**UPC7000 Series**

**Automatic Uplink Power Control Unit**



The **UPC7000 series** are the next generation automatic uplink power control units (AUPC’s) that measure the ‘link losses’ 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’, configuration requires both the optional internal beacon receiver plus an external beacon receiver.

Internal adjustable attenuators are positioned in the uplink chain in either the IF(70/140MHz) or the L-Band signal path. 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) switching systems. Units support low-cost passive concatenated backup/ redundancy configurations utilising the failsafe bypass interfaces of the primary unit (please contact the factory for details).

***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

 High performance; low insertion loss, high gain stability & flat frequency response

 Optional dual beacon receiver automatic source selection redundancy 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

Connection SMA (f), 8MΩ

Option 1d; BNC (f), 8MΩ

Control External receiver ‘alarm’ monitor to freeze response, via discrete connection

Option 17c; Dual external receiver DC inputs, with redundancy control.

Option 17d; Dual receiver (one internal & one external) redundancy control.

**Internal Beacon Receiver (Option 2)**

Note: An external receiver input is still provided.

**Input**

Option 17; Dual polarisation inputs, with local & remote user selection

Frequency L-Band (925-2,150MHz) input

Option 21a; L-Band (925-2,300MHz) input

Option 21b; L-Band (925-2,450MHz) input

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);

Range select; 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 maxaggregate

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 input levels

Option 16; SHF input level control (for options 2a-2e); 0-30dB range, 0.5dB step attenuator, to increase the above composite levels

**Receiver Aux. Output** ±10VDC, ±5VDC, 0 to 10VDC, -10 to 0VDC, user selectable

Slope settings Logarithmic, 0.5, 1, 2, 5 & 10dB/V, user selectable

Connector BNC (f), 0Ω (ideal voltage source, 5mA max)

**Transfer Characteristics**

Synth step size 1kHz

Search ranges ±20, ±50, ±100, ±200 & ±500kHz, user selectable

Sweep rates 2.5 & 5kHz/s, user selectable

Option 11; 2.5, 5, 10, 20, 40, 80, 120 & 240kHz/s

Level thermal stability -0.04dB/0C

**Tracking Parameters**

PLL noise (IF) BW 300Hz, fixed

Option 11; 2kHz, fixed

Threshold lock reaqu. 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 ≥80kHz/s

**Beacon ‘display’** Graphical

Resolution BW 6kHz

**Internal Reference** 10MHz

Adjustment ±0.45ppm, stepped 0.01ppm

Stability;

Allan deviation <5 x 10-12 over 1s

Ageing <3 x 10-10 per day, <3 x 10-8 per year

Temp stability <2 x 10-9 over 0 to 500C

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

For ‘self-test’ & for use when satellite has no useable beacon signal

Frequency range 850-2,150MHz, user settable

Step size 125kHz

Level -50 to -80dBm

Control range 30dB, stepped 0.5dB

Connector SMA (f), 50Ω

***UPC Section***

Compensation ranges 1 to 30dB, user settable

Note: 30dB range has no surplus ‘user offset’ attenuation facility.

Step sizes 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 0.2 to 10s, user settable

Scintillation setting User selectable offering faster response and optimised settings to overcome the effects of scintillation with typically low look angle satellites (only applicable with option 2).

***Output Section***

Number of channels 1 to 4 (single channel order UPC7001, 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)

Option 20; L-Band (950-2,450MHz), only available with option 15

Option 3; IF 70±18MHz/ 140±36MHz (50-180MHz)

Connections SMA (f), 50Ω (input & output)

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 (27VDCmax@1A) & 10MHz signals on the

(Option 4) L-Band input to be passed through to the output.

10MHz injection External reference input injected onto L-Band up-link

(Option 4b) channel outputs, BNC(f).

Output 1dB GCP +8dBm (TOIP +18dBm)

Option 15; +22dBm (TOIP +32dBm)

Note: Increases insertion loss to 4dB nominal

Return loss 15dB nominal (input and output)

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/0C

Bypass mode Fail-safe switching to 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 534mm (21”), plus connectors

Construction Stainless steel chassis

Weight Approx. 9kgs (20lbs)

**Environmental**

Operating temp 00C to +500C

EMC ETSI EN 301 489-1: V2.2.1

 & ETSI EN 300 673: V1.2.1

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

**Power supply**

Voltage 90-264VAC

Frequency 47-63Hz

Power 30 Watts (configuration dependent)

Option 10; Redundant PSU; provides a 1+1 redundant power supply configuration with separate prime power inputs

**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

1d) BNC, 8MΩ, ‘external 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

4b) 10MHz input for injection onto uplink channel outputs

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, user selectable.

17c) Dual external receiver DC inputs, with redundancy control.

17d) Dual receiver (one internal & one external) redundancy control (only valid with option 2).

18) L-Band monitor for SHF inputs (only valid with options 2a-2e)

20) L-Band uplink extended to 2450MHz (only valid with option 15)

21a) L-Band beacon receiver input range extended to 2300MHz (only valid with option 2)

21b) L-Band beacon receiver input range extended to 2450MHz (only valid with option 2)

 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)*



