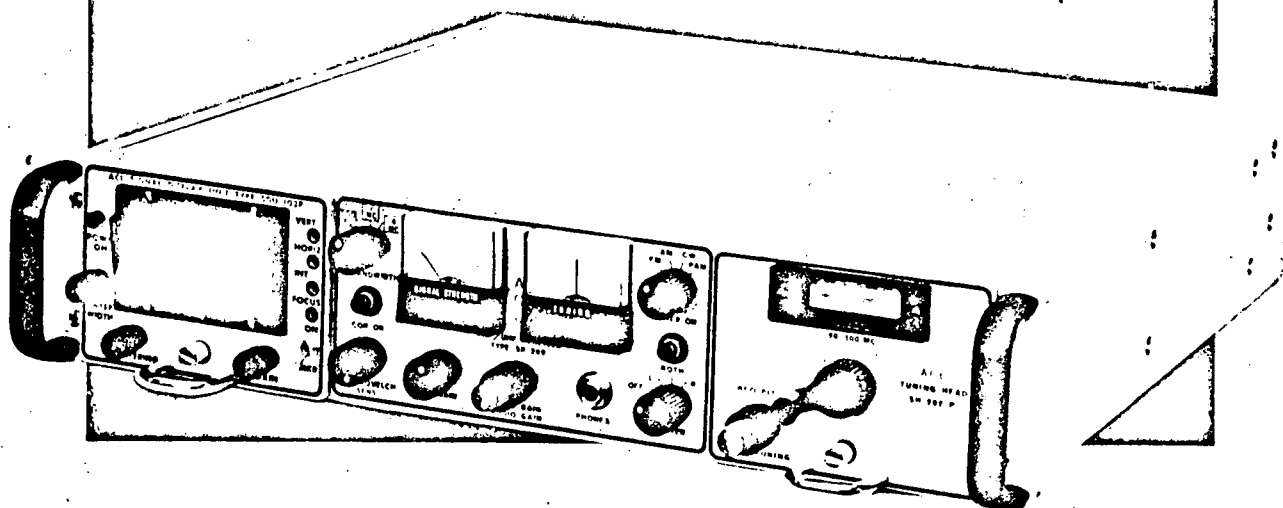


# The SR-209 Receiving System

BY **ACL** FOR

- Surveillance  Telemetry  RFI  Antenna Pattern  Spectrum Analysis
- Field Strength  RF Monitoring  Laboratory
- General HF/VHF/UHF Communications



- The first and only completely solid state, modular receiving system with such outstanding features as
- AM-FM-CW Pulse Reception
  - Frequency Range of 2 MHz to 7 GHz
  - Wide Selection IF Bandwidths
  - Low Noise Figure
  - Companion Signal Display Units
  - Optional Battery Operation
  - Low Oscillator Radiation and Many More Features



**ASTRO COMMUNICATION LABORATORY**  
• A DIVISION OF AIKEN INDUSTRIES, INC. •  
9125 GAITHER ROAD, GAITHERSBURG, MD. 20760  
TELEPHONE (301) 948-5210 TXW 710-828-9706

**T**he Astro Communication Laboratory type SR-209 solid state, modular receiving system is an extremely unique and highly versatile communication system. It is capable of reception of AM, FM, CW and Pulse signals in the frequency range of 2 MHz to 7 GHz. It will accommodate a signal display unit to provide a visual display of signals in a band around the received signal. It will accept a rechargeable nickel cadmium battery pack for portable operation. The receiver is small; designed for standard 19 inch rack mounting; the panel is only 3½ inches high.

The system is entirely solid state and with the ACL modular concept provides excellent MTBF and reduces maintenance to a very minimum. Printed circuit boards are used extensively and provide a reliability and ease of servicing. For example the power supply circuitry is a plug-in printed circuit board as are the audio, video, AGC and others. The IF amplifier with matching FM demodulator is a plug-in board. To provide an even greater reliability and superior performance FET's are being used in all circuits where feasible.

In the SR-209 receiver three IF amplifier FM demodulator boards may be used at one time with operational selection by front panel switch. For VHF/UHF wide selection of IF bandwidths from 10 KHz to 8 MHz are available. In HF there are three bandwidths as specified.

The unusually wide frequency range of 2 MHz to 7 GHz for a manually tuned receiver is provided through the use of ten plug-in RF tuning heads. There are three such tuners in the HF range (2 MHz to 6 MHz, 6 MHz to 20MHz and 20MHz to 45MHz) which carry the series 100 designation. In the VHF frequencies there are three tuning heads, four in UHF and one in SHF to 7000 MHz as shown on the specifications. These are designated series 200 tuners.

The basic SR-209 receiver will accept any two plug-in tuners at one time. A front panel switch enables the selection of either tuner. If a visual display of the signal is desired, one tuner may be replaced by the ACL type SDU-102AP plug-in signal display unit for VHF/UHF/SHF ranges or the SDU-101AP for the above three series 100 HF tuners.

To make the receiver completely self-sufficient for field use a battery pack plug-in unit may be used in lieu of one tuner. No adjustments or changes in the receiver are necessary when this nickel cadmium battery pack is installed. A built-in charger is provided in the battery pack unit.

As in all ACL receivers the front ends employ at least two section preselectors at the RF input to provide maximum reduction of cross modulation and intermodulation interferences.

The SR-209 basic receiver contains a carrier operated relay to control accessory equipment such as recorders. All operating controls are located on the front panel of the SR-209 and except for the phone jack all inputs and outputs are located on the rear panel. An exception to this is the optional first local oscillator output which is provided on the plug-in tuning head panel. Two meters, one for tuning and one for signal strength, are on the receiver front panel.

## SPECIFICATIONS

Type of Reception .....	AM, FM, CW, and Pulse
Input Impedance .....	50 ohms nominal, unbalanced to ground
AM Stability .....	VHF: Output varies less than 6 db for input range of 70 db above 3.5 uv UHF: Output varies less than 6 db for input range of 70 db above 5 uv
FM Stability .....	IF Bandwidths from 10 to 300 KHz: Output varies less than 2db for input above 1.5 uv IF bandwidths 500 KHz and wider: Output varies less than 2 db for input above 4 uv
Pulse Stability .....	Output varies less than 10 db for input range of 70 db above 5 uv
Audio Power Output .....	100 mw minimum into 600 ohm load for external speaker
Video Amplifier Output .....	5 V P-P maximum output into a 93 ohm load
Video Amplifier Response .....	Varies less than 3 db from 20 cps to 4 mcs when terminated with a 93 ohm load
Video Output Impedance .....	93 ohms unbalanced, BNC connector
BFO .....	Operable with 10 to 250 KHz bandwidths BFO Pitch: $\pm 20$ KHz minimum
Signal Display Output .....	21.4 mc center frequency
Rear Panel Connections .....	RF Input (50 ohms), Output for External Signal Display Unit, External Speaker Output, AC Power Input, Video Output, COR Delay On-Off, COR Switch Output
Meters .....	Tuning Meter, Signal Strength Meter
Front Panel Controls .....	Power On-Off, Audio Gain, Video Gain, RF Gain, IF Bandwidth Selection, AM-FM-CW-Pulse Function Switch, COR Visual Indicator, COR Sensitivity Adjustment, Phone Jack
Weight .....	Approximately 30 pounds
Dimensions .....	3½" H x 16¾" W x 15-1/16" D, Standard 19" rack mounting
Power .....	Input: 50-400 cps, 115 vac (230 vac opt.), Wattage: Approximately 25 watts (with SDU)
Finish .....	Gray Enamel per MIL-E-15090, Color No. 26329, Federal Standard 595; Hard anodized satin finish overlay with black etched lettering

### PLUG-IN RF TUNING HEADS

All plug-in tuning heads are designed for installation in the receiver without adjustment or alignment of any kind. All plug-in tuning heads employ at least a two-section preselector at the RF input. All tuners have AGC to allow handling of large RF signals. AFC is also provided. Local Oscillator output is provided through front panel connector.

Model	Tuning Range	NF Max.	IF Rej. Min.	Image Rej. Min.	Osc. Rad. Max.
SH-102 P	2- 6 MHz	8 db	60 db	60 db	5 uv
SH-103 P	6- 20 MHz	6 db	90 db	60 db	5 uv
SH-104 P	20- 45 MHz	6 db	90 db	60 db	5 uv
SH-200 P-1	20- 45 MHz	4.5 db	90 db	65 db	10 uv
SH-201 P-1	30- 100 MHz	{ 4.5 db (to 90 MHz) 5.5 db (above 90 MHz)	60 db	60 db	8 uv
SH-202 P-1	90- 300 MHz	6.5 db	80 db	50 db	15 uv to 260 MHz (25 uv above 260 MHz)
SH-203 P-1	250- 500 MHz	10.0 db	90 db	60 db	5 uv
SH-204 P-1	490-1000 MHz	12.0 db	90 db	80 db	50 uv
SH-205 P-1	1- 2 GHz	14.0 db	90 db	60 db	300 uv
SH-206 AP-1	2- 4 GHz	15.0 db	90 db	60 db	300 uv
SH-207 P-1	4- 7 GHz	16.0 db	90 db	50 db	300 uv

## IF AMPLIFIER/DEMODULATOR SPECIFICATIONS

Operated with	IF Board Model	Bandwidth (3 db, KHz)	Center Frequency MHz	BFO	AM Sensitivity Required RF Input to Produce 10 db (S + N)/N Minimum	FM Sensitivity Required RF Input to Produce 21 db (S + N)/N Minimum	FM Deviation Sensitivity Volts/KHz Minimum (at Video Output)
SH-100 Series RF Tuning Heads	IF-112-01	1	0.455	Available	-118 dbm, 50% at 400 cps rate		0.40
	IF-112-05	5	0.455	Available	-110 dbm, 50% at 400 cps rate		0.40
	IF-112-10	10	0.455	Available	-107 dbm, 50% at 1 KHz rate		0.40
	IF-220-10	10	21.4 & 1.65	Available	VHF: 2 uv, 50% mod. at 1 KHz rate produce 17 db (S + N)/N minimum	2 uv, mod. at 1 KHz rate, 3.5 KHz dev.	0.40
	IF-220-20	20	21.4 & 1.65	Available	VHF: 2 uv, 50% mod. at 1 KHz rate produce 17 db (S + N)/N minimum	2 uv, mod. at 1 KHz rate, 7 KHz dev.	0.40
	IF-211-60	60	21.4 & 2.5	Available	VHF: 2 uv, 50% mod. at 1 KHz rate	2 uv, mod. at 1 KHz rate, 20 KHz dev.	0.15
	IF-211-75	75	21.4 & 2.5	Available	VHF: 2 uv, 50% mod. at 1 KHz rate	2 uv, mod. at 1 KHz rate, 25 KHz dev.	0.15
	IF-211-100	100	21.4 & 2.5	Available	VHF: 3 uv, 50% mod. at 1 KHz rate UHF: 5 uv, 50% mod. at 1 KHz rate	3 uv, mod. at 1 KHz rate, 30 KHz dev. 5 uv, mod. at 1 KHz rate, 30 KHz dev.	0.15
	IF-211-150	150	21.4 & 2.5	Available	VHF: 3.5 uv, 50% mod. at 1 KHz rate UHF: 6 uv, 50% mod. at 1 KHz rate	3.5 uv, mod. at 1 KHz rate, 50 KHz dev. 6 uv, mod. at 1 KHz rate, 50 KHz dev.	0.01
SH-200 Series RF Tuning Heads	IF-212-300	300	21.4	No	VHF: 4 uv, 50% mod. at 1 KHz rate UHF: 8 uv, 50% mod. at 1 KHz rate	4 uv, mod. at 1 KHz rate, 100 KHz dev. 8 uv, mod. at 1 KHz rate, 100 KHz dev.	0.03
	IF-212-500	500	21.4	No	VHF: 5 uv, 50% mod. at 1 KHz rate UHF: 10 uv, 50% mod. at 1 KHz rate	5 uv, mod. at 1 KHz rate, 170 KHz dev. 10 uv, mod. at 1 KHz rate, 170 KHz dev.	0.02
	IF-212-1000	1000	21.4	No	VHF: 10 uv, 50% mod. at 1 KHz rate UHF: 20 uv, 50% mod. at 1 KHz rate	10 uv, mod. at 1 KHz rate, 330 KHz dev. 20 uv, mod. at 1 KHz rate, 330 KHz dev.	0.01
	IF-212-2000	2000	21.4	No	VHF: 13 uv, 50% mod. at 1 KHz rate UHF: 26 uv, 50% mod. at 1 KHz rate	13 uv, mod. at 1 KHz rate, 670 KHz dev. 26 uv, mod. at 1 KHz rate, 670 KHz dev.	0.005
	IF-212-3000	3000	21.4	No	VHF: 14 uv, 50% mod. at 1 KHz rate UHF: 28 uv, 50% mod. at 1 KHz rate	14 uv, mod. at 1 KHz rate, 1000 KHz dev. 28 uv, mod. at 1 KHz rate, 1000 KHz dev.	0.003
	IF-212-4000	4000	21.4	No	UHF: 30 uv, 50% mod. at 1 KHz rate	30 uv, mod. at 1 KHz rate, 1350 KHz dev.	0.003
	IF-212-8000	8000	21.4	No	UHF: 35 uv, 50% mod. at 1 KHz rate	35 uv, mod. at 1 KHz rate, 1350 KHz dev.	0.003

### PLUG-IN DISPLAY UNITS

ACL provides two signal display units, both of which are plug-in assemblies. The SDU-100P is used with the series 100 tuners and the SDU-102AP with the series 200 tuners. They are designed to provide a visual display of the signal to which the receiver is tuned.

CRT Size	Standard 1" x 3" display	Amplitude Response	±1.5 db within any sweepwidth
Sweepwidth	SDU-102AP From DC to 3 MHz Continuously adjustable SDU-100P 0 to 10 KHz and 0 to 50 KHz Continuously adjustable	Sensitivity	10 uv at SDU input produces 1" deflection
Resolution	SDU-102AP 10 KHz SDU-100P 400 Hz and 2 KHz	Crystal Marker	SDU-102AP 21.4 MHz center frequency marker (Sideband markers available on SDU-102AP on request) SDU-100P 455 KHz center frequency marker
Sweep Rate	SDU-102AP 20 Hz SDU-100P 4 Hz	Linearity	5% within any sweepwidth
IF Frequency	SDU-102AP 1st IF, 4.3 MHz; 2nd IF, 455 KHz SDU-100P 1st IF, 80 KHz; 2nd IF, 15 KHz	Dimensions	3½" H x 5" W x 14" D
		Weight	6 lbs.
		Power	Input — ±12 VDC (no external power required when plugged into SDU-101 or into SR-209)
		Finish	Matches SDU-101 or SR-209