| • Maximum Input Power without Damage | +30 dBm over indefinite time   |
| • Isolation between HF Inputs        | > 90 dB  |
| • LO Radiation                       | < -120 dBm, $500 \text{ kHz} \leq f \leq 32 \text{ MHz}$<br>< -110 dBm, $f > 32 \text{ MHz}$<br>< -90 dBm, $f < 500 \text{ kHz}$ |
| • Connector                          | SMA jack   |

## HF Outputs

### Digitized HF Output

- Bandwidth 32 MHz
- Resolution 14 bits
- Sample Rate 96 Msps
- Alias Suppression > 90 dB (0.2 – 32 MHz)
- Spectral Sense Non-inverted

### HF Daisy-Chain Output

Three software-selectable HF Daisy-chain Output modes are available: **Off**, **Pre-filter**, and **Post-filter**. **Off** disconnects the HF Daisy-chain Output connector. **Pre-filter** allows this connector to be used for daisy-chaining a single antenna to multiple tuners, through a bypass path, an attenuator, or a preamplifier. **Post-filter** allows cascading filters of two or more tuners.

- Bandwidth Set by selected filters
- Gain Pre-filter: -5.5 dB typical (bypass path)  
Post-filter: +8.5 dB at 0-dB-attenuation gain control setting
- Impedance 50  $\Omega$
- Connector SMA jack

### Pre-ADC HF Output

Provides a pre-ADC sample output level on the HFT1B. This connector is the primary output for the HFT1B-1, where performance is specified at a nominal 0 dBm out. The HFT1B-1 is the analog version of the HFT1B, providing the nominal output in analog form at the front panel, although there is still data available in digitized form on the backplane (but much lower in level than what is available in the digital version HFT).

- Output Level (for -24 dBm antenna input)
  - HFT1B -24 dBm (corresponds to -5 dBFS of ADC)
  - HFT1B-1 0 dBm
- Impedance 50  $\Omega$
- Connector SSMC jack<sup>1</sup>

<sup>1</sup> Example of SSMC plug mating connector: Part Number 7002-1571-019, for RG-316DS double-shielded flexible cable, Applied Engineering Products, Inc., New Haven, Connecticut, 203-776-2813, [www.aepconnectors.com](http://www.aepconnectors.com).

## Sync In/Out Connector

- Software-configurable as input or output
- TTL logic levels input and output
- Front-panel SSMC jack connector
- Same functionality available on the module's CompactPCI J2 connector (can drive multiple tuners)
- Internal timer for generating sync output
- Selectable dwell times of 50  $\mu$ s to 650 ms

## Control

- Via CompactPCI bus (standard 32-bit PCI)
- Field-programmable for module firmware upgrades
- Simple module command structure

## Physical / Environmental

|                                    |  |
|------------------------------------|--|
| <b>Operating Temperature Range</b> | -20 to +60°C (-4 to + 140°F) (inlet air temperature of the DRT system in which the HFT1B is installed)                         |
| <b>Size</b>                        | Single-slot 3U CompactPCI<br>approximately 0.8 in wide x 4 in high x 6.5 in deep<br>(2 cm wide x 10 cm high x 16.5 cm deep)    |
| <b>Weight</b>                      | 1.2 lbs. (544 g)   |
| <b>Power Consumption</b>           | 19 watts maximum, all functions enabled<br>13 watts maximum, notches disabled, preamp enabled<br>2.5 watts maximum, sleep mode |

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