

## High-power block up converter system

This document should be read in conjunction with the *Block Up Converter 6700/6900 series User Guide* (Codan part number 15-44027-EN) and the *C-Band and Ku-Band Hub-mount SSPAs 5760/5712H and 5940 Reference Manual* (Codan part number 15-44011-EN).

### Overview

This document describes how to connect Codan’s hub-mount high-power (HP) SSPAs with Codan’s LBUCs. The HP SSPAs increase the output power from the 5 W C-Band 6705 and 4 W Ku-Band 6904 LBUCs to provide a range of high-power BUC (HBUC) systems. The HBUC systems available are rated at:

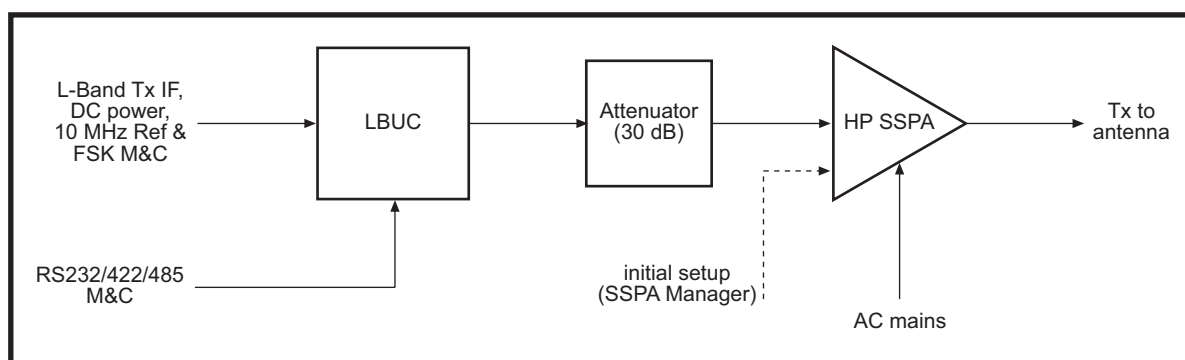
C-Band: 60 W and 120 W

Ku-Band: 40 W

The HP SSPAs are AC mains powered, while the 6705 and 6904 LBUCs are powered via their L-Band IF input. A mounting plate is provided to mount the LBUC and HP SSPA system as a single integrated unit.

The LBUC with HP SSPA system is shown in [Figure 1](#).

Figure 1: Configuration of the HBUC system



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## Frequency bands available for the HBUC systems

Table 1: Frequency bands available for the C-Band and Ku-Band HBUC systems

SSPA	Frequency band (MHz)
C-Band	5850 to 6425
Ku-Band	14000 to 14500

**NOTE** The LBUCs cover frequency ranges greater than those shown in [Table 1](#) however, the operating range is determined by the HP SSPA.

## Installation and setup

This section explains how to set up an HP SSPA with an LBUC.

### Electrical safety

The HP SSPA is AC mains powered and the following precautions must be observed:

- A protective earth connection must be included in the mains wiring to the HP SSPA.
- As the HP SSPA is intended for permanent connection to the mains supply, a readily accessible switch or circuit breaker must be incorporated in the mains wiring to enable easy isolation of the unit.
- The isolating switch must disconnect both poles simultaneously. However, if you can positively identify the neutral conductor, you may have a single-pole isolating device in the live conductor.

## Installing the LBUC and HP SSPA system

The HP SSPA and LBUC system should be mounted on the pedestal of the antenna as shown in the appropriate installation drawing (see [page 8, Drawings](#)). You should avoid areas where water runoff is likely to be channelled into concentrated streams across any connectors.

The HP SSPA mounting bracket supports both the LBUC (on its own mounting plate) and the HP SSPA.

### Cabling

To connect the cabling between the HP SSPA and the LBUC:

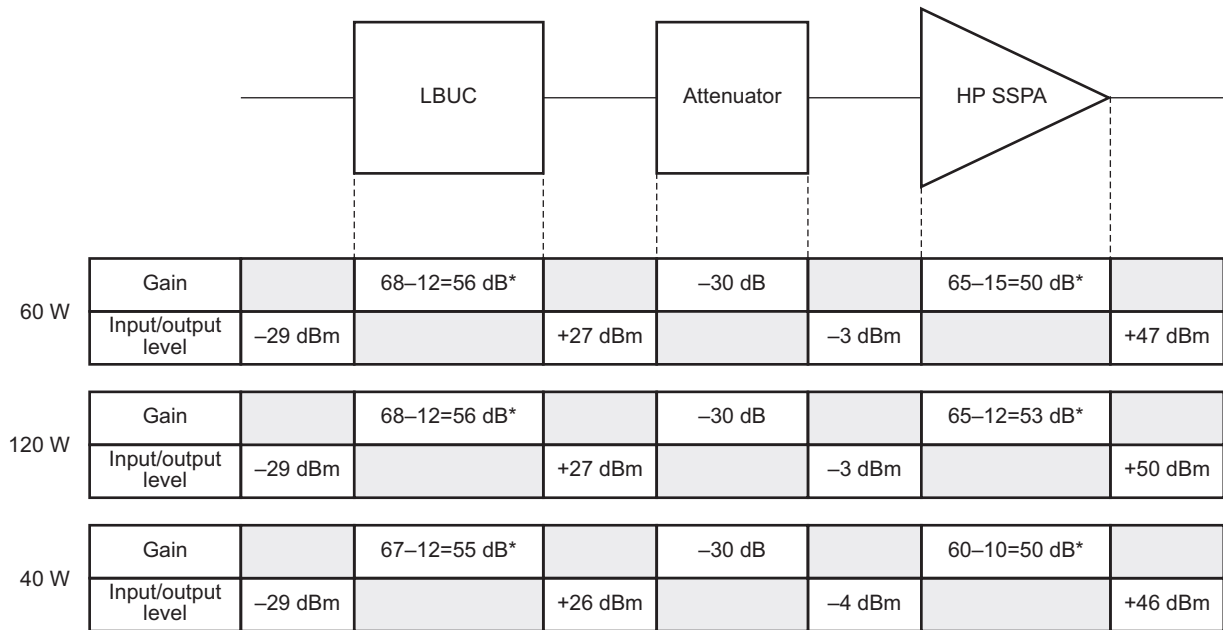
- Connect the 30 dB attenuator (Codan part number 78-01002) to the input of the HP SSPA.
- In Ku-Band installations only, connect the waveguide to N-type transition (Codan part number 78-01030) to the LBUC using the WR75 Flange Kit (Codan part number 15-40173).
- Connect the coaxial cable (Codan part number 08-05366-006 (0.6 m, C-Band) and 08-05597-007 (0.7 m, Ku-Band)) from the LBUC output to the 30 dB attenuator at the input of the HP SSPA.
- Install the remaining cables and connectors as described in *Installation in the Block Up Converter 6700/6900 series User Guide* and the *C-Band and Ku-Band Hub-mount SSPAs 5760/5712H and 5940 Reference Manual*.
- Tape all connectors as per instructions provided with the Connector Sealing Kit (Codan part number 15-40202).

### IF levels

As a guide, the required IF levels are shown in [Figure 2 on page 4](#). It is recommended that you initially set the modem IF output level to its lowest setting, then raise the level to achieve the desired HP SSPA output power.

The LBUC and HP SSPA system requires a lower input IF level to drive the output to 1 dB GCP than a stand-alone LBUC. In installations where the L-Band IF cable is short and its loss is low, or where the modem output level cannot be set low enough, a DC and 10 MHz passing attenuator may be fitted at the L-Band IF input to the LBUC. Suitable attenuators are available from Codan (10 dB attenuator (Codan part number 78-01032) and 20 dB attenuator (Codan part number 78-01033)).

Figure 2: IF level diagrams for the LBUC and HP SSPAs



\* Calculation shown is the minimum gain less the recommended attenuator setting

**NOTE** The levels shown are illustrative only; they are the levels required to achieve P1dB output power from the HP SSPA. Your actual levels will depend upon the number of carriers being transmitted and the output back off required to meet the intermodulation requirements of your system. Adjust the modem output level for the desired HP SSPA output power, not exceeding P1dB.

**WARNING** Do not exceed the recommended IF levels for the LBUC and HP SSPA.

## Operating the HBUC system

The HP SSPA is set up and controlled using Codan's SSPA Manager software. Specifically, the following must be set:

SSPA Manager item	Setting	Comment
Converter Connection (via Options—SSPA Settings)	Generic	Codan mode is only applicable to 5700 series and 5900 series converters
Operating State	Online	
User Setting	RF On	

For information on setting up the HP SSPA see *Setting SSPA parameters* in the *C-Band and Ku-Band Hub-mount SSPAs 5760/5712H and 5940 Reference Manual*. The ex-factory HP SSPA is set to a default transmit attenuation of 10 dB.

**NOTE** You must change the default transmit attenuation of the HP SSPA according to the IF levels provided in [Figure 2 on page 4](#).

The LBUC may be set up and controlled using a 6560 Hand-held Controller or a PC with any terminal software. The ex-factory LBUC is set to a default transmit attenuation of 12 dB.

The LBUC and HP SSPA system should be operated as described in *Setting up and operating the BUC* in the *Block Up Converter 6700/6900 series User Guide*.

Note that all LBUC commands relating to the measurement of RF output power will return power levels as measured at the output of the LBUC, not the HP SSPA. The power level at the HP SSPA output will be at least:

HBUC	Power level at output of HP SSPA
60 W	Output of LBUC + 20 dB
120 W	Output of LBUC + 23 dB
40 W	Output of LBUC + 20 dB

You should use a power meter to establish the difference for your actual installation.

## Maintenance and fault finding

The procedures are described in *Maintenance and fault finding* in the *Block Up Converter 6700/6900 series User Guide*.

If the fault being experienced is an output power fault, perform the tests described in the *Block Up Converter 6700/6900 series User Guide*, then check:

- that the AC power is applied to the HP SSPA
- the integrity of the coaxial cable joining the LBUC to the HP SSPA
- the HP SSPA (see *Maintenance and fault finding* in the *C-Band and Ku-Band Hub-mount SSPAs 5760/5712H and 5940 Reference Manual*)

## Specifications

The following specifications relate to the LBUC with HP SSPA system. For full details see the *Block Up Converter 6700/6900 series User Guide* and the *C-Band and Ku-Band Hub-mount SSPAs 5760/5712H and 5940 Reference Manual*.

### Frequency ranges

#### IF input

C-Band	950 to 1 525 MHz
Ku-Band	950 to 1 450 MHz

#### RF output

C-Band 60 W, 120 W	5 850 to 6 425 MHz
Ku-Band 40 W	14 000 to 14 500 MHz

### System gain specification

#### Gain (at recommended settings)

C-Band 60 W	76 dB minimum
C-Band 120 W	79 dB minimum
Ku-Band 40 W	75 dB minimum

#### Gain flatness

40 MHz	±0.8 dB typical
Full band	±1.8 dB typical

Gain stability ±2.0 dB typical over –40 to +55°C

**RF output**

## Power at 1 dB GCP

C-Band 60 W	+47.0 dBm minimum
C-Band 120 W	+50.0 dBm minimum
Ku-Band 40 W	+46.0 dBm minimum

## Carrier to intermodulation ratio

C-Band 60 W, 120 W	-26 dBc, two carriers, each at 6 dB OPBO from 1 dB GCP
Ku-Band 40 W	-25 dBc, two carriers, each at 6 dB OPBO from 1 dB GCP

## RF output connector

C-Band 60 W, 120 W	CPR137G flange (8 holes, M5 × 8 mm deep)
Ku-Band 40 W	PBR120 flange (WR75, 4 holes, M4 × 8 mm deep)

**Power supply**

HP SSPA voltage	104 to 274 V AC, 47 to 63 Hz
HP SSPA AC power connector	Amphenol T3110 000
LBUC voltage	19 to 35 V DC 42 to 60 V DC (optional)
LBUC power connector	via transmit IF input N-type connector

**Environmental**

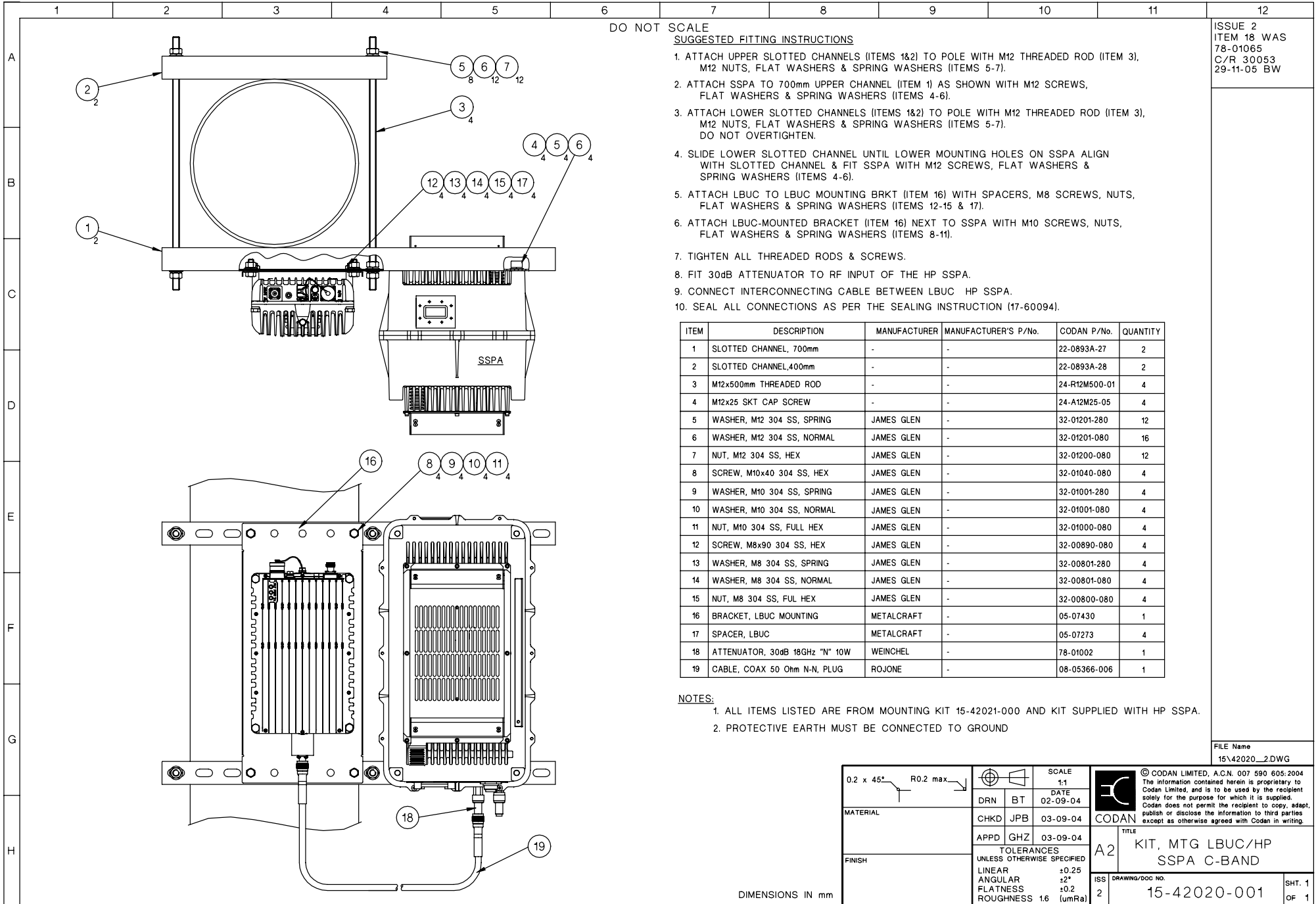
Operating temperature range	-40 to +55°C
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## Drawings

Table 2: Drawings for the HBUC system installation

<b>Description</b>	<b>Drawing number</b>
Fitting Instructions, C-Band: Mounting Kit for LBUC/HP SSPA	<a href="#">15-42020-001</a>
Fitting Instructions, Ku-Band: Mounting Kit for LBUC/HP SSPA	<a href="#">15-42021-001</a>





DO NOT SCALE

**SUGGESTED FITTING INSTRUCTIONS**

1. ATTACH UPPER SLOTTED CHANNELS (ITEMS 1&2) TO POLE WITH M12 THREADED ROD (ITEM 3), M12 NUTS, FLAT WASHERS & SPRING WASHERS (ITEMS 5-7).
2. ATTACH SSPA TO 700mm UPPER CHANNEL (ITEM 1) AS SHOWN WITH M12 SCREWS, FLAT WASHERS & SPRING WASHERS (ITEMS 4-6).
3. ATTACH LOWER SLOTTED CHANNELS (ITEMS 1&2) TO POLE WITH M12 THREADED ROD (ITEM 3), M12 NUTS, FLAT WASHERS & SPRING WASHERS (ITEMS 5-7). DO NOT OVERTIGHTEN.
4. SLIDE LOWER SLOTTED CHANNEL UNTIL LOWER MOUNTING HOLES ON SSPA ALIGN WITH SLOTTED CHANNEL & FIT SSPA WITH M12 SCREWS, FLAT WASHERS & SPRING WASHERS (ITEMS 4-6).
5. ATTACH LBUC MOUNTING BRKT (ITEM 16) WITH SPACERS, M8 SCREWS, NUTS, FLAT WASHERS & SPRING WASHERS (ITEMS 12-15 & 17).
6. ATTACH LBUC-MOUNTED BRACKET (ITEM 16) NEXT TO SSPA WITH M10 SCREWS, NUTS, FLAT WASHERS & SPRING WASHERS (ITEMS 8-11).
7. TIGHTEN ALL THREADED RODS & SCREWS.
8. FIT 30dB ATTENUATOR TO RF INPUT OF THE HP SSPA.
9. CONNECT INTERCONNECTING CABLE BETWEEN LBUC HP SSPA.
10. SEAL ALL CONNECTIONS AS PER THE SEALING INSTRUCTION (17-60094).

ITEM	DESCRIPTION	MANUFACTURER	MANUFACTURER'S P/No.	CODAN P/No.	QUANTITY
1	SLOTTED CHANNEL, 700mm	-	-	22-0893A-27	2
2	SLOTTED CHANNEL, 400mm	-	-	22-0893A-28	2
3	M12x500mm THREADED ROD	-	-	24-R12M500-01	4
4	M12x25 SKT CAP SCREW	-	-	24-A12M25-05	4
5	WASHER, M12 304 SS, SPRING	JAMES GLEN	-	32-01201-280	12
6	WASHER, M12 304 SS, NORMAL	JAMES GLEN	-	32-01201-080	16
7	NUT, M12 304 SS, HEX	JAMES GLEN	-	32-01200-080	12
8	SCREW, M10x40 304 SS, HEX	JAMES GLEN	-	32-01040-080	4
9	WASHER, M10 304 SS, SPRING	JAMES GLEN	-	32-01001-280	4
10	WASHER, M10 304 SS, NORMAL	JAMES GLEN	-	32-01001-080	4
11	NUT, M10 304 SS, FULL HEX	JAMES GLEN	-	32-01000-080	4
12	SCREW, M8x90 304 SS, HEX	JAMES GLEN	-	32-00890-080	4
13	WASHER, M8 304 SS, SPRING	JAMES GLEN	-	32-00801-280	4
14	WASHER, M8 304 SS, NORMAL	JAMES GLEN	-	32-00801-080	4
15	NUT, M8 304 SS, FULL HEX	JAMES GLEN	-	32-00800-080	4
16	BRACKET, LBUC MOUNTING	METALCRAFT	-	05-07430	1
17	SPACER, LBUC	METALCRAFT	-	05-07273	4
18	ATTENUATOR, 30dB 18GHz "N" 10W	WEINCHEL	-	78-01002	1
19	CABLE, COAX 50 Ohm N-N, PLUG	ROJONE	-	08-05366-006	1

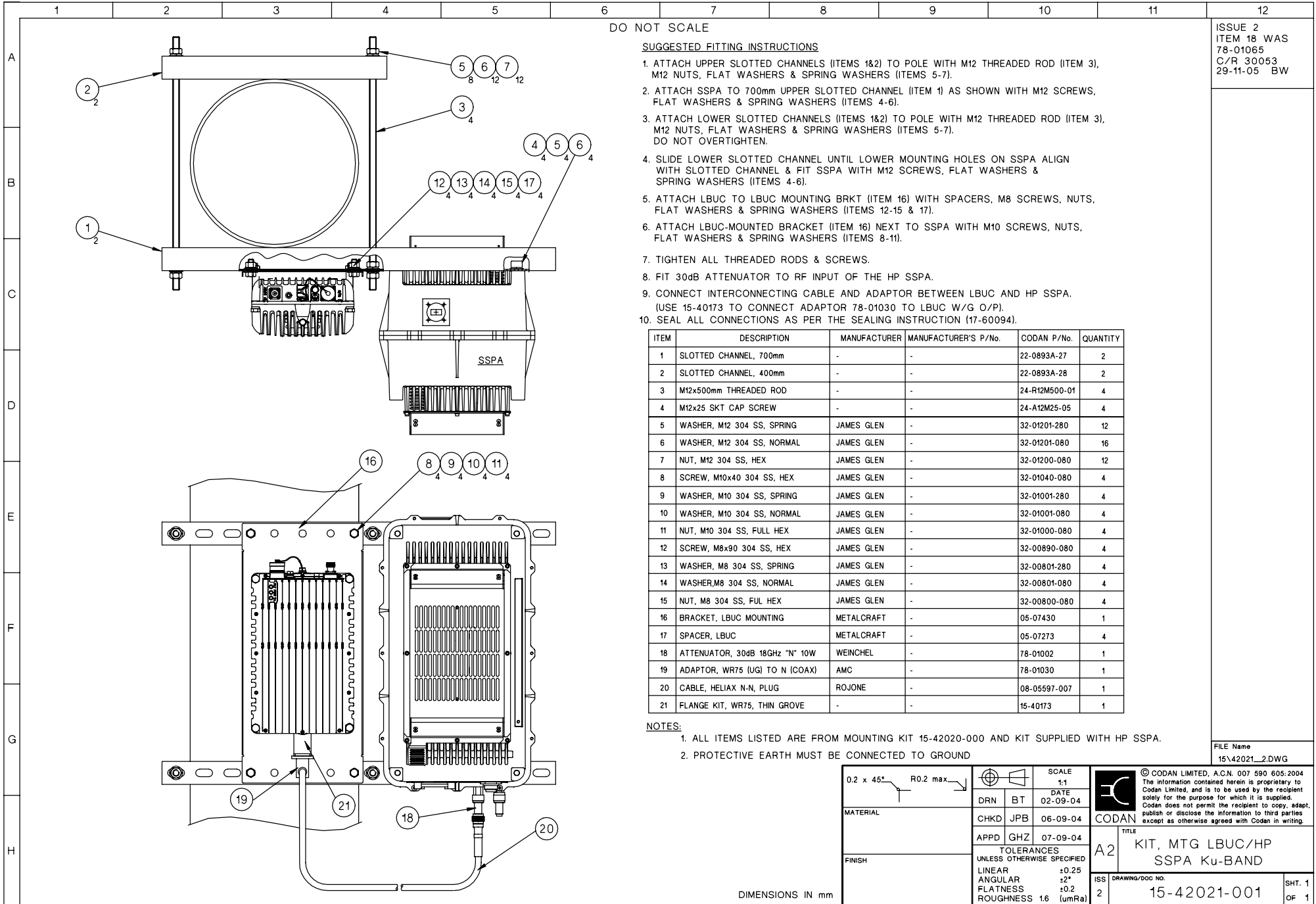
**NOTES:**

1. ALL ITEMS LISTED ARE FROM MOUNTING KIT 15-42021-000 AND KIT SUPPLIED WITH HP SSPA.
2. PROTECTIVE EARTH MUST BE CONNECTED TO GROUND

ISSUE 2  
ITEM 18 WAS  
78-01065  
C/R 30053  
29-11-05 BW

FILE Name  
15\42020\_2.DWG

0.2 x 45° R0.2 max	SCALE 1:1		<p>© CODAN LIMITED, A.C.N. 007 590 605; 2004 The information contained herein is proprietary to Codan Limited, and is to be used by the recipient solely for the purpose for which it is supplied. Codan does not permit the recipient to copy, adapt, publish or disclose the information to third parties except as otherwise agreed with Codan in writing.</p>
	DRN BT CHKD JPB	DATE 02-09-04	
MATERIAL	APPD GHZ 03-09-04	TITL KIT, MTG LBUC/HP SSPA C-BAND	
FINISH	TOLERANCES UNLESS OTHERWISE SPECIFIED LINEAR ±0.25 ANGULAR ±2° FLATNESS ±0.2 ROUGHNESS 1.6 (umRa)		
DIMENSIONS IN mm		ISS DRAWING/DOC NO. 2 15-42020-001	SHT. 1 OF 1



DO NOT SCALE

SUGGESTED FITTING INSTRUCTIONS

1. ATTACH UPPER SLOTTED CHANNELS (ITEMS 1&2) TO POLE WITH M12 THREADED ROD (ITEM 3), M12 NUTS, FLAT WASHERS & SPRING WASHERS (ITEMS 5-7).
2. ATTACH SSPA TO 700mm UPPER SLOTTED CHANNEL (ITEM 1) AS SHOWN WITH M12 SCREWS, FLAT WASHERS & SPRING WASHERS (ITEMS 4-6).
3. ATTACH LOWER SLOTTED CHANNELS (ITEMS 1&2) TO POLE WITH M12 THREADED ROD (ITEM 3), M12 NUTS, FLAT WASHERS & SPRING WASHERS (ITEMS 5-7). DO NOT OVERTIGHTEN.
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5. ATTACH LBUC TO LBUC MOUNTING BRKT (ITEM 16) WITH SPACERS, M8 SCREWS, NUTS, FLAT WASHERS & SPRING WASHERS (ITEMS 12-15 & 17).
6. ATTACH LBUC-MOUNTED BRACKET (ITEM 16) NEXT TO SSPA WITH M10 SCREWS, NUTS, FLAT WASHERS & SPRING WASHERS (ITEMS 8-11).
7. TIGHTEN ALL THREADED RODS & SCREWS.
8. FIT 30dB ATTENUATOR TO RF INPUT OF THE HP SSPA.
9. CONNECT INTERCONNECTING CABLE AND ADAPTOR BETWEEN LBUC AND HP SSPA. (USE 15-40173 TO CONNECT ADAPTOR 78-01030 TO LBUC W/G O/P).
10. SEAL ALL CONNECTIONS AS PER THE SEALING INSTRUCTION (17-60094).

ITEM	DESCRIPTION	MANUFACTURER	MANUFACTURER'S P/No.	CODAN P/No.	QUANTITY
1	SLOTTED CHANNEL, 700mm	-	-	22-0893A-27	2
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6	WASHER, M12 304 SS, NORMAL	JAMES GLEN	-	32-01201-080	16
7	NUT, M12 304 SS, HEX	JAMES GLEN	-	32-01200-080	12
8	SCREW, M10x40 304 SS, HEX	JAMES GLEN	-	32-01040-080	4
9	WASHER, M10 304 SS, SPRING	JAMES GLEN	-	32-01001-280	4
10	WASHER, M10 304 SS, NORMAL	JAMES GLEN	-	32-01001-080	4
11	NUT, M10 304 SS, FULL HEX	JAMES GLEN	-	32-01000-080	4
12	SCREW, M8x90 304 SS, HEX	JAMES GLEN	-	32-00890-080	4
13	WASHER, M8 304 SS, SPRING	JAMES GLEN	-	32-00801-280	4
14	WASHER, M8 304 SS, NORMAL	JAMES GLEN	-	32-00801-080	4
15	NUT, M8 304 SS, FUL HEX	JAMES GLEN	-	32-00800-080	4
16	BRACKET, LBUC MOUNTING	METALCRAFT	-	05-07430	1
17	SPACER, LBUC	METALCRAFT	-	05-07273	4
18	ATTENUATOR, 30dB 18GHz "N" 10W	WEINCHSEL	-	78-01002	1
19	ADAPTOR, WR75 (UG) TO N (COAX)	AMC	-	78-01030	1
20	CABLE, HELIAX N-N, PLUG	ROJONE	-	08-05597-007	1
21	FLANGE KIT, WR75, THIN GROVE	-	-	15-40173	1

NOTES:

1. ALL ITEMS LISTED ARE FROM MOUNTING KIT 15-42020-000 AND KIT SUPPLIED WITH HP SSPA.
2. PROTECTIVE EARTH MUST BE CONNECTED TO GROUND

ISSUE 2  
ITEM 18 WAS  
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0.2 x 45° R0.2 max	SCALE 1:1		<p>© CODAN LIMITED, A.C.N. 007 590 605; 2004 The information contained herein is proprietary to Codan Limited, and is to be used by the recipient solely for the purpose for which it is supplied. Codan does not permit the recipient to copy, adapt, publish or disclose the information to third parties except as otherwise agreed with Codan in writing.</p>
	DRN BT 02-09-04	DATE 02-09-04	
MATERIAL	CHKD JPB 06-09-04	APPD GHZ 07-09-04	TITLE KIT, MTPG LBUC/HP SSPA Ku-BAND
FINISH	TOLERANCES UNLESS OTHERWISE SPECIFIED LINEAR ±0.25 ANGULAR ±2° FLATNESS ±0.2 ROUGHNESS 1.6 (umRa)		DRAWING/DOC NO. 15-42021-001
DIMENSIONS IN mm			SHT. 1 OF 1