

AN EVOLUTIONARY UPGRADE
OF A STANDARD-SETTING PERFORMER



SCR-7204AF COMMUNICATIONS RECEIVER

T O T A L S P E C T R U M C O M M A N D

Enhanced Capabilities to meet current & emerging signal threats

Although it retains the AF suffix, a series of new, "next generation" design enhancements significantly increase the SCR-7204AF Receiver's probability of intercept.

Improvements in circuit design, mounting technology, and operational firmware yield enhanced signal search and capture profiles across a spectrum of high density / low signature environments.

The Standard-Bearer in Performance

The SCR-7204AF sets the industry standard in intercept ability. Special emphasis on HF, VHF, and UHF front-end design, as well as the application of advanced synthesizer techniques, has yielded impressive performance, higher spectral purity, and faster tuning times. Specific upgrades provide exceptional spur free dynamic range, noise figure, and third order performance, commanding the entire 0.1-2600 MHz range. Powerful receiver-housed "smart" electronics store up to 144 scan, discrete Fo, or lockout frequencies. Adjustable signal/dwell level thresholds and high-speed tuning features establish positive control over low threshold signals and provide the ability to tune to any frequency, typically within 2 milliseconds.

Leadership in Versatility, Compatibility, and Reliability

Operating over a wide frequency range and in a variety of operational modes from built-in or remote front panel and bus commands, the SCR-7204AF's highly reliable surface mount technology (SMT) construction allows shipboard, airborne, or fixed site installation. Optional TEMPEST versions and a drop-in IF-Tape Converter module further increase the unit's versatility. Industry-standard interfaces provide an easy, compatible connection of the Receiver to its host computer, and a straightforward, intuitive man-machine interface maximizes the operator's potential for successful intercept. The unit's rugged, connectorized, and modular construction--along with the Optional Remote Receiver Control Unit--improve reliability and decrease potential maintenance issues.

TECHNICAL SPECIFICATIONS

DESCRIPTION

The "Total Spectrum Command" SCR-7204AF Receiver provides enhanced capabilities over a 100 KHz to 2600 MHz continuous tuning range to address current and emerging signal threats for reconnaissance, surveillance, and intelligence collection applications requiring superior performance.

Special emphasis in the 0.1 to 32 MHz HF band using a separate preselector, preamp, first and second converter yields a 12 dB noise figure and +30 dBm 3rd order intercept point performance. VHF and UHF performance is equally impressive with a noise figure of 12 dB and 3rd order IP of +10 dBm. To meet the ever increasing demand for higher spectral purity LO's and faster tuning times the receiver uses a "next generation," combined Four Loop/DDS ultra-high performance synthesizer. Coupled with existing capabilities, these features provide a receiver ideally suited for sophisticated F1-F2 signal search and acquisition roles via internally stored operational profiles which can be commanded by front panel controls or over the remote control bus. The unit retains the high flexibility of 12 IF bandwidths between 500 Hz and 8 MHz, as well as AM, FM, CW and SSB detection modes.

SCR-7204AF Receiver design enhancements are specific upgrades to provide exceptional spur free dynamic range, noise figure and third order intercept performance over the entire 0.1-2600 MHz range.

UPGRADES

- New HF Preselector for improved NF and 2nd Order IP performance
- New, low phase noise, high speed, high spectral purity LO, advanced design synthesizer
- New, 3-band, triple mixer First Converter
- New, 2-band, dual mixer Second Converter
- High reliability surface mount technology (SMT) construction
- Optional Remote Receiver Control Unit available for diagnostic or local, manual control routines

CHARACTERISTICS

- Compact design: 3.5"H x 8.5"W x 22.0"D
- Multiple operational modes using built-in front panel, remote front panel, or bus commands
- Easy lift: Receiver total weight 24 lbs.
- Rugged, connectorized, modular construction

CAPABILITIES

- 0.1 to 2600 MHz frequency coverage in 10/20 Hz increments
- Stores up to 144 scan, discrete FO or lockout frequencies with or without complete receiver set-up parametrics
- Demodulates AM, FM, LSB, USB and CW signals (Bandwidth dependent)
- Tunes to any frequency within 10 milliseconds maximum, 2 milliseconds typical
- Built-in Test (BIT) monitors power supply voltages, internal temperature and synthesizer lock status

FEATURES

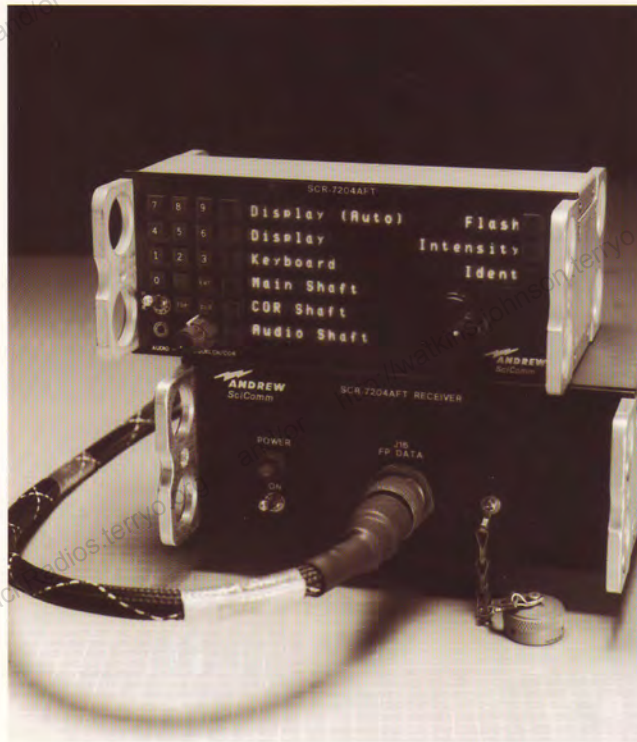
- Operates in Frequency Scan, Step Tune, or Set-On Modes
- Operates from 110 or 220 volts AC, autosensing
- 12 total IF bandwidths from 500 Hz to 8 MHz is standard
- Adjustable signal presence threshold and Carrier Operational Relay (COR) output
- Selectable scan formats include F1-F2, Delta F, and Discrete
- Automatic and Manual Gain Control
- Either upper or lower sideband can be routed to rear panel video output
- May be controlled by either IEEE-488 or RS-232 protocols

RECEIVER CONFIGURATIONS

The SCR-7204AF Receiver is available with full-function, manual front panel controls or blank front panel for remote-only operation. For remote receivers an optional Remote Control Unit connects to a diagnostic port for maintenance or local control purposes

OPTIONS

An optional TEMPEST version of the receiver, the SCR-7204AFT, is now available on a production basis. This unit has been certified to meet or exceed the most stringent level of requirements governing the criteria for susceptibility and allowable radiated emissions.

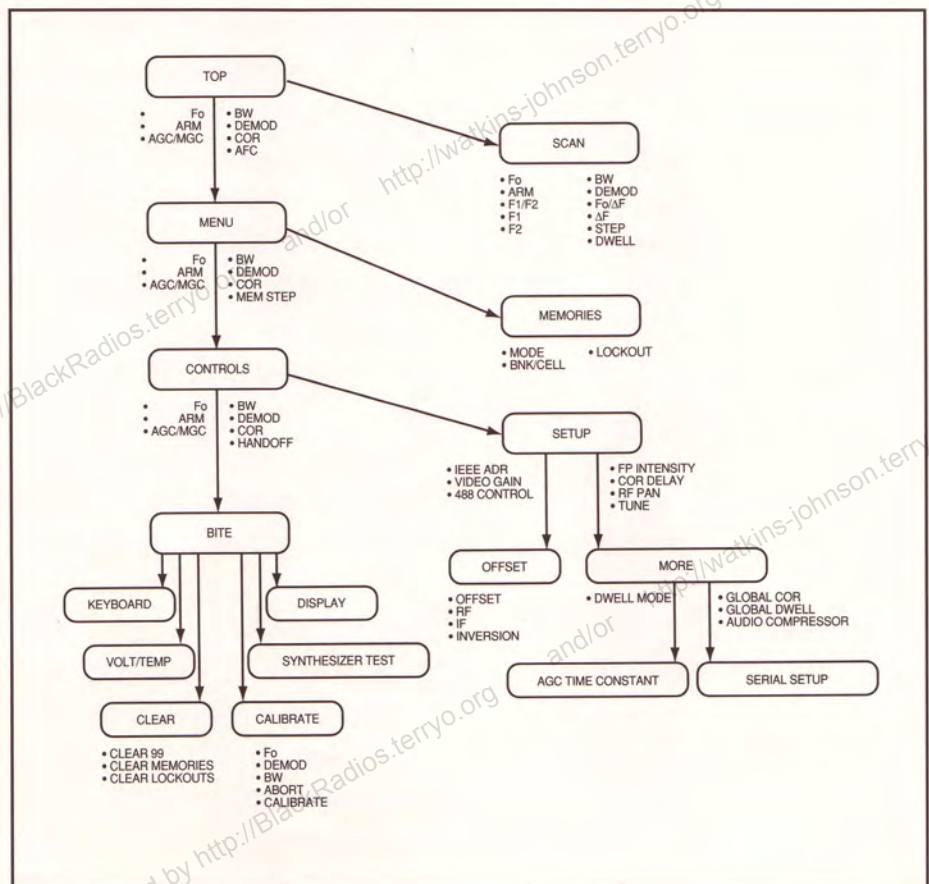


To further enhance the flexibility of the SCR-7204AF Receiver to meet additional mission needs, a new "drop-in" IF-Tape Converter module is available. This module mounts in one of the slots normally used for IF demodulator modules. The IF-Tape Module provides reference-on-tape (ROT) delay equalized, low distortion outputs at either 1.075 and 3.225 MHz center frequencies. When the IF-Tape Module is installed, the receiver provides simultaneous IF-Tape and IF Demodulator operation.

OPERATION

Operation of the SCR-7204AF Receiver is via comprehensive front panel controls with display readouts or over a rear panel remote control IEEE-488 or RS-232 command/status port. Front panel operation is intuitive in nature due to the straightforward control level structure and display prompts.

The below screen hierarchy flow chart depicts the available menu and relationship between each function.



SCR 7204AF Screen Hierarchy

SCR-7204 RECEIVER SPECIFICATIONS

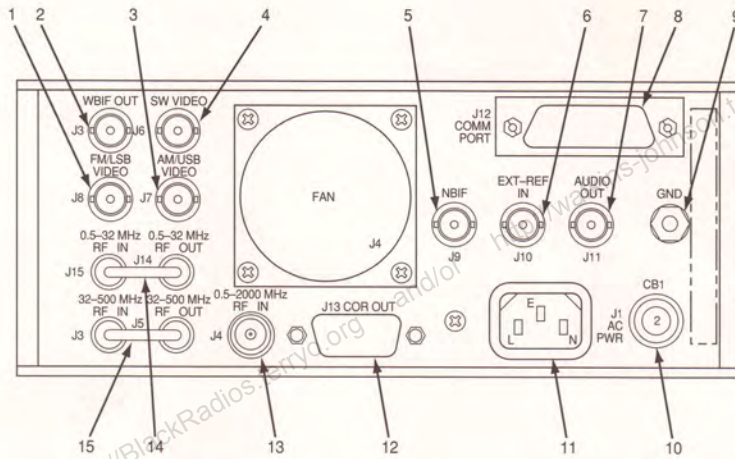
PARAMETER	SPECIFICATION
Frequency Range	100 KHz to 2600 MHz
Noise Figure	12 dB max, 10 dB typical at 2 to 500 MHz 15 dB max, 12 dB typical at 500 to 2000 MHz 17 dB max, 15 dB typical at 2000 to 2600 MHz
Tuning Resolution	10 Hz below 1200 MHz 20 Hz above 1200 MHz
Tuning Speed	10 msec max between any two frequencies, 2 msec typical for scan steps of 10 MHz or less as measured from external command EOB to signal settled to within 1 KHz in IF bandpass
Synthesizer Switching Time	1 msec max, 750 usec typical, LO output settled to within 1 KHz of final frequency
Phase Noise	-100 dBc/Hz max at 10 KHz offset from 0.5-32 MHz -90 dBc/Hz max at 10 KHz offset from 32-1200 MHz -80 dBc/Hz max at 10 KHz offset from 1200-2600 MHz
Internal Reference Stability	± 1 ppm/24-hour period 0 to +50°C
External Reference Input	1,2,5,10 MHz at 0 dBm nominal. Automatic switchover and frequency selection
Third Order Intercept Point	+30 dBm min, 2-32 MHz, Attenuator In, Preamp On +10 dBm min, 32-500 MHz, Attenuator Out, Preamp On 0 dBm, min, 500-2600 MHz
Second Order Intercept Point	+40 dBm min ($0.5 \text{ MHz} \leq f \leq 2600 \text{ MHz}$); Attenuator Out, Preamp On
Image Rejection	80 dB, min
IF Rejection	80 dB, min
RF Input Protection	+20 dBm min, Attenuator Out; +30 dBm, Attenuator In
RF Input VSWR, 50 ohm reference	3.0:1 max
RF Input Impedance	50 ohms nominal
LO Radiation	-90 dBm max
Internally Generated Spurious Signals	-110 dBm max equivalent RF input
Spur Free Dynamic Range	SFDR with -20 dBm signal applied, 65 dB min, 70 dB, typical at ± 300 KHz from center of tuned IF band
Audio Output Level	1.25 VRMS min into 600 ohms
Demodulation Modes	AM, FM, LSB, USB, CW

SCR-7204 RECEIVER SPECIFICATIONS

PARAMETER	SPECIFICATION
IF Bandwidths	
Bandwidth	Shape Factor
500 Hz	3.5:1
3 KHz	3:1
6 KHz	3:1
10 KHz	3:1
20 KHz	3:1
50 KHz	3:1
300 KHz	3:1
500 KHz	3:1
1 MHz	3.5:1
2 MHz	3.5:1
4 MHz	3.5:1
8 MHz	3.5:1
Video Output	0.3 VRMS min into 50 ohms
Wideband IF Output	21.4 MHz, 10 MHz BW, 15 dB min gain
BFO (CW Mode Only)	
Range:	± 8 KHz
Resolution	10 Hz min
Gain Control	AGC, MGC; 90 dB min range
COR Output	Normally open relay contact closure, 500mA DC max
Remote Control	IEEE-488, RS-232
Memory Locations	144 for F ₁ -F ₂ scan, full receiver set-ups and lockout frequencies (total)
Input Power	120/220 vac ±10% 47-73 Hz
Power Consumption	98-125 w. typical with full-function front panel or remote head attached (depending on front panel illumination level) 107 w. typical with blank front panel
Size	Half-rack chassis 3.5"H x 8.5"W x 22"D
Weight	Receiver with blank front panel: 24 lb. nominal Receiver with full function front panel: 25 lb. nominal Remote front panel and cable: 4 lb. nominal
Temperature Range	0 to 50° C Operational, -40 to 70° C storage
Altitude	5,000 feet ASL operating 15,000 feet ASL static
Humidity	0 to 95% at 0 to 40° C, non-condensing
RFI/EMI	Designed to meet the intent of MIL-STD-461B
BIT (Built-in-Test)	1st, 2nd, 3rd LO Lock; DC power supply voltages, Unit Temperature, Display Test, Keyboard Test and Calibrate

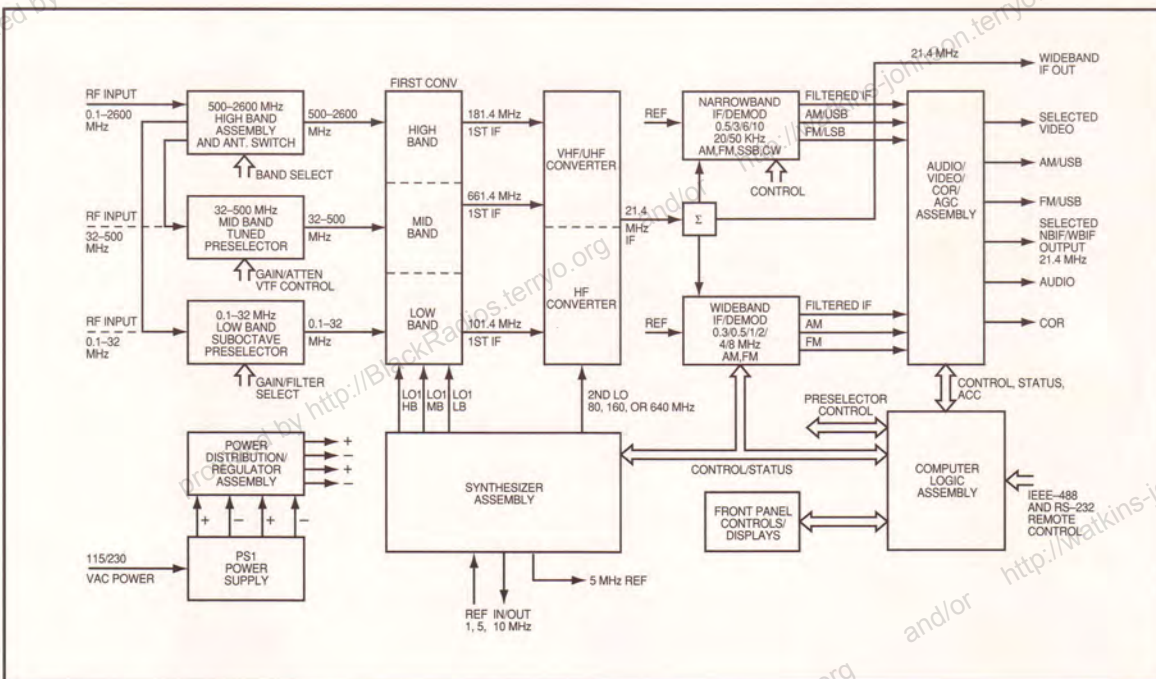
Specifications are subject to change without notice.

RECEIVER REAR PANEL CONNECTIONS



Key

Key	Item
1	J8 FM/LSB VIDEO
2	J3 WBIF OUT
3	J7 AM/USB VIDEO
4	J6 SW VIDEO
5	J9 NBIF
6	J10 EXT REF
7	J11 AUDIO OUT
8	J12 COMM PORT
9	GND STUD
10	CB1, CKT BRKR
11	J1 AC POWER
12	J13 COR OUT
13	J4 0.1-2600 MHz RF IN
14	J14/J15 0.1-32 MHz RF IN/OUT
15	J2/J5 32-500 MHz



SCR 7204AF Simplified Block Diagram



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