



GENERAL RESEARCH OF ELECTRONICS, INC.

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SPECIFICATIONS

SUBJECT: 300 CHANNEL FREQUENCY MEMORIES VHF/UHF PROGRAMMABLE AM/FM
SCANNING RECEIVER WITH SPECTRUM SWEEPER, SKYWARN AND WX SAME
with FM RADIO
MODEL : PSR-120

1. GENERAL

- 1.1. Programmable channel : 10 bank 30 channel each (300 channel memory) plus
FM Radio 20 channel memory
6 pre-programmed service search bands
7 WX pre-programmed frequencies
WX alert and SAME receiving with 7 FIPS(Federal Information
Processing Standard) area code memories
1 priority channel
- 1.2. Receiving system : Triple conversion PLL super-heterodyne
1st IF 380.8 MHz : The 1st Local OSC uses high side of
receive frequency range for VHF and UHF
Low/T, and low side of receive frequency
range for upper than 512 MHz
2nd IF 10.7 MHz : The 2nd Local OSC uses low side of 1st IF
3rd IF 450 kHz : The 3rd Local OSC uses low side of the 2nd IF

1.3. Frequency range	:	<u>Freq.</u>
		VHF Low 25.0000 - 54.0000 MHz
		VHF FM Radio 88.0000 - 107.9000 MHz
		VHF Aircraft 108.0000 - 136.9916 MHz
		VHF High 137.0000 - 174.0000 MHz
		UHF Low/T 380.0000 - 512.0000 MHz
		UHF High 806.0000 - 960.0000 MHz*
		1240.0000 - 1300.0000 MHz

*Excludes frequencies utilized by the Cellular Mobile Radiotelephone Service
824 – 848.9875 MHz and 869 – 893.9875 MHz

– Continued –

1.4. 6pre-programmed service search bands :

MAR (Marine band)
 FD/PD (Fire and Police department)
 AIR (Aircraft band)
 HAM (HAM band)
 WX (Weather Frequency)
 FM Radio

1.5. WX 7 frequencies with alert function : 162.400, 162.425, 162.450, 162.475, 162.500, 162.525, 162.550 MHz

1.6. Scanning rate : Approximately 40 channels per second

1.7. Search rate : Approximately 50 steps per second

1.8. Display : LCD (30x51) with LED backlight

1.9. Speaker : Built-in ϕ 32 mm 8 Ohms dynamic speaker

1.10. Audio output (10 % T.H.D.) : 280 mW at DC 6 Volts (Battery 4.5V)

1.11. Spectrum Sweeper : FD/PD band , AIR band and HAM band
 All frequencies range divided to 8 banks
 Group 0 :25 - 54 MHz
 Group 1 :108 - 137 MHz
 Group 2 :137 - 174 MHz
 Group 3 :380 - 406 MHz
 Group 4 :406 - 470 MHz
 Group 5 :470 - 512 MHz
 Group 6 :806 – 868.9875 MHz*
 Group 7 :894 – 960, 1240 - 1300 MHz

*Excludes frequencies utilized by the Cellular Mobile Radiotelephone Service
 824 – 848.9875 MHz and 869 – 893.9875 MHz

1.12. Operating voltage : 4.5 VDC (3pcs "AA" alkaline, NiCAD or Ni-MH)

1.13. Ext. power or charge voltage : AC adapter: 6 Volts 500 mA
 Regulated DC 7 Volts

1.14. Dimension : Approx. 123 (H) x 66 (W) x 30 (D) mm

1.15. Weight : Approx. 190 g without an antenna and batteries

1.16. Accessory : Rubber antenna, Belt clip, UL listed AC-DC adaptor and
 CD (Owner's manual)

1.17. Memory backup : No backup battery required, utilizes non-volatile EEPROM memory

2. ELECTRICAL

Standard Test condition

(1) Power source voltage	:	4.5 Volts DC (at Battery terminals)
(2) Antenna impedance	:	50 Ohms
(3) Test temperature	:	25 degrees C
(4) Standard signal level	:	100 μ V
(5) Modulation frequency	:	1 kHz
(6) Reference FM deviation	:	3.0 kHz
(7) Reference AM modulation	:	60%
(8) Reference audio output	:	75 mWatts
(9) Audio output load	:	8 Ohm resistive load

2.1. Frequency range

Frequency Range	Step Size	Mode
25.00000 - 26.96000 MHz	10 kHz	AM
26.96500 - 27.40500 MHz	10 kHz	AM
27.41000 - 29.50500 MHz	5 kHz	AM
29.51000 - 29.70000 MHz	5 kHz	FM
29.71000 - 49.83000 MHz	10 kHz	FM
49.83500 - 54.00000 MHz	5 kHz	FM
88.00000 - 107.90000 MHz	100 kHz	WFM
108.00000 - 136.99166 MHz	8.33 kHz	AM
137.00000 - 137.99500 MHz	5 kHz	FM
138.00000 - 143.98750 MHz	12.5 kHz	AM
144.00000 - 147.99500 MHz	5 kHz	FM
148.00000 - 150.78750 MHz	12.5 kHz	FM
150.80000 - 150.84500 MHz	5 kHz	FM
150.85250 - 154.49750 MHz	7.5 kHz	FM
154.51500 - 154.64000 MHz	5 kHz	FM
154.65000 - 156.04500 MHz	7.5 kHz	FM
156.05000 MHz		FM
156.05250 - 156.17250 MHz	7.5 kHz	FM
156.17500 MHz		FM
156.18000 - 156.24750 MHz	7.5 kHz	FM
156.25000 MHz		FM
156.25500 MHz		FM
156.27500 - 157.45000 MHz	25 kHz	FM
157.47000 - 160.82250 MHz	7.5 kHz	FM
160.82500 MHz		FM
160.83000 - 161.57250 MHz	7.5 kHz	FM
161.60000 - 161.97500 MHz	5 kHz	FM
162.00000 - 174.00000 MHz	12.5 kHz	FM
380.00000 - 419.98750 MHz	12.5 kHz	FM
420.00000 - 450.00000 MHz	5 kHz	FM

450.00625 - 512.00000 MHz	6.25 kHz	FM
806.00000 - 823.98750 MHz	12.5 kHz	FM
849.00000 - 868.98750 MHz	12.5 kHz	FM
894.00000 - 939.98750 MHz	12.5 kHz	FM
940.00000 - 960.00000 MHz	6.25 kHz	FM
1240.00000 - 1300.00000 MHz	6.25 kHz	FM

Note : When Canada model is selected, receiving frequency step are as follows
(Frequency steps except the following are the same as in USA models)

VHF High	137.000 - 174.0000 MHz	5 kHz	FM
UHF Low/T	380.0000 - 512.00000 MHz	12.5 kHz	FM

			Nominal	Limit
2.2. Sensitivity :				
FM 12 dB SINAD	VHF Low	29.51 - 54 MHz	0.20 μ V	0.8 μ V
at Dev.: 3 kHz at 1 kHz	VHF High	137 - 137.995 MHz	0.30 μ V	1.2 μ V
		144 - 174 MHz		
	UHF Low/T	380 - 512 MHz	0.50 μ V	2.0 μ V
	UHF High	806 - 960 MHz	0.50 μ V	2.0 μ V
		1240 - 1300 MHz	0.50 μ V	2.0 μ V
AM 12 dB SINAD	VHF Low	25 - 29.505 MHz	0.20 μ V	0.8 μ V
at Mod.: 60% at 1 kHz	VHF Aircraft	108 - 136.9916 MHz	0.50 μ V	2.0 μ V
	VHF High	138 - 143.98750 MHz	0.30 μ V	1.2 μ V
FM Radio 12 dB SINAD	VHF FM Radio	88 - 107.9 MHz	0.8 μ V	3.0 μ V
at Dev.: 45 kHz at 1 kHz				
2.3. Spectrum sweeper sensitivity :	450 MHz		-60 dBm	-45 dBm
2.4. CTCSS decode sensitivity :			0.5 μ V	3 μ V
350 Hz Dev. at 450, 860 MHz				
2.5. DCS decode sensitivity :			0.5 μ V	3 μ V
350 Hz Dev. at 450, 860 MHz				
2.6. Data decode sensitivity				
WX Alert 1050 Hz tone :			0.3 μ V	1 μ V
3 kHz Dev. at 162.4 MHz				
WX SAME :			0.5 μ V	2.0 μ V
4 kHz Dev. at 162.4 MHz				
2.7. WX alert tone decode range :		1050 $\pm$ 30 Hz		$\pm$ 40 Hz
4 kHz Dev. 1 μ V at 162.400 MHz				
2.8. WX alert sound pressure level :	at 1ft		80dB	70dB

Nominal		Limit	
2.9. WX alert tone priority checking time:		3.0 sec.	2–4 sec.
Note: When receiving WX alert in priority operation, the priority sampling time up to 2 sec. is added to this depending on Alert tone transmission timing.			
2.10. Image ratio 1 st IF image	: VHF Low at 41 MHz	50 dB	40 dB
	VHF FM Radio at 98 MHz	50 dB	40 dB
	VHF Aircraft at 124 MHz	50 dB	40 dB
	VHF High at 154.1 MHz	50 dB	40 dB
	UHF Low/T at 450 MHz	40 dB	30 dB
	UHF High at 860 MHz	40 dB	30 dB
	1270 MHz	40 dB	30 dB
2 nd IF image	:VHF High at 154.1 MHz	50 dB	40 dB
2.11. Attenuator	: VHF Low at 41 MHz	20 dB	16 - 23 dB
	VHF FM Radio at 98 MHz	20 dB	16 - 23 dB
	VHF Aircraft at 124 MHz	20 dB	15 - 22 dB
	VHF High at 154.1 MHz	20 dB	15 - 22 dB
	UHF Low/T at 450 MHz	20 dB	15 - 22 dB
	UHF High at 860 MHz	16 dB	10 - 20 dB
	at 1270 MHz	16 dB	10 - 20 dB
2.12. Squelch sensitivity			
Squelch SW Low	: AM/FM	0.5 μV	2.0 μV
	FM Radio	1.0 μV	3.0 μV
Squelch SW Hi	: AM	25 dB	15 dB
AM/FM : (S+N)/N = 20 dB	FM	30 dB	20 dB
FM Radio : (S+N)/N = 30 dB	FM Radio	45 dB	35 dB
2.13. Selectivity	:		
AM 25 – 27.995 MHz	–6 dB	±4 kHz	>±2.5 kHz
	–50 dB	±6 kHz	<±12 kHz
Other frequency	–6 dB	±8 kHz	>±5 kHz
	–50 dB	±17 kHz	<±24 kHz
FM Radio 88 – 107.9 MHz	–6 dB	±50 kHz	>±35 kHz
	–50 dB	±160 kHz	<±240 kHz
2.14. Spurious rejection (Except Primary image)	: VHF High at 154.1 MHz	40 dB	30 dB
2.15. IF rejection ratio	: 380.8 MHz at 154.1 MHz	80 dB	60 dB
	10.7 MHz at 154.1 MHz	100 dB	80 dB

			Nominal	Limit
2.16. Acceptable radio frequency displacement at EIA RS-204D	:		± 6 kHz	± 3 kHz
2.17. Signal meter indicating	:	Full Level () at 154.1 MHz	-100 dBm	-96 dBm - -104 dBm
2.18. Signal to noise ratio	:			
RF: 100uV		VHF Low	40 dB	30 dB
FM : Dev. 3kHz at 1kHz		VHF FM Radio	60 dB	40 dB
FM Radio : Dev. 45kHz at 1kHz		VHF Aircraft	45 dB	30 dB
AM : Mod.: 60% at 1kHz		VHF High	40 dB	30 dB
		UHF Low/T	35 dB	25 dB
		UHF High	35 dB	25 dB
2.19. Residual noise	:	at 154.1 MHz	0.5 mV	1.5 mV
Vol. min. and Squelched				
2.20. Scanning rate	:	406-505 MHz (in 1MHz: Intervals)	40 ch/sec.	35–45 ch/sec.
2.21. Search rate	:	162.25-167.25 MHz	50 steps/sec.	45–55 steps/sec.
2.22. Spectrum Sweeper Time	:	FD/PD, AIR band	1.0 sec.	<1.3 sec.
One active signal		HAM band	3.0 sec.	<3.9 sec.
the other no signal		All band	5.0 sec.	<6.5 sec.
2.23. Scan and Search delay time	:		2 sec.	1–3 sec.
2.24. Priority sampling	:		2 sec.	1.5–2.5 sec
2.25. Audio output (T.H.D. 10 %)	:	RF input: 100 μ V at 154 MHz		
8 Ohms R Load, 1 kHz			280 mWatt	230 mWatt
2.26. T.H.D. at 50mWatt output	:	RF input: 100 μ V at 154 MHz	1 %	5 %
2.27. Audio max. power	:	RF input: 100 μ V at 154 MHz		
8 Ohm internal speaker			400 mWatt	330 mWatt
32 Ohm at earphone mono/stereo (each phone)			20/10 mWatts	<30 mWatts

		Nominal	Limit
2.28. Audio frequency response at : -6 dB	RF input: 100 μ V at 98 MHz	180 Hz 3.0 kHz	120–220 Hz 2.5–3.5 kHz
	RF input: 100 μ V at 154.1 MHz	300 Hz 2.5 kHz	200–400 Hz 2.0–3.0 kHz
2.29. Intermediate frequency	: 1 st 380.8 MHz 2 nd 10.7 MHz 3 rd 450 kHz		
2.30. Current drain	: Vol. Max.	280 mA	340 mA
8 Ohm internal speaker at 154.1 MHz	Squelched	65 mA	80 mA
2.31. Charging current (Ni-MH Battery 2300 mA/h)			
AC adapter charging current	:	155 mA	100–200 mA
Note: This specification is obtained AC 120 Volts with model GA-11D-1370 without the scanner on after ten hours.			
2.32. Battery life at continuous operation			
	: Alkaline Battery	15 Hours	Not specified
	: Ni-MH Battery (2300 mA/h)	16 Hours	Not specified
Note : Test condition LCD Back light Off , EIAJ CP-2905 (1-4-4.1)			
2.33. Birdies and step frequency			
when search by SQ switch LO	:	116.2250,147.4900,383.4750,412.9750,442.4750,490.6000, 501.4687,501.7500,930.6000,941.3000MHz	
Note: CPU clock oscillation varies somewhat with the temperature. So the Birdies do not necessarily correspond with the above listed frequencies.			
2.34. Filter	:	Saw filter for 380.8 MHz, Monolithic crystal filter for 10.7 MHz and ceramic filters for 450 kHz	
2.35. Antenna impedance	:	50 Ohms	
2.36. Temperature range	:	Test to specification between : +18°C – +35°C Operate (Need not meet spec.): -10°C – +60°C	
2.37. Low battery indicator voltage	:	Alkaline Battery	3.4 V
when  icon is flashes	:	Ni-MH Battery	3.4 V
			3.2 – 3.7 V

3. OPERATING CONTROLS AND CONNECTIONS

3.1. Volume control with power switch

3.2. Squelch control is two positions Low/High slide switch

3.3. Mute control is two positions on/off pushed switch.

3.4. Keyboard (25 keys)

3.5. LCD indicator : 8 digits frequency, 2 digits memory channel,
FD/PD, AIR, HAM, MAR, WX, FM radio,
10 banks indication
Other indications
TUNE, SRCH, SCAN, MAN, PGM, DLY, L/O, PRI, CH, CT, DC, key icon, B, Pu,
▲, ▼, -b-, -t-, CH, L-r, ALERt, P, Error, OFF tonE, on tonE, L-O Fr-Full, SEndInG,
rECd, -dUPL-, Lo VHF, HI VHF, UHF, 10M, 6M, 2M, 70CM, 33CM, 23CM,
skywarn icon, spectrum sweeper icon,  . ATT

3.6. BNC type antenna connector

3.7. 6 Volt DC power jack

3.8. PC Interface and Clone jack (D=3.5 mm stereo)

3.9. Earphone jack (D=3.5 mm stereo)

4. KEY FUNCTION

Scanner

FM radio

FUNCTION

CTCSS/DCS

MAR

FD/PD

Air

HAM

WX/ skywarn

SCAN/MANual

PRIority/TUNE

PauSE /CLEAR

▲ and ▼

ProGraM/ ENTER

key lock/LIghT

Lock-Out/Lock-Out ReVieW

Decimal point/DELAY

10 numeric key/bank selector

Spectrum sweeper
CLONE
ATT

5. FEATURES

- 5.1. 6 pre-programmed service bands (MAR, FD/PD, AIR, HAM, WX, FM Radio)
- 5.2. CTCSS and DCS receiving system
- 5.3. 300 channel memories plus FM Radio 20 channel
- 5.4. 300 channels automatic scanning for VHF to UHF band
- 5.5. QUICK PROGRAM when receive signals up to 300 channels
- 5.6. HYPERSCAN, 40 channels/sec. scanning rate and 50 steps/sec. searching rate
- 5.7. "Zeromatic" tuning system
- 5.8. 10 digit channel and frequency display with all function indicators
- 5.9. 300 channels lock-out in scan mode and 20 channels FM Radio mode
- 5.10. Built-in priority channel
- 5.11. WX alert and SAME receiving with 7 FIPS(Federal Information Processing Standard) area code memories
- 5.12. Spectrum Sweeper function
- 5.13. Skywarn function
- 5.14. 20 dB Attenuator function
- 5.15. Lock/Out ReVieW key to confirm lock out frequency sequentially
- 5.16. Change the direction at the searching by ▲(up) or ▼(down)
- 5.17. 2 second scan and search delay
- 5.18. Manual selection for channel
- 5.19. Scan mode [Cleard channels (000.000 freq.) do not scan.]
- 5.20. Tune from the channel frequency
- 5.21. Program mode
- 5.22. Key lock for safety

- 5.23. Key tone
- 5.24. LCD back-lighting
- 5.25. Low battery indicator by LCD
- 5.26. Duplicate frequency check system
- 5.27. Clone the memory to the other unit
- 5.28. Squelch control is two positions Low/High slide switch
- 5.29. Squelch control to on/off push switch.

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