



**New York Justice Centre
Radio Repeater Equipment
For**

GPD Telecom Inc.

AFL Works Order: Q114828

AFL product part Nōs.: 50-146501 (VHF Repeater)

50-146601 (UHF Repeater)

50-146701 (800MHz Repeater)

Table of Contents

1. INTRODUCTION	5
Scope and Purpose of Document	5
Limitation of Liability Notice	5
2. SAFETY CONSIDERATIONS	6
2.1 Earthing of Equipment	6
2.2 Electric Shock Hazard	6
2.3 RF Radiation Hazard	6
2.4 Chemical Hazard	7
2.5 Laser Safety	7
2.6 Emergency Contact Numbers	7
3. EQUIPMENT OVERVIEW	8
3.1 System Description	8
3.2 Whole System Diagram, Drg. # 50-146581	9
4. SYSTEM DETAILS	10
4.1 VHF Channel Selective Cell Enhancer Rack (50-146501)	10
4.1.1 VHF Cell Enhancer Rack Description	10
4.1.2 VHF Cell Enhancer Rack Electrical Specification	10
4.1.3 VHF Cell Enhancer Rack Mechanical Specification	11
4.1.4 VHF Cell Enhancer Rack Parts List	11
4.1.5 VHF Downlink O/P Combiner Shelf (50-146502)	12
4.1.5.P VHF Downlink O/P Combiner Shelf Photographs	12
4.1.5.1 Description	13
4.1.5.2 Technical Specification	13
4.1.6.3 Parts List	13
4.1.5.4 System Diagram, Drg. # 50-146582	14
4.1.6 VHF Uplink I/P Splitter Shelf (50-146503)	15
4.1.6.P VHF Uplink I/P Splitter Shelf Photographs	15
4.1.6.1 Description	16
4.1.6.2 Technical Specification	16
4.1.6.3 Parts List	16
4.1.6.4 System Diagram, Drg. # 50-146583	17
4.1.7 VHF Duplex BDA Channel 1 Shelf (50-146504)	18
4.1.7.P VHF Duplex BDA Channel 1 Shelf Photographs	18
4.1.7.1 Description	19
4.1.7.2 Technical Specification	19
4.1.7.3 Parts List	20
4.1.7.4 System Diagram, Drg. # 50-146584	21
4.1.8 VHF Duplex BDA Channel 2 Shelf (50-146505)	22
4.1.8.P VHF Duplex BDA Channel 2 Shelf Photographs	22
4.1.8.1 Description	22
4.1.8.2 Technical Specification	22
4.1.8.3 Parts List	22
4.1.8.4 System Diagram	23
4.1.9 VHF Simplex BDA Channel 3A Shelf (50-146506)	24
4.1.9.P VHF Simplex BDA Photographs	24
4.1.9.1 Description	25
4.1.9.2 Technical Specification	25
4.1.9.3 System Diagram, Drg. # 50-146586	26
4.1.9.4 Parts List	27
4.1.10 VHF Simplex BDA Channel 3B Shelf (50-146507)	28
4.1.10.P VHF Simplex BDA Channel 3B Photographs	28
4.1.10.1 Description	28
4.1.10.2 Technical Specification	28
4.1.10.3 System Diagram, Drg. # 50-146587	29
4.1.10.4 Parts List	30
4.1.11 VHF Simplex BDA Channel 4 Shelf (50-146508)	31
4.1.11.P VHF Simplex BDA Channel 4 Shelf Photographs	31
4.1.11.1 Description	31

4.1.11.2	Technical Specification	31
4.1.11.3	System Diagram, Drg. # 50-146588	32
4.1.11.4	Parts List	33
4.1.12	Downlink I/P Splitter (50-146509).....	34
4.1.12.P	Downlink Input Splitter Photographs.....	34
4.1.12.1	Description	35
4.1.12.2	Technical Specification	35
4.1.12.3	Parts List	35
4.1.12.4	System Diagram, Drg. # 50-146589	36
4.1.13	Downlink O/P Combiner (50-146510)	37
4.1.13.P	Downlink O/P Combiner Photographs	37
4.1.13.1	Description	38
4.1.13.2	Technical Specification	38
4.1.13.3	Parts List	38
4.1.13.4	System Diagram.....	39
4.1.14	VHF/UHF 24V Power Supply Shelf (50-146512)	40
4.1.14.P	VHF/UHF Power supply Shelf Photographs	40
4.1.14.1	VHF/UHF PSU Shelf Description.....	41
4.1.14.2	VHF/UHF PSU Shelf Technical Specification.....	41
4.1.14.3	VHF/UHF PSU Shelf Parts List.....	42
4.1.14.4	VHF/UHF PSU Shelf System Diagram, (needs new drawing)	43
4.2	UHF Channel Selective Cell Enhancer Rack (50-146601)	44
4.2.1	Description	44
4.2.2	Electrical Specification	44
4.2.3	Mechanical Specification.....	44
4.2.4	Parts List	45
4.2.5	Downlink Combiner Shelf (50-146602)	46
4.2.5.P	Downlink Combiner Photographs	46
4.2.5.1	Description	47
4.2.5.2	Technical Specification	47
4.2.5.3	Parts List	47
4.2.5.4	System Diagram, Drg. # 50-146682	48
4.2.6	Uplink Splitter Shelf (60-146603)	49
4.2.6.P	Uplink Splitter Shelf Photographs	49
4.2.6.1	Description	50
4.2.6.2	Technical Specification	50
4.2.6.3	Parts List	50
4.2.6.4	System Diagram, Drg. # 50-146683	51
4.2.7	UHF Duplex Channel 1 BDA (50-146604)	52
4.2.7.P	Duplex Shelf Photographs (hardware identical, only 1 shelf shown).....	52
4.2.7.1	Description	53
4.2.7.2	Technical Specification	53
4.2.7.3	Parts List	54
4.2.7.4	UHF Duplex Channel 1 BDA System Diagram Drg. # 60-146684.....	55
4.2.8	UHF Duplex Channel 2 BDA (50-146605)	56
4.2.8.1	UHF Duplex Channel 2 BDA System Diagram, Drg. # 50-146685.....	56
4.2.9	UHF Duplex Channel 3 BDA (50-146606)	57
4.2.9.1	UHF Duplex Channel 3 BDA System Diagram, Drg. # 50-146686.....	57
4.2.10	UHF Duplex Channel 4 BDA (50-146607)	58
4.2.10.1	UHF Duplex BDA Channel 4 System Diagram, Drg. # 50-146687.....	58
4.2.11	UHF Duplex Channel 5 BDA (50-146608)	59
4.2.11.1	UHF Duplex Channel 5 System Diagram, Drg. # 50-146688.....	59
4.2.12	UHF Duplex Channel 6 BDA (50-146612)	60
4.2.12.1	UHF Duplex Channel 6 BDA System Diagram, Drg. # 50-146692.....	60
4.2.13	UHF Uplink Combiner Shelf (50-146609).....	61
4.2.13.P	UHF Uplink Combiner Shelf Photographs	61
4.2.13.1	Description	62
4.2.13.2	Technical Specification	62
4.2.13.3	Parts List	62
4.2.13.4	UHF Uplink Combiner Shelf System Diagram, Drg. # 50-146689.....	63
4.2.14	UHF Downlink Splitter Shelf (50-146610)	64
4.2.14.P	UHF Downlink Splitter Shelf Photographs	64
4.2.14.1	Description	65
4.2.14.2	Technical Specification	65

4.2.14.3	Parts List	65
4.2.14.4	UHF Downlink Splitter Shelf System Diagram, Drg. # 50-146690.....	66
4.3	800MHz Channel Selective Cell Enhancer Rack (50-146701)	67
4.3.1	Description	67
4.3.2	Technical Specification.....	67
4.3.3	Parts List	67
4.3.4	800MHz Channel Selective C.E. System Diagram, Drg. # 50-146782.....	68
4.4	Channel Selective Uplink & Downlink Shelf (50-146702).....	69
4.4.P	Uplink & Downlink Shelf Photographs.....	69
4.4.1	Uplink & Downlink Shelf Description	70
4.4.2	Uplink & Downlink Shelf Electrical Specifications	70
4.4.3	Uplink & Downlink Shelf Mechanical Specifications.....	70
4.4.4	Uplink & Downlink Shelf System Diagram See section 4.3.4	70
4.4.5	Uplink & Downlink Shelf Parts List	71
4.5	800MHz Downlink Power Amplifier Shelf (50-146703)	72
4.5.P	Downlink Power Amplifier Shelf Photographs	72
4.5.1	Downlink Power Amplifier Shelf Description	73
4.5.2	Downlink Power Amplifier Shelf Electrical Specifications.....	73
4.5.3	Downlink Power Amplifier Shelf Mechanical Specification	73
4.5.4	Downlink Power Amplifier Shelf System Diagram.....	73
4.5.5	Downlink Power Amplifier Shelf Parts List	74
4.6	Multiband Combiner Shelf (50-146705)	75
4.6.P	Multiband Combiner Shelf Photographs.....	75
4.6.1	Multiband Combiner Shelf Description	76
4.6.2	Multiband Combiner Shelf Technical Specification	76
4.6.3	Multiband Combiner Shelf Parts List.....	76
4.6.4	Multiband Combiner Shelf System Diagram, Drg. # 50-146785.....	77
5.	INSTALLATION.....	78
5.1	Initial Installation Record.....	78
6.	FAULT FINDING & MAINTENANCE	78
6.1	General Fault Finding Procedures.....	78
5.2	Downlink	79
5.3	Uplink	79
5.4	Fault repair.....	79
5.5	Checking service.....	79
5.6	Service Support.....	79
5.7	Tools & Test Equipment	79
5.8	General Maintenance Procedures	80
5.9	Module Removal (LNAs, general procedure).....	80
5.10	Module Replacement (general)	80
5.11	Power Amplifiers	80
5.12	Low Power Amplifier Replacement	81
5.13	Module Transportation	81
APPENDIX A.....		82
Amendment List Record Sheet.....		82
Glossary of Terms.....		83
Key to AFL Drawing Symbols		84
EC Declaration of Conformity		85
APPENDIX B.....		86
Initial Equipment Set-Up Calculations		86
General Information.....		86
Antenna Systems		86
Initial Parameters		86
Downlink Calculations		86
Uplink Calculations.....		86

1. INTRODUCTION

Scope and Purpose of Document

This handbook is for use solely with the equipment identified by the AFL Part Number shown on the front cover. It is not to be used with any other equipment unless specifically authorised by Aerial Facilities Limited. This is a controlled release document and, as such, becomes a part of Aerial Facilities' Total Quality Management System. Alterations and modification may therefore only be performed by Aerial Facilities Ltd.

AFL recommends that the installer of this equipment familiarise themselves with the safety and installation procedures contained within this document before installation commences.

The purpose of this handbook is to provide the user/maintainer with sufficient information to service and repair the equipment to the level agreed. Maintenance and adjustments to any deeper level must be performed by AFL, normally at the company's repair facility in Chesham, England.

This handbook has been prepared in accordance with BS 4884, and AFL's Quality procedures, which maintain the company's registration to BS EN ISO 9001:2000 and to the R&TTE Directive of the European Parliament. Copies of the relevant certificates and the company Quality Manual can be supplied on application to the Quality Manager.

This document fulfils the relevant requirements of Article 6 of the R&TTE Directive.

Limitation of Liability Notice

This manual is written for the use of technically competent operators/service persons. No liability is accepted by AFL for use or misuse of this manual, the information contained therein, or the consequences of any actions resulting from the use of the said information, including, but not limited to, descriptive, procedural, typographical, arithmetical, or listing errors.

Furthermore, AFL does not warrant the absolute accuracy of the information contained within this manual, or its completeness, fitness for purpose, or scope.

AFL has a policy of continuous product development and enhancement, and as such, reserves the right to amend, alter, update and generally change the contents, appearance and pertinence of this document without notice.

All AFL products carry a twelve month warranty from date of shipment. The warranty is expressly on a return to base repair or exchange basis and the warranty cover does not extend to on-site repair or complete unit exchange.

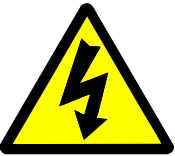
2. SAFETY CONSIDERATIONS

2.1 Earthing of Equipment



Cell Enhancers supplied from the mains must be connected to grounded outlets and earthed in conformity with appropriate local, national and international electricity supply and safety regulations.

2.2 Electric Shock Hazard



Electrical shocks due to faulty mains driven power supplies. Whilst ever potentially present in any electrical equipment, such a condition would be minimised by quality installation practice and thorough testing at:

- a) Original assembly
- b) Commissioning
- c) Regular intervals, thereafter.

All test equipment to be in good working order prior to its use. High current power supplies can be dangerous because of the possibility of substantial arcing. Always switch off during disconnection and reconnection.

2.3 RF Radiation Hazard



RF radiation, (especially at UHF frequencies) arising from transmitter outputs connected to AFL's equipment, must be considered a safety hazard.

This condition might only occur in the event of cable disconnection, or because a 'spare' output has been left un-terminated. Either of these conditions would impair the system's efficiency. No investigation should be carried out until all RF power sources have been removed. This would always be a wise precaution, despite the severe mismatch between the impedance of an N type connector at 50Ω , and that of free space at 377Ω , which would severely mitigate against the efficient radiation of RF power. Radio frequency burns could also be a hazard, if any RF power carrying components were to be carelessly touched!

Antenna positions should be chosen to comply with requirements (both local & statutory) regarding exposure of personnel to RF radiation. When connected to an antenna, the unit is capable of producing RF field strengths, which may exceed guideline safe values especially if used with antennas having appreciable gain. In this regard the use of directional antennas with backscreens and a strict site rule that personnel must remain behind the screen while the RF power is on, is strongly recommended.

Where the equipment is used near power lines or in association with temporary masts not having lightning protection, the use of a safety earth connected to the case-earthing bolt is strongly advised.

2.4 Chemical Hazard



Beryllium Oxide, also known as Beryllium Monoxide, or Thermalox™, is sometimes used in devices within equipment produced by Aerial Facilities Ltd. Beryllium oxide dust can be toxic if inhaled, leading to chronic respiratory problems. It is harmless if ingested or by contact.

Products that contain beryllium are load terminations (dummy loads) and some power amplifier transistors. These products can be identified by a yellow and black “skull and crossbones” danger symbol (shown above). They are marked as hazardous in line with international regulations, but pose no threat under normal circumstances. Only if a component containing beryllium oxide has suffered catastrophic failure, or exploded, will there be any danger of the formation of dust. Any dust that has been created will be contained within the equipment module as long as the module remains sealed. For this reason, any module carrying the yellow and black danger sign should not be opened. If the equipment is suspected of failure, or is at the end of its life-cycle, it must be returned to Aerial Facilities Ltd for disposal.

To return such equipment, please contact the Quality Department, who will give you a Returned Materials Authorisation (RMA) number. Please quote this number on the packing documents, and on all correspondence relating to the shipment.

PolyTetraFluoroEthylene, (P.T.F.E.) and P.T.F.E. Composite Materials

Many modules/components in AFL equipment contain P.T.F.E. as part of the RF insulation barrier. This material should never be heated to the point where smoke or fumes are evolved. Any person feeling drowsy after coming into contact with P.T.F.E. especially dust or fumes should seek medical attention.

2.5 Laser Safety



General working practices adapted from EN60825-2: 2000

“Do not stare with unprotected eyes or with any unapproved optical device at the fibre ends or connector faces or point them at other people.”

“Use only approved filtered or attenuating viewing aids.”

“Any single or multiple fibre end or ends found not to be terminated (for example, matched, spliced) shall be individually or collectively covered when not being worked on. They shall not be readily visible and sharp ends shall not be exposed.”

“When using test cords, the optical power source shall be the last connected and the first disconnected.”

“Use only approved methods for cleaning and preparing optical fibres and optical connectors.”

Always keep optical connectors covered to avoid physical damage

Do not allow any dirt/foreign material ingress on the optical connector bulkheads.

The optical fibre jumper cable maximum bend radius is 3cm; any smaller radii may result in optical cable breakage or excessive transmission losses.

Note: Not all AFL products use fibre optic units and they are **NOT** weather proof.

2.6 Emergency Contact Numbers

The AFL Quality Department can be contacted on:

Telephone +44 (0)1494 777000
Fax +44 (0)1494 777002
E-mail qa@aerialfacilities.com

3. EQUIPMENT OVERVIEW

3.1 System Description

The New York Justice Centre needs three different frequency bands of radio coverage within its designated areas, each having specific channel allocations, some of which are simplex type, i.e. Tx & RX on a single frequency, and some duplex where the Tx & Rx are on two different frequencies so that both parties may transmit (or receive) simultaneously.

The AFL equipment supplied for this task is in several different parts:

VHF Channel selective Cell Enhancer	150MHz band, 5 channels (50-146501)
UHF Channel Selective Cell Enhancer	400MHz band, 6 channels (50-146601)
800MHz Channel Selective Cell Enhancer	800MHz band, 2 channels (50-146701)
Multi-Band Combiner	All three frequency bands (80-146705)

All the cell enhancers have two switched attenuators in each path, a 0-30dB device to adjust the signal level entering the channel selective module, and a 0-15dB unit which varies the output power (after the channel module) that drives the leaky feeder antennas. In this way the system may be finely tuned to both receive and transmit at the correct levels.

Each cell enhancer will be described separately in this document but where enhancers have common modules, these will be detailed only once.

An alarm system is fitted that monitors all active devices and is easily integrated into any series 'loop' type system (where any break will trigger an alarm and show a local fault LED in the area where the fault originated).

4. SYSTEM DETAILS

4.1 VHF Channel Selective Cell Enhancer Rack (50-146501)

4.1.1 VHF Cell Enhancer Rack Description

The VHF cell enhancer, built into ten 19" wide shelves and housed in a 43U high equipment rack, is a mixture of simplex (Tx & Rx on one frequency) and duplex (Tx & Rx on two separate frequencies) systems, three simplex and two duplex. There are separate Rx and Tx antennæ for the VHF and UHF bands and a composite antenna for the 800MHz bi-directional system. All VHF input channels, up and downlink are selected by narrow band crystal filters, and all outputs have ferrite isolators fitted in series to increase the isolation between adjacent channels and protect the transistors of the power stages from possibly damaging reflections. Each active module has a volt-free relay contact pair alarm which is looped to provide a normally-closed system. The inputs and outputs are handled by combining and splitting shelves and the channel processing and amplification is all within the BDA channel shelves.

The simplex Tx/Rx system relies upon noise-free paths to enable accurate detection and muting to occur and for this reason it is not recommended to disturb these circuits as they are carefully set up by AFL when system tested and should not be adjusted except by expert personnel.

A dedicated power supply shelf provides the DC needed by the VHF system, (a similar power supply is used in the UHF system also), and all alarms are volt-free relay contact pairs, looped in each shelf to provide a summary alarm with local failure indicator, suitable for integration into any such existing system. No battery backup is provided for this system and so should the mains supply fail, this system could not function.

4.1.2 VHF Cell Enhancer Rack Electrical Specification

PARAMETER	SPECIFICATION	
VHF Frequencies:	153.965MHz* (Ch. 1)	VHF downlink
	154.755MHz	
	154.785MHz	
	154.980MHz	
	158.925MHz* (Ch. 2)	VHF uplink
	151.355MHz* (Ch. 1)	
	154.6575MHz* (Ch. 2)	
	154.755MHz	
	154.785MHz	
	154.980MHz	
Bandwidth:	15kHz (up & downlink)	
Downlink Gain(Duplexed):	97 dB min	
Downlink Gain(Simplex):	97 dB min	
Uplink Gain (Duplex & Simplex):	100 dB min	
Gain Adjustment:	0 – 15dB (in 1dB step)	
Uplink Power:	>2-5Watts	
Downlink Power:	>10Watts	
AGC:	Fitted in all channel selective modules	
Noise Figure:	<6dB (@ maximum gain)	
VSWR:	better than 1.5:1	
Impedance:	50Ω	
RF Connectors:	N type, female	
Supply voltage:	110V AC (nominal) @ 43-63Hz	
System power requirement:	24V DC @ <13A	
Alarms Fitted:	1	Amplifiers
(volt-free contacts/TTL)	2	PSU

* = duplex channel

4.1.3 VHF Cell Enhancer Rack Mechanical Specification

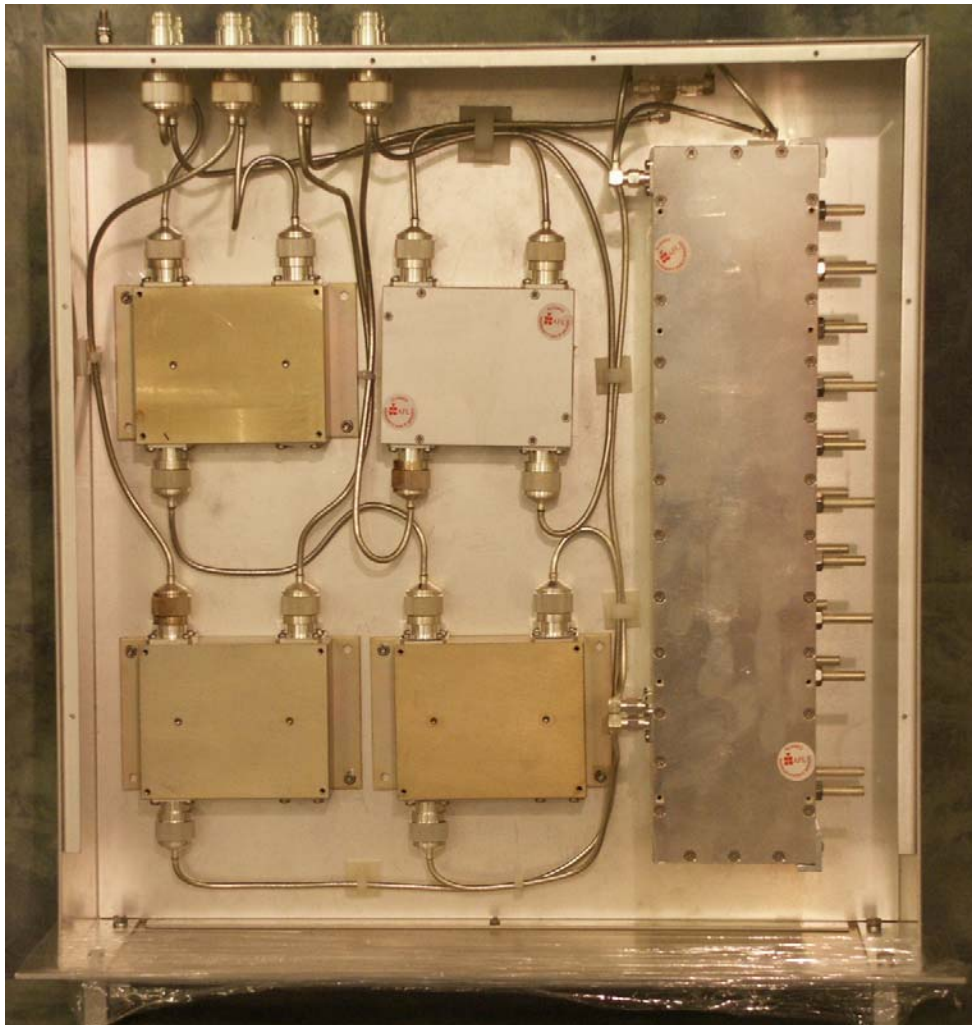
PARAMETER		SPECIFICATION
Rack	Height:	43U Standard Eldon Vented Rack
	Width:	19" (482.6mm)
	Depth:	600mm
Shelves	Height:	See parts lists
	Width:	19" (482.6mm)
	Depth:	<450mm(excluding heatsinks, connectors, handles and feet)
Temperature range	operational:	-20°C to +60°C
	storage:	-40°C to +70°C
Weight:		>100kg
Relative humidity:		5 – 95% non-condensing
RF Connectors:		N type female
Environmental protection:		IP44
Supply cable:		Unit supplied from PSU shelf
Finish	Case:	Iridite NCP coat
	Heatsinks:	None
	Handles:	Silver anodised aluminium alloy
	Fascia:	Painted to RAL7035

4.1.4 VHF Cell Enhancer Rack Parts List

AFL Part #	Part Description	Qty.
50-146502	VHF DOWNLINK O/P COMBINER	1
50-146503	VHF UPLINK I/P SPLITTER	1
50-146504	VHF DUPLEX BDA CHN 1	1
50-146505	VHF DUPLEX BDA CHN 2	1
50-146506	VHF SIMPLEX BDA CHN 3A	1
50-146507	VHF SIMPLEX BDA CHN 3B	1
50-146508	VHF SIMPLEX BDA CHN 4	1
50-146509	VHF DOWNLINK I/P SPLITTER	1
50-146510	VHF UPLINK O/P COMBINER	1
50-146512	VHF/UHF SYSTEM PSU 24V	1
80-054020	600mm DEEP SUPPORT BRACKET	20
80-063654	1U BLANKING PANEL (BS) RAL 7035	7
80-063655	2U BLANKING PANEL (BS) RAL 7035	2
90-100011	IEC MAINS LEAD '6 AMP' for USA	1
91-000002	N PLUG RG223:U	30
91-030002	N ADAPTOR PANEL FEMALE:FEMALE	4
97-500175	ELDON 43U 600 x 600 RACK (VENTED LID)	1
99-000082	PALLET 900 x 900 x 7ply FOR RACKS	1

4.1.5 VHF Downlink O/P Combiner Shelf (50-146502)

4.1.5.P VHF Downlink O/P Combiner Shelf Photographs



4.1.5.1 Description

The five (downlink) channels are received from the output ports of the individual bi-directional amplifier shelves and coupled together through hybrids, except for channel 2 which, being a substantially higher frequency than the other four, has its own path through a dedicated bandpass filter at the output of which the other four combined frequencies and channel 2 meet. The single signal path is then passed through a divider to two equal level downlink output ports, VHF1 & VHF2. This is a passive shelf and has no connection to the PSU and no alarms

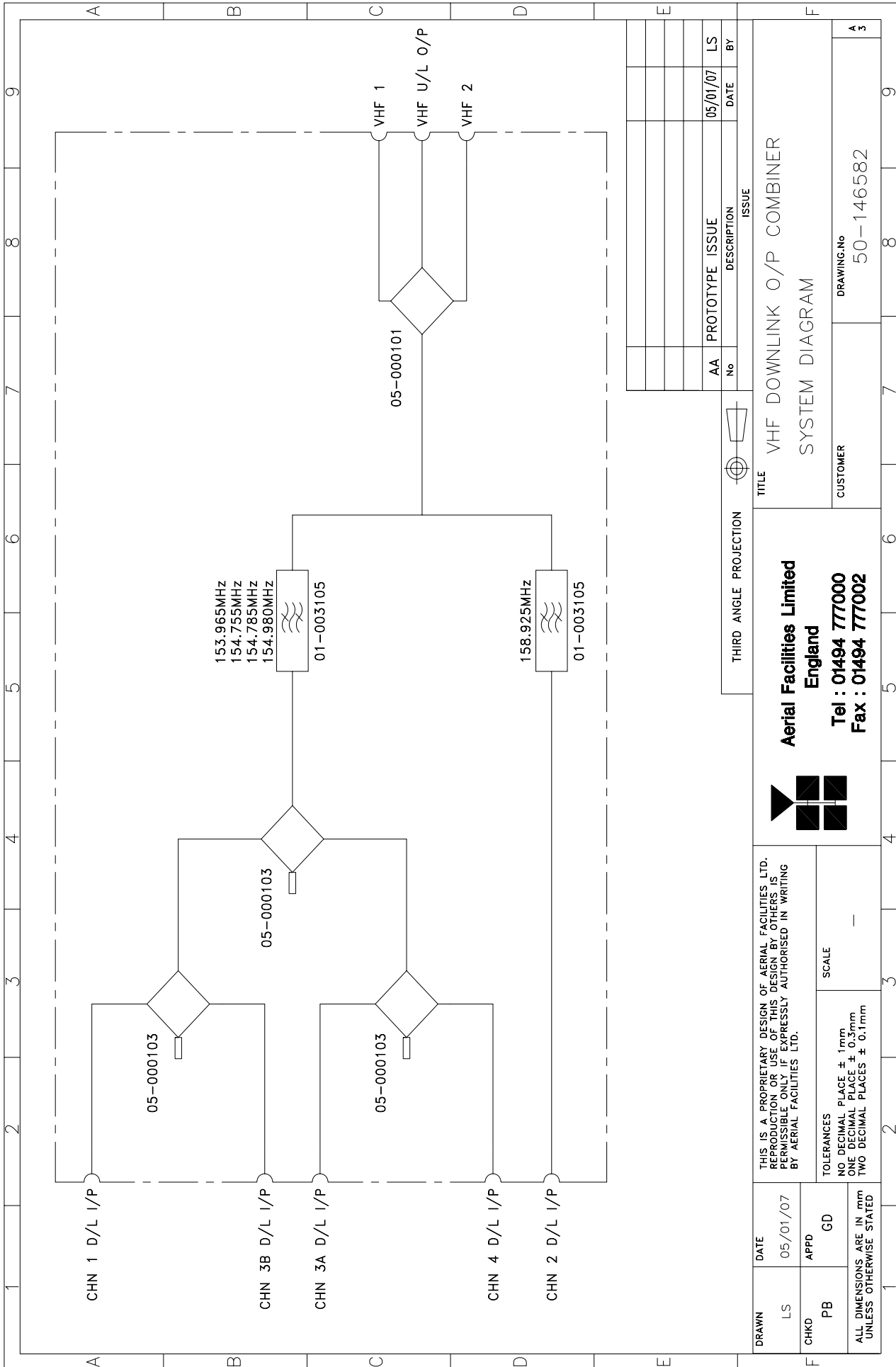
4.1.5.2 Technical Specification

PARAMETER		SPECIFICATION
Shelf dimensions:	Height:	3U
	Width:	19" (482.6mm)
	Depth:	<450mm (excluding connectors & handles)
Temperature range:	operational:	-20°C to +60°C
	storage:	-40°C to +70°C
	Weight:	<10kg
	Frequency ranges passed:	153.965 to 154.980 & 158.925MHz
	Impedance:	50Ω
	Humidity:	5 – 95% non-condensing
	RF Connectors:	N type female
	Environmental protection:	IP44
Finish	Case:	Iridite NCP coat
	Heatsinks:	None
	Handles:	Silver anodised aluminium alloy
	Fascia:	Painted to RAL7035

4.1.6.3 Parts List

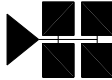
AFL Part #	Part Description	Qty.
01-003105	SD NOTCH FILT.N 6 SECT.VHF H/B SMA	2
05-000101	TRANSMITTER HYBRID COUPLER (4 PORT)	1
05-000103	TX HYBRID COUPLER 3 PORT (NO HEATSINK)	3
19-000922K	3U CHASSIS KIT (450mm deep)	1
91-030002	N ADAPTOR PANEL FEMALE:FEMALE	8
91-130001	SMA ADAPT 'T' ALL FEMALE 3 GHz	1

4.1.5.4 System Diagram, Drg. # 50-146582



AA	PROTOTYPE	ISSUE	LS	BY
	No	DESCRIPTION	DATE	
			05/01/07	

TITLE VHF DOWNLINK O/P COMBINER SYSTEM DIAGRAM	
CUSTOMER DRAWING No 50-146582	A 3


Aerial Facilities Limited
 England
 Tel : 01494 777000
 Fax : 01494 777002

THIS IS A PROPRIETARY DESIGN OF AERIAL FACILITIES LTD.
 REPRODUCTION OR USE OF THIS DESIGN BY OTHERS IS
 PERMISSIBLE ONLY IF EXPRESSLY AUTHORISED IN WRITING
 BY AERIAL FACILITIES LTD.

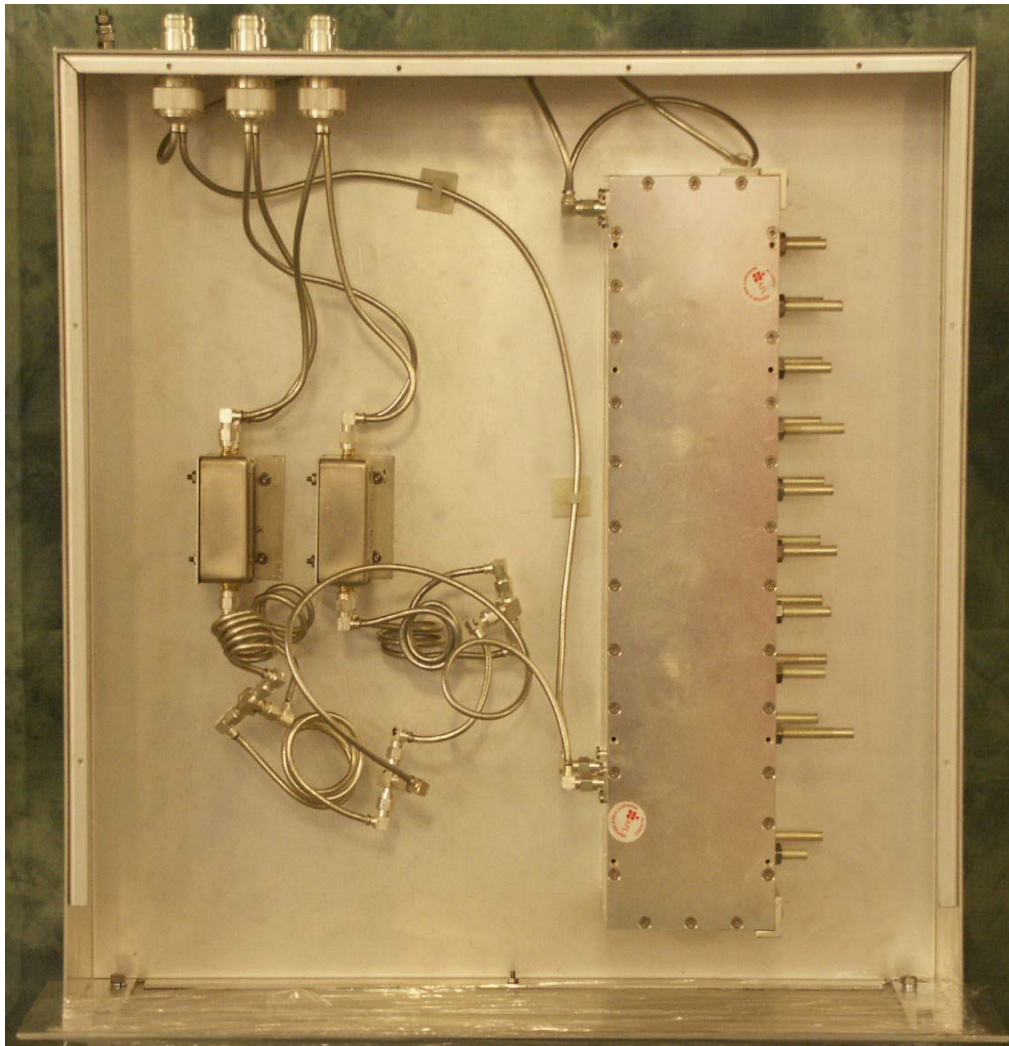
TOLERANCES
 NO DECIMAL PLACE ± 1mm
 ONE DECIMAL PLACE ± 0.3mm
 TWO DECIMAL PLACES ± 0.1mm

SCALE
 —

DRAWN LS	DATE 05/01/07
CHKD PB	APPD GD
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED	

4.1.6 VHF Uplink I/P Splitter Shelf (50-146503)

4.1.6.P VHF Uplink I/P Splitter Shelf Photographs



4.1.6.1 Description

This shelf receives the single uplink RF from the antenna(s) and, similar to the downlink, one of the five channels is substantially different in frequency to the other four. This means that channel 1 is routed through a dedicated bandpass filter and the other four signals together also use a single filter. The output of this 'four-way' signal path is then split to four individual crystal filters, which, together with channel 1 path form the five uplink inputs to the five VHF amplifying shelves. Channel 1 signal needs no crystal filter as its single bandpass filter is tuned to a much narrower bandwidth to the filter in the other path containing the 'four' frequencies. This is a passive shelf and has no connection to the PSU and no alarms

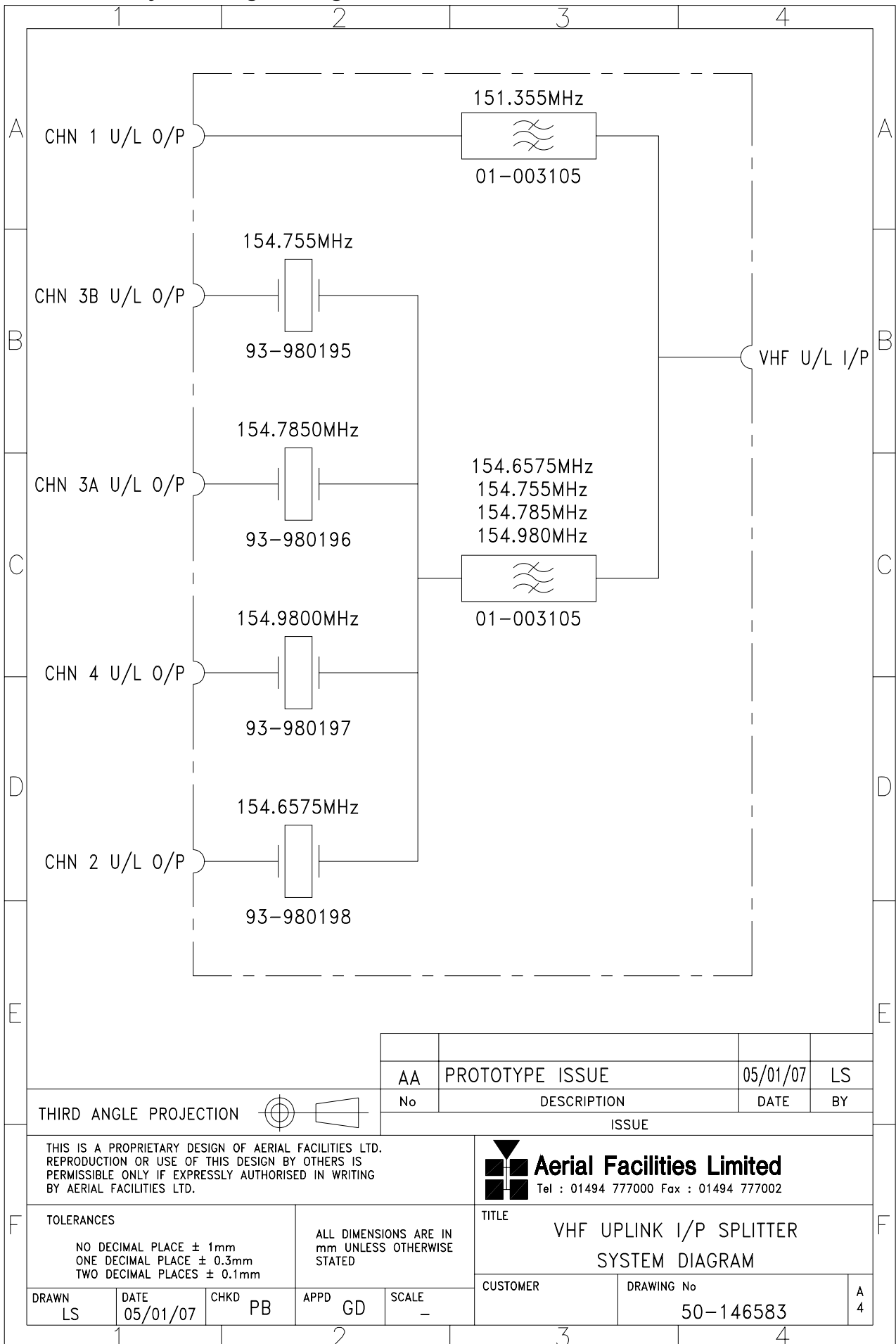
4.1.6.2 Technical Specification

PARAMETER		SPECIFICATION
Shelf dimensions:	Height:	3U
	Width:	19" (482.6mm)
	Depth:	<450mm (excluding connectors & handles)
Temperature range:	operational:	-20°C to +60°C
	storage:	-40°C to +70°C
	Weight:	<10kg
	Frequency ranges passed:	153.965 to 154.980 & 158.925MHz
	Impedance:	50Ω
	Humidity:	5 – 95% non-condensing
	RF Connectors:	N type female
	Environmental protection:	IP44
Finish	Case:	Iridite NCP coating
	Heatsinks:	None
	Handles:	Silver anodised aluminium alloy
	Fascia:	Painted to RAL7035

4.1.6.3 Parts List

AFL Part #	Part Description	Qty.
01-003105	SD NOTCH FILT.N 6 SECT.VHF H/B SMA	2
19-000922K	3U CHASSIS KIT (450mm deep)	1
91-030002	N ADAPTOR PANEL FEMALE:FEMALE	6
91-130001	SMA ADAPT 'T' ALL FEMALE 3 GHz	4
93-980195	154.755MHz CRYSTAL FILT FAN4M52500	1
93-980196	154.785MHz CRYSTAL FILT FAN4M52500	1
93-980197	154.980MHz CRYSTAL FILT FAN4M52500	1
93-980198	154.6575MHz CRYSTAL FILT FAN4M52500	1

4.1.6.4 System Diagram, Drg. # 50-146583



AA	PROTOTYPE ISSUE	05/01/07	LS
No	DESCRIPTION	DATE	BY
ISSUE			

THIRD ANGLE PROJECTION

THIS IS A PROPRIETARY DESIGN OF AERIAL FACILITIES LTD. REPRODUCTION OR USE OF THIS DESIGN BY OTHERS IS PERMISSIBLE ONLY IF EXPRESSLY AUTHORISED IN WRITING BY AERIAL FACILITIES LTD.

Aerial Facilities Limited
Tel : 01494 777000 Fax : 01494 777002

TOLERANCES
NO DECIMAL PLACE ± 1mm
ONE DECIMAL PLACE ± 0.3mm
TWO DECIMAL PLACES ± 0.1mm

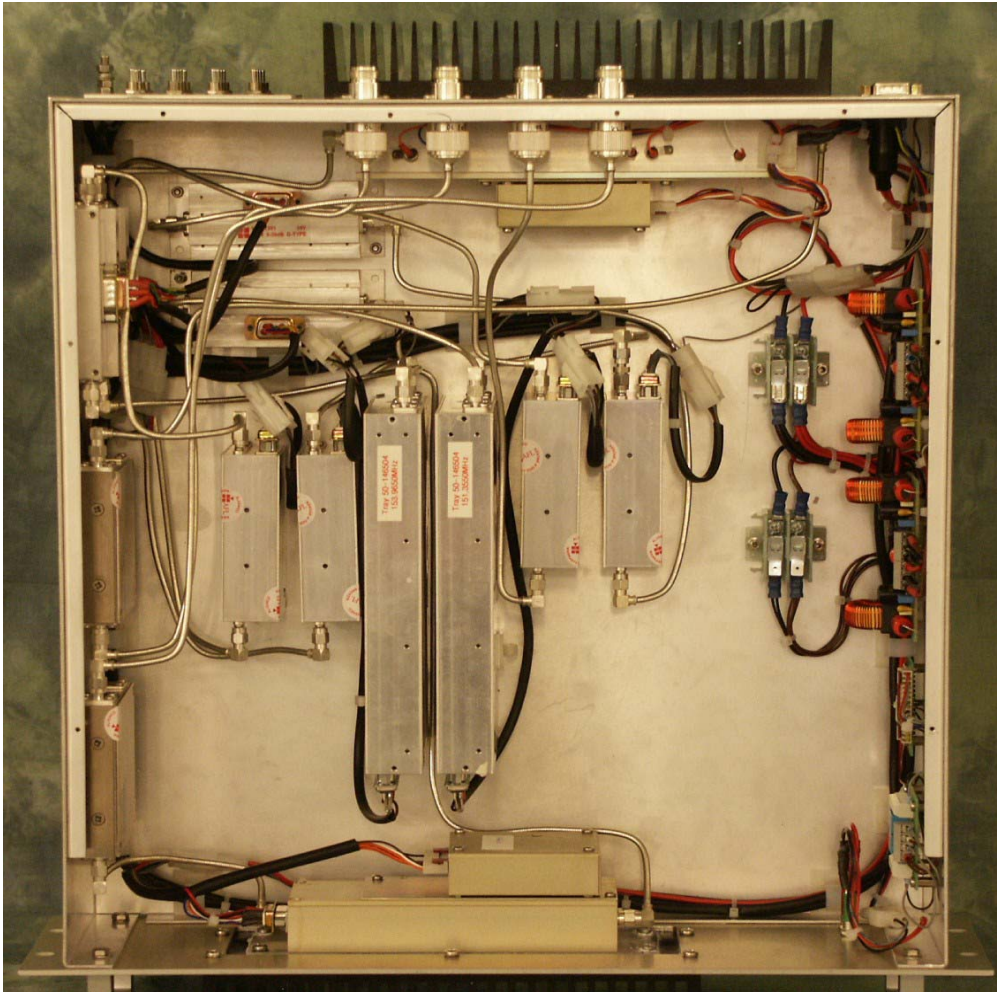
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED

TITLE
VHF UPLINK I/P SPLITTER
SYSTEM DIAGRAM

DRAWN LS	DATE 05/01/07	CHKD PB	APPD GD	SCALE -	CUSTOMER	DRAWING No 50-146583	A 4
-------------	------------------	------------	------------	------------	----------	-------------------------	--------

4.1.7 VHF Duplex BDA Channel 1 Shelf (50-146504)

4.1.7.P VHF Duplex BDA Channel 1 Shelf Photographs



As all the duplex shelves are hardware similar, only this pair of duplex shelf photographs are shown.

4.1.7.1 Description

The two duplex bi-directional amplifier shelves receive a downlink signal from the input antenna, amplify it to a level suitable for processing by a channel selective module and send the resultant 10W power signal to its designated antenna.

The uplink path is very similar but in reverse with only a five Watt RF output power. Both paths feature a ferrite isolator on the output to prevent damage to the power amplifier should any reflected signals occur at their output antenna ports.

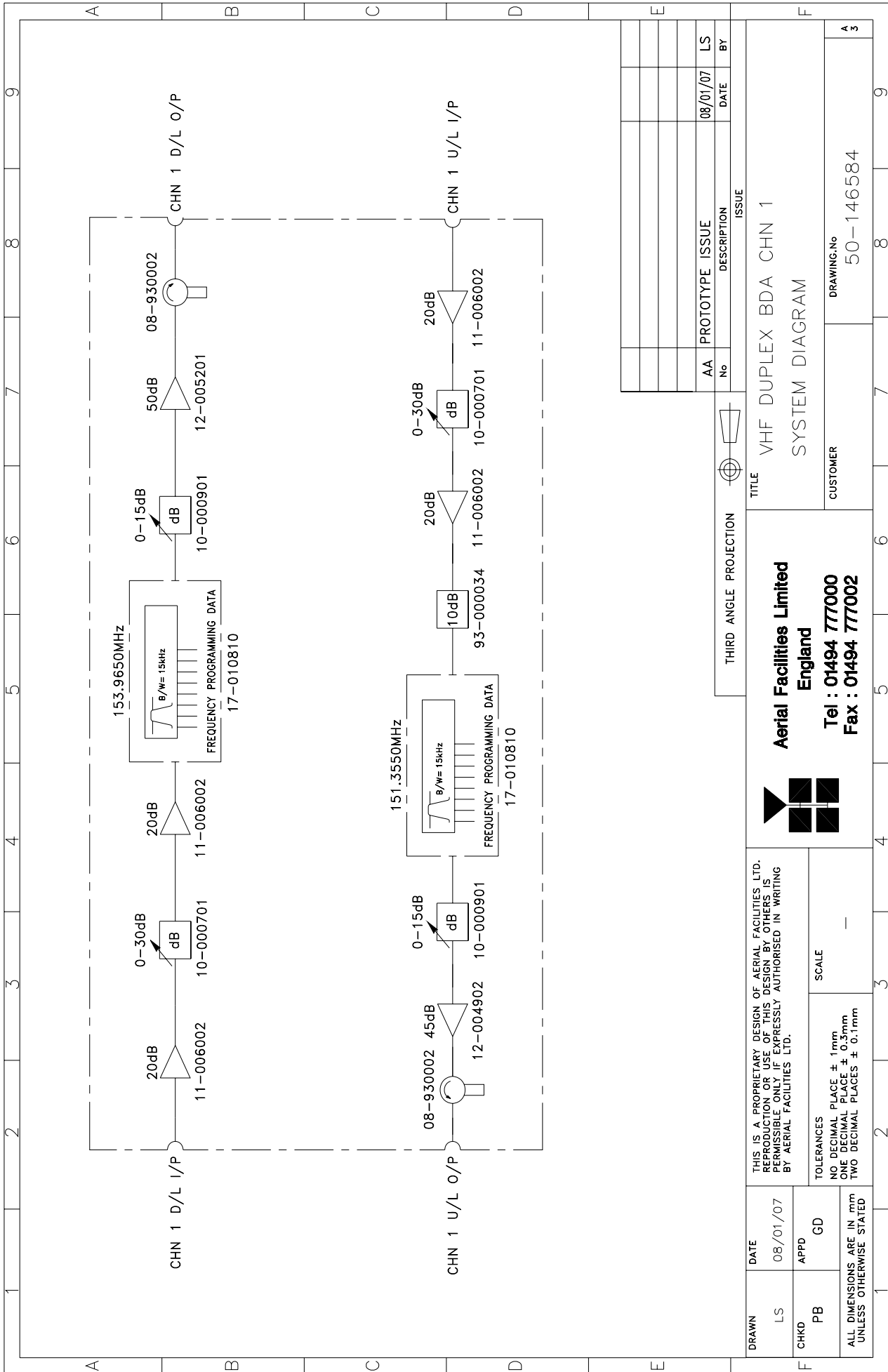
4.1.7.2 Technical Specification

PARAMETER		SPECIFICATION
Shelf dimensions:	Height:	3U
	Width:	19" (482.6mm)
	Depth:	<450mm (excluding connectors & handles)
Temperature range:	operational:	-20°C to +60°C
	storage:	-40°C to +70°C
	Weight:	<10kg
Downlink channel frequency:		153.956MHz (Ch. 1)
		158.925MHz (Ch. 2)
Uplink channel frequency:		151.355MHz (Ch. 1)
		154.6575MHz (Ch. 2)
	Shelf gain:	100dB (typical)
	Impedance:	50Ω
	Humidity:	5 – 95% non-condensing
	RF Connectors:	N type female
	Environmental protection:	IP44
Finish	Case:	Iridite NCP coating
	Heatsinks:	Black anodised
	Handles:	Silver anodised aluminium alloy
	Fascia:	Painted to RAL7035

4.1.7.3Parts List

AFL Part #	Part Description	Qty.
08-930002	2 PORT ISOLATOR 150-300MHz SMA	2
10-000701	1/4W0-30dB SWITCHED ATTENUATOR	2
10-000901	SW. ATTENUATOR 0.25W 0-15dB	2
11-006002	LNA VHF 70-500MHz WITH RELAY	4
12-002201	3 STAGE AMPLIFIER ALARM BOARD	2
12-002220	3 STAGE ALARM PCB COVER	2
12-002826	ALARM BOARD ACRYLIC LENS	2
12-004902	POWER AMP VHF 5W CLASS AB	1
12-005201	P/A 10W VHF CLASS AB	1
13-001803	DUAL DC/DC CONVERTER 24V-12V 1A	2
13-001822	DC-DC CON 24V-5V/15V COVER	2
17-009725	EQUIP. MTG PLATE No.6	2
17-010810	VHF CH MOD 15kHz 8p +IFRX 10k Gated	2
19-000922KL	3U chassis kit 450 deep with led	1
20-001601	12V RELAY BOARD	1
80-008902	24V RELAY PCB ASSEMBLY **NO LED**	1
80-063920	HEATSINK 2U ASS140 (5W)	2
91-030002	N ADAPTOR PANEL FEMALE:FEMALE	4
91-500001	POWER PLG 3 PIN PNL.MOUNT NC-X	1
91-510003	3 PIN R.ANGLE FREE SOC.NC-X.	1
91-600001	'D'TYPE 9 WAY PLUG S/B TERM	1
91-600007	'D' 9 WAY BLACK SHELL	1
91-600014	'D' 9 WAY SOCKET S/B (NON FILTERED)	5
91-620001	'D' 25 WAY SOCKET S/B TERM	2
91-700017	ICD 15 WAY 0.1' CONNECTOR	3
93-000034	10dB IN LINE ATTENUATOR 1W SMA	1
96-110001	FUSE HOLDER 20 x 5mm6.3A	1
96-600002	INSULATING BOOT SMALL	1
96-600003	INSULATING BOOT D.C.	1

4.1.7.4 System Diagram, Drg. # 50-146584



AA	PROTOTYPE	ISSUE	DESCRIPTION	ISSUE
No				
		08/01/07		LS
				BY

THIRD ANGLE PROJECTION		TITLE	
VHF DUPLEX BDA CHN 1		SYSTEM DIAGRAM	
CUSTOMER		DRAWING No	
Aerial Facilities Limited England		50-146584	
Tel : 01494 777000		A	
Fax : 01494 777002		3	

DRAWN	DATE	THIS IS A PROPRIETARY DESIGN OF AERIAL FACILITIES LTD. REPRODUCTION OR USE OF THIS DESIGN BY OTHERS IS PERMISSIBLE ONLY IF EXPRESSLY AUTHORISED IN WRITING BY AERIAL FACILITIES LTD.	
LS	08/01/07		
CHKD	APPD	TOLERANCES	
PB	GD	NO DECIMAL PLACE ± 1mm	
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED		ONE DECIMAL PLACE ± 0.5mm	
		TWO DECIMAL PLACES ± 0.1mm	
		SCALE	

4.1.8 VHF Duplex BDA Channel 2 Shelf (50-146505)

4.1.8.P VHF Duplex BDA Channel 2 Shelf Photographs

The duplex shelves are all hardware similar – so only the channel 1 shelf photographs are shown (see section 4.1.7.P)

4.1.8.1 Description

See section 4.1.7.1

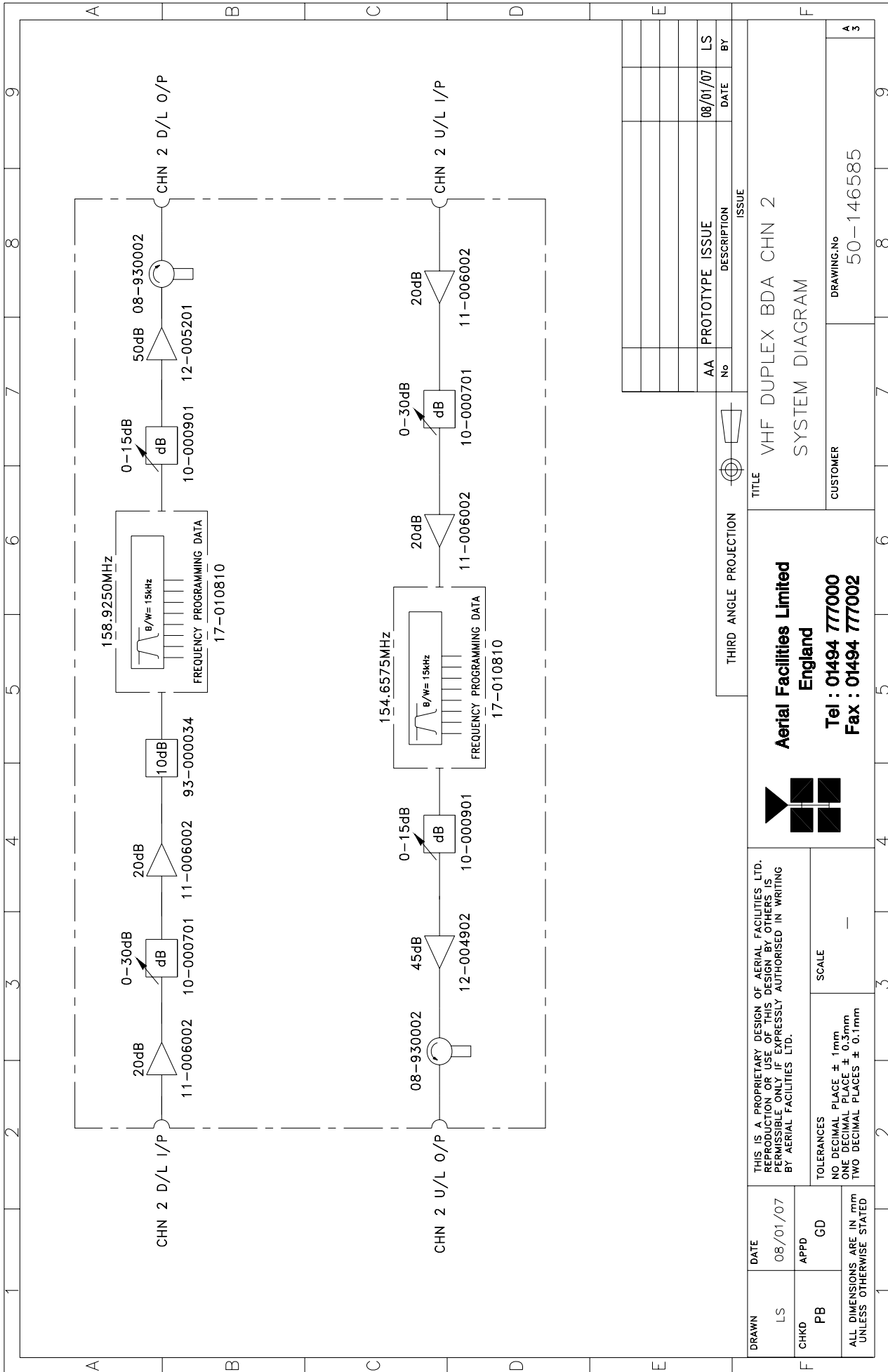
4.1.8.2 Technical Specification

See section 4.1.7.2

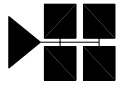
4.1.8.3 Parts List

AFL Part #	Part Description	Qty.
08-930002	2 PORT ISOLATOR 150-300MHz SMA	2
10-000701	1/4W0-30dB SWITCHED ATTENUATOR	2
10-000901	SW. ATTENUATOR 0.25W 0-15dB	4
11-006002	LNA VHF 70-500MHz WITH RELAY	4
12-002201	3 STAGE AMPLIFIER ALARM BOARD	2
12-002220	3 STAGE ALARM PCB COVER	2
12-002826	ALARM BOARD ACRYLIC LENS	2
12-004902	POWER AMP VHF 5W CLASS AB	1
12-005201	P/A 10W VHF CLASS AB	1
13-001803	DUAL DC/DC CONVERTER 24V-12V 1A	2
13-001822	DC-DC CON 24V-5V/15V COVER	2
17-009725	EQUIP. MTG PLATE No.6	2
17-010810	VHF CH MOD 15kHz 8p +IFRX 10k Gated	2
19-000922KL	3U chassis kit 450 deep with led	1
20-001601	12V RELAY BOARD	1
80-008902	24V RELAY PCB ASSEMBLY **NO LED**	1
80-063920	HEATSINK 2U ASS140 (5W)	2
91-030002	N ADAPTOR PANEL FEMALE:FEMALE	4
91-500001	POWER PLG 3 PIN PNL.MOUNT NC-X	1
91-510003	3 PIN R.ANGLE FREE SOC.NC-X.	1
91-600001	'D'TYPE 9 WAY PLUG S/B TERM	1
91-600007	'D' 9 WAY BLACK SHELL	1
91-600014	'D' 9 WAY SOCKET S/B (NON FILTERED)	4
91-620001	'D' 25 WAY SOCKET S/B TERM	2
91-700017	ICD 15 WAY 0.1' CONNECTOR	3
93-000034	10dB IN LINE ATTENUATOR 1W SMA	1
96-110001	FUSE HOLDER 20 x 5mm6.3A	1
96-600002	INSULATING BOOT SMALL	1
96-600003	INSULATING BOOT D.C.	1

4.1.8.4 System Diagram

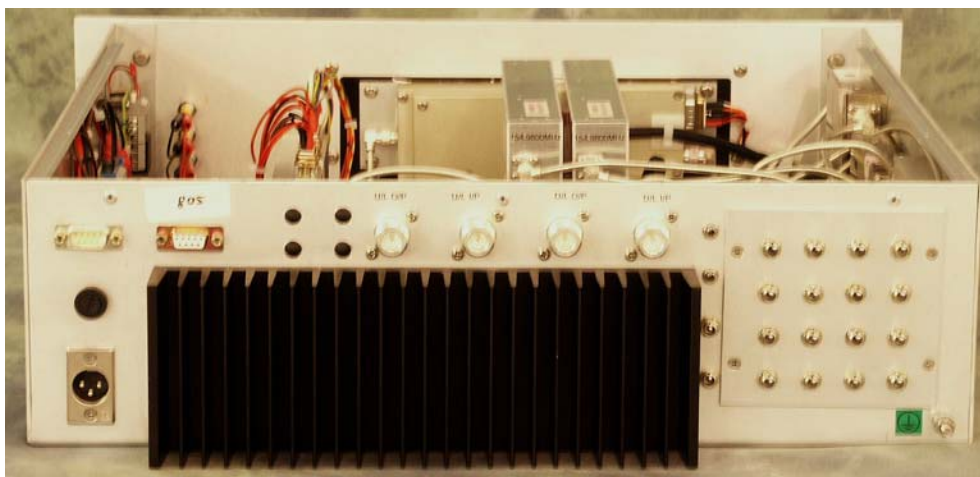
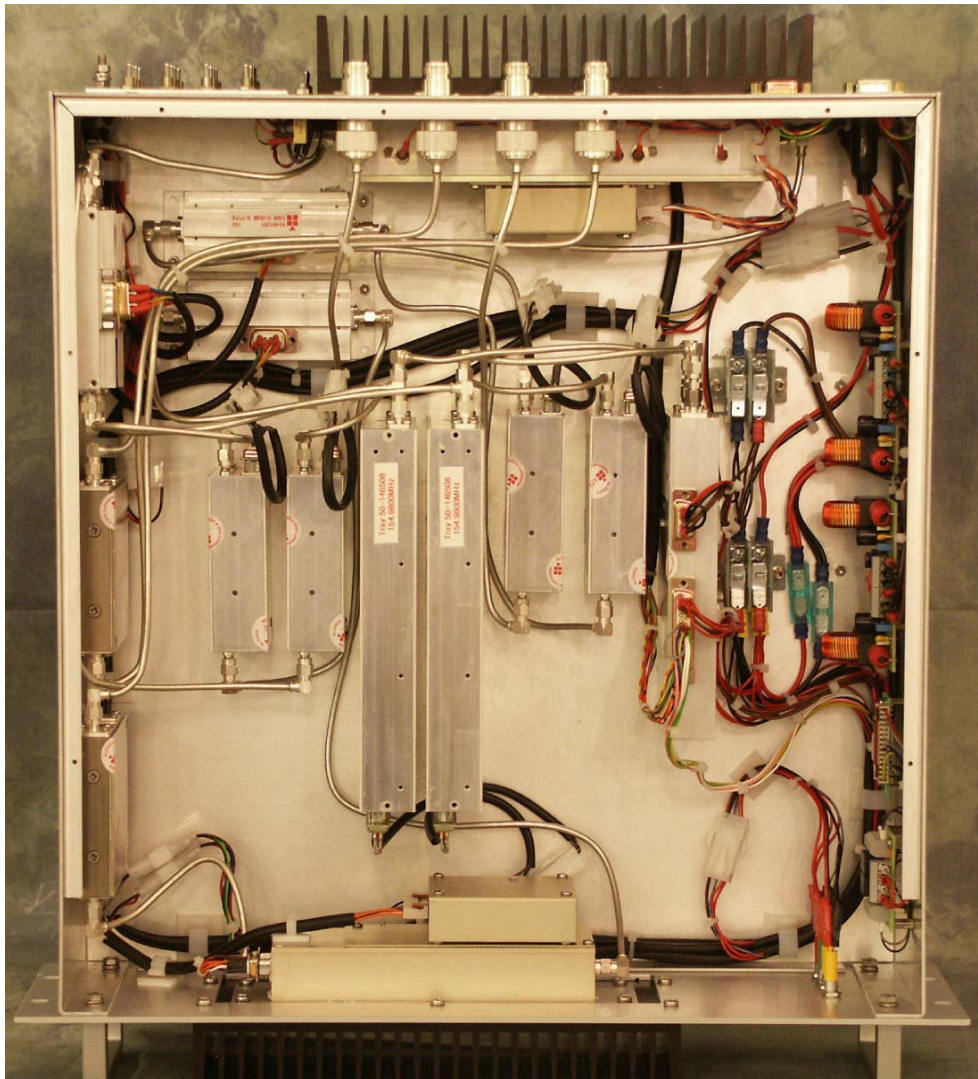


AA	No	DESCRIPTION	ISSUE	DATE	BY
AA		PROTOTYPE	ISSUE	08/01/07	LS

 <p>Aerial Facilities Limited England</p> <p>Tel : 01494 777000 Fax : 01494 777002</p>		<p>TITLE: VHF DUPLEX BDA CHN 2 SYSTEM DIAGRAM</p> <p>CUSTOMER: DRAWING No 50-146585</p>	
<p>THIS IS A PROPRIETARY DESIGN OF AERIAL FACILITIES LTD. REPRODUCTION OR USE OF THIS DESIGN BY OTHERS IS PERMISSIBLE ONLY IF EXPRESSLY AUTHORISED IN WRITING BY AERIAL FACILITIES LTD.</p>	<p>TOLERANCES</p> <p>NO DECIMAL PLACE ± 1mm ONE DECIMAL PLACE ± 0.3mm TWO DECIMAL PLACES ± 0.1mm</p>	<p>SCALE</p> <p>---</p>	<p>DATE: 08/01/07</p> <p>APPD: GD</p>
<p>DRAWN: LS</p> <p>CHKD: PB</p> <p>ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED</p>	<p>DATE: 08/01/07</p> <p>BY: LS</p>	<p>THIRD ANGLE PROJECTION</p>	

4.1.9 VHF Simplex BDA Channel 3A Shelf (50-146506)

4.1.9.P VHF Simplex BDA Photographs



4.1.9.1 Description

The simplex channel amplifier shelves (x3) receive their input signals from antennas and are processed as follows:-

The Simplex controller module (17-015301) monitors the receiver output for a signal change and activates the supply switching for either the uplink or down link path accordingly. In normal operation, the low level Rx path is activated and the associated Tx path is switched off. When a signal is detected by the downlink channel selective module, the Rx output goes low, which triggers the controller logic PCB. The PCB mutes the power supply to the opposite path Rx LNA's and switches on the power to the output power stage. In order to prevent the power stage noise blocking the opposite path's low level receiver, the power amplifier is normally muted.

Both outputs are protected by ferrite isolators in a similar way to the duplex shelves.

All three simplex shelves are hardware similar so only channel 3A shelf is described.

4.1.9.2 Technical Specification

PARAMETER		SPECIFICATION
Shelf dimensions:	Height:	3U
	Width:	19" (482.6mm)
	Depth:	<450mm (excluding connectors & handles)
Temperature range:	operational:	-20°C to +60°C
	storage:	-40°C to +70°C
	Weight:	<10kg
Channel frequencies:		154.785MHz (Ch. 3A)
		154.755MHz (Ch. 3B)
		154.980MHz (Ch. 4)
	Shelf gain:	100dB (typical)
	Impedance:	50Ω
	Humidity:	5 – 95% non-condensing
	RF Connectors:	N type female
	Environmental protection:	IP44
Finish	Case:	Iridite NCP coating
	Heatsinks:	Black anodised
	Handles:	Silver anodised aluminium alloy
	Fascia:	Painted to RAL7035

4.1.9.4Parts List

AFL Part #	Part Description	Qty.
05-002901	3dB BROADBAND SPLITTER SMA 1WATT	4
08-930002	2 PORT ISOLATOR 150-300MHz SMA	2
10-000701	1/4W0-30dB SWITCHED ATTENUATOR	2
10-000723	2xSWITCHED ATTENUATOR FIXING PLATE	2
10-000901	SW. ATTENUATOR 0.25W 0-15dB	2
11-006002	LNA VHF 70-500MHz WITH RELAY	4
12-002201	3 STAGE AMPLIFIER ALARM BOARD	2
12-002220	3 STAGE ALARM PCB COVER	2
12-002826	ALARM BOARD ACRYLIC LENS	2
12-004902	POWER AMP VHF 5W CLASS AB	1
12-005201	P/A 10W VHF CLASS AB	1
13-001803	DUAL DC/DC CONVERTER 24V-12V 1A	2
13-001822	DC-DC CON 24V-5V/15V COVER	2
17-010810	VHF CH MOD 15kHz 8p +IFRX 10k Gated	2
17-015301	DUAL SIMPLEX CONTROLLER	1
19-000922KL	3U chassis kit 450 deep with led	1
20-001602	24V RELAY BOARD	2
80-008902	24V RELAY PCB ASSEMBLY **NO LED**	1
80-063920	HEATSINK 2U ASS140 (5W)	2
91-030002	N ADAPTOR PANEL FEMALE:FEMALE	4
91-130005	SMA BULKHEAD ADAPTOR F/F	4
91-500001	POWER PLG 3 PIN PNL.MOUNT NC-X	1
91-510003	3 PIN R.ANGLE FREE SOC.NC-X.	1
91-600001	'D'TYPE 9 WAY PLUG S/B TERM	1
91-600014	'D' 9 WAY SOCKET S/B (NON FILTERED)	5
91-620001	'D' 25 WAY SOCKET S/B TERM	2
91-620005	'D' 25 WAY PLUG S/B TERM	1
91-700017	ICD 15 WAY 0.1' CONNECTOR	2
93-520015	10K PANEL/PCB MTG POT	2
93-540035	1K3 0.25W 1% RES MRS25 M:F	2
96-110001	FUSE HOLDER 20 x 5mm 6.3A	1
96-600002	INSULATING BOOT SMALL	1
96-600003	INSULATING BOOT D.C.	1
96-700017	LED AMBER 5mm SEALED IP66	2

4.1.10 VHF Simplex BDA Channel 3B Shelf (50-146507)

4.1.10.P VHF Simplex BDA Channel 3B Photographs

See section 4.1.9.P

4.1.10.1 Description

See section 4.1.9.1

4.1.10.2 Technical Specification

See section 4.1.9.2

4.1.10.4 Parts List

AFL Part #	Part Description	Qty.
05-002901	3dB BROADBAND SPLITTER SMA 1WATT	4
08-930002	2 PORT ISOLATOR 150-300MHz SMA	2
10-000701	1/4W0-30dB SWITCHED ATTENUATOR	2
10-000723	2 x SWITCHED ATTENUATOR FIXING PLATE	2
10-000901	SW. ATTENUATOR 0.25W 0-15dB	2
11-006002	LNA VHF 70-500MHz WITH RELAY	4
12-002201	3 STAGE AMPLIFIER ALARM BOARD	2
12-002220	3 STAGE ALARM PCB COVER	2
12-002826	ALARM BOARD ACRYLIC LENS	2
12-004902	POWER AMP VHF 5W CLASS AB	1
12-005201	P/A 10W VHF CLASS AB	1
13-001803	DUAL DC/DC CONVERTER 24V-12V 1A	2
17-010810	VHF CH MOD 15kHz 8p +IFRX 10k Gated	2
17-015301	DUAL SIMPLEX CONTROLLER	1
19-000922KL	3U chassis kit 450 deep with led	1
20-001602	24V RELAY BOARD	2
80-008902	24V RELAY PCB ASSEMBLY **NO LED**	1
80-063920	HEATSINK 2U ASS140 (5W)	2
91-030002	N ADAPTOR PANEL FEMALE:FEMALE	4
91-130005	SMA BULKHEAD ADAPTOR F/F	4
91-500001	POWER PLG 3 PIN PNL.MOUNT NC-X	1
91-510003	3 PIN R.ANGLE FREE SOC.NC-X.	1
91-600001	'D'TYPE 9 WAY PLUG S/B TERM	1
91-600014	'D' 9 WAY SOCKET S/B (NON FILTERED)	5
91-620001	'D' 25 WAY SOCKET S/B TERM	2
91-620005	'D' 25 WAY PLUG S/B TERM	1
91-700017	ICD 15 WAY 0.1' CONNECTOR	2
93-520015	10K PANEL/PCB MTG POT	2
93-540035	1K3 0.25W 1% RES MRS25 M:F	2
96-110001	FUSE HOLDER 20 x 5mm6.3A	1
96-600002	INSULATING BOOT SMALL	1
96-600003	INSULATING BOOT D.C.	1
96-700017	LED AMBER 5mm SEALED IP66	2

4.1.11 VHF Simplex BDA Channel 4 Shelf (50-146508)

4.1.11.P VHF Simplex BDA Channel 4 Shelf Photographs

See section 4.1.9.P

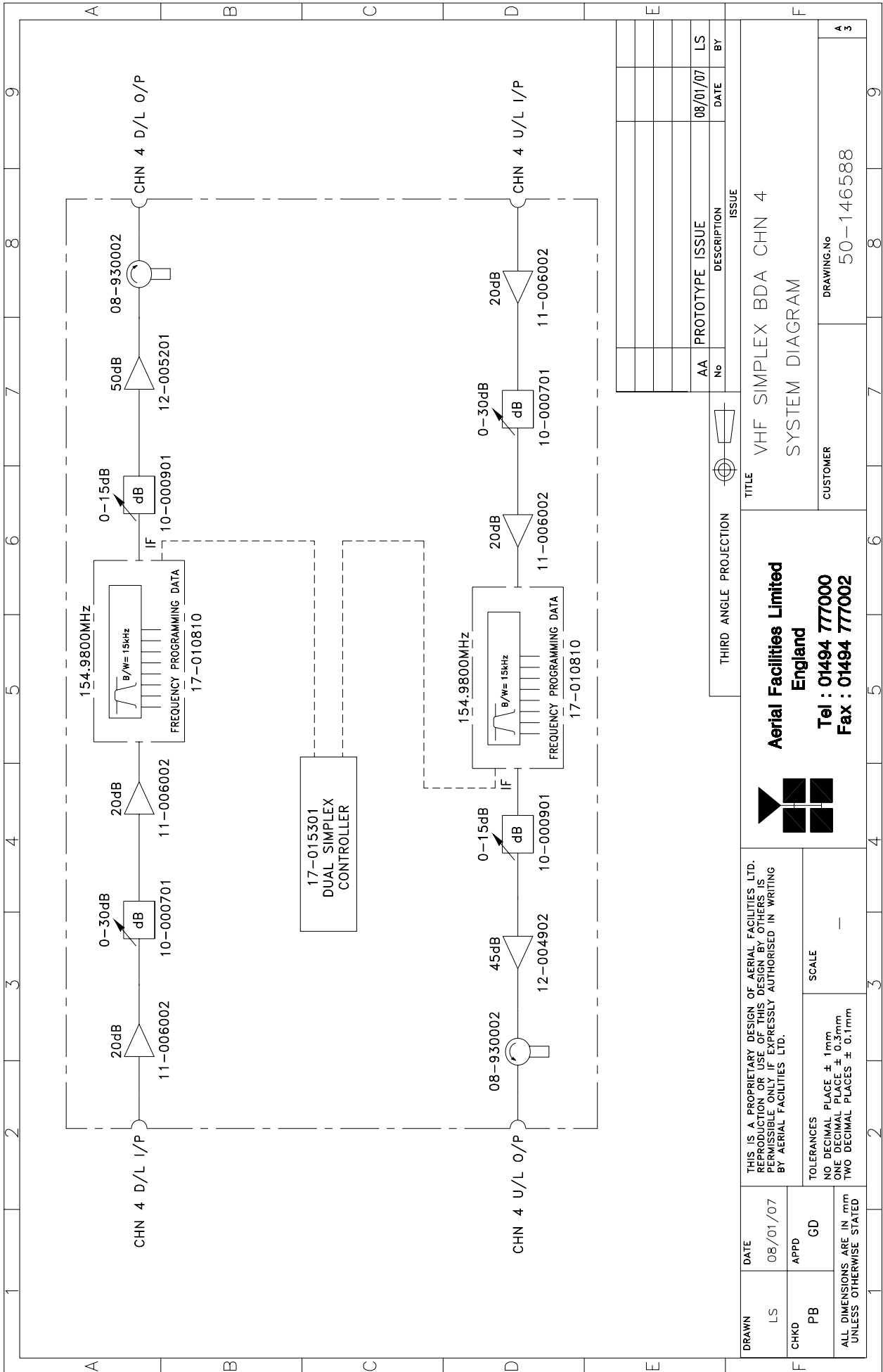
4.1.11.1 Description

See section 4.1.9.1

4.1.11.2 Technical Specification

See section 4.1.9.2

4.1.11.3 System Diagram, Drg. # 50-146588

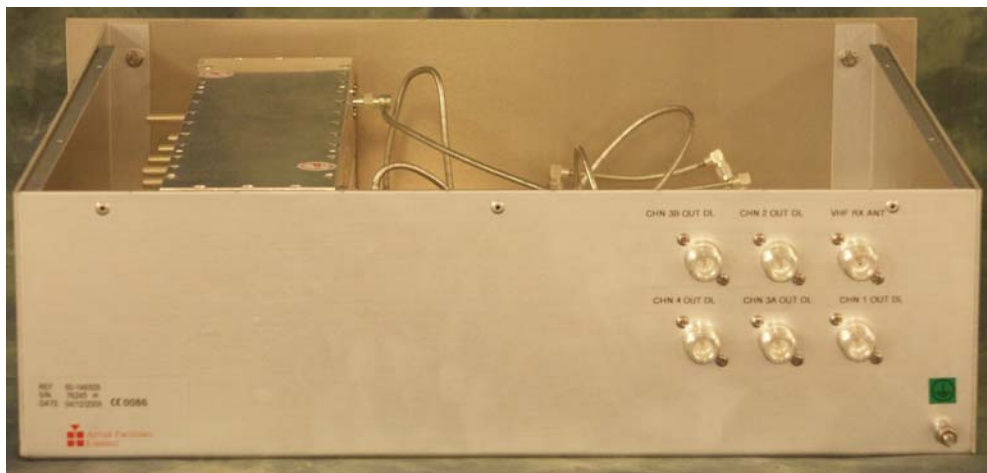
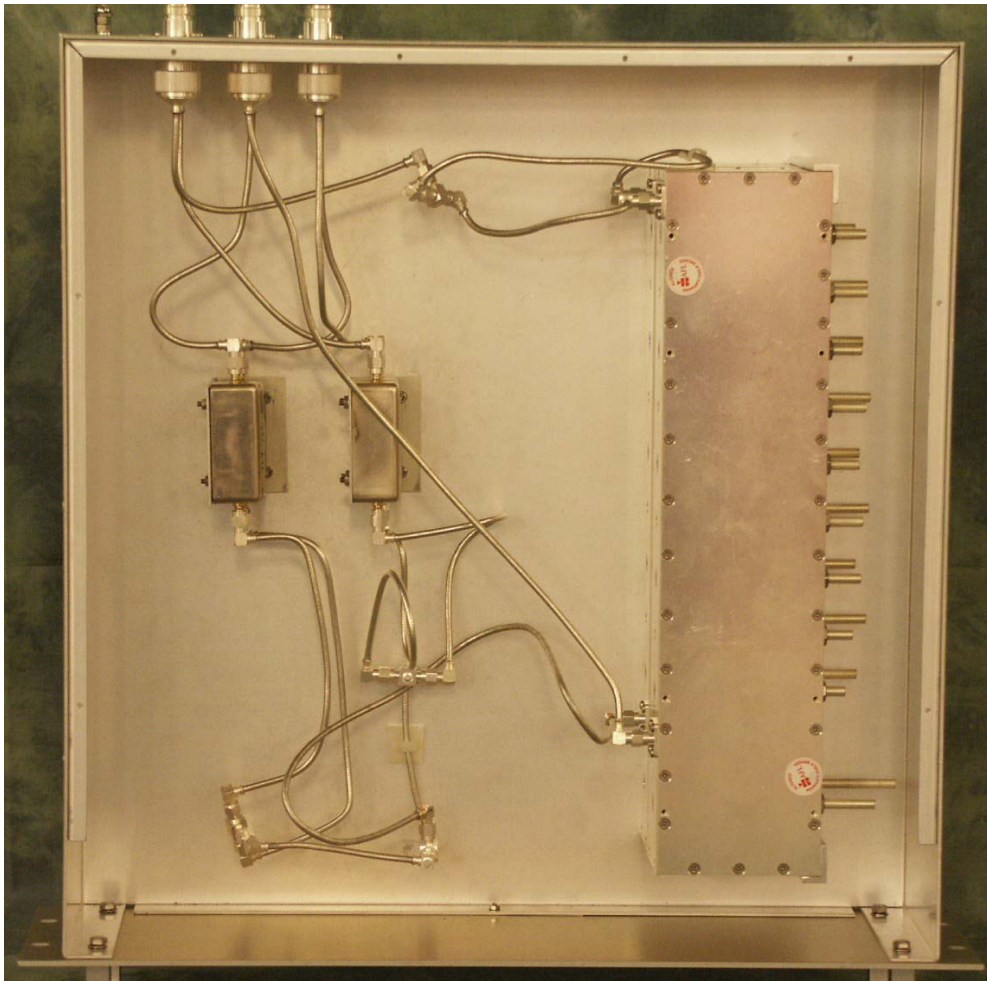


4.1.11.4 Parts List

AFL Part #	Part Description	Qty.
08-930002	2 PORT ISOLATOR 150-300MHz SMA	2
10-000701	1/4W0-30dB SWITCHED ATTENUATOR	2
10-000723	2xSWITCHED ATTENUATOR FIXING PLATE	2
10-000901	SW. ATTENUATOR 0.25W 0-15DB	2
11-006002	LNA VHF 70-500MHz WITH RELAY	4
12-002201	3 STAGE AMPLIFIER ALARM BOARD	2
12-002220	3 STAGE ALARM PCB COVER	2
12-002826	ALARM BOARD ACRYLIC LENS	2
12-004902	POWER AMP VHF 5W CLASS AB	1
12-005201	P/A 10W VHF CLASS AB	1
13-001803	DUAL DC/DC CONVERTER 24V-12V 1A	2
13-001822	DC-DC CON 24V-5V/15V COVER	2
17-010810	VHF CH MOD 15kHz 8p +IFRX 10k Gated	2
17-015301	DUAL SIMPLEX CONTROLLER	1
19-000922KL	3U chassis kit 450 deep with led	1
20-001602	24V RELAY BOARD	2
80-008902	24V RELAY PCB ASSEMBLY **NO LED**	1
80-063920	HEATSINK 2U ASS140 (5W)	2
91-030002	N ADAPTOR PANEL FEMALE:FEMALE	4
91-500001	POWER PLG 3 PIN PNL.MOUNT NC-X	1
91-510003	3 PIN R.ANGLE FREE SOC.NC-X.	1
91-600001	'D'TYPE 9 WAY PLUG S/B TERM	1
91-600014	'D' 9 WAY SOCKET S/B (NON FILTERED)	5
91-620001	'D' 25 WAY SOCKET S/B TERM	2
91-620005	'D' 25 WAY PLUG S/B TERM	1
91-700017	ICD 15 WAY 0.1' CONNECTOR	2
93-520015	10K PANEL/PCB MTG POT	2
93-540035	1K3 0.25W 1% RES MRS25 M:F	2
96-110001	FUSE HOLDER 20 x 5mm6.3A	1
96-600002	INSULATING BOOT SMALL	1
96-600003	INSULATING BOOT D.C.	1
96-700017	LED AMBER 5mm SEALED IP66	2

4.1.12 Downlink I/P Splitter (50-146509)

4.1.12.P Downlink Input Splitter Photographs



4.1.12.1 Description

The input splitter shelf receives VHF signals from the off-air antenna and passes them through two bandpass filters one of which is tuned to channel 2 and the other tuned to include channels 1, 3A, 3B & 4. The output of the filter tuned for channel 2 goes directly to the channel 2 cell enhancer input but the other path is split by four crystal filters, the outputs of which go separately to the inputs of the respective cell enhancer inputs. This is a passive shelf with no connection to any DC source and no alarms.

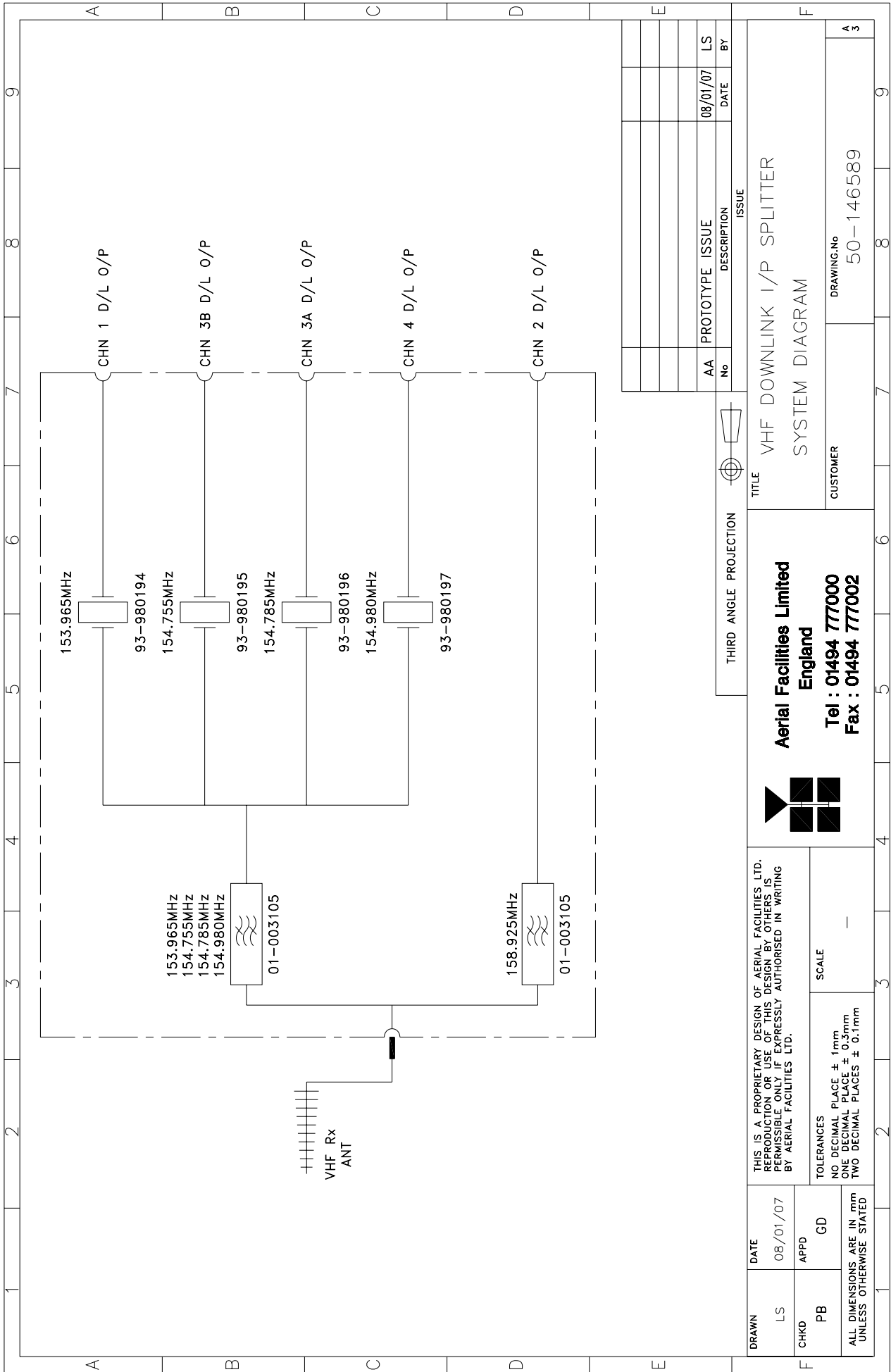
4.1.12.2 Technical Specification

PARAMETER		SPECIFICATION
Shelf dimensions:	Height:	3U
	Width:	19" (482.6mm)
	Depth:	<450mm (excluding connectors & handles)
Temperature range:	operational:	-20°C to +60°C
	storage:	-40°C to +70°C
	Weight:	<10kg
	Frequency ranges passed:	153.965 to 154.980 & 158.925MHz
	Impedance:	50Ω
	Humidity:	5 – 95% non-condensing
	RF Connectors:	N type female
	Environmental protection:	IP44
Finish	Case:	Iridite NCP coat
	Heatsinks:	None
	Handles:	Silver anodised aluminium alloy
	Fascia	Painted to RAL7035

4.1.12.3 Parts List

AFL Part #	Part Description	Qty.
01-003105	SD NOTCH FILT.N 6 SECT.VHF H/B SMA	2
19-000922K	3U CHASSIS KIT (450mm deep)	1
91-030002	N ADAPTOR PANEL FEMALE:FEMALE	6
91-130001	SMA ADAPT 'T' ALL FEMALE 3 GHz	4
93-980194	153.965MHz CRYSTAL FILT FAN4M52500	1
93-980195	154.755MHz CRYSTAL FILT FAN4M52500	1
93-980196	154.785MHz CRYSTAL FILT FAN4M52500	1
93-980197	154.980MHz CRYSTAL FILT FAN4M52500	1

4.1.12.4 System Diagram, Drg. # 50-146589



THIS IS A PROPRIETARY DESIGN OF AERIAL FACILITIES LTD.
 REPRODUCTION OR USE OF THIS DESIGN BY OTHERS IS
 PERMISSIBLE ONLY IF EXPRESSLY AUTHORISED IN WRITING
 BY AERIAL FACILITIES LTD.

TOLERANCES
 NO DECIMAL PLACE ± 1mm
 ONE DECIMAL PLACE ± 0.3mm
 TWO DECIMAL PLACES ± 0.1mm

SCALE
 —

DATE
 08/01/07

APPD
 GD

DRAWN
 LS

CHKD
 PB

ALL DIMENSIONS ARE IN mm
 UNLESS OTHERWISE STATED

Aerial Facilities Limited
 England
 Tel : 01494 777000
 Fax : 01494 777002

THIRD ANGLE PROJECTION

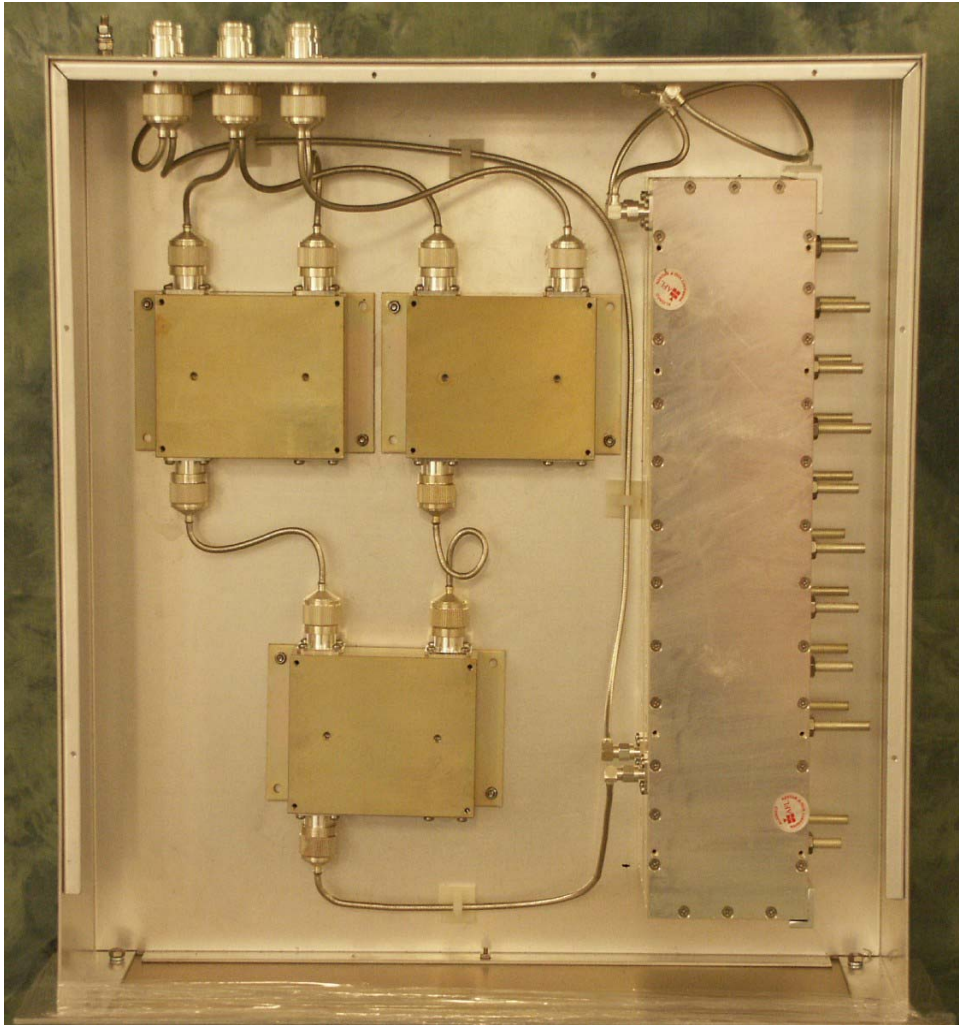
TITLE
 VHF DOWNLINK I/P SPLITTER
 SYSTEM DIAGRAM

CUSTOMER
 DRAWING No
 50-146589

AA	No	DESCRIPTION	ISSUE
AA	08/01/07	PROTOTYPE	LS
		ISSUE	BY
		DATE	

4.1.13 Downlink O/P Combiner (50-146510)

4.1.13.P Downlink O/P Combiner Photographs



4.1.13.1 Description

The passive downlink output combiner shelf receives the five separate VHF cell enhancer output signals and couples them together through hybrid and bandpass filters into three identical paths. This shelf has no power source and no alarms.

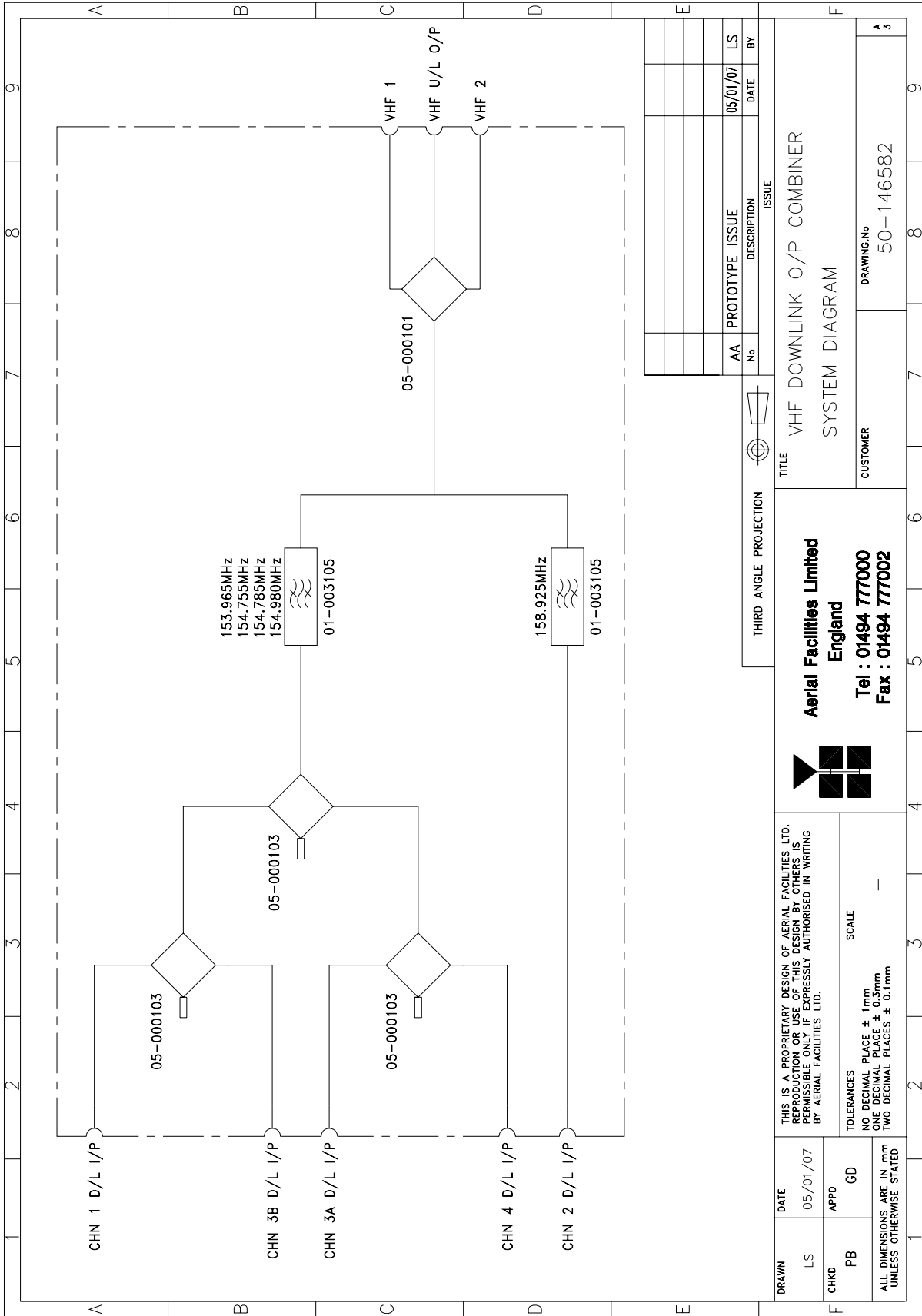
4.1.13.2 Technical Specification

PARAMETER		SPECIFICATION
Shelf dimensions:	Height:	3U
	Width:	19" (482.6mm)
	Depth:	<450mm (excluding connectors & handles)
Temperature range:	operational:	-20°C to +60°C
	storage:	-40°C to +70°C
	Weight:	<10kg
	Frequency ranges passed:	153.965 to 154.980 & 158.925MHz
	Impedance:	50Ω
	Humidity:	5 – 95% non-condensing
	RF Connectors:	N type female
	Environmental protection:	IP44
Finish	Case:	Iridite NCP coat
	Heatsinks:	None
	Handles:	Silver anodised aluminium alloy
	Fascia	Painted to RAL7035

4.1.13.3 Parts List

AFL Part #	Part Description	Qty.
01-003105	SD NOTCH FILT.N 6 SECT.VHF H/B SMA	2
05-000103	TX HYBRID COUPLER 3 PORT NO HTSINK	3
19-000922K	3U CHASSIS KIT (450mm deep)	1
91-030002	N ADAPTOR PANEL FEMALE:FEMALE	6
91-130001	SMA ADAPT 'T' ALL FEMALE 3 GHz	1

4.1.13.4 System Diagram



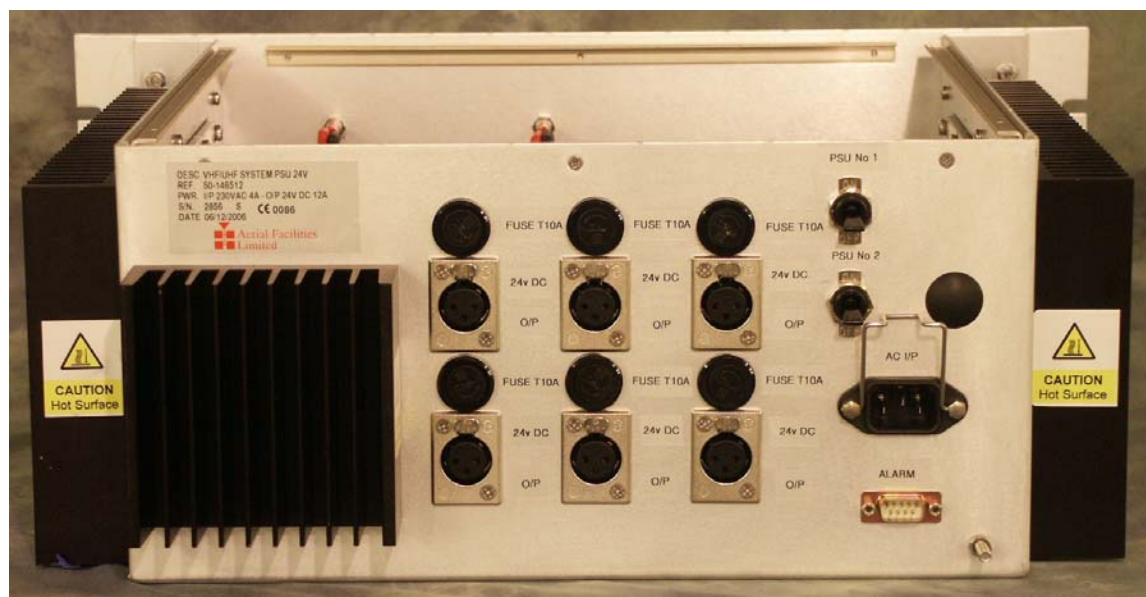
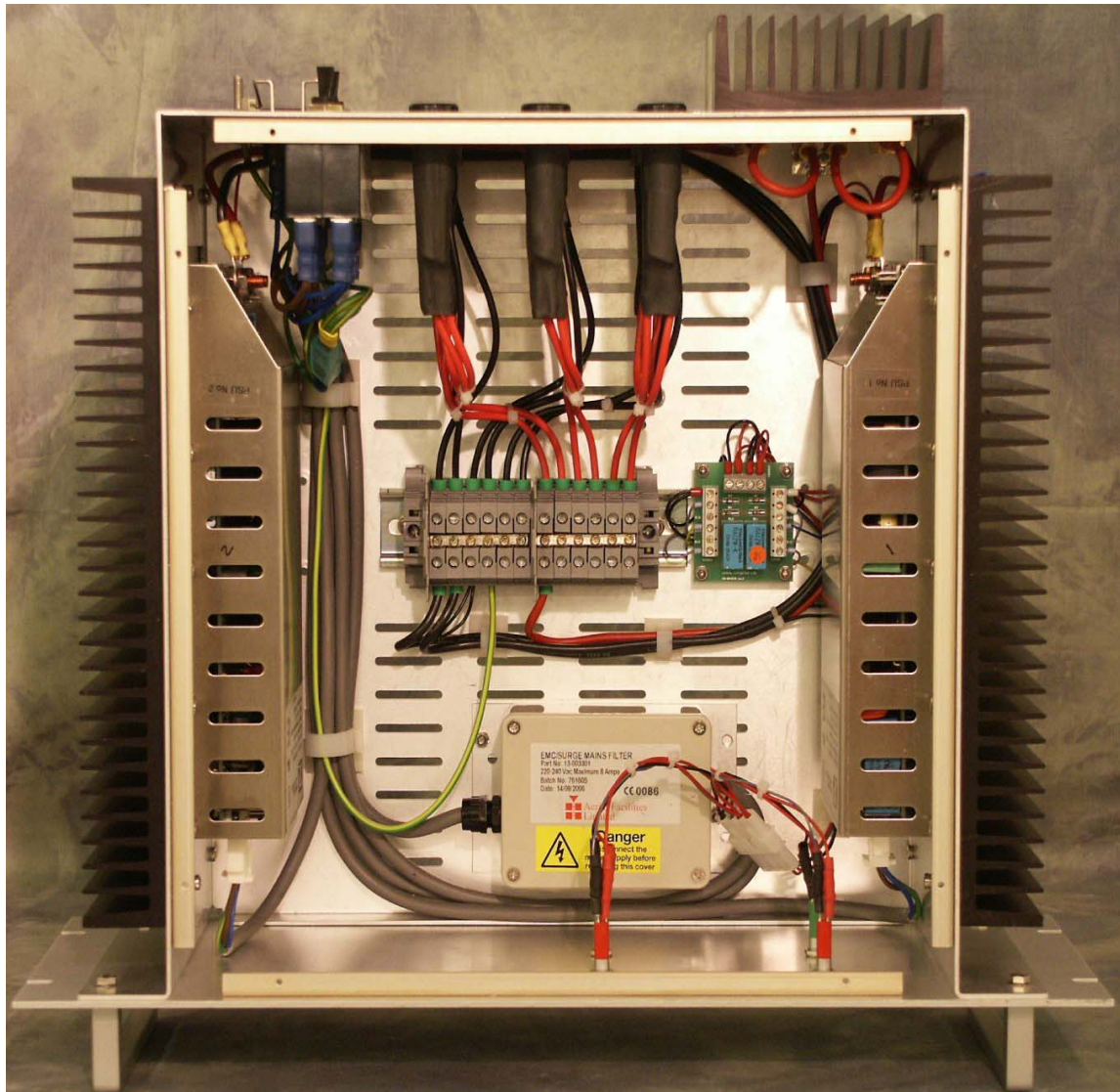
No	DESCRIPTION	DATE	BY
AA	PROTOTYPE ISSUE	05/01/07	LS

THIRD ANGLE PROJECTION		TITLE	
		VHF DOWNLINK O/P COMBINER	
		SYSTEM DIAGRAM	
Aerial Facilities Limited England Tel : 01494 777000 Fax : 01494 777002		CUSTOMER	
		DRAWING No	
		50-146582	
		A	
		3	

THIS IS A PROPRIETARY DESIGN OF AERIAL FACILITIES LTD. REPRODUCTION OR USE OF THIS DESIGN IS NOT PERMISSIBLE WITHOUT THE EXPRESSLY AUTHORISED IN WRITING BY AERIAL FACILITIES LTD.		SCALE	
TOLERANCES NO DECIMAL PLACE ± 1mm ONE DECIMAL PLACE ± 0.3mm TWO DECIMAL PLACES ± 0.1mm UNLESS OTHERWISE STATED		---	
DRAWN	DATE		
LS	05/01/07		
CHKD	APPD		
PB	GD		

4.1.14 VHF/UHF 24V Power Supply Shelf (50-146512)

4.1.14.P VHF/UHF Power supply Shelf Photographs



4.1.14.1 VHF/UHF PSU Shelf Description

The power supply shelf consists of two, 400Watt 24V DC O.E.M modules which are commonly supplied from the mains but separately switched. The DC outputs are separately monitored and this data becomes half of the alarm data for the shelf (the two monitor loops are summed to form a single alarm relay contact pair). A pair of low-loss power diodes combine the outputs from the PSU modules in a redundant configuration such that if either module fails, the other supply would still be active but the faulty supply's DC LED on the front panel would be extinguished and the alarm loop would be broken.

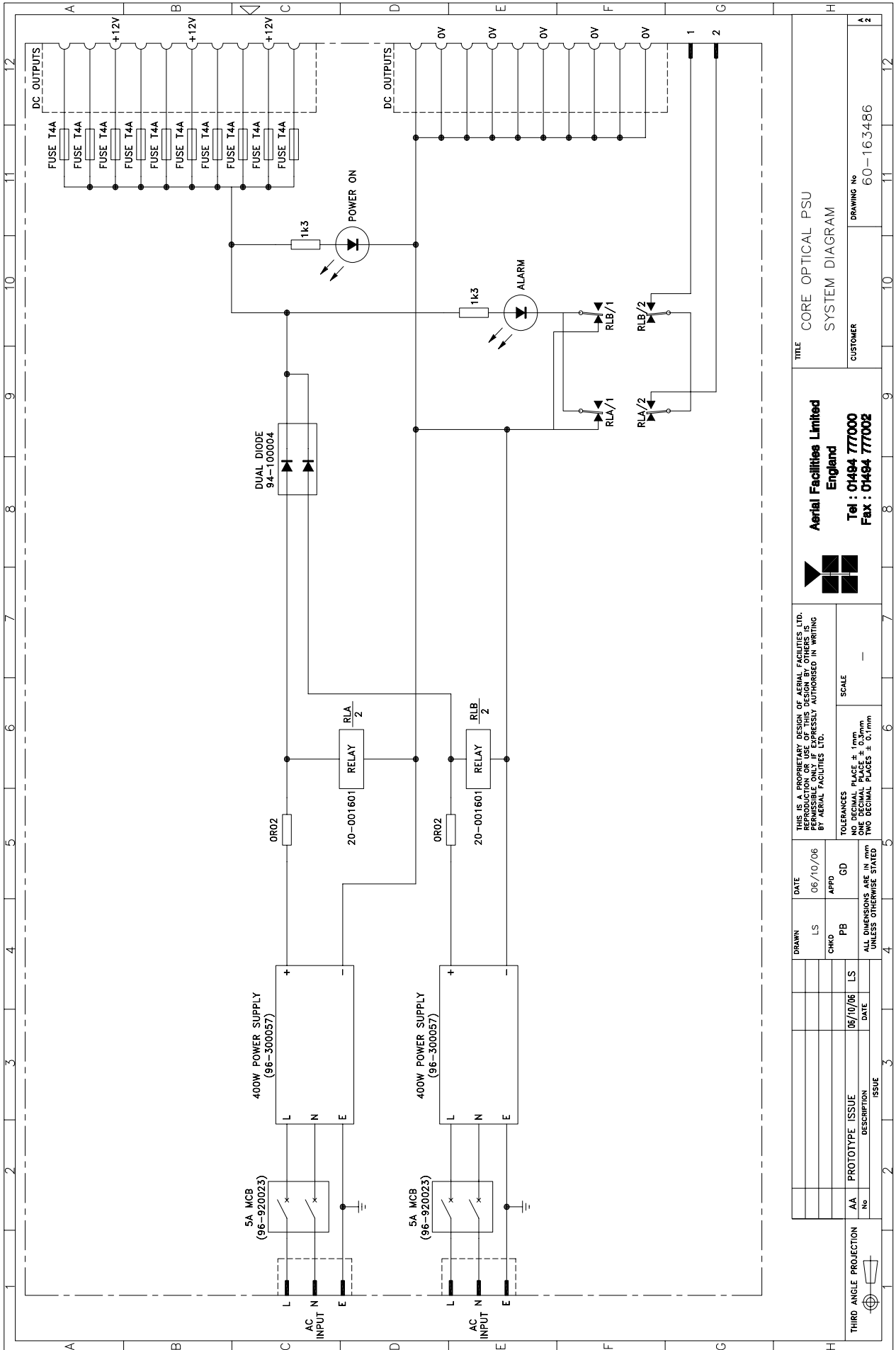
4.1.14.2 VHF/UHF PSU Shelf Technical Specification

PARAMETER		SPECIFICATION
Shelf dimensions:	Height:	5U
	Width:	19" (482.6mm)
	Depth:	<450mm (excluding connectors & handles)
Temperature range:	operational:	-20°C to +60°C
	storage:	-40°C to +70°C
	Weight:	<10kg
	Humidity:	5 – 95% non-condensing
	DC Output connectors:	6 x XLR female
	DC Output Voltage:	24V DC (x 6)
	24V DC O/P fuse rating:	10A (x 6)
	Environmental protection:	IP44
	Alarms:	PSU1 & 2 ('D' connector pins 1 & 2)
Finish	Case:	Iridite NCP coat
	Heatsinks:	Black anodised aluminium
	Handles:	Silver anodised aluminium alloy
	Fascia	Painted to RAL7035

4.1.14.3 VHF/UHF PSU Shelf Parts List

AFL Part #	Part Description	Qty.
13-003301	MAINS FILTER 8AMP ASSEMBLY	1
16-000222	DUPLEXER/CELL ENHANCER CASE RAIL	4
20-001601	12V RELAY BOARD	1
80-008920	DUAL PSU HEATSINK	2
80-008921	DUAL PSU CASE	1
80-008922	DUAL PSU LID	1
80-008925	DUAL PSU FRONT PANEL	1
91-500025	3 PIN RIGHT ANGLE FREE PLUG NC-X	6
91-510004	3 PIN PNL.MOUNT SOCKET NC-X	6
91-510035	3 WAY MATE N LOK PLUG HOUSING	2
91-520001	PWR MAINS INL FIXED/SOLD.TERMS	1
91-520005	MAINS LEAD	1
91-520010	MAINS RETAINING CLIP	1
91-520032	MATE N LOK SOCKET CONTACT 20/14 AWG	6
91-600015	'D' 9 WAY PLUG S/B (NON FILTERED)	1
91-800014	3 WAY TERMINAL BLOCK	1
91-800015	TRIPLE DECK TERMINAL BLOCK	8
91-800016	TRIPLE DECK TERMINAL JUMPER	6
91-800017	TRIPLE DECK TERMINAL END	1
91-800028	DIN RAIL END-STOP	2
91-800031	SYMETRIC 35 x 7.5mm DIN RAIL	0
92-900014	DIN RAIL (TOP HAT) EARTH CLAMP M5	1
93-510077	0R02 50W RESISTOR ALUMINIUM CLAD	2
94-100004	STPS12045TV 60A DUAL DIODE	1
95-100007	TX.FERRITE ISOL.HT.SINK B/ANOD	3
96-110034	FUSE HOLDER 16-30A, 32mm BODY ONLY	6
96-110064	FUSE HOLDER 16-30A, 32mm INSERT	6
96-300054	24V 17A PSU 400W (XP BCC)	2
96-600001	INSULATING BOOT LARGE	1
96-700034	LED RED 5mm IP67 INTEGRAL RES. 24V	1
96-700035	LED GREEN 5mm IP67 INTEGRAL RES 24V	2
96-920023	5A CIRCUIT BREAKER (ETA)	2
97-400002	HANDLE TYPE H6803 4U.[ALLOY]	2

4.1.14.4 VHF/UHF PSU Shelf System Diagram, (needs new drawing)



THIRD ANGLE PROJECTION		AA		PROTOTYPE ISSUE		DATE		06/10/06		LS	
No		DESCRIPTION		ISSUE		DATE		06/10/06		PB	
LS		GD		SCALE		—		—		—	
ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED		TOLERANCES		NO DECIMAL PLACE ± 1mm		ONE DECIMAL PLACE ± 0.3mm		TWO DECIMAL PLACE ± 0.1mm		—	
<p>THIS IS A PROPRIETARY DESIGN OF AERIAL FACILITIES LTD. REPRODUCTION OR USE OF THIS DESIGN BY OTHERS IS EXPRESSLY AUTHORISED IN WRITING BY AERIAL FACILITIES LTD.</p>											
<p>Aerial Facilities Limited England</p>				<p>Tel : 01484 770000 Fax : 01484 770002</p>				<p>TITLE CORE OPTICAL PSU SYSTEM DIAGRAM</p>			
CUSTOMER				DRAWING No				60-163486			