UPC7000 Series
Automatic Up-Link Power Control Unit

The UPC7000 series are the next generation automatic uplink power control units (AUPC's) measure the 'link loss' from a satellite beacon signal and subsequently automatically control the uplink power via a number of adjustable IF or L-Band channels. The system can operate in 'open-loop mode' based on a single beacon signal, or in the slightly more accurate 'comparison mode' when a beacon signal plus a looped-back carrier or pilot signal is available (requires options 2, plus an additional external beacon receiver).

The beacon receiver can either be a separate external unit providing a DC signal to the unit or the UPC7000 series can be supplied with an optional internal beacon receiver based upon the popular Peak PTR50 'CW' beacon receiver unit with L-band or SHF input options, providing a compact 'total solution' in only 1RU of rack space. The beacon receiver is offered with a spectral display facility which offers a convenient visual display of the received signal. The display can be used for system fault location, routine maintenance and can be an effective alternative to a fully functional spectrum analyser, which may not be necessary for these tasks.

Note, for use in the 'comparison mode', both the optional internal beacon receiver plus an external beacon receiver are required.

The adjustable attenuators are positioned in the uplink chain in either the IF (50-180MHz) or the L-Band (950-2150MHz) signal path (SHF solutions available) which can either be supplied internally mounted, or the unit can directly control attenuators mounted in other Peak products (indoor & outdoor up converters, BUC's, line amplifiers etc.). The standard UPC7000 series supports up to 4 adjustable internal attenuator channels within the standard 1RU chassis ('expansion' units are available for additional channels).

The UPC7000 series provide easy to use and comprehensive configuration & control features, fault monitoring protection, safe-start routines, failsafe bypass and in-built redundancy to ensure minimum disruption of uplink signals. It incorporates a graphics display module, membrane keyboard and features a clear and intuitive control and configuration menu, fully utilising the unique graphics display.

For redundancy the UPC series units are fully compatible with the Peak P1000L (1+1) systems.

Peak Features

- Supports open-loop or comparison modes (with additional external beacon receiver)
- Compact; 1RU solution for up to 4-channel integral AUPC control, with integral fail-safe ‘bypass’ switching mode
- Expandable; 10-Channel, 2RU ‘modular’ expansion unit available (see EXP010)
- Integral beacon /pilot receiver option (L-Band or SHF input), with ‘graphical’ spectrum display
- Controllable; 0-30dB, 0.1dB step attenuation allows up to 30dB AUPC range, plus user-settable ‘offset’ facility
- Flexible; directly compensates Peak devices in the uplink chain (up converter, BUC, line amplifier etc.)
- High performance; low insertion loss, high gain stability & flat frequency response
- Beacon receiver output and key parameter 24hr ‘history’ recording facility
- Pre-set & user settable ‘smoothing’ routines to prevent beacon signal noise related response problems
- Scintillation facility offering rapid compensation changes for typically low look angle satellites
- Supports site diversity switching (please contact factory for details)
**UPC7000 series – Typical Specification**

### Input Section

**External Beacon Receiver Input**

- **DC input ranges**: ±10VDC, ±5VDC, 0 to 10VDC, -10 to 0VDC, user selectable
- **DC input damage level**: ±16VDC max
- **Slope settings**: Logarithmic, 0.5, 1, 2, 5 & 10dB/V, user settable

**Input**

- **Internal Connection**
- **Connection**: SMA (f), 8Ω
- **Control**: External Beacon ‘alarm’ monitor

**Internal Beacon Receiver (Option 2)**

Note: an external receiver input is still provided.

- **Input**
  - **Frequency**: L-Band (922-2,150MHz) input
    - **Note**: wider ranges to 2450MHz available (please contact factory).
  - **Option 2a**: C-Band: 3.4-4.2GHz
  - **Option 2b**: X-Band: 7.25-7.75GHz
  - **Option 2d**: Full Ku-Band: 10.7-12.75GHz (unreferenced LNB)
  - **Option 2e**: Ka-Band (contact factory for band availability)

**L-Band monitor for SHF input options 2a-2e (option 18)**

- **Connection**: SMA (f), 50Ω
- **Level**: -20dBc -3dB

**LNB supply**

- **Fed on L-Band input, user selectable (on/off)**
- **Ext Ref**: 10MHz (0dBm nom)
- **Range select**: 22kHz tone & DC voltage level (13-15V/ 18-20VDC)
- **Power**: 500mA max. (300mA per output for option 17)

**Connector**

- **N-type (f), 50Ω**
- **Option 1**: F-Type (f), 75Ω
- **Option 1b**: BNC (f), 75Ω
- **Option 1c**: BNC (f), 50Ω

**Return loss**

- **15dB typical**
- **Level**: -70dBm nom, -50dBm max, -20dBm max aggregate
- **Options 2a-2e**: -90dBm nom, -70dBm max, -40dBm max aggregate
- **Level control**: L-Band user input level control; 0-30dB range, 0.5dB step attenuator, to increase the above composite levels
- **Option 16**: SHF input level control (for options 2a-2e); 0-30dB range, 0.5dB step attenuator, to increase the above composite levels

**Aux. Receiver DC Output**

- **±10VDC, ±5VDC, 0 to 10VDC, -10 to 0VDC, user selectable**

**Transfer Characteristics**

- **Slope settings**: Logarithmic, 0.5, 1, 2, 5 & 10dB/V, user settable
- **Connector**: BNC (f), 0Ω (ideal voltage source, 5mA max)

**Transfer Properties**

- **Slew rate**: DC & 10MHz pass 0.01 to 0.1dB/s
- **Power losses**: 2.5dB, 10MHz, 0Ω (2 connections per channel)

**Testing Parameters**

- **PLL noise (IF) BW**: 300Hz, fixed
- **Option 11**: 2kHz, fixed
- **Threshold lock acqu.**: 35dBHz, for sweep rates ±10kHz/s
- **Average search time**: 6s, for search range ±20kHz and sweep rate 5kHz/s (see application note AN0025)
- **Option 11**: <1s, for search range ±50kHz and sweep rate 20kHz/s

**Beacon ‘display’**

- **Resolution BW**: 6kHz
- **Resolution Reference**: 10MHz

**Beacon ‘display’**

- **Adjustment**: ±4.5ppm, stepped 0.01ppm
- **Allan deviation**: <5 x 10^-6 over 1s
- **Ageing**: <3 x 10^-10 per day, <3 x 10^-6 per year
- **Temp stability**: <2 x 10^-6 over 0 to 50°C

**Pilot ‘CW’ Generator Output (option 14)**

- **Frequency range**: 850-2,150MHz, user settable
- **Controller**: SMA (f), 50Ω
- **Level**: -20 to -80dBm
- **Step size**: 125kHz

### UPC Section

**Compensation ranges**

- **1 to 30dB, user settable**
  - **Note**: 30dB range has no surplus ‘user offset’ attenuation facility.
- **Step size**: 0.1, 0.2, 0.5, 1 or 2dB, user selectable
- **Compensation ratio**: 0.1 to 10dB, user settable (for 1dB drop in beacon level, attenuation is reduced according to the above value)
- **Slew rate**: 0.01 to 0.1dB/s, user settable (can be disabled)
- **Sample period**: +2 to 10s, user selectable
- **Scintillation setting**: User selectable offering faster response and optimised settings to overcome the effects of scintillation with typically low look angle satellites.

### Output Section

**Direct compensation of external Peak up converter, BUC or line amplifiers**

**Signal type**: Data over CANBUS

**Connection**: D-Type (f), 9-way

**Compensation via Internal Adjustable Attenuators**

- **Number of channels**: 1 to 4 (single channel order UPC701, dual channel order UPC7002 etc.)
  - **Note**: expansion units are available for additional channels, please see EXP010 datasheet.

**Uplink signal type**: L-Band (950-2,150MHz), SMA (f), 50Ω
  - **Note**: wider ranges to 2450MHz available (please contact factory).

**Option 3**: IF 70:±18MHz/ 140:±36MHz (50-180MHz), SMA (f), 50Ω
- **Option 3b**: F-Type (f), 75Ω
- **Option 3c**: BNC (f), 75Ω
- **Option 3f**: L-Band, N-Type (f), 50Ω (UPC7001, UPC7002 only)

**DC & 10MHz pass**

- Allows DC & 10MHz signals on the L-Band input
- **(Option 4)**

**Output 1dB GCP**

- **+5dBm (TOIP +1dBm)**
- **Option 15**: +22dBm (TOIP +32dBm)
  - **Note**: increases insertion loss to 4dB nominal

**Attenuation control**

- **0-30dB, stepped 0.1dB**

**Insertion loss**

- **1dB nominal (L-Band), at min attenuation**
- **Gain stability**: ±0.1dB per week (constant temp.)
- **Gain flatness**: ±0.5dB 950-2150MHz full band (±0.2dB IF option 3)
- **±0.2dB across any 36MHz in band**

**Compensation coeff.**

- **±0.01dB/°C**

**Bypass mode**

- Fast switch from external user selectable pad

**Bypass connection**

- SMA (f), 50Ω (2 connections per channel)

**Bypass insertion loss**

- 2dB nom (plus external pad attenuation value)

### Other

**Mechanical**

- **Size**: 19” standard rack mount, 1U (1.75”), depth 53mm (21”), plus connectors

**Construction**: Stainless steel chassis

**Weight**: Approx. 9kg (30lbs)

**Environmental**

- **Operating temp**: 0°C to +50°C
- **EMC**: ETSI EN 301 489-1: V2.2.1 & ETSI EN 300 587-1: V1.2.1

**Safety**: IEC/EN 62368-1:2014 (second edition)

**Power supply**

- **Voltage**: 90-264VAC
- **Frequency**: 47-63Hz
- **Power**: 80 Watts max (configuration dependent)

**Control System**

- **Remote control**: RS232/ 485 port
- **Option 9**: Ethernet; embedded web server & SNMP network management support.

**Alarms**

- PSU fault, ext. alarm inputs & summary failure relay (form C)
**Options**

1) F-Type, 75Ω, 'internal beacon receiver' input connection
1b) BNC, 75Ω, 'internal beacon receiver' input connection
1c) BNC, 50Ω, 'internal beacon receiver' input connection
2) Internal beacon receiver with L-Band beacon input
2a) Internal beacon receiver with C-Band beacon input
2b) Internal beacon receiver with X-Band beacon input
2d) Internal beacon receiver with full Ku-Band beacon input
2e) Internal beacon receiver with Ka-Band beacon input
3) 70MHz & 140MHz (50-180MHz) internal uplink interface
3b) F-Type, 75Ω internal uplink interface
3c) BNC, 75Ω internal uplink interface
3f) N-Type, 50Ω internal uplink interface
4) DC & 10MHz pass-through for L-Band uplink channels
5b) Bypass external fixed attenuator & loop-back co-axial connection link
9) Ethernet interface with embedded web server & SNMP
10) Redundant power supplies
11) Fast lock acquisition to <1s
14) Pilot 'CW' signal output (only valid with option 2)
15) Higher uplink channel output P1dB GCP to +22dBm nom. (TOIP +32dBm)
16) SHF input level control (only valid with options 2a-2e)
17) Dual polarisation inputs
18) L-Band monitor for SHF inputs (only valid with options 2a-2e)

*Note: the addition of options can modify the typical performance & rear panel layout, for details please consult the factory*

**Rear panel view (sample 4-Channel unit with integral beacon receiver)**