

**VHF AMP-2 30W
POWER AMPLIFIER
INSTRUCTION MANUAL
136 – 174 MHZ**

Covers Models:
AMP-2/150-30-00

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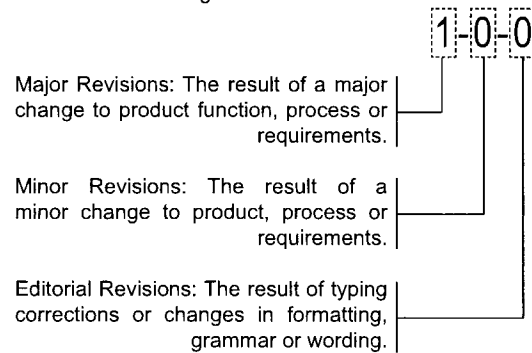
DOCUMENT CONTROL

This document has been produced, verified and controlled in accordance with Daniels Electronics' Quality Management System requirements.

Please report any errors or problems to Daniels Electronics' Customer Service Department.

DOCUMENT REVISION DEFINITION

Daniels Electronics Ltd. utilizes a three-level revision system. This system enables Daniels to identify the significance of a revision. Each element of the revision number signifies the scope of change as described in the diagram below.



Three-level revision numbers start at 1-0-0 for the first release. The appropriate element of the revision number is incremented by 1 for each subsequent revision, causing any digits to the right to be reset to 0.

For example:

If the current revision = 2-1-1 Then the next major revision = 3-0-0

If the current revision = 4-3-1 Then the next minor revision = 4-4-0

If the current revision = 3-2-2 Then the next editorial revision = 3-2-3

The complete revision history is provided at the back of the document.

NOTE

The user's authority to operate this equipment could be revoked through any changes or modifications not expressly approved by Daniels Electronics Ltd.

The design of this equipment is subject to change due to continuous development. This equipment may incorporate minor changes in detail from the information contained in this manual.

RF Exposure Warning

Exposure to radio frequency (RF) energy has been identified as a potential environmental factor that must be considered before a radio transmitter can be authorized or licensed. The FCC and IC have therefore developed maximum permissible exposure (MPE) limits for field strength and power density, listed in FCC 47 CFR § 1.1310 and IC RSS-102 Issue 2 Sect 4. The FCC has furthermore determined that determination of compliance with these exposure limits, and preparation of an Environmental Assessment (EA) if the limits are exceeded, is necessary only for facilities, operations and transmitters that fall into certain risk categories, listed in FCC 47 CFR § 1.1307 (b), Table 1. All other facilities, operations and transmitters are categorically excluded from making such studies or preparing an EA, except as indicated in FCC 47 CFR §§ 1.1307 (c) and (d).

Revised FCC OET Bulletin 65 (Edition 97-01) and IC RSS-102 Issue 2 provide assistance in determining whether a proposed or existing transmitting facility, operation or device complies with RF exposure limits. In accordance with OET Bulletin 65, FCC 47 CFR § 1.1307 (b) and RSS-102 Issue Sect 2.5, this Daniels Electronics Ltd. transmitter is categorically excluded from routine evaluation or preparing an EA for RF emissions and this exclusion is sufficient basis for assuming compliance with FCC/IC MPE limits. This exclusion is subject to the limits specified in FCC 47 CFR §§ 1.1307 (b), 1.1310 and IC RSS-102 Issue 2 Sect 4. Daniels Electronics Ltd. has no reason to believe that this excluded transmitter encompasses exceptional characteristics that could cause non-compliance.

Notes:

- The FCC and IC's exposure guidelines constitute exposure limits, not emission limits. They are relevant to locations that are accessible to workers or members of the public. Such access can be restricted or controlled by appropriate means (i.e. fences, warning signs, etc.).
- The FCC and IC's limits apply cumulatively to all sources of RF emissions affecting a given site. Sites exceeding these limits are subject to an EA and must provide test reports indicating compliance.

RF Safety Guidelines and Information

Base and Repeater radio transmitters are designed to generate and radiate RF energy by means of an external antenna, typically mounted at a significant height above ground to provide adequate signal coverage. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that permitted for successful communication. The following antenna installation guidelines are extracted from Appendix A from OET Bulletin 65 and must be adhered to in order to ensure RF exposure compliance:

Non-building-mounted Antennas:

Height above ground level to lowest point of antenna ≥ 10 m or
Power ≤ 1000 W ERP (1640 W EIRP)

Building-mounted Antennas:

Power ≤ 1000 W ERP (1640 W EIRP)

The following RF Safety Guidelines should be observed when working in or around transmitter sites:

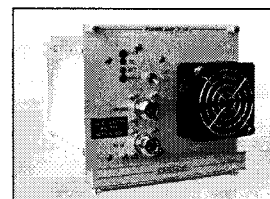
- Do not work on or around any transmitting antenna while RF power is applied.
- Before working on an antenna, disable the appropriate transmitter and ensure a "DO NOT USE" or similar sign is placed on or near the PTT or key-up control.
- Assume all antennas are active unless specifically indicated otherwise.
- Never operate a transmitter with the cover removed.
- Ensure all personnel entering a transmitter site have electromagnetic energy awareness training.

For more information on RF energy exposure and compliance, please refer to the following:

1. FCC Code of Regulations; 47 CFR §§ 1.1307 and 1.1310.
2. FCC OET Bulletin 65, Edition 97-01, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields".
3. <http://www.fcc.gov/oet/rfsafety/>
4. IC RSS-102 Issue 2, "Radio Frequency Exposure Compliance of Radio Communication Apparatus"

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GENERAL INFORMATION

INTRODUCTION

The MT-3 / MT-4 repeater system is a VHF / UHF radio system which is characterized by high performance and reliability under the most severe environmental conditions. The total system is designed to provide dependable, low maintenance performance, even in the most difficult circumstances.

The MT-3 / MT-4 series of modules are packaged in the compact Euro-standard (5" h x 2.8" w x 7.5" d) housing, and are robustly designed for urban, remote or transportable applications. Voltage stress testing is done over the range of +11 to +16 VDC, which is followed by 24 hours of continuous operation at maximum rated power output.

When the VT-3 / VT-4 transmitter is used as an exciter for the VHF AMP-2 30W power amplifier (PA) module, it will provide an adjustable 20 to 30W RF output over the 136–174 MHz VHF frequency range.

The VHF AMP-2/150-30 covers three frequency bands: 136–150 MHz, 150–162 MHz and 162–174 MHz. The VHF AMP-2 power amplifier (PA) mates with either of the MT-3 / MT-4 VHF transmitter exciter modules (the VT-3 transmitter exciter module or the VT-4 transmitter exciter module).



WARNING

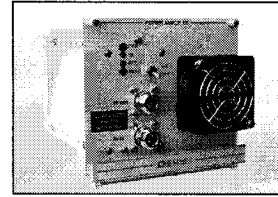
The Performance Specifications below are specific for the VHF AMP-2 30W with a Maximum Input Power of **6 Watts**. If the Maximum Input Power shown on the front panel is different, please refer to the power amplifier manual that came with the amplifier or contact Daniels Electronics.

PERFORMANCE SPECIFICATIONS

Type:	MT-2 Series Power Amplifier
Family:	AMP-2/150
Model:	AMP-2/150-30-00
Compatibility:	MT-3 and MT-4 Series Transmitter Exciters
Frequency Range:	136–174 MHz
Frequency Bands:	136–150 MHz 150–162 MHz 162–174 MHz
RF Input Power:	2–6W
RF Output Power:	Adjustable: 20–30 watts (set by MT-3 or MT-4 exciter)
Output Impedance:	50Ω
Conducted Spurious & Harmonics:	≤ -70 dBc (at 30W output) Less than 0.3 μw (-35 dBm) absolute level
Operating Voltage:	+13.8 VDC nominal, range +11 to +16 VDC
Transmit Current:	3.5 to 5.5A at 30W 136–174 MHz
Standby Current:	Minimum 5 mA options 20 mA
Thermal:	Thermal interlock disables at 80°C (175°F) Fan activated at 40°C (105°F)
Duty Cycle:	Continuous (with fan) -40°C to +60°C operation
Exciter:	VT-3 and VT-4 6W maximum output for 30W PA
IC Number:	142A-AMP2150
FCC ID:	H4JVT-30
Emission Designator:	F1D, F1E, F3D, F3E, G3E

PHYSICAL SPECIFICATIONS

Physical Dimensions:	width: 14.2 cm (5.6")	Height: 12.8 cm (5.05")	Depth: 20.5 cm (8.1")
Weight:	1.6 kg (3.5 lb)		
Operating Temperature Range:	-40°C to +60°C		
Operating Humidity:	Up to 95% R.H. at 25°C		
RF Connectors:	Type N Standard		
Corrosion Prevention:	Anodized aluminum construction. Stainless steel hardware.		
Features:	<ul style="list-style-type: none"> • Heavy Duty Aluminum Heatsink • Thermal Switched Fan (at 40°C) • RF Power and Over Temp Indicators • Optional Unit Power Indicator 		



THEORY OF OPERATION

GENERAL

The VHF AMP-2 power amplifier consists of an RF main printed circuit board (PCB) and an RF sensor PCB. The VHF AMP-2 power amplifier is compatible with all MT-3 and MT-4 rack mounting systems and VT-3 and VT-4 exciters.

RF SENSOR CIRCUITRY

DC power is applied at two points to the power amplifier: +9.5 V regulated to pins B6, Z6 and +11 to +16 V to pins B2, Z2. The +9.5 VDC is applied to all RF sensing circuits, i.e., RF power O/P indicator transistors Q2 and Q3 and the wide band stripline opposed emitter (SOE) transistor Q1.

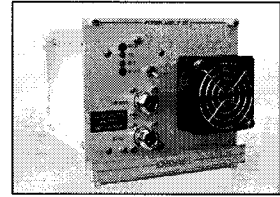
RF sampling via C28 is rectified and filtered by CR1, C29, and C30 (RF PCB). This DC level is applied to Q3 via connector J2. R11 provides DC drive to Q2 therefore setting the RF O/P power threshold for CR4 (TX PWR LED).

RF CIRCUITRY

The VHF VT-3 or VT-4 6W exciter drives the VHF AMP-2 power amplifier. RF is fed through J5 (exciter input) to Q1, a wide band SOE transistor. Q1 is mounted through the extrusion to the heatsink but maintains thermal contact to thermal switch (TH1) via the extrusion. C2 provides input matching to Q1 and is peaked for minimum reflected power. C17 and C19 match the collector of Q1 to the low pass filter network and should be peaked for maximum RF power.

The RF power is sampled by C28, then rectified through CR1, C29 and C30. This DC level is applied to the RF sensor board and is used to adjust CR4's intensity level from 20–30W. The low pass filter network L7, L8, L9, L10 and associated capacitors provide a 150–180 MHz LPF cut-off frequency.

Thermal switch TH2 activates the front panel fan when the temperature in the proximity of Q1 reaches +40°C. The fan is connected to the +11 to +16V supply, therefore, variations in fan noise and velocity are normal under various supply conditions.



INSTALLATION AND SITE OPERATION

The VHF AMP-2 RF power amplifier is approved for operation with the VT-3 or VT-4 exciter. Complete MT-3 subracks shipped directly from the factory are normally set to the appropriate options and O/P power calibration as requested by the customer. These units require no recalibration.

For VHF AMP-2 RF power amplifiers shipped separately from the MT-3 / MT-4 racks, install as outlined in this section.

VHF AMP-2 RF POWER AMPLIFIER INSTALLATION

1. Confirm exciter and PA are aligned for the same frequency (see Alignment Procedure).
2. Remove the blank cover plates or transmitter / receiver pair in the System B subrack slots.
3. Install the VHF AMP-2 in Slot 36 (visible via the marker hole on the upper left VHF AMP-2 front panel).

NOTE: If the unit is set up with the extender card there will be a voltage drop of +1 to +1.5 VDC when the power amplifier is transmitting. This voltage drop must be compensated for valid power O/P readings. Adjust the power supply for +13.8 VDC at the power amplifier.

4. Connect the output of the exciter to the input of the VHF AMP-2 power amplifier with the cable provided.
5. Connect the antenna system and key the transmitter. The LED indicators are defined as follows:

Power Indicator: (optional)

Indicates +13.8 VDC is applied to the transmitter when the ON / OFF switch is activated. An internal connector on the sensor PCB disables the power indicator LED in the event standby LED current drain must be eliminated.

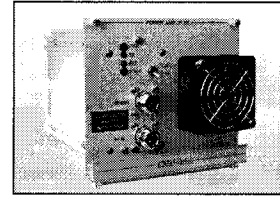
TX Indicator:

Indicates that a preset forward RF power level is present at the transmitter output. The threshold level is internally adjustable for various RF output levels over the 20–30W range.

OT Indicator: (Over Temperature)

A thermostat control switch interrupts the input supply voltage (nominally +13.8 VDC) to the PA when the heat sink temperature exceeds 175°F (80°C). The over temperature thermostat will reset at 145°F (63°C), thus providing hysteresis. The OT indicator is only operational when exciter drive is present.

The fan is activated automatically when the VHF PA O/P transistor temperature sensor reaches +40°C. The fan's operating temperature range is -20°C to +60°C. The fan sensor will not activate the fan when ambient temperature is below -20°C.



VHF AMP-2 ALIGNMENT

TEST EQUIPMENT LIST

To align the transmitter the following test equipment is recommended:

-
- Daniels Subrack SR-39-1 with System Regulator
-
- Power supply regulated +13.8 VDC at 10A
-
- Wattmeter – Bird 6104
-
- Socal, Power Pad 50 Ω Splitter, Dummy Load
-
- Spectrum Analyzer – IFR 7550
-
- Alignment Tool – Johanson 8777
-
- Daniels Extender Card EC-48RK-1.22
-
- VSWR Meter – 10W 200 MHz
-
- Dummy Load 50 Ω 50W
-
- Current Meter (10A)
-
- DC Voltmeter
-



WARNING

The Amplifier Alignment instructions below are specific for the VHF AMP-2 30W with a Maximum Input Power of **6 Watts**. If the Maximum Input Power shown on the front panel is different, please refer to the power amplifier manual that came with the amplifier or contact Daniels Electronics.

AMPLIFIER ALIGNMENT

1. Remove the cover from the exciter.
2. Install the exciter in the System A side of the MT-3 or MT-4 subrack.
3. Remove all receivers from the rack (to facilitate easier power O/P calibration).
4. Install the extender card in the location for the VHF AMP-2 power amplifier (System B).
 - a. Connect the extender cable to the VHF AMP-2 module.
 - b. Connect the RF exciter output of the exciter to the input of the VHF AMP-2 PA through a VSWR meter so that the VSWR is measured between the exciter and the amplifier.
5. Adjust the exciter transmitter to obtain 5W power out of the exciter transmitter.
6. Attach a wattmeter, terminated with a 50Ω resistive load to the output of the VHF AMP-2.
7. Apply +13.8 VDC to the subrack.
8. Activate the transmitter (exciter and VHF AMP-2).
9. Measure the DC supply voltage on the Thermostat (TH1) temperature switch lug.
10. Adjust the external power supply voltage until there is +13.8 VDC at the TH1 thermostat lug.
This will compensate for the DC voltage drop across the extender card and cables.

While the VHF AMP-2 is tuned for maximum RF power output, it may be necessary to re-adjust the power supply to maintain +13.8 VDC at the VHF AMP-2 supply input. Measure at TH1.

11. Monitor the RF power output of the VHF AMP-2.
 - a. Adjust C19, C17 and C2 for maximum output power and minimum current.
 - b. Ensure that the current does not exceed 7A while tuning.
 - c. Adjust the exciter power as required to maintain 30 watts output.

NOTE: C4 is a select component. See the schematic or the Capacitor Select Table below for more details.

C17 has a broad tuning range that can affect the current consumption of the VHF AMP-2 in some situations.

With the output power at 30W:

12. Readjust C2 and C19 for minimum input VSWR.

Confirm that the VSWR is less than 1.6:1 (typically < 1.1:1) at 30W output and with the exciter transmitter set for minimum input power.

NOTE: Remove the VSWR meter from between the exciter and VHF AMP-2 and set the power amplifier output to 30W by adjusting the exciter.

13. Confirm RF output spectral purity with a spectrum analyzer—using a power splitter.

- a. Adjust the external DC voltage supply from +11 to +16 VDC.
- b. Confirm that there are no observable changes in the spectral purity.

NOTE: Extreme misalignment of capacitor adjustments may result in spurious emission, excessive current consumption (VHF AMP-2 PA) and a high VSWR at the exciter transmitter output. Maximum continuous collector current for Q1 is 7A at +16 VDC.

Capacitor Select Table

Band	C4	Description	DE Part Number
136–150 MHz	30 pF	CAP/SM/PORCELAIN, 30pF,5%,500V	1036-1B2300J5
150–162 MHz	12 pF	CAP/SM/PORCELN, 12pF,+5%,500V	1036-1B2120J5
162–174 MHz	N/I		

(N/I indicates the capacitor is not installed.)

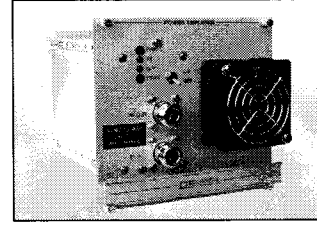
SENSOR CIRCUITRY

After completion of the amplifier alignment:

1. Set the PA power to 20W.
2. Adjust R11 until the LED CR4 is barely visible.
3. Set the Power to 30W and the LED should be bright.
This control is set to indicate that a forward RF power condition is present at the VHF AMP-2 PA output.

NOTE: This sensor will only work correctly when the PA is properly terminated with a 50Ω load.

OPTION: Power Indicator (+13.8 VDC) consumes 15–20 mA. It is disabled by removing JU1.



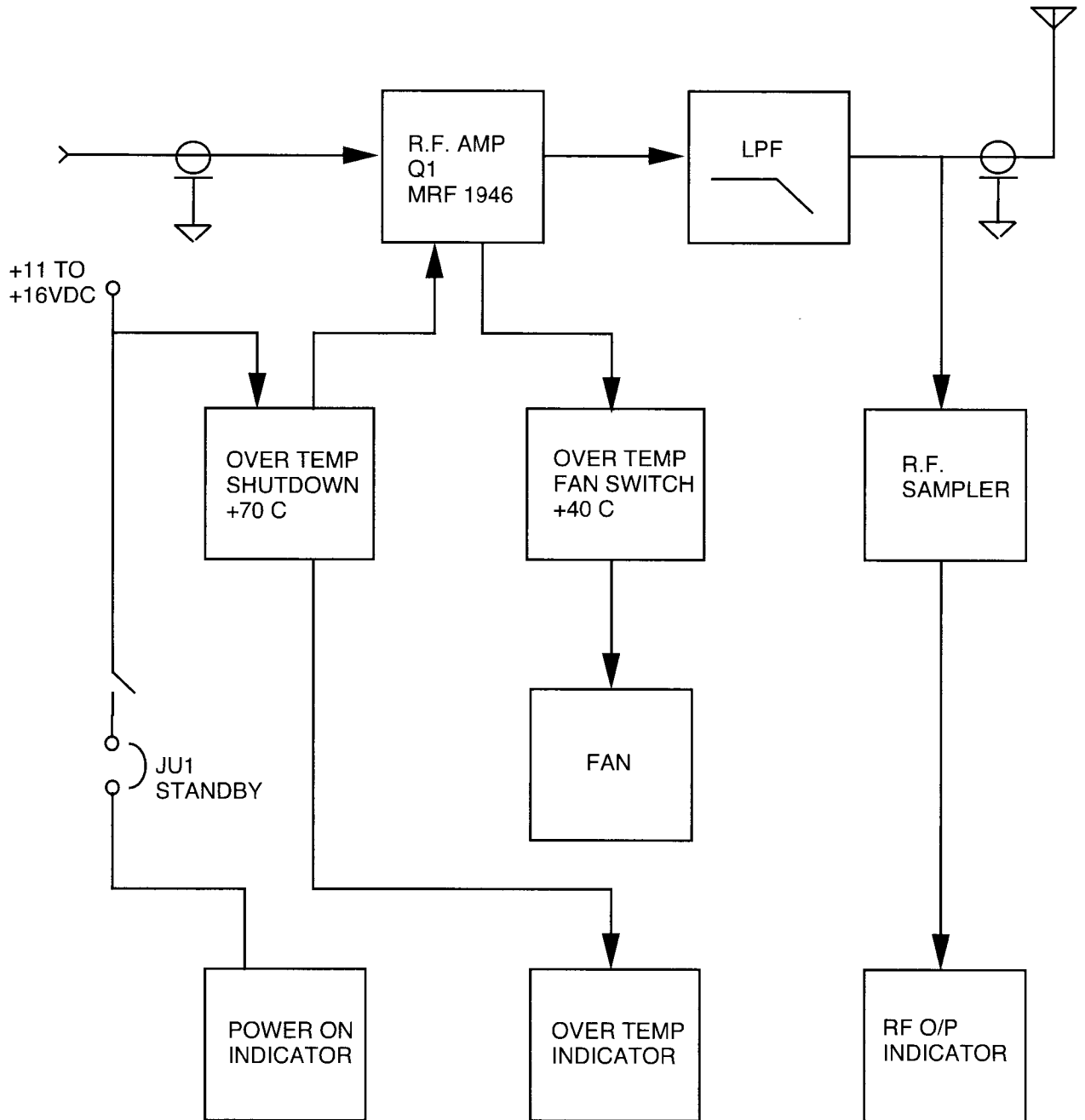
ILLUSTRATIONS AND SCHEMATICS

PRINTED CIRCUIT BOARD NUMBERING CONVENTION

Daniels Electronics Ltd. has adopted a printed circuit board (PCB) numbering convention in which the last two digits of the circuit board number represent the circuit board version. All PCBs manufactured by Daniels Electronics Ltd. are identified by one of the following numbering conventions:

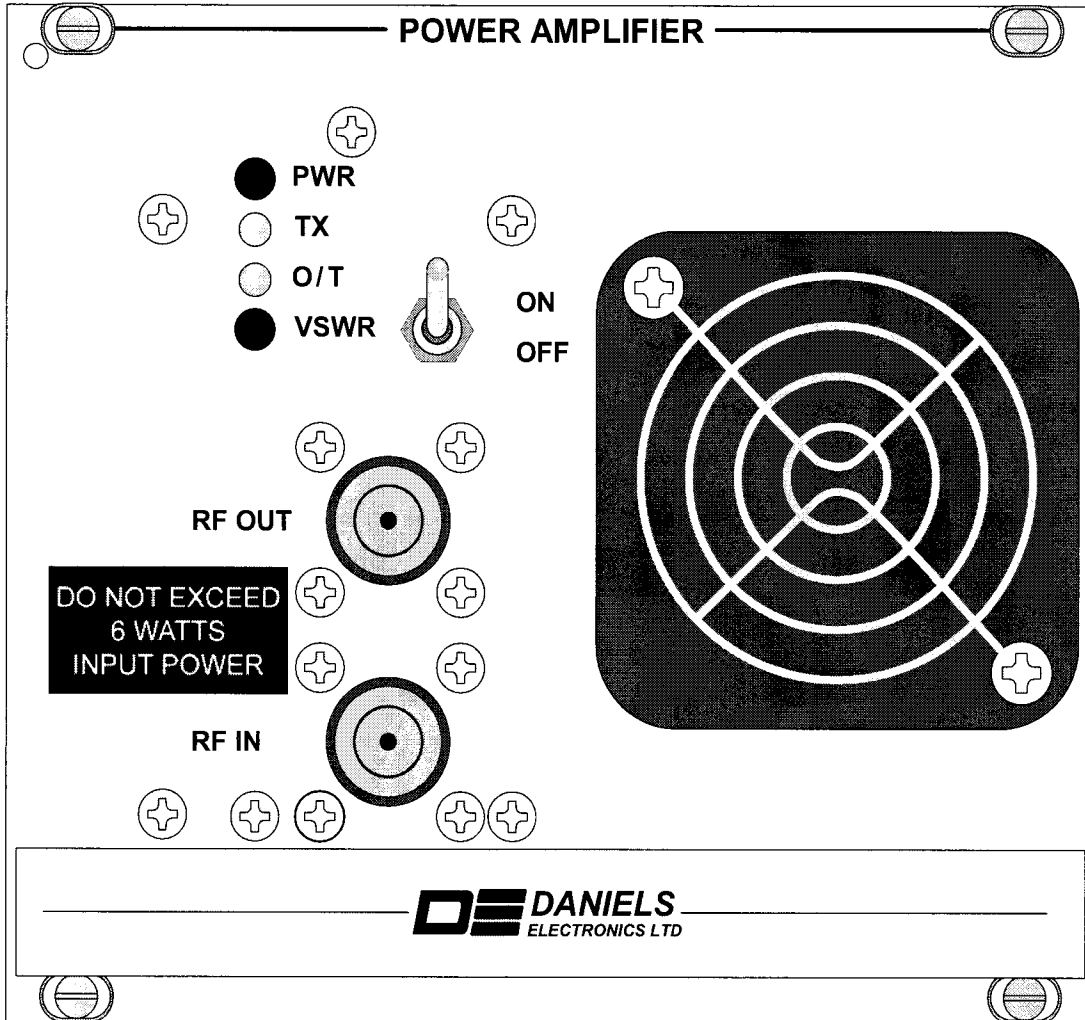
PCB number	43-912010
	Indicates circuit board Version 1.0
PCB number	50002-01 60003-01
	Indicates circuit board Version 1 (no decimal version)

VHF AMP-2 30W AMPLIFIER BLOCK DIAGRAM

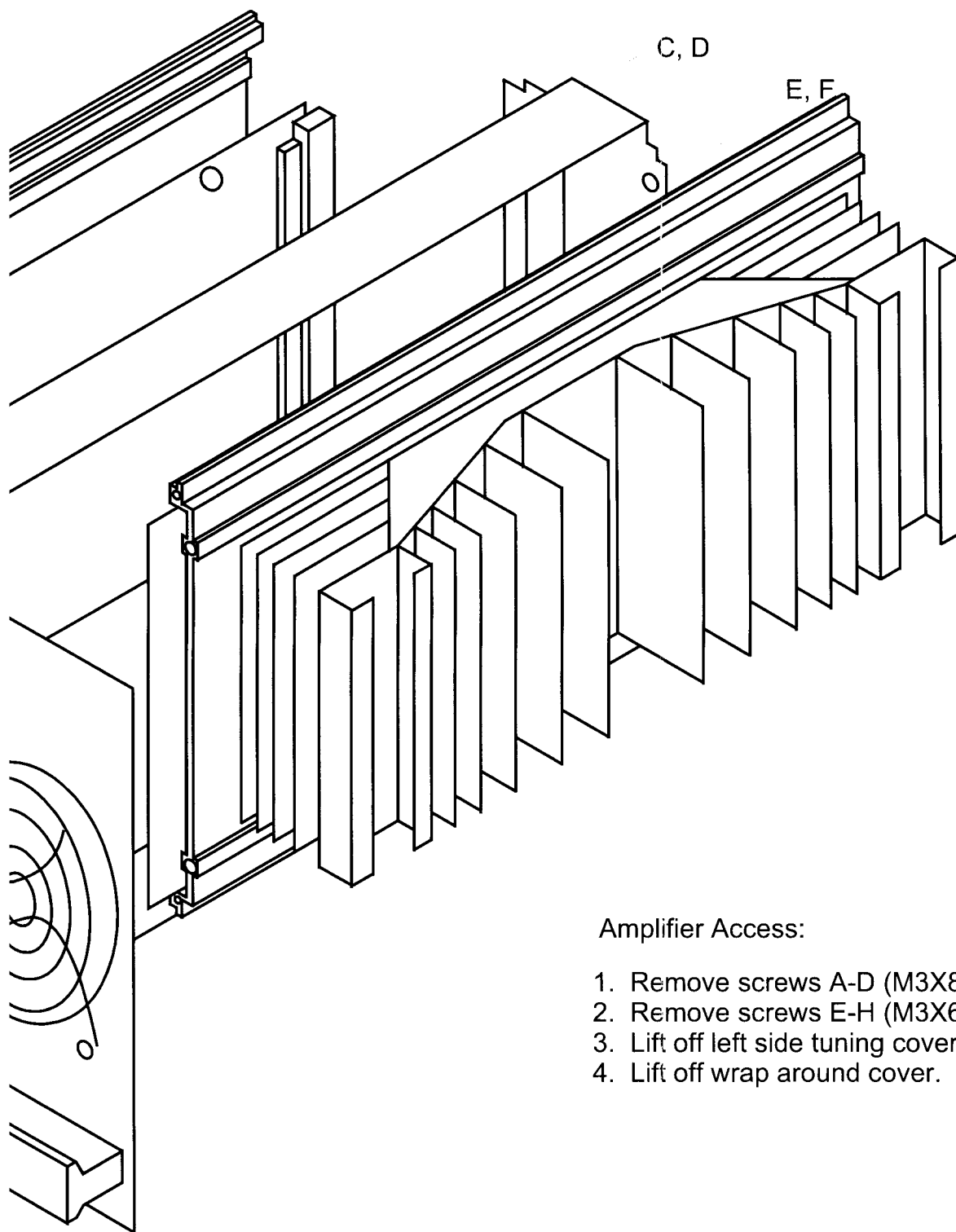


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VHF AMP-2 FRONT PANEL



VHF AMP-2 30W AMPLIFIER EXPLODED VIEW



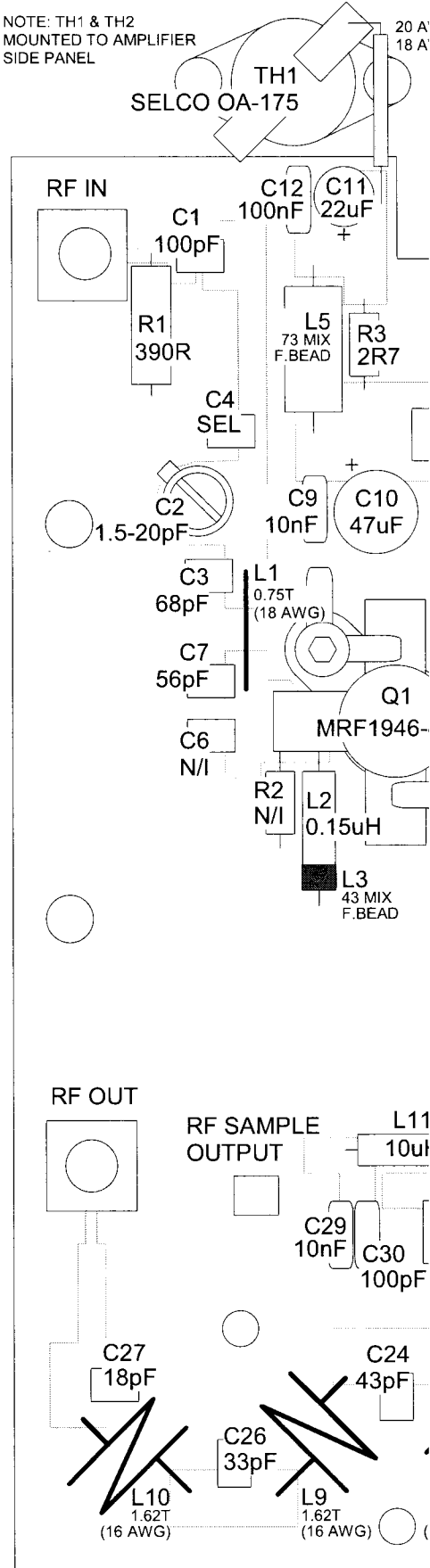
Amplifier Access:

1. Remove screws A-D (M3X8mm CSK).
2. Remove screws E-H (M3X6mm PAN).
3. Lift off left side tuning cover.
4. Lift off wrap around cover.

B0397

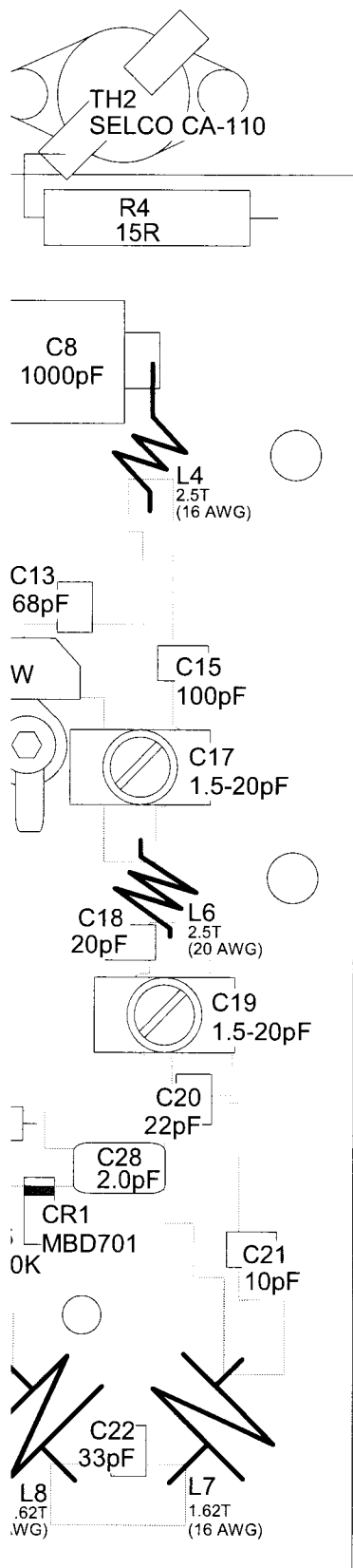
VHF AMP-2 30W AMPLIFIER BOARD COMPONENT LAYOUT

NOTE: TH1 & TH2 MOUNTED TO AMPLIFIER SIDE PANEL

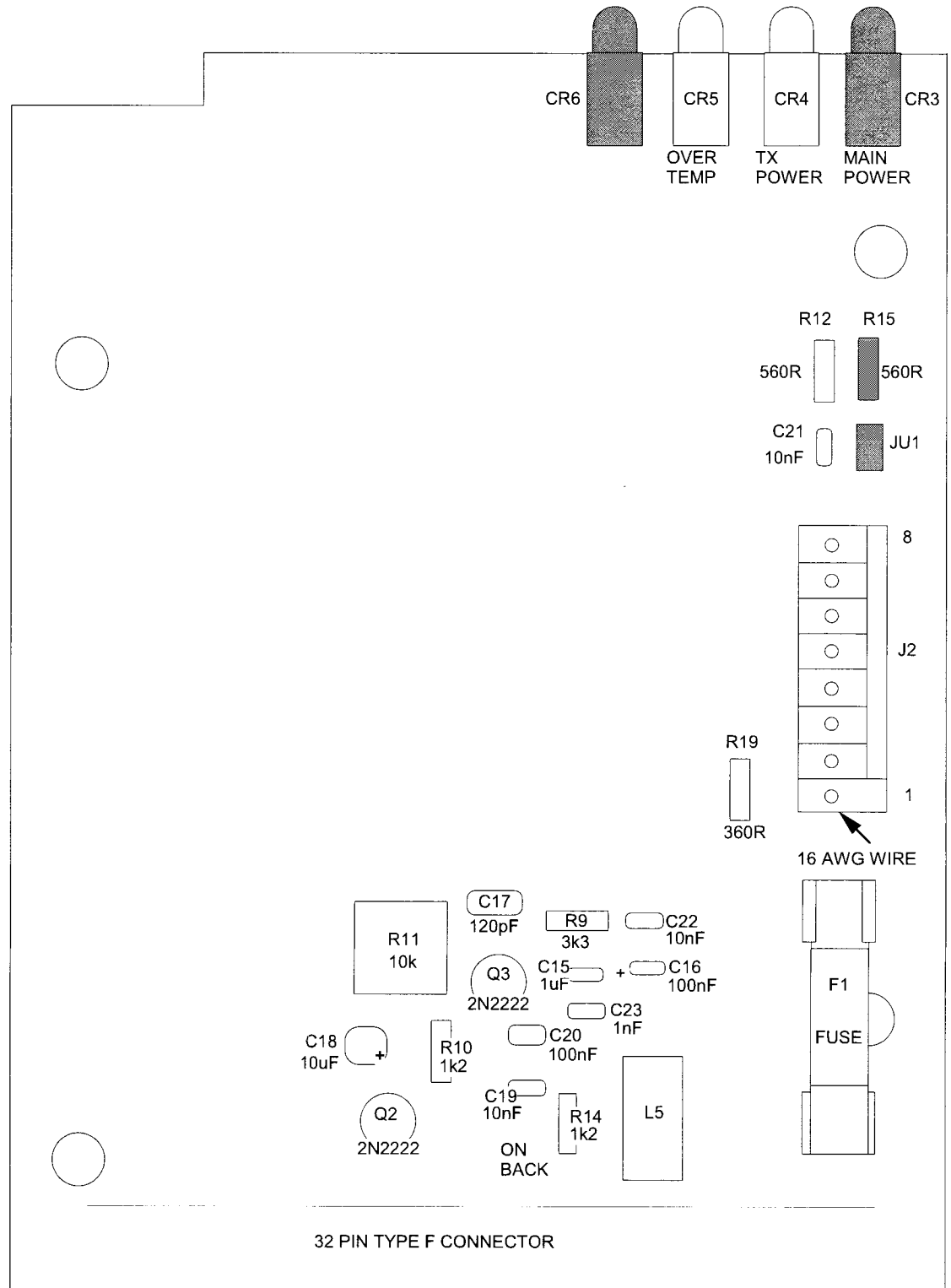


FREQUENCY BAND SELECT COMPONENTS	
FREQ BAND	C4
136 - 150 MHz	30pF
150 - 162 MHz	12pF
162 - 174 MHz	N/I

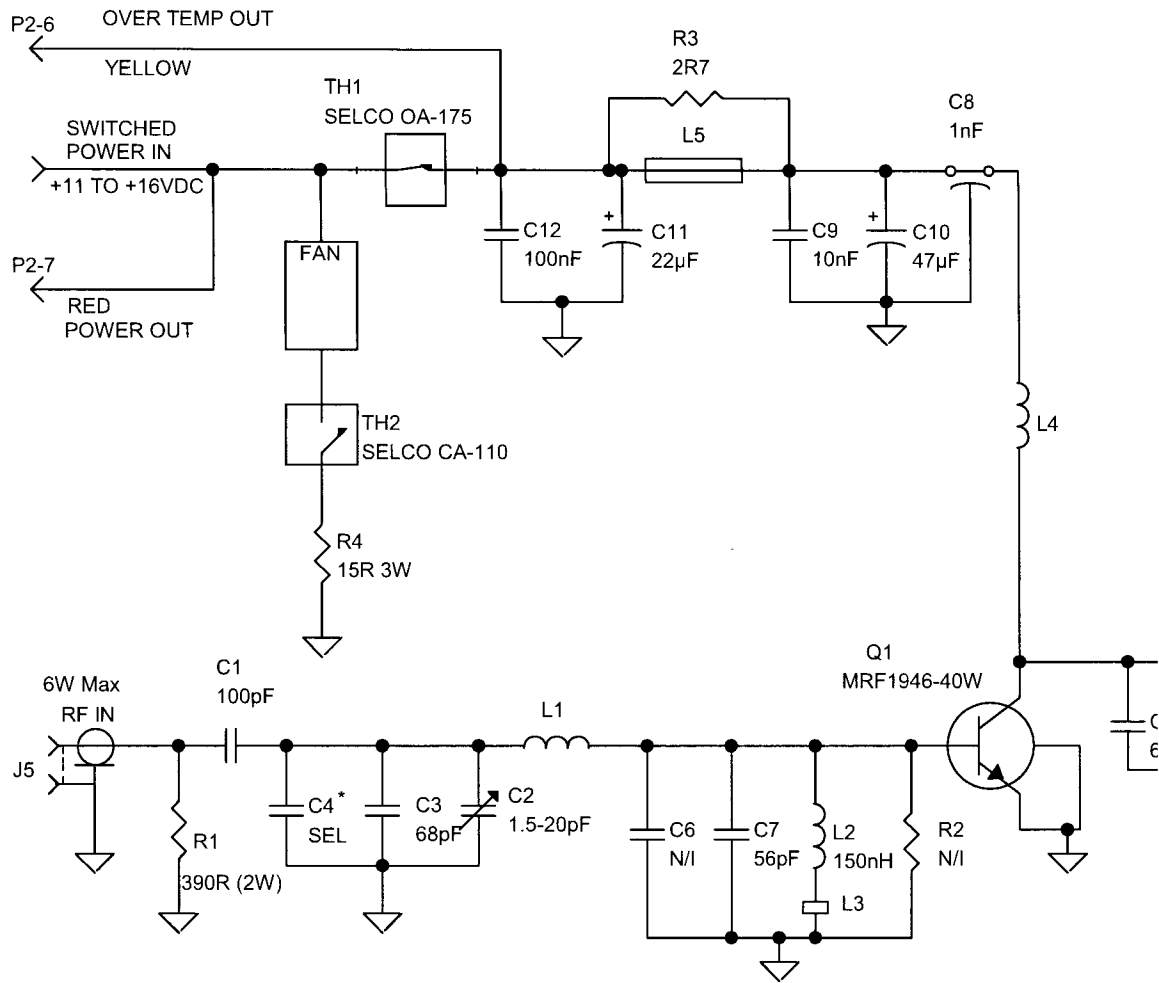
BUSS WIRE with
TEFLON TUBING



VHF AMP-2 RF SENSOR BOARD COMPONENT LAYOUT



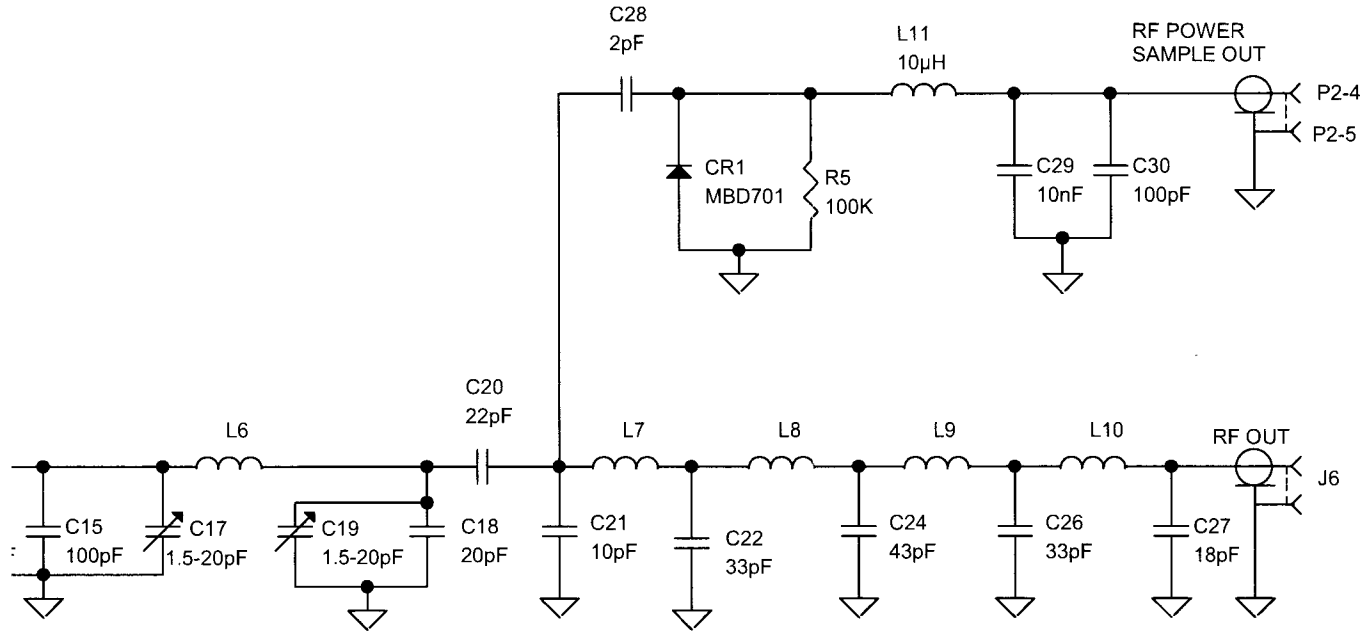
 COMPONENTS NOT INSTALLED



Frequency Band Seletion		
Band	C4	Description
136-150MHz	30pF	CAP/SM/PORCELAIN, 30pF,5%,500V
150-162MHz	12pF	CAP/SM/PORCELN, 12pF,+5%,500V
162-174MHz	N/I	Not Installed

HIGHEST REFEREN	
C30	C
Q1	F
J6	F
UNUSED REFEREN	
C5	C
C23	C
J1-J4	-

VHF AMP-2 30W AMPLIFIER BOARD SCHEMATIC DIAGRAM



Notes

- 1) ALL RESISTORS 1/2 WATT UNLESS OTHERWISE STATED
- 2) TH1 & TH2 THERMOSTATS ARE IN THERMAL CONTACT WITH CASE

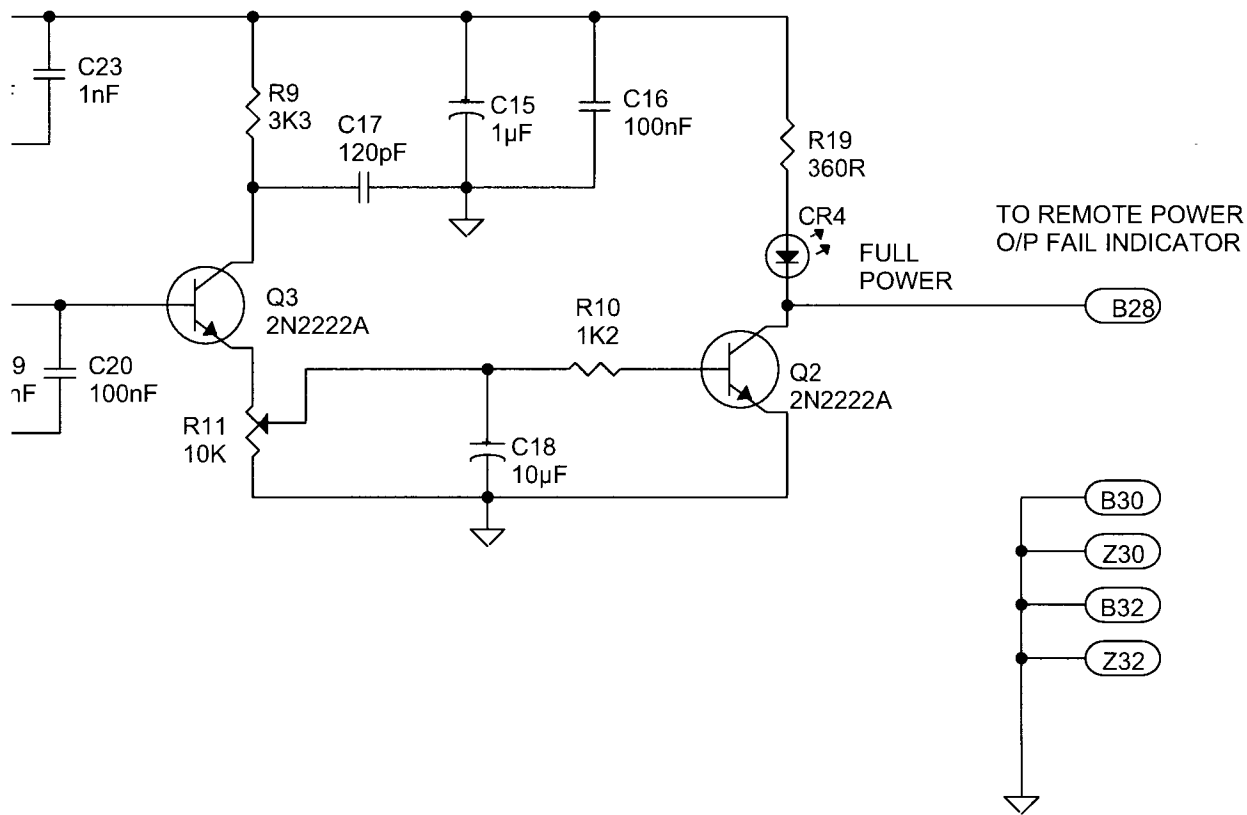
DESIGNATORS	
	L11
	TH2

DESIGNATORS	
	C16
	P1

DE DANIELS™ ELECTRONICS LTD		VICTORIA BC.
TITLE: VHF POWER AMPLIFIER VT-30		
DATE: 26 OCT 1991	DWN BY: S. SHANNON	APRVD: DR
DWG No.: 01-S-14-01	REVISED BY: JS	
BOARD No.: 43-884221	REV: 2.1	DWG REV DATE: 02 Aug 2011

VHF AMP-2 RF SENSOR BOARD SCHEMATIC DIAGRAM

R
CB.



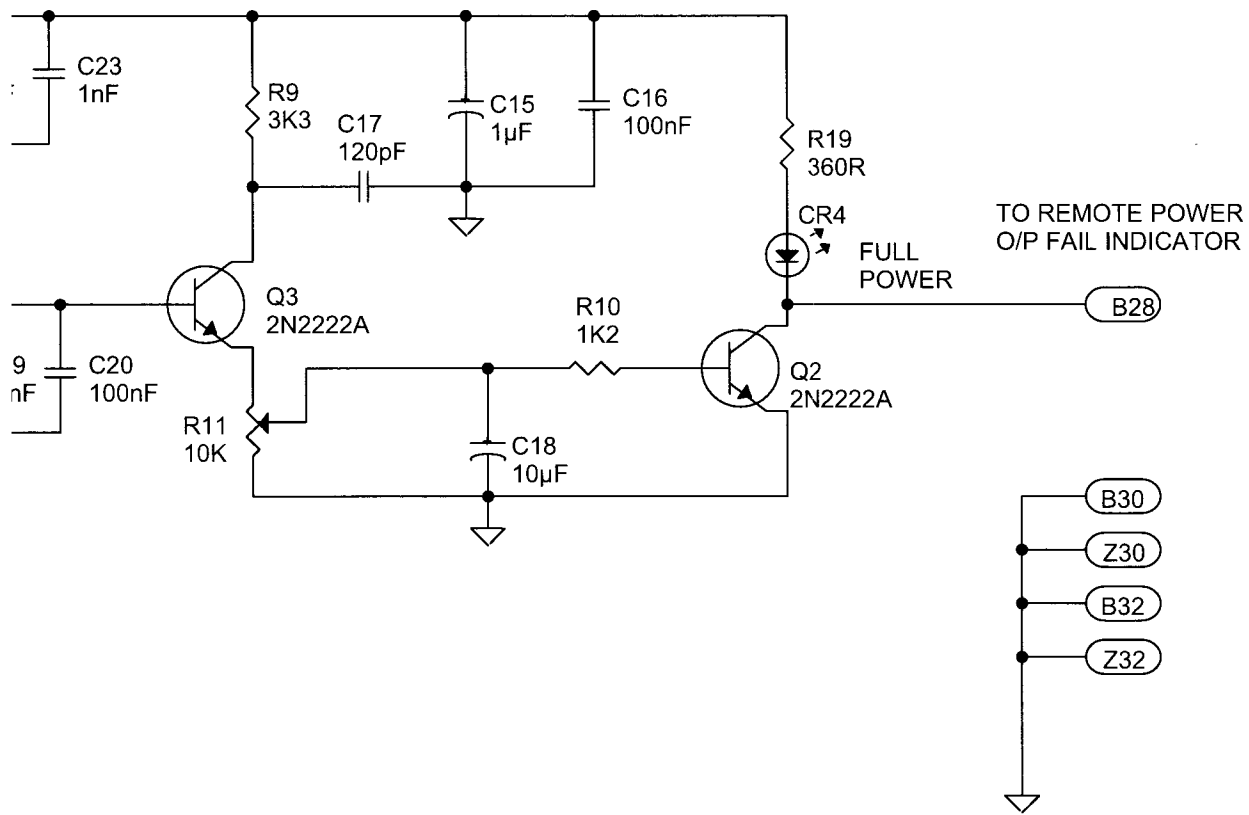
HIGHEST REFERENCE DESIGNATORS		
C23	CR5	L5
Q3	R19	J2
----	----	----
UNUSED REFERENCE DESIGNATORS		
C1-C14	CR1-CR2	Q1
R1-R8	L1-L4	----
----	----	----

DE DANIELS™ ELECTRONICS LTD		VICTORIA BC.
TITLE: VHF AMP-2 RF SENSOR BOARD		
DATE: 26 OCT 1991	DWN BY: S. SHANNON	APRVD:
DWG No.: 01-S-06-01	REVISED BY: EVA DANIELS	
BOARD No.: 43-884311	REV: 1.1	DWG REV DATE: 18 OCT 2004

D.
WISE STATED.

VHF AMP-2 RF SENSOR BOARD SCHEMATIC DIAGRAM

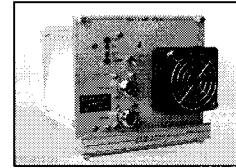
R
CB.



HIGHEST REFERENCE DESIGNATORS		
C23	CR5	L5
Q3	R19	J2
----	----	----
UNUSED REFERENCE DESIGNATORS		
C1-C14	CR1-CR2	Q1
R1-R8	L1-L4	----
----	----	----

DE DANIELS™ ELECTRONICS LTD		VICTORIA BC.
TITLE: VHF AMP-2 RF SENSOR BOARD		
DATE: 26 OCT 1991	DWN BY: S. SHANNON	APRVD:
DWG No.: 01-S-06-01	REVISED BY: EVA DANIELS	
BOARD No.: 43-884311	REV: 1.1	DWG REV DATE: 18 OCT 2004

UNLESS OTHERWISE STATED.



PARTS LIST

AMPLIFIER BOARD

Part Number	Description	Narration
A71-AMP2150	AMP, VHF 30W ASSEMBLY	
1036-2B2101J5	CAP/SM/PORCELAIN,100pF,5%,500V	C1, C15
1054-6M476M35	CAP/DIP/TANTALUM, 47uF,20%,35V	C10
1054-6G226M20	CAP/DIP/TANTALUM, 22uF,20%,20V	C11
1007-5B104M5U	CAP., 100nF MONO., 20%,50V,Z5U	C12
1082-C1R5020F	CAP/TRIM., 1.5-20pF VERT. >12T	C17, C19, C2
1036-1B2200J5	CAP/SM/PORCELAIN, 20pF,5%,500V	C18
1036-1B2220J5	CAP/SM/PORCELAIN, 22pF,5%,500V	C20
1036-1B2100J5	CAP/SM/PORCELN, 10pF,+5%,500V	C21
1046-1A430JCB	CAP.,43pF METAL CLAD, 5%, 300V	C24
1046-1A330JCB	CAP.,33pF METAL CLAD, 5%, 300V	C26, C22
1046-1A180JCB	CAP.,18pF METAL CLAD, 5%, 300V	C27
1044-0A020DCD	CAP., 2 pF MICA, +-.5pF, 500V	C28
1036-1B2680J5	CAP/SM/PORCELAIN, 68pF,5%,500V	C3, C13
1003-2B101C0G	CAP.,100pF CER,2%,100V,NP0,.2"	C30
1036-1B2560J5	CAP/SM/PORCELAIN, 56pF,5%,500V	C7
1046-3C102JCC	CAP., 1 nF METAL CLAD 5% 500V	C8
1004-4B103Z5V	CAP.,10nF CER,100V, X7R,0.2"SP	C9, C29
2005-MBD70100	DIODE, MBD701, HOT-CARRIER	CR1
1220-0T751815	COIL, 0.75 TURN,18AWG,4.7mm ID	L1
1220-1T621615	COIL, 1.62TURNS,16AWG,0.325"ID	L10, L7, L8, L9
1251-4A00100K	CHOKE, RF/MOLDED,10uH,10%,.25"	L11
1251-2A00R15K	CHOKE, RF/MOLDED,150nH,10%,.25	L2
1210-43030350	FERRITE, BEAD,43MIX,3x3.5mm OD	L3
7142-10001601	WIRE, MAGNET,16AWG,HEAVY,BROWN	L4
1210-73110500	FERRITE BEAD, 73MIX,11X5mm OD	L5
1220-2T502005	COIL, 2.5 TURNS, 20AWG,0.11"ID	L6

Amplifier Board (Continued)

Part Number	Description	Narration
4321-80884221	PCB,VHF 30W AMPLIFIER VT-30	PCB
2025-MRF19464	TRANSISTOR/NPN/RF,136-220M,40W	Q1
1105-2A0391JI	RES., 390R METAL FILM, 5%, 2W	R1
1101-0A02R7JI	RES., 2R7 METAL FILM, 5%, 0.5W	R3
1105-1B0150JI	RES., 15R METAL FILM, 5%, 3W	R4
1101-5A0104JP	RES., 100K METAL FILM, 5%,0.5W	R5
5281-175SB15A	SWITCH, TEMP/175~F,SPST,NC,10A	TH1
5281-110SC30A	SWITCH, TEMP/110~F,SPST,NO,10A	TH2

Amplifier Board Mechanical Parts

Part Number	Description	Qty.
5673-250N312A	BUSHING, 1/4" NYLON,.312" HOLE	1
7405-RG316000	CABLE, COAX, RG316, TFE, WHITE	15.5 cm
7910-SP6NJ014	CABLE,SMA PLUG-N PNL JACK,14CM	1
7910-SP6NJ019	CABLE,SMA PLUG-N PNL JACK,19CM	1
5816-3M0SH08S	CAP SCREW, M3x8 HEX SOCK-M2.5	2
5112-J28100BG	CONN., SMA STR. JK,PC MNT,.281	2
3802-62302020	COVER WITH GASKETS, POWER AMP	1
6510-60251209	FAN, 12VDC, 60*60*25 mm,19 CFM	1
3702-10000120	FASTENER, QUICK RELEASE, GRAY	4
5604-5GAGC080	FUSE, 8 AMP FAST-BLO, 1-1/4 IN	1
6519-60602R0S	GUARD, FOR 60mm SQ. FAN, STEEL	1
3702-10000628	HANDLE, FRONT PANEL, 28HP,GREY	1
5572-20884911	HEATSINK, VT-30/UT-30, BLACK	1
5671-187N062B	HOLE PLUG, .187" HOLE,NYL.,BLK	2
5022-156HS07L	HOUSING, .156,CRIMP TERM,7 CCT	1
3536-10212805	LABEL/LEXAN, 28HP, VHF: RED	1
5814-3M0LK00S	LOCKWASHER, M3, SPLIT,A2 STEEL	20
5814-4M0LK00S	LOCKWASHER, M4, SPLIT,A2 STEEL	2
5814-5M0LK00S	LOCKWASHER, M5, SPLIT,A2 STEEL	3
5682-S1085000	LUG, N0.10, 0.85"L., INT.TOOTH	1
3702-10001228	NAMEPLATE, BLANK, 28HP, GREY	1
5813-2M5SQ50S	NUT, M2.5, SQUARE-5mm, A2 S/S	2
5813-3M0HX54S	NUT, M3, HEX, 5.4mm FLATS, A2	8
5813-4M0HX69S	NUT, M4, HEX, 6.9mm FLATS, A2	2
5219-2540BN00	NUT, SWITCH-1/4-40UNS,BRASS/Ni	1
3702-23160000	PANEL, SIDE, 160 mm, ALUMINUM	1
3802-62002020	PANEL, SIDE,AMP-2/150 HEATSINK	1

Amplifier Board Mechanical Parts (Continued)

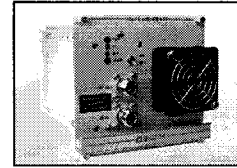
Part Number	Description	Qty.
3802-61002010	PANEL/FRONT, W/IDENT: V/UHF PA	1
5065-250R16A4	RECEP,TAB/.250",16-14AWG,INSUL	1
5812-2M5FP12S	SCREW, M2.5 x 12 FLAT/PHIL, A2	2
5812-3M0PP04S	SCREW, M3 x 4, PAN/PHIL, A2	7
5812-3M0PP06S	SCREW, M3 X 6, PAN/PHILLIPS,A2	10
5812-3M0PP08S	SCREW, M3 x 8, PAN/PHIL, A2	8
5812-3M0VP08S	SCREW, M3 x 8, OVAL C/S/PHIL,A2	4
5812-4M0PP35S	SCREW, M4 X 35, PAN/PHIL., A2	2
5812-5M0PP16S	SCREW, M5 x 16 PAN/PHIL, A2	4
1083-S234T640	SEAL, SLOTTED, 0.234-64 UNS-2	3
5205-T2U21P02	SWITCH, TOG./DPDT, ON-NONE-ON	1
3702-67802010	TAB, GND,M3,2-WAY/90~,BRASS/Ni	2
3702-67002025	TAB, GROUND,VT-30 TRIM CAP.,BR	4
5022-156CTFT0	TERMINAL, TRIF/FEM,CRIMP,18-20	1
5022-156CTFT3	TERMINAL, TRIF/FEM,CRIMP,22-26	5
5660-1003L01N	TIE STRAP, .1"W x3",LOCK.,NYL.	7
7602-105C08CL	TUBING, PVC-105C, 8 AWG, CLEAR	8 cm
7610-260C18TW	TUBING, TFE-260C,18AWG T/W,CLR	4 cm
5814-5M0FLA0S	WASHER, FLAT, M5, 10mm OD, A2	4
7110-16S26302	WIRE, PVC/STRANDED, 16AWG, RED	10.5 cm
7110-22S07302	WIRE, PVC/STRANDED, 22AWG, RED	13 cm
7110-22S07305	WIRE, PVC/STRANDED,22AWG,GREEN	15 cm
7110-22S07303	WIRE,PVC/STRANDED,22AWG,ORANGE	15 cm
7110-22S07304	WIRE,PVC/STRANDED,22AWG,YELLOW	14.5 cm

RF SENSOR BOARD

Part Number	Description	Narration
A71-VT30RFS-A	ASSEMBLY: RF SENSOR, AMP-2/150	
1054-5A105M35	CAP., 1uF DIP. TANT., 20%, 35V	C15
1007-5B104M5U	CAP., 100nF MONO., 20%,50V,Z5U	C16, C20
1003-2B121C0G	CAP.,120pF CER, 2%,50V,C0G,.2"	C17
1054-6E106M25	CAP.,10uF DIP. TANT., 20%, 25V	C18
1004-4A103Z5V	CAP., 10nF CER, 100V,X7R,.1"SP	C19, C21, C22
1004-3A102Y5P	CAP.,1nF CER,10%,100V, X7R,.1"	C23
2017-391N05RD	LED, RED, L/P R/A PCB, NYLON	CR4, CR5
1211-43061025	CHOKE/RF, FERRITE, 2.5 TURNS	L5
4321-80884311	PCB, VHF 30W AMP. RF SENSOR	PCB
2020-2N2222A0	TRANSISTOR/NPN,600mA,1.5W,TO18	Q2, Q3
1101-3A0122JP	RES., 1K2 METAL FILM, 5%, 0.5W	R10, R14
1171-S30103P1	POT-3/8" SQUARE,10K,S/T, TOP ADJ	R11
1101-2A0561JP	RES., 560R METAL FILM, 5%,0.5W	R12
1101-2A0361JP	RES., 360R METAL FILM, 5%,0.5W	R19
1101-3A0332JP	RES., 3K3 METAL FILM, 5%, 0.5W	R9

RF Sensor Board Mechanical Parts

Part Number	Description	Qty.
3720-6032M0RA	CONNECTOR, F/32 MALE, R/A PCB	1
5609-C250P01B	FUSE CLIP, O.250"DIAM., W/EAR	2
5022-156HD07L	HEADER, .156",7 PIN/Au,LOCKING	1
5813-2M5HX50S	NUT, M2.5, HEX, 5.0mm FLATS,A2	2
5812-2M5PP10S	SCREW, M2.5 x 10 PAN/PHIL, A2	2
5917-7B4BM30T	STANDOFF, 7/32OD,1/4L,M3,SWAGE	4
5065-250T16A4	TAB, .250", 16-14AWG,INSULATED	1
7110-16S26302	WIRE, PVC/STRANDED, 16AWG, RED	6.4 cm



REVISION HISTORY

Revision	Date	Action #	Description
1-0-0	Jun 05	842 842A1 6030 6034	First Print. Replaces IM71-AMP2150-30. <ul style="list-style-type: none"> Update FCC and IC numbers BOM updated to remove capacitor ground tabs and include L1 BOM updated to include four lockwashers
1-1-0	May 06	6148	AMP-2/150-30-00 re-introduced
1-1-1	Jul 09	8032 (CO 6148)	Editorial revision: <ul style="list-style-type: none"> updated logos and front cover text replaced three discontinued models from the front cover with one generic band model removed references to the discontinued models in text changed references of "system monitor" to "system regulator"
2-0-0	Aug 2011	6580	Zinc Plated Sq. Nut (5813-2M5SQ50Z) Changing to Stainless Steel Type (5813-2M5SQ50S) <ul style="list-style-type: none"> Updated BOM
		6645	Replace Obsolete Transistor <ul style="list-style-type: none"> updated BOM, schematics and CLD for amplifier board Added R1 resistor to the amplifier board WAS N/I NOW 1105-2A0391JI RES., 390R METAL FILM, 5%, 2W maximum input power for VHF changed from 4 watts to 6 watts added warning for users when performing alignment procedures (4W input versus 6W input) corrected conducted spurious performance specifications to match Spec Data WAS ≤ -80 dBc NOW ≤ -70 dBc expanded the Capacitor Select Table to include descriptions and DE part numbers
		6703	AMP-2/150-30-00 - 30 Watt VHF PA – Addition of R1 <ul style="list-style-type: none"> Updated amplifier board BOM, CLD and schematic
		---	Electronic approval and control only

