

## **MT-3 LOW CURRENT FRONT END INSTRUCTION MANUAL**

**132-174 MHz**

**406-470 MHz**

Covers Models:

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A11-FEF3/150

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A11-RFAMP3/150

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A13-FEF3/400

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A13-RFAMP3/400

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## NOTE

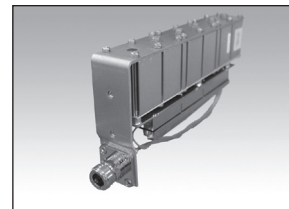
The user's authority to operate this equipment could be revoked through any changes or modifications not expressly approved by Daniels Electronics Ltd.

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.

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## GENERAL INFORMATION

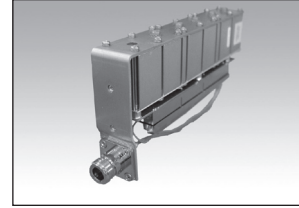
### INTRODUCTION

The MT-3 Front End is a highly integrated, frequency selective, down converter used in Daniels Electronics standard MT-3 FM receiver product line. RF signals at the antenna input are filtered by a 5 pole helical filter, amplified through a low noise amplifier, filtered again by a seven pole low pass or high pass filter, and then mixed, with an externally supplied local oscillator, to produce an IF frequency of 21.4 MHz. The Front End's two main bands of operation are 132 to 174 MHz and 406 to 470 MHz. Power for the Front End is supplied from the receiver's regulated +9.5 volts at a typical current consumption of 8 mA. All Front End ports (antenna input, local oscillator input, and IF output) are designed for 50  $\Omega$  terminations.

### PERFORMANCE SPECIFICATIONS

Frequency Range:	132 MHz - 174 MHz (VHF) 406 MHz - 470 MHz (UHF)
Bandwidth (3 dB):	greater than 5 MHz (VHF Preselector Filter) greater than 7 MHz (UHF Preselector Filter)
Conversion Gain:	typically 12 dB (VHF) typically 6 dB (UHF)
IF Frequency:	21.4 MHz
Local Oscillator Injection:	+7 dBm maximum, high or low side injection depending on frequency band
Impedance:	50 $\Omega$ at all ports
Power Requirements:	8 mA at +9.5 Vdc





## THEORY OF OPERATION

### GENERAL

The MT-3 Front End consists of a five pole helical resonator filter structure with a single stage, low noise, bipolar amplifier followed by an image rejection filter and a double balanced mixer. The highly selective narrow bandwidth of the helical filter provides high out-of-band signal rejection, high receiver spurious response, and high wide band intermodulation attenuation. The low noise amplifier increases receiver sensitivity while the image rejection filter increases the receiver's image frequency attenuation. After filtering and amplification, the received signal is down converted to 21.4 MHz by a double balanced mixer. The MT-3 Front End is built in a VHF (132 to 174 MHz) and two UHF (406 to 430 MHz and 450 to 470 MHz) versions. MT-3 Front End tuning over the respective frequency ranges is done through helical filter adjustment and image rejection filter selection.

### POWER AND INTERCONNECTION

The MT-3 Front End operates from +9.5 Vdc applied via a short red wire connected to supply point J6-2 on the receiver main IF/audio board. Ground return is supplied via direct mounting to the receiver chassis and coaxial cable interconnections. The MT-3 Front End draws approximately 8 mA from the IF/audio board's +9.5 Vdc supply.

The RF input signal connected to the receiver front panel type N connector is fed to the front end SMB input connector (J1) by a short coaxial cable. The MT-3 Front End's local oscillator input and IF output are respectively routed by coaxial cable from the local oscillator module and to SMB connector J7 on the main IF/audio board.

### FIVE POLE HELICAL FILTER

The received RF signal is filtered by a five pole helical resonator band pass filter. This filter provides front end selectivity and attenuates any potential internally generated spurious signals. Typically, the filter has an insertion loss of 3 dB and a 3 dB bandwidth of 5.0 MHz in the VHF range and an insertion loss of 4.5 dB and a 3 dB bandwidth of 7.0 MHz in the UHF range. The filter is tunable from 132 to 174 MHz for VHF applications and 406 to 430 MHz or 450 to 470 MHz for UHF applications through adjustment of the helical filter's five trimmer capacitors.

## RF AMP

The output from the five pole helical filter is coupled through impedance matching network L4 and C9 to the base of RF amplifier Q2. The RF amplifier stage is supplied by the regulated +9.5 Vdc line and typically draws 8 mA of collector current. Transistor Q2 provides high gain, typically 20 dB in the VHF band and 16 dB in the UHF band, and low noise figure typically 2.5 dB in the both bands, for increased receiver sensitivity. Transistor Q1 actively regulates the bias to RF transistor Q2. The output signal is coupled to an image rejection filter via impedance matching network C11 and L2 (VHF) or L3 (UHF).

## IMAGE REJECTION FILTER

The amplified RF signal is followed by a 7 pole Chebyshev lowpass or highpass image rejection filter which further rejects the image frequency. The image filter topology (either lowpass or highpass) depends on if the Front End is using lowside or highside local oscillator injection. The lowpass image filter consists of capacitors C16 to C19 and inductors L8 to L10. The highpass image filter consists of capacitors C12 to C15 and inductors L5 to L7. Jumpers JU1 and JU2 are used to select the appropriate filter for the desired receive frequency band. The table below summarizes the receive frequency, whether lowside or highside injection is used, and which filter is installed.

### MT-3 Front End Image Filter Selection

Frequency Band	Local Oscillator Injection	Image Filter
132 to 150 MHz	Highside: RF + 21.4 MHz	Lowpass: JU1 and JU2 - B side installed
150 to 174 MHz	Lowside: RF - 21.4 MHz	Highpass: JU1 and JU2 - A side installed
406 to 430 MHz	Highside: RF + 21.4 MHz	Lowpass: JU1 and JU2 - B side installed
450 to 470 MHz	Lowside: RF - 21.4 MHz	Highpass: JU1 and JU2 - A side installed
470 to 490 MHz	Lowside: RF - 21.4 MHz	contact factory
490 to 512 MHz	Lowside: RF - 21.4 MHz	contact factory

**Note:** There is an error in the silkscreen on PCB v1.0. JU1 A & B designations are reversed.

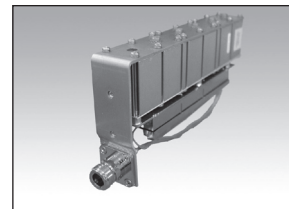
## LOCAL OSCILLATOR INPUT

The MT-3 Front End local oscillator input port (50  $\Omega$ ) connects directly to a double balanced mixer (M1). Any one of Daniels Electronics MT-3 Synthesizer modules or MT-3 Crystal Controlled modules provide a suitable RF local oscillator source. The local oscillator input level should never exceed +7 dBm (5 mW into 50  $\Omega$ )

## DOUBLE BALANCED MIXER

Double Balanced Mixer, M1, down converts the received signal to 21.4 MHz. The mixer has a maximum conversion loss of 7.5 dB and its maximum local oscillator drive level is +7 dBm.





## FRONT END ALIGNMENT

### GENERAL

Alignment for the MT-3 Front End consists of tuning the five section preselector filter only. No tuning is required for frequency changes within the 3 dB bandwidth of its originally tuned frequency (5 MHz for VHF and 7 MHz for UHF); although, without tuning at the 3 dB band edges, the receivers sensitivity will be degraded. For frequency changes outside of the Front End's 3 dB bandwidth, use the tuning procedure outlined below.

### REPAIR NOTE

The MT-3 Front End employs a high percentage of surface mount components which should not be removed or replaced using an ordinary soldering iron. Removal and replacement of surface mount components should be performed only with specifically designed surface mount rework and repair stations complete with Electro Static Dissipative (ESD) protection.

When removing Surface Mount Solder Jumpers, it is recommended to use solder wick braid in place of vacuum type desoldering tools. This will help prevent damage to the circuit boards.

### RECOMMENDED TEST EQUIPMENT

Alignment of the MT-3 Front End requires the following test equipment or its equivalent:

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Power supply - Regulated +9.5 Vdc

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Spectrum Analyzer with Tracking Generator

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Alignment Tool - Johanson 8764

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### CHECK POINTS

Vsupply:	+9.5 Vdc @ 8 mA
Preselector Filter Insertion Loss:	typically VHF: 3 dB; UHF: 4.5 dB
RF Amplifier Gain:	typically VHF: 20 dB; UHF: 16 dB
Image Rejection Filter Loss:	1.5 dB maximum
Mixer Conversion Loss:	7.5 dB maximum
Test Point #1 (TP1):	+7.4 Vdc
Test Point #2 (TP2):	+8.0 Vdc
Local Oscillator Frequency:	RF Frequency $\pm$ 21.4 MHz

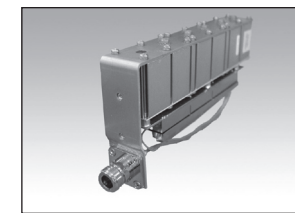
## TUNING PROCEDURE

The best way to tune the MT-3 Front End is to use a Spectrum Analyzer with a tracking generator. The frequency response of the Preselector Filter can be seen at the IF output. Use the following procedure for swept frequency tuning:

- 
- 1) Check to see if the correct image rejection filter is selected for the frequency of interest. This operation requires removing the Front End's shield lid and changing the solder jumpers if required.
- 
- 2) Supply +9.5 Vdc to the MT-3 Front End (red wire).
- 
- 3) Connect the Tracking Generator output with the Front End's RF input. The tracking generator should have an output level of -20 dBm and a frequency span of at least 10 MHz. If the preselector filter is grossly misaligned, a larger frequency span may be required.
- 
- 4) Adjust the helical filter trimmer capacitors for a flat response centered at the desired RF frequency. The measured input level should be approximately -25 dBm and the 3 dB bandwidth should be 5 MHz and 7 MHz in the VHF and UHF range respectively.
- 

## MT-3 FRONT END REMOVAL AND INSTALLATION

The MT-3 Front End is fastened to the main board (MT-3 Receiver IF/Audio Board) with a single Phillips screw to the Type F connector and to the front panel with two countersunk Phillips screws. Remove these screws and disconnect the IF, LO, and power cables to remove the VHF / UHF Front End. Installation of the MT-3 Front End is performed in a fashion reverse to the above procedure.



## ILLUSTRATIONS AND SCHEMATICS

### PRINTED CIRCUIT BOARD NUMBERING CONVENTION

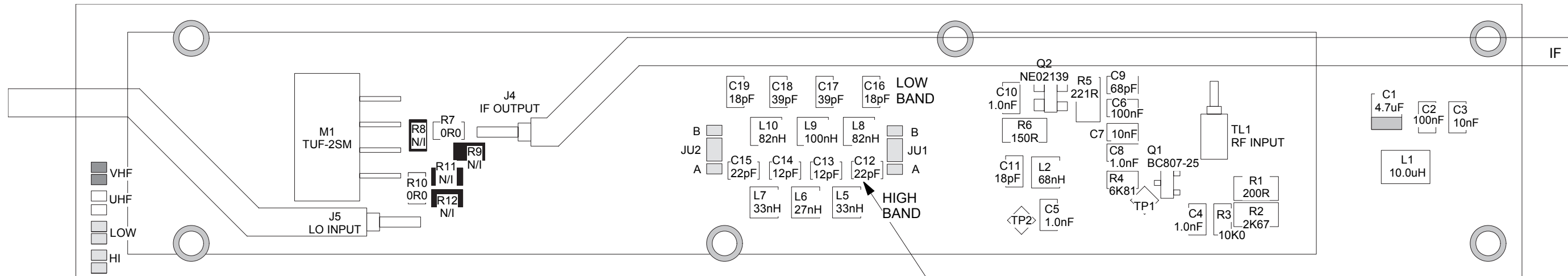
Daniels Electronics Ltd. has adopted a printed circuit board (PCB) numbering convention in which the last two digits of the circuit board number represent the circuit board version. All PCB's manufactured by Daniels Electronics Ltd. are identified by one of the following numbering conventions:

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PCB number	<u>43-912010</u> Indicates circuit board version 1.0
PCB number	<u>50002-02</u> Indicates circuit board version 2 (no decimal version)

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# VHF FRONT END COMPONENT LAYOUT



PCB 50037-01

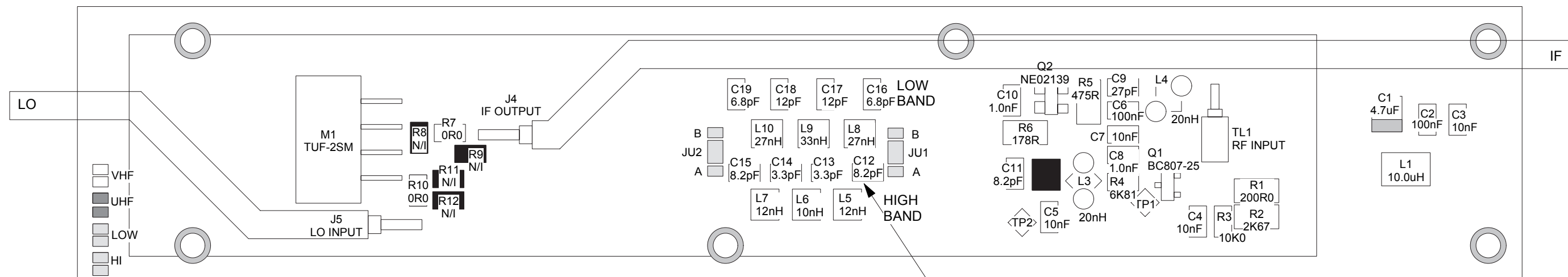
**NOTE:**  
0R0 JUMPERS ARE INSTALLED FOR  
COMPONENTS C12 THROUGH C15

■ NOT INSTALLED  
■ JUMPERS INSTALLED

SELECT JUMPER TABLE	
VR-3/140-xxxxxxx	VR-3/160-xxxxxxx
JU1-B	JU1-A
JU2-B	JU2-A
LOW	HI

	<table border="1"> <tr> <td>A</td><td>A</td><td>A</td><td>A</td><td>A</td><td>5</td><td>7</td><td>8</td><td>9</td><td>10</td> </tr> <tr> <td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td> </tr> <tr> <td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td> </tr> </table>										A	A	A	A	A	5	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
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	11	12	13	14	15	16	17	18	19	20																														
	21	22	23	24	25	26	27	28	29	30																														
TITLE: MT-3 RF AMP VHF LOW CURRENT RF AMP BOARD																																								
DATE: 05 MAR 03						BOARD NO: 50037-01																																		
DWG No: 01-T-01-01						REV DATE: -																																		

# UHF FRONT END COMPONENT LAYOUT



PCB 50037-01

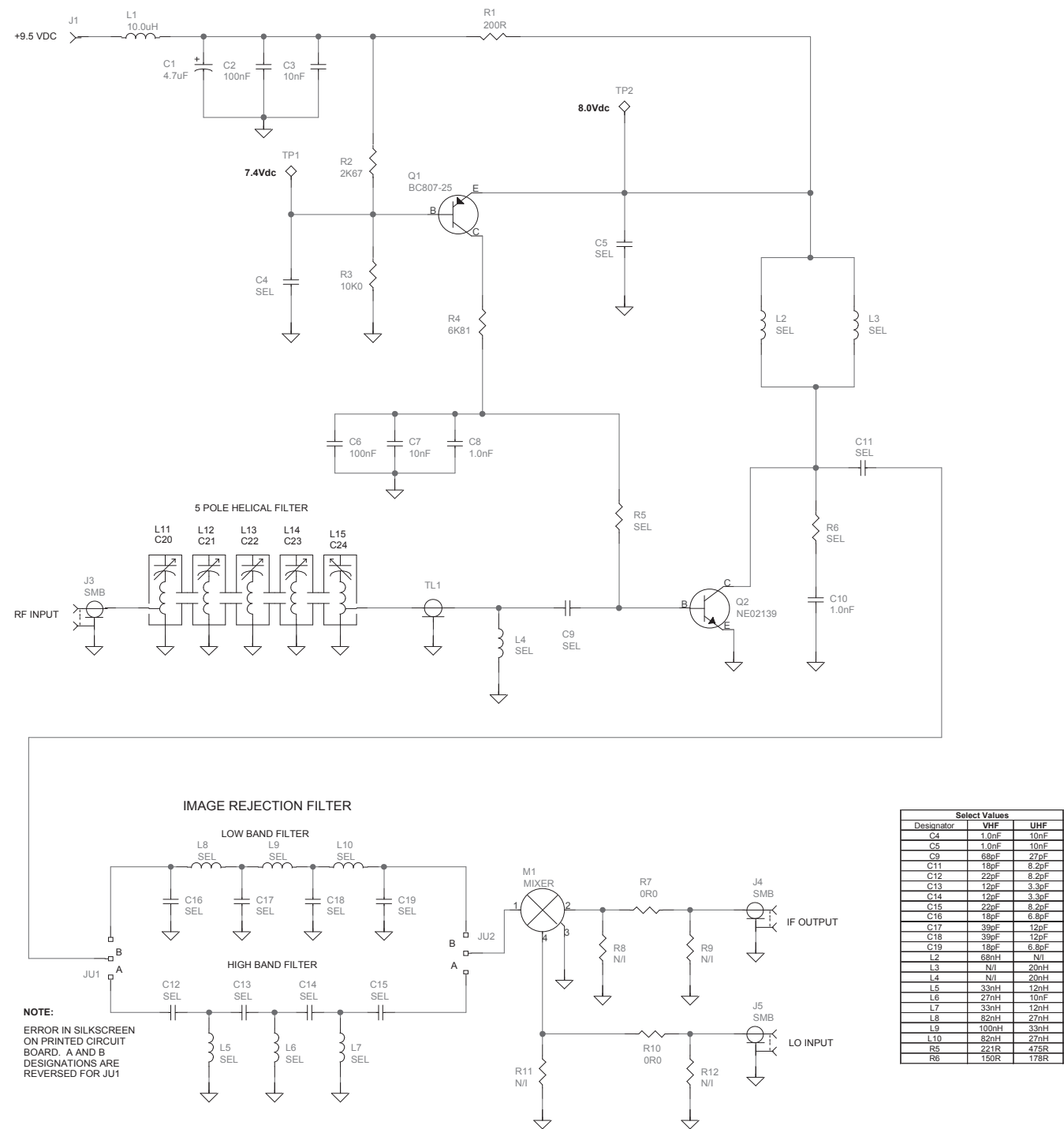
SELECT JUMPER TABLE	
UR-3/420-xxxxxxx	UR-3/460-xxxxxxx
JU1-B	JU1-A
JU2-B	JU2-A
LOW	HI

NOT INSTALLED  
 JUMPERS INSTALLED

**NOTE:**  
 0R0 JUMPERS ARE INSTALLED FOR  
 COMPONENTS C12 THROUGH C15

		<table border="1"> <tr> <td>A</td><td>A</td><td>A</td><td>A</td><td>A</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td> </tr> <tr> <td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td> </tr> <tr> <td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td> </tr> </table>										A	A	A	A	A	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
		A	A	A	A	A	6	7	8	9	10																														
11	12	13	14	15	16	17	18	19	20																																
21	22	23	24	25	26	27	28	29	30																																
TITLE: MT-3 RF AMP UHF LOW CURRENT RF AMP BOARD																																									
DATE: 05 MAR 03						BOARD NO: 50037-01																																			
DWG No: 02-T-01-01						REV DATE: -																																			

### VHF/UHF FRONT END SCHEMATIC DIAGRAM



Highest Reference Designators		
C24	L15	M1
Q2	R12	JU2
Unused Reference Designators		

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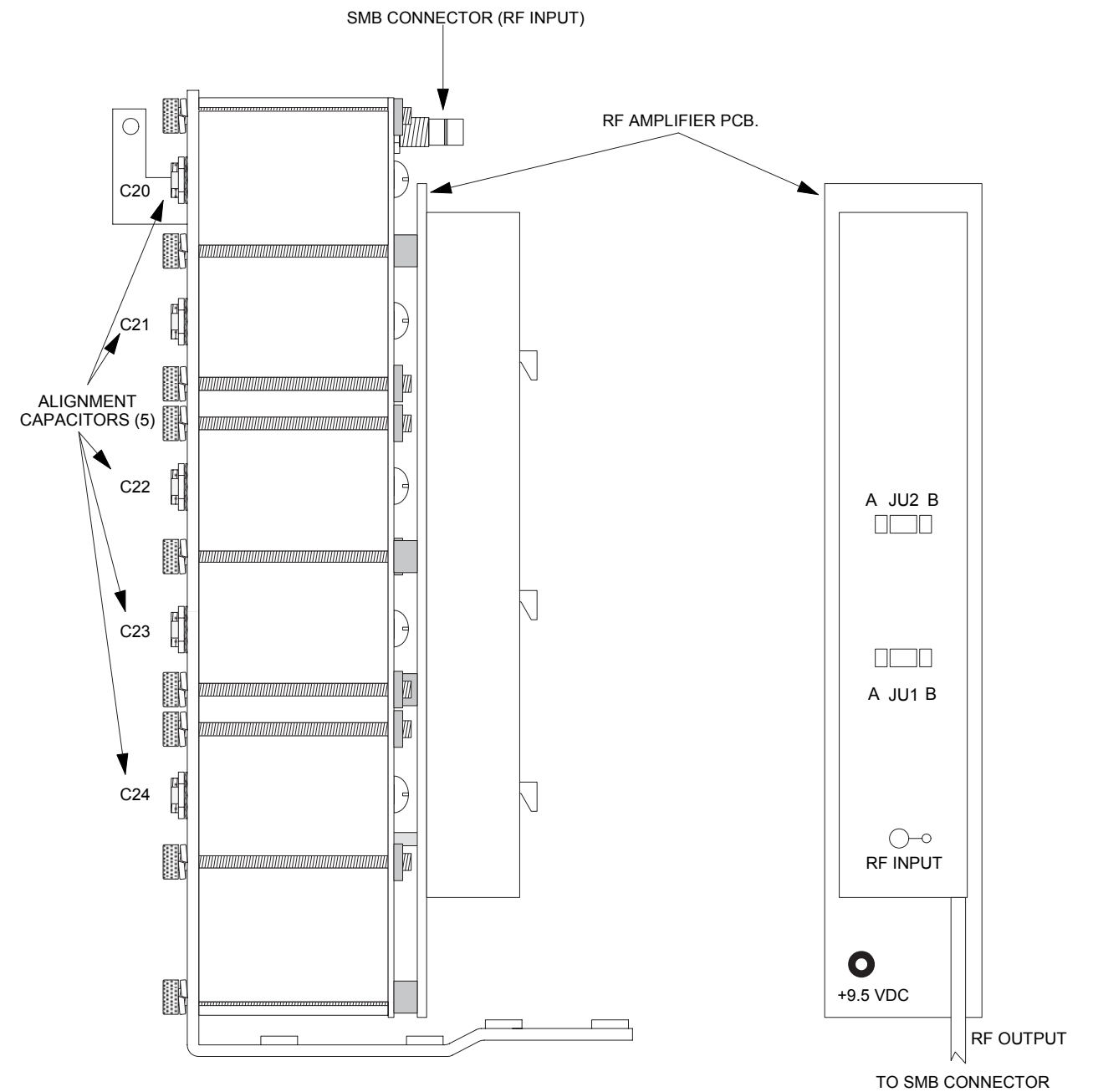
TITLE: MT-3 RF AMP VHF/UHF FM FRONT END

DATE: JUN. 19, 1997    DWN BY: PETE LUNNESS    APRVD:   

DWG No.: FE3M3A    REVISED BY: Peter Rudge

BOARD No.: 50037-01    REV: 01    DWG REV DATE: April 1, 2003

### VHF/UHF FRONT END TUNING DIAGRAM



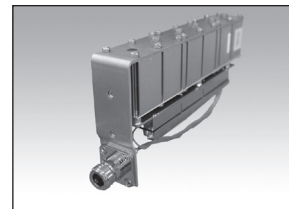
**DE DANIELS™ ELECTRONICS LTD.**

TITLE: VHF / UHF Front End Tuning Diagram

DATE: 6 AUG 2003    DRAWN BY: S. EARTHY

DWG No: B0303    REV DATE: -

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11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30



## PARTS LIST

### ELECTRICAL PARTS LIST

Ref			VHF Front End	UHF Front End
Desig	Description	Part Number		
C1	CAP., SM, 4.7uF TANT., 10%, 16V	1055-5B475K16	•	•
C2	CAP., SM, 100nF CER,0805,X7R,50	1008-5A104K5R	•	•
C3	CAP., SM, 10nF CER,0805,X7R,50V	1008-4A103K5R	•	•
C4	CAP., SM, 1nF CER,0805,X7R,50V	1008-3A102K5R	•	
	CAP., SM, 10nF CER,0805,X7R,50V	1008-4A103K5R		•
C5	CAP., SM, 1nF CER,0805,X7R,50V	1008-3A102K5R	•	
	CAP., SM, 10nF CER,0805,X7R,50V	1008-4A103K5R		•
C6	CAP., SM, 100nF CER,0805,X7R,50	1008-5A104K5R	•	•
C7	CAP., SM, 10nF CER,0805,X7R,50V	1008-4A103K5R	•	•
C8	CAP., SM, 1nF CER,0805,X7R,50V	1008-3A102K5R	•	•
C9	CAP., SM, 27pF CER., 0805, C0G	1008-1A270J1G		•
	CAP., SM, 68pF CER., 0805, C0G	1008-1A680J1G	•	
C10	CAP., SM, 1nF CER,0805,X7R,50V	1008-3A102K5R	•	•
C11	CAP., SM, 18pF CER., 0805, C0G	1008-1A180J1G	•	
	CAP., SM, 8.2pF CER., 0805,C0G	1008-0A829J1G		•
C12	CAP., SM, 22pF CER., 0805, C0G	1008-1A220J1G	•	
	CAP., SM, 8.2pF CER., 0805,C0G	1008-0A829J1G		•
C13	CAP., SM, 12pF CER., 0805, C0G	1008-1A120J1G	•	
	CAP., SM, 3.3pF CER., 0805,C0G	1008-0A339J1G		•
C14	CAP., SM, 12pF CER., 0805, C0G	1008-1A120J1G	•	
	CAP., SM, 3.3pF CER., 0805,C0G	1008-0A339J1G		•
C15	CAP., SM, 22pF CER., 0805, C0G	1008-1A220J1G	•	
	CAP., SM, 8.2pF CER., 0805,C0G	1008-0A829J1G		•
C16	CAP., SM, 18pF CER., 0805, C0G	1008-1A180J1G	•	
	CAP., SM, 6.8pF CER., 0805,C0G	1008-0A689J1G		•
C17	CAP., SM, 12pF CER., 0805, C0G	1008-1A120J1G		•
	CAP., SM, 39pF CER., 0805, C0G	1008-1A390J1G	•	
C18	CAP., SM, 12pF CER., 0805, C0G	1008-1A120J1G		•
	CAP., SM, 39pF CER., 0805, C0G	1008-1A390J1G	•	
C19	CAP., SM, 18pF CER., 0805, C0G	1008-1A180J1G	•	
	CAP., SM, 6.8pF CER., 0805,C0G	1008-0A689J1G		•
C20	CAP.,TRIM. .8-10pF,"D" BUSHING	1082-E0R8010B	•	
C21	CAP.,TRIM. .8-10pF,"D" BUSHING	1082-E0R8010B	•	
C22	CAP.,TRIM. .8-10pF,"D" BUSHING	1082-E0R8010B	•	
C23	CAP.,TRIM. .8-10pF,"D" BUSHING	1082-E0R8010B	•	
C24	CAP.,TRIM. .8-10pF,"D" BUSHING	1082-E0R8010B	•	

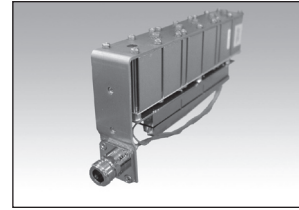
Ref Desig	Description	Part Number	VHF Front End	UHF Front End
L1	INDUCTOR, SM, 10.0uH, 10%,1812	1255-4G10000K	•	•
L2	INDUCTOR, SM, 150nH CER, 10%, 1008	1256-2BR1500K	•	
L3	COIL, 2.5 TURNS, 20AWG, 2.54mmID	1220-2T502007		•
L4	COIL, 2.5 TURNS, 20AWG, 2.54mmID	1220-2T502007		•
L5	INDUCTOR, SM, 12nH CER, 10%, 1008	1256-1B12N00K		•
	INDUCTOR, SM, 33nH CER, 10%, 1008	1256-1B33N00K	•	
L6	INDUCTOR, SM, 10nH CER, 10%, 1008	1256-1B10N00K		•
	INDUCTOR, SM, 27nH CER, 10%, 1008	1256-1B27N00K	•	
L7	INDUCTOR, SM, 12nH CER, 10%, 1008	1256-1B12N00K		•
	INDUCTOR, SM, 33nH CER, 10%, 1008	1256-1B33N00K	•	
L8	INDUCTOR, SM, 27nH CER, 10%, 1008	1256-1B27N00K		•
	INDUCTOR, SM, 82nH CER, 10%, 1008	1256-1B82N00K	•	
L9	INDUCTOR, SM, 33nH CER, 10%, 1008	1256-1B33N00K		•
	INDUCTOR, SM, 100nH CER, 10%, 1008	1256-2BR1000K	•	
L10	INDUCTOR, SM, 27nH CER, 10%, 1008	1256-1B27N00K		•
	INDUCTOR, SM, 82nH CER, 10%, 1008	1256-1B82N00K	•	
L11	COIL, 8TURNS, 16AWG, .50"ID, CuAg	1225-8T001630	•	
L12	COIL, 2.75T, 16AWG, .50"ID, Cu/Ag	1225-2T751640		•
	COIL, 8TURNS, 16AWG, .50"ID, CuAg	1225-8T001630	•	
L13	COIL, 2.75T, 16AWG, .50"ID, Cu/Ag	1225-2T751640		•
	COIL, 8TURNS, 16AWG, .50"ID, CuAg	1225-8T001630	•	
L14	COIL, 2.75T, 16AWG, .50"ID, Cu/Ag	1225-2T751640		•
	COIL, 8TURNS, 16AWG, .50"ID, CuAg	1225-8T001630	•	
L15	COIL, 2.75T, 16AWG, .50"ID, Cu/Ag	1225-2T751640		•
	COIL, 8TURNS, 16AWG, .50"ID, CuAg	1225-8T001630	•	
L16	COIL, 2.75T, 16AWG, .50"ID, Cu/Ag	1225-2T751640		•
M1	MIXER/SM, DBL. BAL., DC-1000MHZ	2605-DBS21000	•	•
PCB	PCB, RF AMP, F/E, LO CUR. 150/400	4311-70500371	•	•
Q1	TRANSISTOR, BC807-25, PNP, SOT23	2120-BC807025	•	•
Q2	TRANSISTOR, NE02139, HIGH FREQ.	2124-NE021390	•	•
R1	RES., SM, 200R 1206, 1%, 100ppm	1150-2B2000FP		•
	RES., SM, 475R 1206, 1%, 100ppm	1150-2B4750FP	•	
R2	RES., SM, 2K67 1206, 1%, 100ppm	1150-3B2671FP	•	•
R3	RES., SM, 10K0 0805, 1%, 100ppm	1150-4A1002FP	•	•
R4	RES., SM, 6K81 0805, 1%, 100ppm	1150-3A6811FP	•	•
R5	RES., SM, 221R 1206, 1%, 100ppm	1150-2B2210FP	•	
	RES., SM, 475R 1206, 1%, 100ppm	1150-2B4750FP		•
R6	RES., SM, 150R 1206, 1%, 100ppm	1150-2B1500FP	•	
	RES., SM, 178R 1206, 1%, 100ppm	1150-2B1780FP		•
R7	RES., SM, ZERO OHM JUMPER, 0805	1150-0A0R0000	•	•
R10	RES., SM, ZERO OHM JUMPER, 0805	1150-0A0R0000	•	•



## MECHANICAL PARTS LIST

Description	Part Number	VHF Front End	UHF Front End
BRACKET, CAP. MTG,V/UHF 5P F/E	3702-65001005	1	1
BRACKET, COIL MTG,V/UHF 5P F/E	3702-65001006	1	1
CABLE, CONFORM., 28mm/4mm/9mm	7489-C1055600	1	1
CABLE,SMB PLUG-OPEN,RG316,24CM	7910-WP004024	1	1
CABLE,SMB STR/PL-N(CSK)JK,21CM	7910-WS7NJ021	1	1
CABLE,SMA PLUG-OPEN,RG316,21CM	7910-SP001021	1	1
SHIELD, V/UHF F/END AMP - LID	3702-67301121	1	1
SHIELD, V/UHF F/END AMP - WALL	3702-67301120	1	1
CAP.,TRIM. .8-10pF,"D" BUSHING	1082-E0R8010B		5
CASE, V/UHF 5 POLE HEL. FILTER	3702-65801120	1	1
CONN., SMB, JACK,BULKHEAD,REAR	5121-J1SC01BG	1	1
CORE, COIL,V/UHF 5PL HEL FILT.	5790-B1027000	5	5
LOCK WASHER .234-64 FOR 8052/4	1083-L234T640	5	5
LOCKWASHER,M2.5,SPLIT,A2 STEEL	5814-2M5LK00S	18	18
NUT, .234-64, HEX, FOR 8052/4	1083-N234T640	5	5
SCREW, M2.5x39 CHEESE/PHIL, A2	5812-2M5PP39S	18	18
SCREW, M3 X 6, FLAT/PHIL., A2	5812-3M0FP06S	2	2
SCREW, NYLON, 6-32x3/8,RD/SLOT	5802-632RS06P	5	5
STANDOFF,5.56mmOD,4mmL,M2.5,SW	5927-5S4BM25T	6	6
WIRE, TFE/STRAND., 24AWG, RED, 20cm	7121-24S19362	1	1





## REVISION HISTORY

Revision	Date	ECO	Description
1	May 97		Issue 1.
1 Rev A	Apr. 98	550	BRACKET, COIL MTG, 5P F/E, AgPLT part number was 3802-65001006 is now 3702-65001006.
	Dec. 98	531	To provide more gain in the 406-430 MHz frequency band. L11 – L15 were 1/4 turn coils now 3/4 turn coils.
	Apr. 01	5053	The SMA and SMB cables are now a turnkey production. Part numbers were \$7910... are now 7910...
	May 01	5061	Some mechanical changes were made to improve manufacturing. The M3x40 pan/phil is now a M2.5 x 39 pan/phil. The M3 lockwasher is now a M2.5 lockwasher. The M3 press nut is now a M2.5 standoff.
	Jan 02	5069	To improve manufacturing. CABLE, COAXIAL is now bought out.
	Jan 02	5077	To simplify manufacturing. CASE, V/UHF 5 POLE HE..., FILTER was 3802-... now 3702-...
	Sep 02		Add missing L.O. input cable part number.
	Sep 02	727	To improve intermodulation performance - VHF band only. R1 is now 475R (was 200R.) L2 is now 150nH (was 68nH.)
1 Rev B	Oct 02		Revision B released which includes all changes indicated above, since release of Issue 1 Revision A (Apr. 98).
2-0-0	Oct 03		New Revision Moved to new instruction manual format.
2-0-1	Jan 04		Added missing parts from mechanical parts list.
2-0-2	Aug 05		Added CABLE, SMA PLUG-OPEN, RG316, 21CM (7910-SP001021) missing from Mechanical parts list. Added Lid (3702-67301121) to Mechanical parts list; part was missing. Updated VHF/UHF Schematic on page 10; wrong version was displayed.

