

RADAR ESM AND ELINT RECEIVERS

MODEL	RECEIVER TYPE	OPERATING FREQ.	INST. BANDWIDTH	INSTALLED SENSITIVITY	TOTAL DYNAMIC RANGE	INST. DYNAMIC RANGE
ASELSAN A.S.; Ankara, Turkey; +90-312-592 1000; www.aselsan.com.tr						
Wide Band	IFM	S to Ku Band	*	*	*	*
Narrow Band	Digital Channelized	L to Ka Band	*	*	*	*
Low Band	Digital Channelized	UHF, L band	*	*	*	*
Chordell Systems Ltd.; Oxford, UK; +44 1865 784384; www.chordell.com						
Wolverine	Digital	0.5-18 GHz	17.5 GHz	CRLB +0.2 dB	140 dB	*
Collins Aerospace; Richardson, TX, USA; +1 972-705-3920; www.rockwellcollins.com/ewsigint						
DPAU-4001 Digital Pulse Analyzer Unit	Digital	0.5-18 GHz; 0.5-40 GHz	500, 100, 50, 25, 10 and 1 MHz	*	> 100 dB	60 dB
IFMR-6070 IFM Receiver	IFM	0.5-18 GHz	0.5-18 GHz	*	65 dB	65 dB
DAS Photonics; Valencia, Spain; +34 963 556 150; www.dasphotonics.com						
RESM/ ELINT Receiver	*	0.5-40 GHz	40 GHz	*	*	*
D-TA Systems; Arlington, VA, USA; +1 (571) 775-8924 x7712; www.d-ta.com						
MFEL-5000	Scanning superhet	0.5GHz to 18GHz (ext. 40 GHz)	500 MHz	-80 dBm	90 dB	60dB
Elbit Systems EW and SIGINT - Elisra; Bene Beraq, Israel; +972-3-6175411; www.elbitsystems.com						
WBR	Wideband	0.5-40 GHz	0.5-40 GHz	*	> 75 dB	> 60 dB
DSHR	Superhet/Tuner	0.5-40 GHz	4, 40, 140, 500, 3000 MHz	*	> 75 dB	> 60 dB
QSHR	Superhet/Tuner	0.5-40 GHz	4, 40, 140, 500, 3000 MHz	*	> 75 dB	> 60 dB
Elettronica Group; Rome, Italy; +39 0641541; www.elt-roma.com						
ELT/800 family	Superhet/Digital/ IFM	C to J Band min	*	*	*	*
ELT 1000	Digital Direct RF Sampling	E to J + D Band	1GHz min	*	60 dB	50 dB
ELT/819 A	Superhet/Digital/ IFM (with wide open integrated channels and functions)	from A to D Band	65 MHz and 1 GHz	*	80 dB	60 dB
ELTA Systems Ltd.; Ashdod, Israel; +972-8-857-2312; www.elta-iai.com						
ELL-8385 ESM/ ELINT Digital Receiver	Superhet, Digital (Direct sampling)	0.5-18 GHz	> 500 MHz	> -80dBmi	80 dB	60 dB
ESROE Ltd.; Fareham, Hampshire, UK; +44 (0)1329 237285; www.esroe.com						
MicroESM 1t	*	2-18 GHz	*	-60 dBm	40 dB	*
FEI-Elcom Tech, Inc.; Northvale, NJ, USA; +1 201-767-8030 ext 271; www.fei-elcomtech.com						
SIR-4001-8-9	Airborne Microwave Wideband DSP Receiver	0.5-18 GHz; 0.5-26.5 GHz; 0.5-40 GHz	Up to 2 GHz	At L Band 500, 1, 2 GHz; 160 MHz 1, 5, 10, 20, 40, 80 MHz	65 dB (Including non-carrier related spurious, carrier prelared, IP3, IP2) per 1 MHz BW	IP3 > 0 dBm; NF < 15 dB

SUPPORT DF	CHANNELS	POWER (W)	SIZE (HxWxL inches/cm)	PLATFORM	WEIGHT (lb/kg)	FEATURES
Amplitude	4	< 300W	*	Air, grd, shp	< 20 kg	Full capability against modern threats (high sensitivity, precise parameter measurement).
Phase	8	< 500W	*	Air, grd, shp	< 50 kg	*
Amplitude	4	< 350W	*	Air, grd, shp	< 25 kg	*
Yes, TDOA, FDOA Phase	4 for DF and 3d Geo	300W Input	15U Typical	*	120 kg	Offers real time wideband staring across 17.5GHz of spectrum.
Amplitude, time, phase	1	250W	4U rack mount, 7 x 17 x 21 in.	*	32 lb	Precision parameter & intrapulse measurement, recording and analysis.
Amplitude, time	1	250W	2U rack mount, 3.5 x 17 x 21 in.	*	35 lb	Continuously staring from 0.5 to 18 GHz. Generates detection Tips and PDW data.
Yes	*	*	*	*	*	360 deg coverage; DF accuracy 1 deg RMS
Amplitude; phase or spinner	2 min for Amp DF; 4+ phase	300W Input (Typical)	6U Typical (3U min)	Grd-fix, grd-mob, air, shp	40+ kg	Offers autonomous situation assessment & collection.
Amplitude	Multiple	400W	44 x 72 x 77(D) cm	*	60 kg	>99% POI, digital map, remote control.
Amplitude, phase	2	260W	17 x 18 x 29(D) cm	*	11 kg	Synthesized and fast tuning, digital map, remote control.
Amplitude, phase	4	550W	17 x 36 x 29(D) cm	*	23 kg	Synthesized and fast tuning, digital map, remote control.
Amplitude monopulse (4-8 antennas), TDOA	4 min.	*	*	Air	*	Airborne: fast localization.
*	4	200W typ.	3U x 12 Modules typ.	Air	12 kg typ.	Wideband radar emitters detection, discrimination and identify cation; radar emitter measurement and technical parameters extraction.
Interferometry correlative vectorial	5 superhet, 2 wide open	700W typ.	RPU: 26 x 20 x 60; Signal Routing; 29 x 17 x 29 in.	Shp, grd, air	8 kg signal routing; 31 kg RPU; weight of antenna varies w/ installation	Very low ELINT; ground, aircraft and naval: localization by triangulation.
Amplitude, phase, time	Multichannel (4 channels)	400W	11.4 x 8.26 x 18 in.	Air, grd-mob, grd-fix, ship, sub	25 kg w/o antennas	Software defined receiver with automatic system process. Integrated with ELTA's radars for complete active and passive situation picture.
Yes	*	<20W	18 x 18 x 9.6 cm	Grd-fix, grd-mob, air, ship, sub	1.5 kg (main unit); 1kg (tablet); 0.62 kg (9Ah battery)	DF accuracy 10 deg. RMS; can report 100 simultaneous emitters.
No	1	95 - 265 VAC, 47-440 Hz, 150 Watts	19-in. Rack 1U	*	20 lb	ELINT, RWR, EW, SIGINT

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FEI-Elcom Tech, Inc.; Northvale, NJ, USA; +1 201-767-8030 ext 271; www.fei-elcomtech.com cont'd.						
SIR-1024	ChirpSounder Receiver	2-30 MHz	*	(For 10 dB SINAD) AM (6.4 KHz BW): -103 dBm input CW (300 Hz BW): -122 dBm input SSB (3.2 KHz BW): -112 dBm input FM (16 KHz BW): -98 dBm input, 5 KHz deviation, 400 Hz modulation: 20 dB SINAD	-135 dBm MDS	80 dBm IP2 90 dBm IP3
SIR-3200	NHF/UHF Wideband DSP receiver	20 MHz to 3000 MHz	80 MHz	20 kHz IF Bandwidth: -101 dBm type 1 MHz IF Bandwidth: -84 dBm type 20 MHz IF Bandwidth: -70 dBm type AM Sensitivity Condition: 50 % Modulation, 1 kHz tone, 10 dB S+N/N ratio FM Sensitivity Condition: 30 % of Selected IF Bandwidth Deviation, 1 kHz tone, 17 dB S+N/N	>95 dB @1 MHz BW	25 dBm IP2 15 dBm IP3
HENSOLDT Sensors GmbH; Ulm, Germany; 0049 731 392 0; www.hensoldt.net						
HENSOLDT Kalætron® Elint Rx	Full digital receiver	0.5-40 GHz	≥2 GHz	Depending on used antenna frontend ≥ -95 dBm for high gain antenna	≥ 70dB	≥ 60dB
IRF - Intelligent RF Solutions; Sparks, MD USA; +1 443-310-2814; www.irf-solutions.com						
iWR-6500	Superhet; stepped sweeper	0.5-26.5GHz	500 MHz @ 1 GHz IF; 85 MHz @ 160 MHz	*	94 dB @ 1MHz	65 dB STSFDR
SMR-5550i	Superhet; set-on/collection	0.1-18 GHz	100 MHz @ 160 MHz	*	> 90 dB @ 1MHz	53 dB min. @ 50MHz BW
Kratos General Microwave Israel Ltd.; Jerusalem, Israel; +972-2-5689444; www.kratosmed.com						
WBR-0518-MOD	Superhet	0.5-18 GHz	up to 500 MHz	-58 dBm	60 dB + 60 dB DCA	60 dB
L3Harris Technologies – Surveillance Solutions; Van Nuys, CA, USA; +1 818-988-2600; www.L3Harris.com						
ES-5080	Superhet, digital	To Ka Band	500 MHz	Depends on high gain antenna; to -95 dBmi typical	> 75 dB	60 dB
Leonardo DRS; Germantown, MD, USA; +1 301-948-7550; www.leonardodrs.com/SignalSolutions						
SI-9172/3 Vesper	Superhet	3 MHz - 6.2 GHz	Selectable bandwidths, 100, 30 & 15 MHz	13 dB NF, -122 dBm sensitivity @ 10 kHz BW	88 dBc SFDR in 10 KHz BW	VITA 49 packetized digital IF via Aurora transport protocol
SI-9170A Sparrow	Superhet	20 MHz - 18.25 GHz	500 MHz BW @ 1000 MHz C.F.	15 dB NF max	-2 dBm input P1dB	10/100Base-T Ethernet
Lockheed Martin Mission Systems and Training; Owego, NY, USA; +1 607-751-7089; www.lockheedmartin.com						
Advanced Digital Receiver Processor (ADRP)	Superhet, digital	*	*	*	*	*
Mercury Systems; Andover MA, USA; +1 866-627-6951; www.mrcy.com						
RFM3101	Superhet	6-18 GHz	1 GHz	NA	50 dB Gain Control	60 dB (1 MHz BW)
RFT-3200	Superhet	0.1-40 GHz	Selectable: 2 GHz, 1 GHz; 500, 200, 100, 50 MHz	12 dB NF, typ at max gain	Input 1 dB Compression Point: -15 dBm typ	<-60 dBc Spurious, at rated output level
FM021814-001	IFM	2-18 GHz	16 GHz	-10 dBm / -50 dBm	20 dB / 60 dB	20/60 dB
Patria; Tampere, Finland; +358-20-4691; www.patria.fi						
ARIS	Digital	0.5-18 GHz (optional 20 MHz - 40 GHz)	Variable 0.1-500 MHz	-130 to -80 dBm depending on BW and resolution settings	130 dB	56-81 dB depending on BW and resolution settings

SUPPORT DF	CHANNELS	POWER (W)	SIZE (HxWxL inches/cm)	PLATFORM	WEIGHT (lb/kg)	FEATURES
No	1	95 - 265 VAC, 47-63 Hz, 100 Watts	19-in. Rack 2U	*	35 lb	2 Slot, VME 6U Optional
No	2	95 - 265 VAC, 47-63 Hz, 100 Watts	19" Rack 2U	*	35 lb	2 Slot, VME 6U Optional
Receiver is supporting Amplitude and Phase DF technology	4 fully digital, independent channels	28 VAC, 380W	250 x 128 x 380 mm	Air, grd-mob, grd-fix, ship, sub	ELINT Rx < 10 kg	Software upgradable; continuous IQ raw data recording and spectrum analysis; PDW recording; operator tasking online; offline supported by AI technologies; type classification of unknown emitters; qualified according MIL standards
Yes	Single	45W	1.6 x 5.5 x 10 in.	Grd-mob, grd-fix, air	3.5 lb	Next-generation digital-based search receiver; supports SIGINT collection, N-channel DF.
Monopulse DF, Cross Pole	Single, expandable to multi-channels	100W	1.75 x 20.16 x 17 in.	Grd-mob, grd-fix, air, sub	20 lb	Very low integrated phase noise and up to 40 GHz integrated freq. extension. SEI certified.
No	1	70	220 x 440 x 40 mm	shp	6kg	LAN communication, BIT, scan/search modes, demodulator AM&FM video output.
High gain, spinning DF	2 standard	< 1kW	Varies with installation	grd-mob, grd-fix, shp, air	Varies with installation	Detect, ID FMCW radars; supports many operators (local or remote over TCP/IP).
N-channel coherent or full independent tuning	SI-9173 up to 8 Rx & 1 Tx, SI-9172 up to 4 Rx & 1 Tx	50/111W	3U VPX & 6 U VPX	3U VPX & 6U VPX	4.5 lb	Highly configurable with multiple channels.
Phase coherent up to N channels	2 channels phase coherent	46W cond. cooled	3U VPX	3U VPX	4.5 lb	Highly configurable with multiple channels.
*	Multiple	350W	6 x 7.7 x 10 in.	*	29 lb	Open architecture, high performance digital receiver for RWR, ESM, ELINT applications.
Yes	2	20W	VPX 3U card	Air, grd, shp	*	Modular OpenRFM design
Yes	4	35W	1.75 x 17 x 22 typ	Grd-fix, shp	< 20 lb typ	Agile IF, configurable
No	1	20W	1.2 x 5 x 6.5 in	Air, grd, shp	2.5 lb	Low/ High DR options
Amplitude and phase monopulse and spinning dish	Independent microwave channels (2) and 2 V/UHF channels feeding digital channelizers	1130W (including recorder unit)	10U (receiver processor) + 3U (recorder unit) 19-in. rack mount chassis	Grd-fix, grd-mob, ship, air (optional)	85 kg (including receiver processor, 55 kg and recorder unit, 30 kg)	Continuous real-time and offline ELINT analysis capability. Recording capability of IF up to 500 MHz BW. Channelized pulse processor. Radar identification and automatic recording.

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Rohde & Schwarz GmbH & Co.KG; Munich, Bavaria, Germany; +49-89-4129-0; www.rohde-schwarz.com						
R&S®WPU2000	Superhet, digitizer and pulse analyzer (full Nyquist sampling)	8 kHz - 18 GHz (optional to 40 GHz)	Digital; from 2.5 kHz to 2000 MHz in 8000 steps	Max. -120 dBm (DANL)	> 110 dB	> 72 dB
Space and Defence Technologies (SDT); Ankara, Turkey; +903122101015; www.sdt.com.tr						
Wideband Microwave Receiver	Superhet	0.1-18 GHz	1 GHz	*	> 60 dB at- 30 dBm input	*
Teledyne Defence Limited; Shipley, West Yorkshire, UK; +44-1274-535147; www.teledyne.com						
Phobos-R QR020-M1	CV IFM	2-18 GHz (options to 500 MHz, 20 GHz and 40 GHz)	16 GHz	*	62 dB	62 dB
DR068	CV IFM	2-18 GHz	16 GHz	*	65 dB	65 dB
TUALCOM; Ankara, Turkey; +90 312 485 22 85; www.tualcom.com.tr						
Compact ESM/ELINT Receiver	*	2-18 GHz	16 GHz	*	65 dB	*
Ultra Electronics - TCS; Ottawa, Ontario, Canada; +1 613-592-2288; www.ultra-tcs.com, info@ultra-tcs.com						
xLR-501	Superhet, digital, channelized	0.5-40 GHz	500 MHz, Selectable down to 3 MHz	-94 dBm at 2 GHz -101 dBm at 18 GHz	> 90 dB	> 70 dB
xLR-510	Superhet, digital; channelized, interferometer	0.5-18 GHz	500 MHz, Selectable down to 3 MHz	<-78 dBm	> 90dB	> 70 dB

SURVEY KEY - ELINT RECEIVERS

MODEL

Product name or model number

RECEIVER TYPE

Superheterodyne, Channelizer, IFM, etc.

- CV = crystal video receiver
- IFM = instantaneous frequency measurement
- Superhet = Superheterodyne

OPERATING FREQUENCY

Indicated in kHz, MHz or GHz

INSTANTANEOUS BANDWIDTH

Includes selectable bandwidths if more than one.

INSTALLED SENSITIVITY

Indicated in dBm or dBmI

CRLB = Cramer-Rao Lower Bound

DANL = Displayed Average Noise Level

NF = Noise Figure

SINAD = Signal-to-Noise and Distortion Ratio

TOTAL DYNAMIC RANGE

Total dynamic range, indicated in dB, dBm or dBc

INSTANTANEOUS DYNAMIC RANGE

Instantaneous dynamic range, indicated in dB or dBm

- BW = bandwidth

SUPPORT DF

Does it support DF and with what technology and accuracy?

- RMS = root mean square
- TDOA = time difference of arrival

CHANNELS

Single channel receiver, multiple channels or single expandable to multiple?

POWER

Power dissipated in Watts

SIZE

H x W x L in inches/cm

- ATR = Air Transport Rack

SUPPORT DF	CHANNELS	POWER (W)	SIZE (HxWxL inches/cm)	PLATFORM	WEIGHT (lb/kg)	FEATURES
Spinning dish	8	250-400W	426 x 176 x 450 mm (4HU, 19 in.)	Grd-fix, grd-mob, air, shp, sub	44 lb	Superhet tuner, digitizer, digital channelizer and pulse analyzer in one device. Digital signal processing for CW and LPI radars.
*	*	*	6U, 19-in. rack mount	Grd-fix, grd-mob, air, shp, sub	40 kg	Extendable up to 40 GHz; Eremote programming via Ethernet 1000 Base-T
monopulse amplitude comparison	4	24W	31 D x 12 H cm	grd-mob	< 8.5 kg	Man-portable and deployable; suitable for remote deployment and operation with no fixed ground infrastructure requirement.
*	1	< 40W	2 6U VME slots	*	1.5 kg	Can also include switched multiplexer preselector to manage dense signal environments.
*	4	1.8 A @ 28 VDC	41 x 26 x 7.5 cm	Grd-fix, grd-mob, air, ship, sub	8 kg	Signal processor can generate more than 3 million PDWs per sec.; can store more than 2 million PDWs in internal memory.
High gain spinning DF antenna; rotation speed up to 200 rpm	1 or 2	421	Rackmount Receiver: 3U x 19 x 24 in. Antenna Unit: 21.3 (D) x 17.9 (H) in.	Grd-fix, grd-mob, air, ship	60 kg	Multiple sub-channels for improved system sensitivity. Front end pre-selector with band specific filters and LNAs; can be integrated with wideband IFM receiver to support situational awareness
Interferometer. DF accuracy better than 1° rms and better than 140° IFOV Port and Starboard	4	500	ATR: 11.3 x 11.1 x 18.9 in. AHU: 70 x 15.4 x 5.4 in	Grd-fix, grd-mob, air, ship	72 kg	Multiple sub-channels for improved system sensitivity; front end pre-selector with band specific filters and LNAs; pulse-by-pulse emitter polarization detection; can be integrated with wideband IFM receiver to support situational awareness.

PLATFORM*Host platform*

- air = airborne
- grd-fix = ground-fixed
- grd-mob = ground-mobile
- ship = shipboard
- sub = submarine

WEIGHT*Weight in lb/kg***FEATURES***Additional features*

- CW = continuous wave
- EDW = emitter descriptor word
- FDOA = frequency difference of arrival
- FMCW = frequency-modulated continuous-wave
- GUI = graphical user interface
- POI = Probability of Intercept
- PDW = pulse descriptor word
- TDOA = time difference of arrival

OTHER ABBREVIATIONS USED

- < = greater than
- > = less than
- min = minimum
- max = maximum
- deg = degree
- freq = frequency

* Indicates answer is classified, not releasable or no answer was given.

FEBRUARY 2020 PRODUCT SURVEY: FPGA BOARD FOR EW AND SIGINT APPLICATIONS

This survey will cover Field Programmable Gate Array boards for electronic warfare (EW), communications intelligence (COMINT) and electronic intelligence (ELINT) applications. Please e-mail JEDeditor@naylor.com to request a survey questionnaire.