APPLICATION
The Comtech EF Data (CEFD) UT-4514/X Up Converter is the ultimate in high performance and cost effective C-Band frequency conversion. The UT-4514/X can be used for SCPC, DAMA, and TDMA, as well as full transponder HDTV and analog TV. Spectral purity and stability characteristics fully meet or exceed the requirements of all domestic, international, and regional commercial satellite networks.

HIGH GAIN
The UT-4514/X has +10 dBm minimum output level at the 1 dB compression point and 35 dB of gain as a standard. This capability permits longer cable runs to the modem rack or compensates for elaborate splitting networks without adding expensive options such as external line amplifiers.

LOW PHASE NOISE
The phase noise performance of the UT-4514/X exceeds the Intelsat phase noise mask for IBS and IDR services by more than 8 dB. This allows phase dependent demodulators to perform better. The close-in phase noise is very low, making the converter ideal for low bit rate digital circuits such as those used in DAMA hub earth stations.

REMOTE CONTROL
The remote control interface is selectable between EIA-232 and EIA-485. All configuration control, status retrieval, and adjustments are available as simple ASCII commands through the serial interface or through the front panel menu. As a cost option, the remote control command structure can be customized in order to accommodate existing network control software.

DETACHABLE RF/IF CONNECTOR MODULE
Each UT-4514/X is equipped with a detachable module that establishes input and output connections for the RF and IF paths. The module inserts into a rear compartment of the converter, and requires no additional outside space. The module includes Type N connectors for the RF path and BNC connectors at 50 or 75Ω for the IF path.

DAISY CHAIN REDUNDANCY SWITCHING
The converter uses CEFD’s proprietary “Daisy Chain” integrated switching technology. The Daisy Chain design removes the relays associated with a centralized protection switch tray and distributes them across the individual converters. CEFD was awarded patent 5,666,646 on this distributed protection switch topology.

Daisy Chain technology successfully eliminates a central switching chassis, two power supplies, a microprocessor, and several long, costly cables. Widely accepted in the industry, CEFD’s Daisy Chain provides both pricing and marketing advantages.

MINIMUM RACK SPACE
Due to its small rack height (1.75 inches) and the elimination of the space penalty paid for a separate 1+N switch chassis, the UT-4514/X and the Daisy Chain switch architecture provide the most compact and cost effective converter subsystem available. The units are ideal for the construction of transportable systems such as “flyaways,” and high capacity earth stations where space utilization and economy are prime considerations.
UT-4514/X Ku-Band Up Converter

Specifications

Frequency Range
- DT-4514: 14.00 to 14.50 GHz
- DT-4514/C: 12.75 to 13.25 GHz
- DT-4514/D: 13.75 to 14.50 GHz
- DT-4514/E: 14.70 to 15.00 GHz
- DT-4514/F: 12.75 to 14.50 GHz

Conversion
- Dual, No Inversion

Step Size
- 125 kHz standard, 1 kHz optional

Preset Channels
- Up to 32 frequencies and gains

Stability Over Time
- ± 1 x 10⁻⁶ per day

Stability Over Temp
- ± 1 x 10⁻⁸ from 32 to 122°F (0 to 50°C)

IF Input
- Input Level: -35 dBm Typical
- Range: 52 to 88 or 104 to 176 MHz
- Return Loss: 23 dB Minimum with I/O Module or Switch Module
- Impedance: 50 or 75Ω
- Noise Figure: 13 dB Maximum at 0 dB Attenuation

RF Output
- Level: +10 dBm at 1 dB Compression
- Range: 52 to 88 or 104 to 176 MHz, with 60 W Dissipation
- Non-Carrier Spurious: -80 dBm
- Carrier Spurious: -65 dBc at 0 dBm Output
- Intermodulation: -38 dBc at 0 dBm Output SCL
- AM to PM: 0.1°/dB at –5 dBm Out
- Return Loss: 23 dB Minimum with RF/IF Connector Module or SW Module
- Carrier Mute: -70 dBc

Transfer
- Gain: 35 dB ± 2 dB
- Attenuation Adjust: 0 to 20 in 0.25 dB Steps, 0.1 dB Steps Optional
- Gain Stability: ± 0.25 dB/Day
- Ripple: ± 0.25 dB (± 18 MHz), 0.75 dB (± 36 MHz)
- Slope: 0.05 dB/MHz

External Reference
- Input, either 5 or 10 MHz Option @ +3 dBm
- Optional 10 MHz Rear Panel Reference Output

Group Delay
- Linear: 0.03 ns/MHz
- Parabolic: 0.01 ns/MHz
- Ripple: 1.0 ns Peak-to-Peak

Phase Noise

<table>
<thead>
<tr>
<th>Limit (dBc/Hz)</th>
<th>Typical (dBc/Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UT-4514</td>
<td>UT-4514F</td>
</tr>
<tr>
<td>100 Hz</td>
<td>-72</td>
</tr>
<tr>
<td>1 KHz</td>
<td>-79</td>
</tr>
<tr>
<td>10 KHz</td>
<td>-89</td>
</tr>
<tr>
<td>100 KHz</td>
<td>-98</td>
</tr>
<tr>
<td>1 MHz</td>
<td>-110</td>
</tr>
</tbody>
</table>

Remote Control (Rear Panel)
- Comm Port RS-485 or RS-232C

Indicators (Front Panel)
- Power On: Green LED
- Mute: Yellow LED
- Remote: Yellow LED
- Reference: Yellow LED
- Stored Fault: Red LED
- Fault: Red LED

Test Points (Front Panel)
- RF Sample: SMA, -20 dBc Nominal
- IF Sample: BNC, -20 dBc Nominal
- Optional L.O. Sample

Power
- Voltage: 90 to 250 VAC Auto ranging, optional -48 VDC
- Frequency: 47 to 63 Hz
- Dissipation: 60 Watts

Environmental
- Temperature: 32 to 122°F (0 to 50°C)
- Altitude: 10,000 Feet MSL
- Humidity: 0 to 95% Relative Humidity

Physical
- Dimensions (1RU): 19W x 1.75H x 22D Inches (48.30W x 4.45H x 55.90D cm)
- Weight: 15 Pounds (7.0 kg)

MTBF
- 49,740 hrs (calculated)
- > 100,000 hrs. (field experience)

Summary Alarm
- Relay Closure: Form C

Patented Daisy Chain distributed converter protection switching

Optimizing Satellite Communications