

E-band Converters (71-76 GHz TX, 71-86 GHz RX) with LO

Applications

- Point-to-point or multi-point radio
- Multi-Gbps wireless transfer
- Measurement systems

Main features

- 71-76 and 81-86 GHz RF bandwidths
- Platform concept, easy to customize
- 0,1 to 10 GHz IF bandwidth
- Small size and weight
- Standard waveguide and SMA interface

E-band Converters (71-76 GHz TX, 71-86 GHz RX) with LO**General**

This converter platform is a broadband and versatile building block for E-band (71-86 GHz) applications. It is intended as a platform where customer requirements will be implemented upon request. It consists of one up- and one down-converter in a single unit. The up- and down-converter works independently, and can thus be used in both frequency multiplexed and time multiplexed applications.

FC1003E features

The basic FC1003E unit possesses a very broad IF bandwidth, from 0.1 to 10 GHz. The IF gain can be increased. Please contact Sivers IMA for details.

A set of two identical FC1003E modules can be used in a full duplex configuration by appropriate choice of LO signals for the up- and down-converter modules respectively.

The optional synthesizers are fully controlled from a computer through a serial I2C interface. Easy-to-use control software for evaluation purposes is supplied with every unit.

The user also has access to a bias control input for both the up- and down-converter. This feature enables time-division duplex (TDD) operation and power save modes by independently turning OFF the up- and down-converter when not in use. The bias can be turned ON and OFF in less than 5 μ s from a CMOS gate, operational amplifier or comparator.

The standard version of the converter is equipped with standard waveguide WR-12 input/outputs. These waveguide input/outputs can be replaced by a diplexer for a single waveguide WR-12 input/output with very high isolation.

E-band Converters (71-76 GHz TX, 71-86 GHz RX) with LO**RF, DC, and computer control interfaces**

The FC1003E is intended as a sub-unit to be integrated into a user application. For easy handling, the unit is furnished with standard SMA connectors for IF signals. The RF input/output can be mated to a standard WR-12 waveguide flange for easy connection to other equipment or antennas.

Sequencing of bias is necessary. Apply first GND, then Vgg , then Vdd. Disconnect in reverse order.

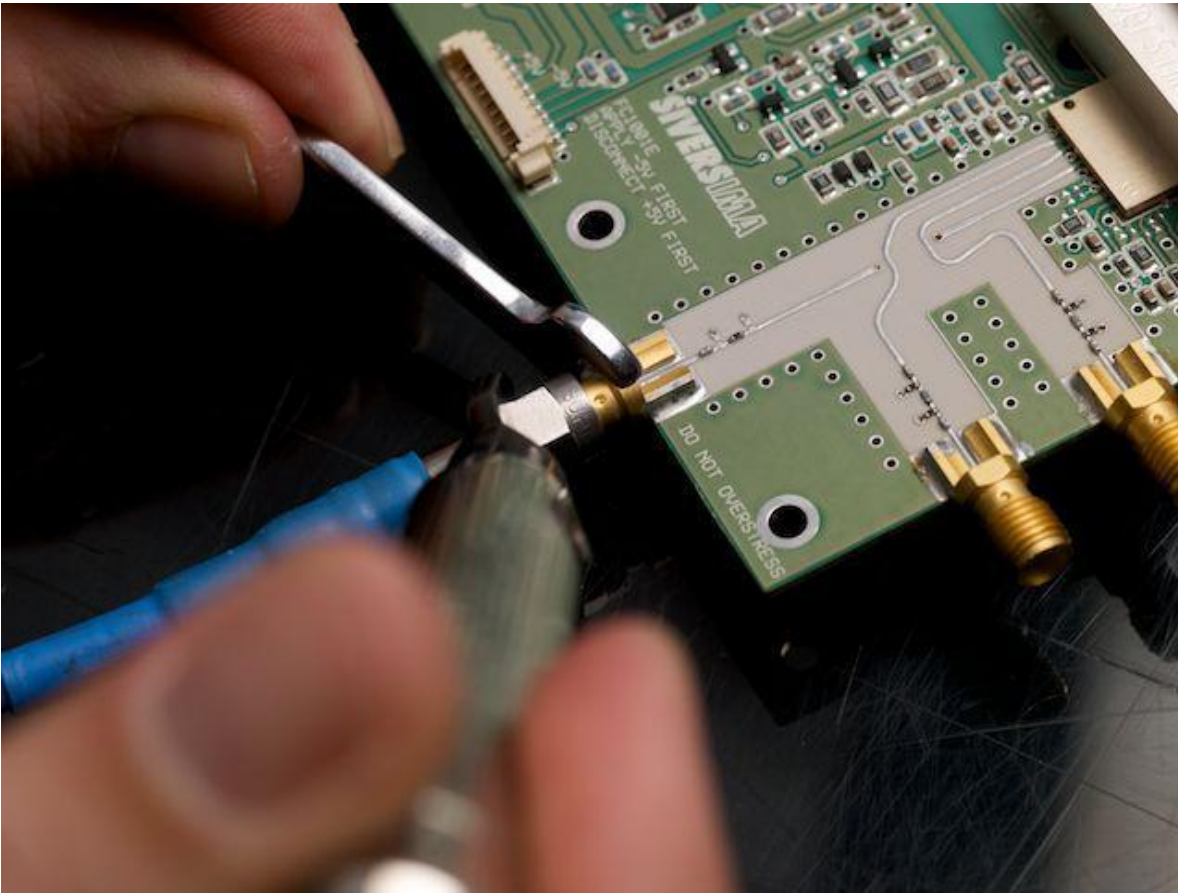
Handling and precautions

Although the construction is of highest standard and sensitive parts such as MMICs and RF circuits are packaged, the unit must be handled with care. All semiconductor electronics are ESD sensitive, and this is of course also true for the delicate E-band structures. Normal handling with ESD protection is recommended and special care is advised before the unit is integrated into a protective case.

The RF circuits will develop heat during operation. The aluminum housing on the of RF modules provides enough cooling for lab usage. An additional heat sink may attached to the converter using the four threaded M3 holes found on the two waveguide launches. This additional heat sink is necessary for continuous operation of the converter. It is normally not necessary to use heat conducting paste between the FC1003E converter and the heat sink. Do not use excessive force when attaching the additional heat sink.

The maximum RF (71-86 GHz) input power at the WR-12 waveguide input is -20 dBm.

SMA connectors for IF and LO must be handled with care, otherwise damage to the PCB may occur. Use a wrench to counteract the torque when tightening the connection, see photograph below. Use a torque wrench for correct torque of SMA connector.



Tightening of SMA connectors - note that a wrench is used to unload force on the SMA connector, in order to avoid damage to the PCB.

E-band Converters (71-76 GHz TX, 71-86 GHz RX) with LO**Transmitter (TX) up-converter, typical values**

Parameter	FC1003E @ 71-76 GHz	Unit
RF output frequency range	71-76	GHz
Nominal gain IF to RF	4	dB
Saturated output power	+12	dBm
1-dB output compression point	+9	dBm
LO phase noise @ E-band @ 100 kHz offset	-80	dBc/Hz
LO synthesizer step size @ E-band	0.25	MHz
IF input frequency range	0.1-10	GHz
Switching delay, bias control	5	µs

All data given for ambient temperature of +25 °C

E-band Converters (71-76 GHz TX, 71-86 GHz RX) with LO**Receiver (RX) down-converter, typical values**

Parameter	FC1003E @ 71-86 GHz	Unit
RF input frequency range	71-86	GHz
Nominal gain RF to IF	4	dB
Noise figure (TBC)	8	dB
1-dB input compression point	-25	dBm
LO phase noise @ E-band @ 100 kHz offset	-80	dBc/Hz
LO synthesizer step size @ E-band	0.25	MHz
IF output frequency range	0.1-10	GHz
Switching delay, bias control	5	µs

All data given for ambient temperature of +25 °C

E-band Converters (71-76 GHz TX, 71-86 GHz RX) with LO**Interface / environmental specifications**

Parameter	Min	Max	Unit/Remark
Waveguide input/output			Mates to WR-12 (UG-387/U)
Operating temperature	-30	+70	°C
Storage temperature	-50	+80	°C

* Note, sequencing of bias is necessary. Apply first GND, then Vgg , then Vdd, Disconnect in reverse order