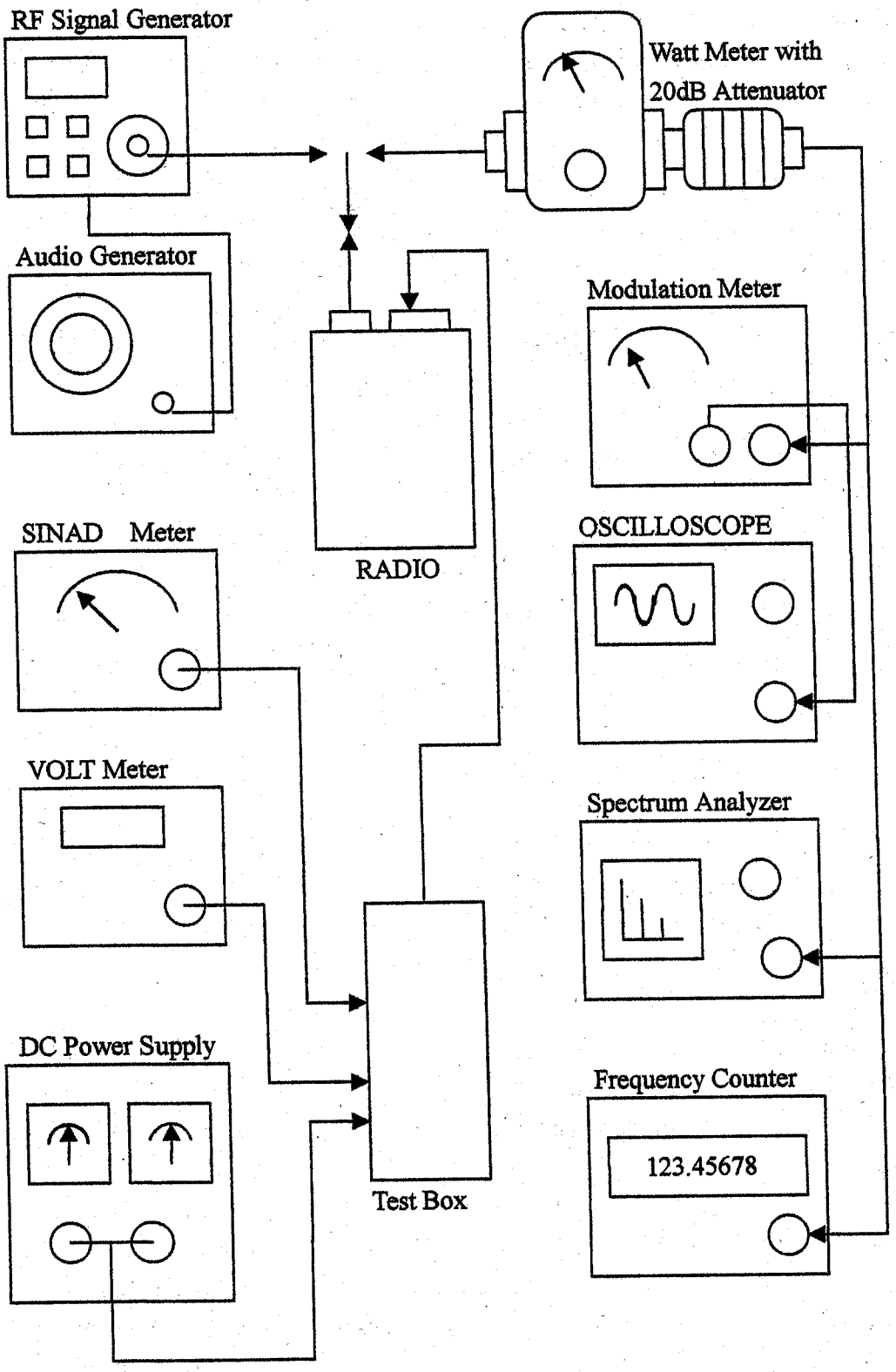
5. TEST EQUIPMENT CONFIGURATION



Test Equipment Configuration

6. TRANSMITTER PERFORMANCE TESTS

Power Output

1. Set the power supply voltage to 13.8V dc. and monitor the voltage during transmit.
2. Switch data radio TX and check and record the output power. The nominal output power is adjustable between 1 and 5W depending on the programming .
3. Set the PTT switch to OFF .

Peak Deviation

1. Connect the oscilloscope to the output of the modulation meter.
2. Set the AF signal generator to 100 Hz at 5Vpeak–to-peak and connect to DATA _IN Line (pin 1 of J501)
3. Switch data radio to TX and observe the oscilloscope display to check that the 100Hz tone is a square wave.
4. Using the AF signal generator, sweep from 100 Hz to 3 kHz and record the peak deviation.

5. Check the peak deviation for appropriate channel spacing as follows :
   For 12.5 kHz channel spacing, Peak deviation is not greater than 2.5 kHz.
   For 20 kHz channel spacing, Peak deviation is not greater than 4 kHz.
   For 25 kHz channel spacing, Peak deviation is not greater than 5 kHz.

Spectrum Test

It may be necessary to notch the fundamental signal during this test.

1. Connect a spectrum analyser and RF power meter to the antenna socket.
2. Switch data radio to TX. Observe the output spectrum on the spectrum analyser.
3. Adjust notch filter to minimise the carrier. All spurious and harmonics signals should be below- 36 dBm up to 1 GHz and below –30 dBm between 1 and 4 GHz.
4. Switch off the data radio transmit control.

Receiver Performance Tests

Sensitivity

The SINAD performance test may be used to test the sensitivity of the receiver.

1. Connect the RF signal generator to the data radio BNC antenna connector.
2. Set the RF signal generator to the receive frequency .
3. Connect the leads of the SINAD meter between 0 V and pin 2 on J501.
4. Set the deviation to 60% of the peak system deviation.
5. Set the AF generator to 1 kHz.
6. Adjust the RF signal generator level until the SINAD Meter reads 12 dB.
7. Check that the signal generator RF level is less than 0.35uV pd (-116dBm).

7. TROUBLESHOOTING

The section includes voltage which should assist the engineer to isolate and repair the fault. Voltage measurements should be made using a high-impedance voltmeter and the values given are with respect to ground.

Careful alignment, using suitable test equipment, and quality interface cables should ensure that the radio meet their specified performance.

Voltage Charts

Measurement Condition: 455.5MHZ,13.8V supply, RX Carrier Present.

Transistors .

Ref. No.	RX			TX		
	B	C	E	B	C	E
Q2	16.08	1.97	16.08	16.08	8.16	16.08
Q4	0	1.97	0	0	8.16	0
Q6	4.07	0	4.18	4.07	0	4.18
Q9	4.85	5.04	4.18	4.85	5.04	4.18
Q10	3.54	3.08	16.08	3.54	3.13	16.08
Q11	6.42	0	6.73	0	5.78	6.45
Q12	0	6.42	0	0.76	0	0
Q14	5.02	0	5.05	4.3	4.9	5.05
Q15	0	4.85	5.04	5.04	0	5.04
Q18	0	0	0	0	4.3	4.88
Q19	0	13.65	0	3.68	3.28	2.99
Q21	0	0	0	0.76	1.8	0
Q22	0	0	0	2.26	4.17	1.8
Q23	13.67	0	13.8	13.05	13.2	13.8
Q24	0.7	4.16	0	0	0	0
Q25	0.7	0	0	0	11.8	0
Q31	4.98	0	0	4.98	0	0
Q32	4.98	0	0	4.98	0	0
Q33	4.98	0	0	4.98	0	0
Q34	0	0	0	0	0.76	0
Q35	0	0	0	0.76	0	0
Q502	4.35	5.04	5.04	4.35	5.04	5.04
Q503	0.72	0	0	0	5.01	0
Q505	0	5.05	0	0.72	0	0
Q506	13.02	7.28	13.68	13.02	7.28	13.68
Q507	0.37	10.75	0	0.44	7.05	0
Q508	0.58	0.37	0	0.57	0.44	0
Q509	0	0	0	5.0	0	0
Q512	4.98	0	0	0	0	0

Integrated Circuits

RECEIVER										
Pin	IC1	IC2	IC5	IC6	IC8	IC501	IC502	IC504	IC508	U4
1	1.96	6.72	0	4.22	0	0	0	2.59	5.03	0
2	2.01	0	0	3.6	0	5.05	0	2.58	5.03	0
3	0.38	5.04	0	3.44	0	0	5.04	2.35	0	0
4	4.14		13.8	4.37	0	0	0	5.04	5.04	0
5	0		0	3.3	0	0	0	2.35	5.04	0
6	0			3.28	0	5.05	0.92	2.58		0
7	4.17			3.3		4.58	0	2.59		0
8	2.89			4.4		0	5.04	2.59		0
9	0			1.47		0		2.58		
10	0			0.65		0		2.53		
11	0			2.91		1.07		0		
12	4.03			2.02		0.05		2.35		
13	0			3.7		0.17		2.59		
14	0			3.2		0		2.58		
15	3.07			0		0				
16	0			1.76		0				
17						5.04				
18						0				
19						0				
20						4.97				
21						4.98				
22						0				
23						0				
24						0				
25						0				
26						1.99				
27						1.81				
28						5.04				

Integrated Circuit Voltages (Receive)

Integrated Circuits

TRANSMIT										
PIN	IC1	IC2	IC5	IC6	IC8	IC501	IC502	IC504	IC508	U4
1	1.96	6.65	0	0	0	0	0	2.59	0.6	3.73
2	2.01	0	13.74	0	0	5.04	0	2.58	0.6	0.8
3	0.38	5.04	5.88	0	0	0	5.04	2.35	0	0.86
4	4.17		13.8	0	0	0	0	5.04	0.3	0
5	0		1.72	0	0	0	0	2.35	5.04	0
6	0			0	0	0.3	0.92	2.58		0
7	4.17			0		4.58	0	2.59		3.8
8	2.89			0		0	5.04	2.59		4.93
9	0			0		0		2.58		
10	0			0		0		2.58		
11	0			0		0		0		
12	4.03			0		0		2.38		
13	0			0		0		2.59		
14	0			0		5.03		2.58		
15	5.07			0		0				
16	0			0		0				
17						5.04				
18						4.98				
19						0				
20						0				
21						4.97				
22						4.98				
23						0				
24						0				
25						0				
26						1.97				
27						2.01				
28						5.04				

Integrated Circuit Voltages (Transmit)

8. PROGRAMMER INSTRUCTION

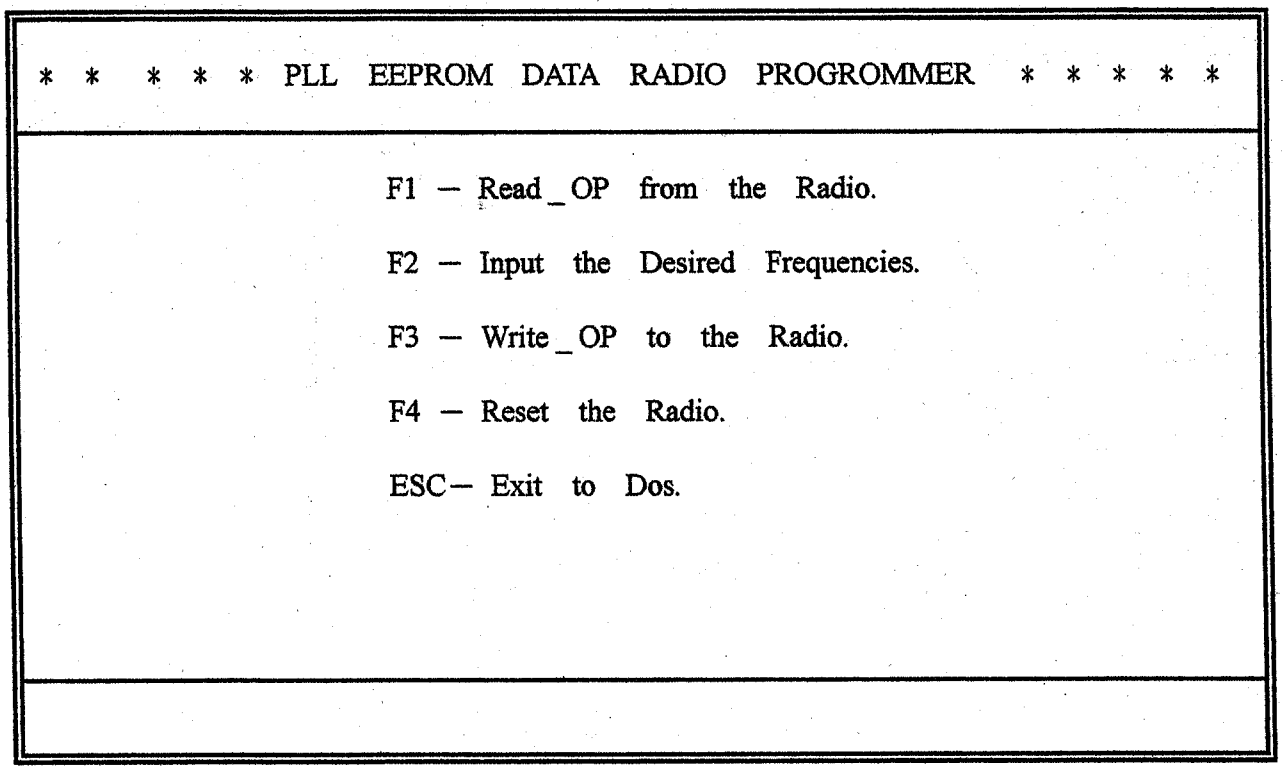


Figure 1 – 1

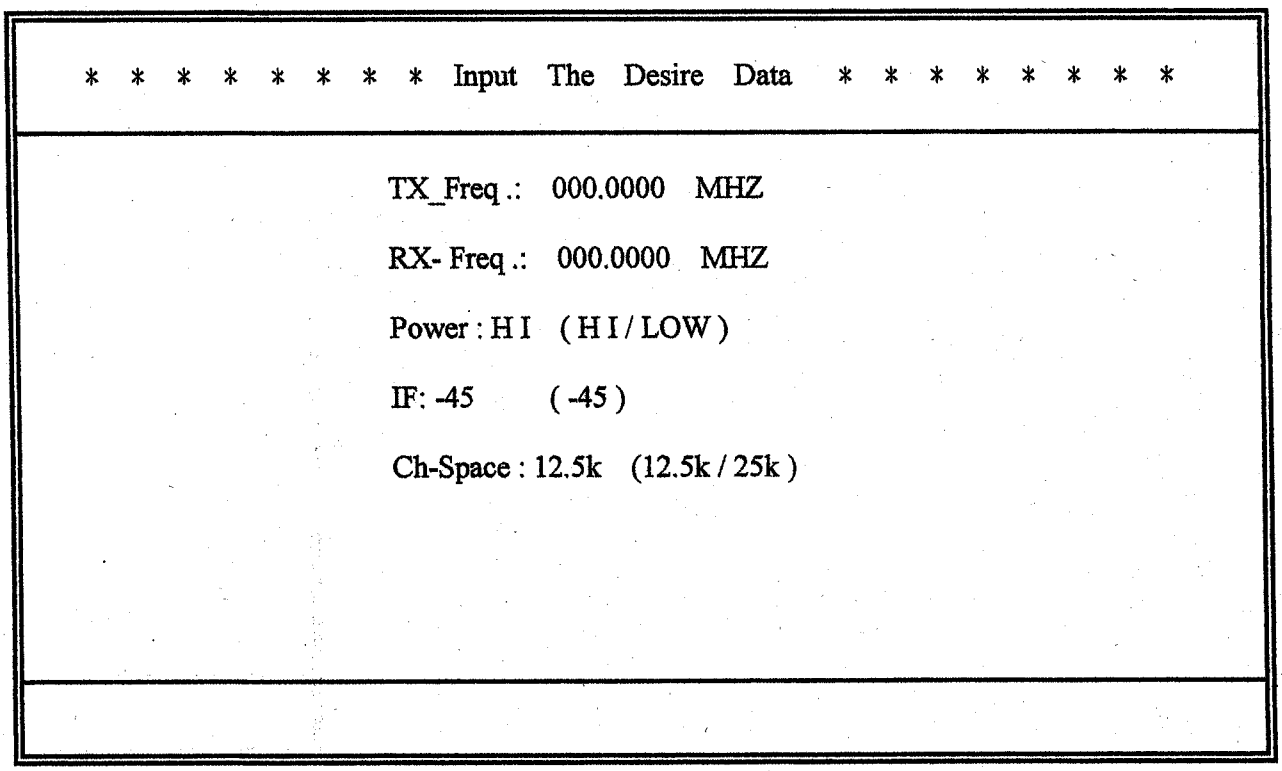


Figure 1 – 2

HERMES DATA RADIO PROGRAMMER INSTRUCTION SHEET

HARDWARE CONNECTION :

1. CONNECT THE AC ADAPTER TO THE PROGRAMMERS DC POWER INPUT SOCKET.
   CONNECT THE PROGRAMMERS RS232 SOCKET (P102, NEAR THE POWER ON/OFF SWITCH) TO THE CONPUTERS RS232 SERIAL PORT.
   CONNECT THE PROGRAMMERS RADIO SOCKET (P101, NEAR THE DC INPUT SOCKET) TO THE DATA RADIO.
   SWITCH ON THE POWER TO THE PROGRAMMER AND MAKE SURE THE POWER ' LED ' TURNS ON.

PROGRAM INSTALLATION :

2. PRESS THE COMPUTER KEYS " F ", " –", " 4 "," 5", AND THEN PRESS THE " ENTER " KEY.
   A PROGRAMMING FORM WILL APPEAR ON THE SCREEN.
   SEE FIGURE 1-1.

PROGRAMMING THE RADIO :

3. PRESS THE " F1 " KEY AND THE SCREEN SHOW " THE READ _OP IS COMPLETE " FLASH ON THE BUTTOM OF SCREEN THEN PRESS " ENTER " KEY.
4. PRESS THE " F2 " KEY, AND THE SCREEN SHOW ANOTHER FORM.
   SEE FIGURE 1 - 2. THEN INPUT THE DESIRED FREQUENCIES AND ALSO CAN CHANGE " OUTPUT POWER ", " IF " AND " CH- SPACE " BY " PAGE UP " KEY OR " PAGE DOWN " KEY. IF COMPLETED ALL THE INPUT, PRESS " F5 " KEY RETURN TO MAIN FORM.
5. PRESS THE " F3 " KEY TO COMPLETE PROGRAMMING OF THE RADIO.
6. TURN OFF THE POWER TO THE PROGRAMMER AND DISCONNECT THE DATA RADIO.
7. IF ANOTHER RADIO IS TO BE PROGRAMMED CONNECT THE PROGRAMMER TO THIS RADIO AND REPEAT PROCESS FROM POINT (3) ABOVE.
8. PLEASE NOTE THAT YOU SHOULD NOT OPERATE THE COMPUTER UNLESS THE PROGRAMMER IS CONNECTED TO A RADIO AND THE COMPUTER, PLUS THE PROGAMMERS POWER SWITCH IS TURNED " ON ".
9. IF THERE IS ANY ERROR DURING PROGRAMMING THEN PRESS THE " RESET " KEY TO RESET THE PROGRAM AND PRESS " ESC " KEY TO RESTART THE PROCEDURE AGAIN FROM POINT (2) ABOVE.