

1.0 **General Description**

1.1 Product Description

The General Research of Electronics, Inc. Model No.: RP-6120 is a scanning receiver.

Please refer to the attached users manual for more details.

A pre-production version of the sample was received on April 1, 1998 in good condition.

1.2 Related Submittal(s) Grants

This is an Application for Certification of a scanning receiver.

1.3 Test Methodology

Both AC mains line-conducted (if applicable) and radiated emission measurements were performed according to the procedures in ANSI C63.4 (1992). All measurements were performed in Open Area Test Sites. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Data Section"** of this Application.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is Site 3. This test facility and site measurement data have been fully placed on file with the FCC.

2.0 **System Test Configuration**

2.1 Justification

For emission testing, the equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). During testing, all cables were manipulated to produce worst case emissions.

For the measurements, the EUT is attached to a cardboard box (if necessary) and placed on the wooden turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). The EUT is wired to transmit full power without modulation.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Detector function is in peak mode. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance if measured at a closer distance.

2.2 EUT Exercising Software

For emissions testing, the units were setup to receive continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing.

Intertek Testing Services

General Research of Electronics Inc., Scanning Receiver

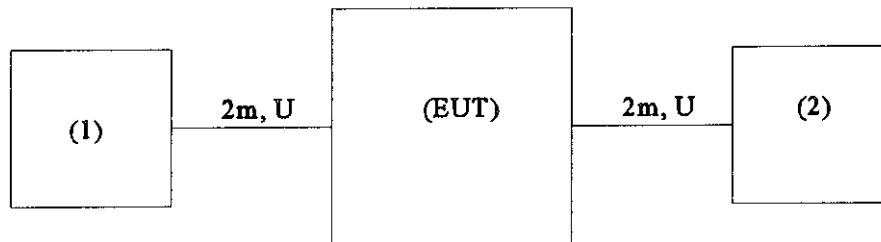
FCC ID: ADVRP-6120

2.3 Support Equipment List and Description

- a) The FCC ID's for all equipment used in the tested system (included inserted cards, which have grants) are:

Item #	Description	Model No.	Serial No.	FCC ID
2	Sony Headphones	N/A	N/A	N/A
1	Radio Shack AC Power Adapter	273-1662	9615	N/A

- b) Equipment Setup Block Diagram



* = EUT

** = No ferrites on video cable

S = Shielded;

U = Unshielded

F = With Ferrite

2.4 Equipment Modification

Any modifications installed previous to testing by General Research of Electronics Inc. will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Inchcape Testing Services.

3.0 **Emission Results**

AC line conducted emission measurements were performed from 0.45 MHz to 30 MHz. Analyzer resolution is 10 kHz or greater.

Radiated emission measurements were performed from 30 MHz to 5000 MHz. Analyzer resolution is 100 kHz or greater for 30 MHz to 1000 MHz, 1 MHz for > 1000 MHz.

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG + DF$$

where

- FS = Field Strength in $\text{dB}\mu\text{V/m}$
- RA = Receiver Amplitude (including preamplifier) in $\text{dB}\mu\text{V}$
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB
- DF = Distance Factor

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:-

$$FS = RR + LF$$

where

- FS = Field Strength in $\text{dB}\mu\text{V/m}$
- RR = RA - AG in $\text{dB}\mu\text{V}$
- LF = CF + AF + DF in dB

Assume a receiver reading of $52.0 \text{ dB}\mu\text{V}$ is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of $32 \text{ dB}\mu\text{V/m}$. This value in $\text{dB}\mu\text{V/m}$ was converted to its corresponding level in $\mu\text{V/m}$.

RA = $52.0 \text{ dB}\mu\text{V}$	DF = 0 dB
AF = 7.4 dB	RR = $23.0 \text{ dB}\mu\text{V}$
CF = 1.6 dB	LF = 9.0 dB
AG = 29.0 dB	
FS = RR + LF	
FS = $23 + 9 = 32 \text{ dB}\mu\text{V/m}$	

Level in $\mu\text{V/m}$ = Common Antilogarithm $[(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$

Intertek Testing Services

General Research of Electronics Inc., Scanning Receiver

FCC ID: ADVRP-6120

3.3 Radiated Emission Data

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Judgement : Passed by 7.1 dB

INTERTEK TESTING SERVICES

Company: GRE America
 EUT: Portable Scanning Receiver
 Model: RP-6120
 Test Mode: Normal

Project #: J98010153
 Date of Test: 4-21-98
 Test Site #: 3
 Engineer: Ollie Moyrong *OM*

FCC Part 15.109 Class B Radiated Emissions

Tuned Frequency (MHz)	L.O. Frequency (MHz)	Antenna Location (m)	Antenna Polarization (H=0/V=1)	Reading (dBuV)	Antenna Factor (dB/m)	Preamp (dB)	Cable Loss (dB)	Corrected Reading dBuV/m	Limit At 3 m (dBuV/m)	Margin (dB)
29.000	286.500	3.0	0	27.5	12.4	-22.5	0.8	18.2	46.0	-27.8
39.500	297.000	3.0	0	27.8	12.0	-22.5	0.8	18.1	46.0	-27.9
54.000	311.500	3.0	1	29.9	5.9	-22.5	0.9	14.2	46.0	-31.8
108.000	365.500	3.0	1	29.7	10.0	-22.6	2.1	19.3	46.0	-26.7
122.500	380.000	3.0	1	29.0	11.6	-22.6	2.1	20.2	46.0	-25.8
136.975	394.475	3.0	0	27.5	8.7	-22.6	2.2	15.8	46.0	-30.2
137.000	394.500	3.0	1	26.1	10.9	-22.6	2.2	16.6	46.0	-29.4
154.000	411.500	3.0	1	29.7	11.0	-22.6	2.2	20.3	46.0	-25.7
174.000	431.500	3.0	1	29.9	9.5	-22.6	2.3	19.1	46.0	-26.9
380.000	637.500	3.0	1	27.6	15.8	-22.4	4.5	25.5	46.0	-20.5
440.000	697.500	3.0	1	31.0	16.8	-22.5	4.6	29.9	46.0	-16.1
512.000	769.500	3.0	1	28.4	18.3	-22.4	4.8	29.1	46.0	-16.9
806.000	552.000	3.0	1	30.3	22.1	-22.2	5.9	36.1	46.0	-9.9
815.000	557.500	3.0	1	29.9	22.5	-22.2	5.9	36.1	46.0	-9.9
824.000	564.000	3.0	1	29.1	22.7	-22.2	5.9	35.5	46.0	-10.5
849.000	591.515	3.0	1	27.0	22.7	-22.2	6.0	33.5	46.0	-12.5
859.000	601.500	3.0	1	27.5	22.6	-22.1	6.0	34.0	46.0	-12.0
869.000	611.500	3.0	1	26.9	22.8	-22.1	6.0	33.6	46.0	-12.4
894.000	636.500	3.0	1	26.1	23.2	-22.1	6.1	33.2	46.0	-12.8
926.000	668.500	3.0	1	29.7	23.3	-22.2	6.1	36.9	46.0	-9.1
960.000	702.500	3.0	0	27.9	24.3	-22.2	6.1	36.1	46.0	-9.9
29.000	278.900	3.0	1	33.9	10.6	-22.5	0.8	22.8	46.0	-23.2
806.000	275.400	3.0	1	33.1	22.1	-22.2	5.9	38.9	46.0	-7.1
815.300	236.100	3.0	1	29.5	22.5	-22.2	5.9	35.7	46.0	-10.3
820.750	238.600	3.0	0	26.5	23.0	-22.2	5.9	33.2	46.0	-12.8

Note: Negative signs (-) in the Margin column signify levels below the limit.

Readings proceeded with a '*' are Quasi-Peak measurements.

All other readings are Peak measurements.

3.5 Conducted Emission Data

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Judgement : Passed by 13.2 dB

hp

21 Apr 1998 13:38:00

EMISSION LEVEL [dBuV]

100

80

60

40

20

FCC, Pt 15 - AC LINE CONDUCTED
GRE AMERICA
PORTABLE SCANNING RECEIVER
M/N ADVRP-8120
LINE [X] NEUTRAL []

CLASS A

CLASS B

.45

1

10

30

FREQUENCY [MHz]

hp

21 Apr 1998 13:50:27

EMISSION LEVEL [dBuV]

100

80

60

40

20

FCC, Pt 15 - AC LINE CONDUCTED
GRE AMERICA
PORTABLE SCANNING RECEIVER
M/N ADVRP-8120
LINE [] NEUTRAL [X]

CLASS A

CLASS B

.45

1

10

30

FREQUENCY [MHz]

21 Apr 1999 13:38:00

3. FCC CFR 47, Pt 15

3.1 FCC, Pt 15 - AC LINE CONDUCTED

GRE AMERICA
PORTABLE SCANNING RECEIVER
M/N ACURP-6120
LINE [X] NEUTRAL []

PEAKS FOUND ABOVE 32 dBuV

PEAK#	FREQ (MHz)	AMPL (dBuV)
1	.5345	33.1
2	.6788	32.6
3	.8738	32.9
4	1.221	34.8
5	1.323	32.6
6	2.080	32.6
7	2.430	32.6
8	4.038	32.6
9	4.541	32.2
10	4.657	32.4
11	5.720	32.2
12	6.171	32.6
13	6.924	32.4
14	14.28	32.6
15	16.39	32.6
16	23.03	32.6

21 Apr 1999 13:50:27

3. FCC CFR 47, Pt 15

3.1 FCC, Pt 15 - AC LINE CONDUCTED

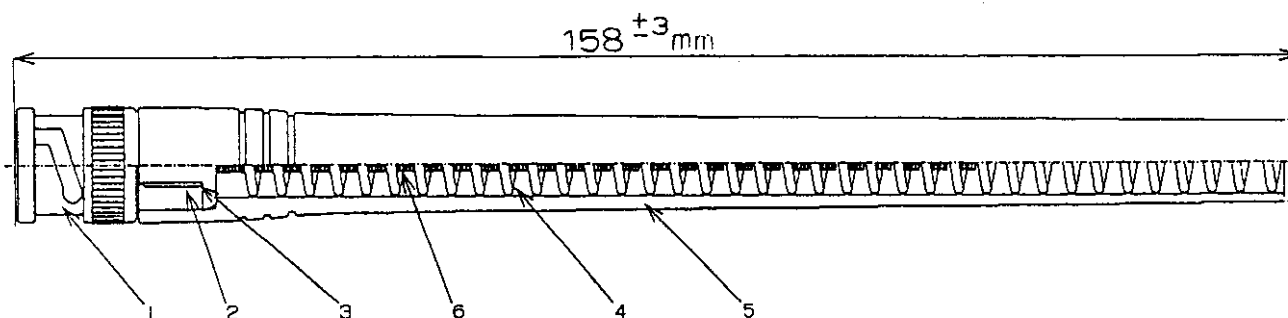
GRE AMERICA
PORTABLE SCANNING RECEIVER
M/N ACURP-6120
LINE [] NEUTRAL [X]

PEAKS FOUND ABOVE 33 dBuV

PEAK#	FREQ (MHz)	AMPL (dBuV)
1	.4893	33.7
2	.5811	33.4
3	1.221	34.5
4	1.468	33.8
5	3.138	33.4
6	3.744	33.3
7	5.985	33.0
8	12.54	33.7
9	13.41	33.6

5.0 **Antenna Requirement**

The EUT used permanently attached antenna.



1	6		Element Cable		
1	5		Element rubber case		
1	4		Element SP		
1	3		Element FT		
1	2		Insulator		
1	1		BNC Connector		
QTY	ITEM NO	PART OR DWG. NO	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	CODE IDENT

DATE	SYM	REVISION	BY	APPROV	NUMBER	TITLE	QUANT	MATERIAL	REMARK
SCALE	TREAT					ISSUED			
	PAINT								
DATE	DEC. 5, 1991	DESIGN	GRE			RUBBER ANTENNA			
DRAWING NO.	GE-91 D-9447	DRAWN	T. Koga						
		CHECKED	K. Wakui						
		APPROV	S. H. T. R. L.			GENERAL RESEARCH OF ELECTRONICS INC.			

TEL: 813-5439-3611
FAX: 813-5439-3644SHIBA NO.3 AMEREX BLDG.
3-12-17 MITA, MINATO-KU
TOKYO, JAPAN 108Rev. Mar. 19, 1998
Tokyo: DEC. 16, 1997

Reference No. 97030

S P E C I F I C A T I O N SSUBJECT : VHF/UHF PROGRAMMABLE AM/FM HAND-HELD SCANNING RECEIVER
RP-61201. GENERAL

- 1 Programmable channel : 200 channels (20 channels x 10 banks)
1 Limit search bank
20 Monitor channels
1 Priority channel
7 WX frequencies
10 Pre-programmed band search
- 2 Receiving system : PLL synthesizer triple conversion superheterodyne
- 1st IF 257.5MHz : the 1st Local OSC frequency for
VHF and UHF Low/T Band employs
upper side of receiving
frequency range
: the 1st Local OSC frequency for
UHF high Band employs lower side
of receiving frequency range
- 2nd IF 21.4MHz : the 2nd Local OSC frequency
employs upper side of 1st IF
- 3rd IF 455kHz : the 3rd Local OSC frequency
employs lower side of 2nd IF
- 3 Receiving wave mode : Narrow FM (Business, communication, ham radio)
AM (Aircraft)
- 4 Frequency range
- | | <u>Freq.</u> | <u>Step</u> | <u>Mode</u> |
|---------------|--------------------|-------------|-------------|
| 4-1) Coverage | 29.000- 54.000MHz | 5.0kHz | FM |
| | 108.000-136.975MHz | 25.0kHz | AM |
| | 137.000-174.000MHz | 5.0kHz | FM |
| | 380.000-512.000MHz | 12.5kHz | FM |
| | 806.000-824.000MHz | 12.5kHz | FM |
| | 849.000-869.000MHz | 12.5kHz | FM |
| | 894.000-960.000MHz | 12.5kHz | FM |

- cont'd -

PRODUCT DEVELOPMENT & MANUFACTURING

- 4-2) Band search : 29-54, 108-136.975, 137-148, 148-174, 380-420, 420-450, 450-512, 806-824, 849-869, 894-960MHz
- 4-3) WX : 162.400, 162.425, 162.450, 162.475, 162.500, 162.525, 162.550MHz
- 5 Scanning rate : 25 channels/sec.
- 6 Search rate : 50 channels/sec.
- 7 Frequency and mode display: LCD with back-lighting
- 8 Zeromatic : Activates during search mode
- 9 Audio output : 240m watts
- 10 Speaker : Built-in 36mm 8 ohms dynamic speaker
- 11 Operating Voltage : DC 9 volts "AA" cell x 6pcs.
- 12 Ext. power or charge voltage : DC 9 volts
- 13 Dimension : Approx. 63 (W) x 45 (D) x 150 (H) mm
- 14 Weight : Approx. 260g without antenna and batteries
- 15 Accessory : Rubber antenna, AC-DC adapter, Belt clip, Owner's manual and Frequencies guide
- 16 Memory backup : Capacitor

2. ELECTRICALNominalLimit

- 1 Frequency range : VHF Low 29- 54MHz
- VHF Air 108-136.975MHz
- VHF High 137-174MHz
- UHF Low 380-512MHz
- UHF High 806-960MHz

Except cellular band: 824.0125-848.9875MHz and 869.0125-893.9875MHz

- 2 Sensitivity : VHF Low FM 1 μ V 2 μ V
- FM: (S+N)/N=20dB VHF Air AM 2 μ V 5 μ V
- DEV.: 3kHz at 1kHz VHF High FM 1 μ V 2 μ V
- AM: (S+N)/N=20dB UHF Low FM 1 μ V 2 μ V
- MOD.: 60% at 1KHz UHF High FM 2 μ V 4 μ V

		<u>Nominal</u>	<u>Limit</u>
-3	Image ratio 1st IF Image : VHF Low at 40MHz	40dB	
	VHF Air at 124MHz	40dB	
	VHF High at 154MHz	40dB	Not specified
	UHF Low at 450MHz	30dB	
	UHF High at 860MHz	40dB	
	2nd IF Image : VHF High at 154MHz	50dB	
-4	Squelch sensitivity (Band center)		
	Threshold : FM and AM	1 μ V	5 μ V
	Tight: (S-N)/N : FM	25dB	15dB
	: AM	20dB	10dB
-5	Selectivity : -6dB	± 10 kHz	± 14 kHz
	-50dB	± 18 kHz	± 25 kHz
-6	Spurious rejection : VHF High at 154MHz	40dB	30dB
	(Except Primary image)		
-7	IF rejection : 257.5MHz at 154MHz	50dB	40dB
	21.4MHz at 154MHz	100dB	80dB
-8	Acceptable radio frequency: displacement at EIA RS-204D	± 6 kHz	± 3 kHz
-9	Signal to noise ratio : 29.000- 54.000MHz	40dB	30dB
	RF : 100 μ V 108.000-136.975MHz	40dB	30dB
	DEV. : 3kHz at 1kHz 137.000-174.000MHz	40dB	30dB
	380.000-512.000MHz	35dB	25dB
	806.000-960.000MHz	35dB	25dB
-10	Residual noise : 3mV	3mV	5mV
	Vol. min. and Squelched		
-11	Scanning rate : 25ch/sec.	25ch/sec.	22-28ch/sec.
-12	Search rate : 50 steps/sec.	50 steps/sec.	45-55 steps/sec.
-13	Scan and Search delay time: 2sec.	2sec.	1-3sec.
-14	Audio output (T.H.D. 10%) : RF input 100 μ V at 154MHz	240m watt	180m watt
	(8 ohms R Load, 1kHz)		
-15	T.H.D. at 50mW : RF input 100 μ V at 154MHz	3%	8%

		<u>Nominal</u>	<u>Limit</u>
-16	Audio max. power : RF input: 100 μ V at 154MHz 8 Ω internal speaker 32 Ω at headphone jack	300m watt 19m watt	220m watt 25m watt
-17	Audio frequency response : RF input: 100 μ V at 154MHz at -6dB	300Hz 2.0kHz	200Hz-400Hz 1.5kHz-3.0kHz
-18	Intermediate frequency : 1st 257.5MHz 2nd 21.4MHz 3rd 455kHz		
-19	Current drain at 9 volts : 8 Ω internal speaker at 154MHz Vol. Max. 32 Ω at headphone jack at 154MHz Vol. Max. at Squelched	170mA 90mA 70mA	210mA 110mA 90mA
-20	Charging current :	65mA	50mA
Note: This specification is obtained AC 120V with model 5-2413A power supply without the scanner on after ten hours.			
-21	Memory hold time	10 Hours	1 Hour
-22	Birdies and step frequency: Under discussion when search		
-23	Filter : Monolithic crystal filter for 21.4MHz and ceramic filter for 455kHz		
-24	Antenna impedance : 50 ohms		
-25	Temperature range : Test to specification between: +18°C - +35°C Operate (Need not meet spec.): -10°C - +60°C		
-26	Low BATT indicator :	5.5V	5.5 \pm 0.5V

3. OPERATING CONTROLS AND CONNECTIONS

- 1 Volume control with power switch
- 2 Squelch control
- 3 Keyboard (25 Keys)
- 4 7 digit frequency display by LCD
- 5 3 digit channel indicator by LCD
- 6 Indicator by LCD: FREQUENCY, CHANNEL, SCAN, MANUAL, SEARCH, PROGRAM, PRI,
Ch-FULL, DELAY, LOCK-OUT, ►, ◄, MEM, WX, BANK, LOW BATT,
KEY-LOCK, P-SAVE and ERROR

- 7 BNC type antenna connector
- 8 Earphone jack (D=3.5mm stereo)
- 9 External power jack and charge jack
- 10 Key lock (keyboard)
- 11 Battery compartment for 6 "AA" cells (User service)
- 12 Reset switch

4. FEATURES

- 1 Direct key entry
- 2 200 channels automatic scanning for VHF to UHF band
- 3 20 monitor temporary memory
- 4 Duplicate frequencies indicator by LCD
- 5 "Zeromatic" tuning system
- 6 Pre-programmed Weather frequencies
- 7 Change the direction at the searching by ► (up) or ◄ (down)
- 8 25 channels/sec. scanning rate and 50 steps/sec. searching rate
- 9 2 second scan and search delay
- 10 Manual selection for channel
- 11 Scan mode [cleared channels (000.000 freq.) are not scan]
- 12 Deleting a frequency from a channel or monitor memory
- 13 Direct search
- 14 Program mode
- 15 Key lock for safety
- 16 Key tone
- 17 10 digit channel and frequency display with all function indicators
- 18 LCD backlighting
- 19 Low battery indicator by LCD
- 20 Regulated DC power supply circuit
- 21 Built-in dynamic speaker
- 22 Crystal filter for 1st IF and Ceramic filter for 2nd IF section
- 23 Belt clip attached

GENERAL RESEARCH OF ELECTRONICS, INC.

MODEL RP-6120

FUNCTION OF EACH SEMICONDUCTOR OR OTHER ACTIVE CIRCUIT DEVICE [2.983(6)]

1. Transistor, FET

Q101	2SC4226	RF AMP
Q102	2SC4226	RF AMP
Q103	2SC1979	AGC AMP
Q104	2SC4250	1st IF AMP
Q105	2SC4250	1st IF AMP
Q106	2SC4250	2nd MIXER
Q107	2SC4226	VCO 1
Q108	DTC114 or UN5214	SWITCHING
Q109	2SC4226	VCO 2
Q110	DTC114 or UN5214	SWITCHING
Q111	2SC4226	BUFFER VCO 1&2
Q112	2SC4226	BUFFER VCO 1&2
Q113	2SK209	LOW PASS FILTER
Q114	2SC2712	LOW PASS FILTER
Q115	2SC4250	BUFFER VCO 3
Q116	2SC4226	VCO 3
Q117	2SC4226	SWITCHING
Q301	2SC4215	2nd IF AMP
Q302	2SC4116	AGC AMP
Q303	UMC2N	SWITCHING
Q304	DTC114 or UN5214	SWITCHING
Q305	DTC114 or UN5214	SWITCHING
Q306	2SC4116	PRE AMP AF

MODEL RP-6120

FUNCTION OF EACH SEMICONDUCTOR OR OTHER ACTIVE CIRCUIT DEVICE [2.983(6)]

2. IC

IC1	GRE-9744	CPU	
IC2	S-80745SN-D9		VOLTAGE DETECTOR
IC3	S-80745SN-D9		VOLTAGE DETECTOR
IC4	S-81332HG-KC		VOLTAGE REGULATOR
IC101	M64074GP		PLL
IC102	TC74HC164AF		BAND SELECT/ATT. CONT
IC301	KA3361D		3rd IF AMP, 3rd LO, 3rd MIX, NOISE AMP, QUADRATURE DETECTOR
IC302	TA2003F	AM	
IC303	TC4066		SWITCHING
IC304	NJM2070D		AUDIO AMP
IC305	S-81235SG-Q1		VOLTAGE REGULATOR
IC306	TK11806M		DC TO DC CONVERTOR
IC307	TK11235BUCB		VOLTAGE REGULATOR
IC308	S81337HG-KE		VOLTAGE REGULATOR

1. LOCAL OSC FREQUENCY CALCULATION

-1 MODEL NO. RP-6120 formula for 1st, 2nd and 3rd Local oscillation frequencies are as follow:

RECEIVING BAND	RECEIVING FREQ. (FR) (MHz)	1st LO	2nd LO	3rd LO
		PLL 1 (MHz) VC0 1 or VC0 2	PLL 2 (MHz) VC0 3	(MHz) X' TAL
VHF LO	29.0000- 42.5950	VC0 1 - FR + 257.5	$257.5 + 21.4 = 278.9$	20.945
	42.6000- 43.0000	"	$257.5 - 21.4 = 236.1$	"
	43.0050- 54.0000	"	$257.5 + 21.4 = 278.9$	"
VHF HI	108.0000-174.0000	VC0 1 = FR - 257.5	$257.5 + 21.4 = 278.9$	20.945
UHF LO	380.0000-512.0000	VC0 2 = FR + 257.5	$257.5 - 21.4 = 278.9$	20.945
UHF HI	806.0000-811.0000	VC0 2 = FR - 254.0	$254.0 + 21.4 = 275.4$	20.945
	811.0125-815.2875	VC0 2 = FR - 257.5	$257.5 + 21.4 = 278.9$	"
	815.3000-815.5000	"	$257.5 - 21.4 = 236.1$	"
	815.5125-820.7375	"	$257.5 + 21.4 = 278.9$	"
	820.7500-824.0000	VC0 2 = FR - 260.0	$260.0 - 21.4 = 238.6$	"
	849.0000-869.0000	VC0 2 = FR - 257.5	$257.5 - 21.4 = 278.9$	"
	894.0000-960.0000	"	"	"

RF DENOTES Frequency Received.

-2 Example

RECEIVING BAND	RECEIVING FREQ. (MHz)	1st LO (MHz)	2nd LO (MHz)	3rd LO (MHz)
VHF LO	29	$29 + 257.5 = 286.5$	$257.5 + 21.4 = 278.9$	20.945
	40	$40 + 257.5 = 297.5$	"	"
	50	$50 + 257.5 = 307.5$	"	"
VHF HI	108	$108 - 257.5 = 365.5$	$257.5 + 21.4 = 278.9$	20.945
	146	$146 - 257.5 = 403.5$	"	"
	174	$174 - 257.5 = 431.5$	"	"
UHF LO	380	$380 - 257.5 = 637.5$	$257.5 - 21.4 = 278.9$	20.945
	446	$446 - 257.5 = 703.5$	"	"
	512	$512 - 257.5 = 769.5$	"	"
UHF HI	806	$806 - 254.0 = 552.0$	$254.0 - 21.4 = 275.4$	20.945
	860	$860 - 257.5 = 602.5$	$257.5 - 21.4 = 278.9$	"
	960	$960 - 257.5 = 702.5$	"	"

2. IF FREQUENCY

1st IF: 254MHz/257.5MHz/260MHz

2nd IF: 21.4MHz

3rd IF: 455kHz

9.0 **Instruction Manual**

Attached is a preliminary copy of the Instruction Manual.

This manual will be provided to the end-user with each unit sold/leased in the United States.