Extensive research and development activities by Marconi Selenia Communications in the HF field have led to the design and production of advanced HF/SSB system for fixed-wing aircraft and helicopters.

These transceivers provide voice/data radiocommunications for airborne applications over the 2 to 30 MHz frequency range. Designed to meet the most diverse requirements, they provide various output power possibilities (from 100 W to 400 W) and a wide range of voice/data services in the USB/LSB/AM and CW modes.

Data communication capabilities include Link-11, as per STANAG 5511.

The components of this HF systems family has been specifically designed for airborne applications, where a very tough EMI environment is expected, such as in co-located installations requiring simultaneous operation of several radios (i.e. voice/data) on the same airborne platform.

Storage of operation-related data reduce the operator workload during the mission phase.

Maintenance is simplified by advanced BITE facilities allowing failure isolation down to module level.

Extensive flight tests on helicopters and fixed-wing aircraft have demonstrated excellent performance in the most severe environments.

All the systems are powered by 115Vac / 400 Hz 3-phase power line, but there is also a DC powered version of the SRT-[170, 270]/L version, i.e. the SRT-170/M system, which is suitable for installation in very severe EMI environments.

The SRT-170/M combines high flexibility and simplified operation in a reduced size and weight package, achieved through innovative electrical and mechanical design.

The receiver/exciter and RF amplifier are assembled into a single, 1/2 ATR sized LRU.

All these HF systems are currently in service on several airborne platforms.

Any of these transceivers can be interfaced with various Antenna Tuning Units (ATU) dedicated to Loop, Wire or Notch antennas.

As an example, a typical configuration for helicopter installation includes an externally mounted ATU (ATU-1992, an aerodynamically shaped unit, suited for external installation on the fuselage of low-speed aircraft), and a Loop antenna.

The external ATU installation reduces the problems of EMI with other equipment onboard.

The Loop antenna allows use of HF ionospheric propagation in the ‘Near Vertical Incidence Skywave’ (NVIS) mode.

The combination of NVIS and surface-wave modes provides reliable radio communication over adverse terrain.
A typical HF system consists of the following units:

- Receiver/Exciter
- Power amplifier
- Pre- post-selector (option, only to meet severe co-location / simop requirements).
- Mounting tray.

The HF system provides simplex receive/transmit operation over the 2 to 30 MHz range.

Mission-oriented data are stored in the SRT-170/M including frequency, mode, and time of operation.

By using this approach, tuning times of the order of 50 ms are achieved.

The ATU is able to store up to 256 channels. Antenna tuning data are acquired and stored prior to the mission. When any of the stored channels is selected during the mission, the stored tuning data are used to speed up the antenna tuning operation, without power emission (‘silent tuning’).

The HF system can be controlled via either MIL-STD-1553B, or ARINC 429 data bus, or from a dedicated Remote Control Panel (SP-648/L).

The HF System can interface to the following devices:

- Adaptive Communications Processor, for automatic selection of the best operating frequency, based on data on the channel conditions
- Data Link Modem, to set up point-to-point and network links
- Crypto Modem, to operate in the crypto voice narrowband mode.

### MAIN FEATURES

- Voice and data operation
- Adaptive communication (ALE), according to MIL-STD-188-141A
- SELCAL function i.a.w. ARINC 714
- Microprocessor control and LSI component design
- Direct Digital Synthesis (DDS) technology for fast frequency setting
- Digital Signal Processing (DSP)
- 100W systems built in a single, compact unit of 1/2 ATR-short package, which combines receiver/exciter and power amplifier functions
- Use of whip, wire, loop or structural antennas by using the appropriate ATU
- 100 presettable channels
- FSK mode by optional internal modem
- Extensive, continuous and interruptive BITE to locate failures and minimize turnaround time
- Pre- post-selector (option, only to meet severe co-location / simop requirements).
- Mounting tray.

### CONFIGURATION

A typical HF system consists of the following units:

- Receiver/Exciter
- Power amplifier

- Modular construction combined with advanced BITE facilities for quick, simple and economical maintenance
- Crypto voice by optional external modem
- Fast, automatic tuning
- Embedded growth capability for EPM/ARCS and high-speed serial modem
- Complete remote control for all operating functions, through bus interface or dedicated control panel

### OPERATION

See table above for a complete list of available system components.
<table>
<thead>
<tr>
<th>Systems Types</th>
<th>Systems Components</th>
<th>Description</th>
<th>Power Supply</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>W</td>
</tr>
<tr>
<td>SRT-170/M</td>
<td>100W lightweight HF system.</td>
<td>+ 28Vdc</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>(SRT-170/L)</td>
<td>Note that the SRT-170/L version is powered by 115Vac / 400 Hz 3-phase</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT-170/M</td>
<td>100 W, lightweight, HF transceiver, includes internal Receiver/Exciter and Power Amplifier</td>
<td>124</td>
<td>193</td>
<td>457</td>
</tr>
<tr>
<td>SP-1127/L</td>
<td>ATU for Wire antennas</td>
<td>124</td>
<td>193</td>
<td>457</td>
</tr>
<tr>
<td>SP-1992</td>
<td>ATU for Loop antennas</td>
<td>115</td>
<td>323</td>
<td>367</td>
</tr>
<tr>
<td>SRT-270/L</td>
<td>200W HF system</td>
<td>115Vac / 400 Hz 3-phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SP-649/L</td>
<td>Receiver/Exciter</td>
<td>90</td>
<td>197.5</td>
</tr>
<tr>
<td></td>
<td>SP-480/L1</td>
<td>Power Amplifier</td>
<td>90</td>
<td>197.5</td>
</tr>
<tr>
<td></td>
<td>SP-1325/L</td>
<td>Pre-post selector (optional) for loop and notch antennas. Used to meet severe constraints of co-location and simop requirements</td>
<td>92</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>SP-1992</td>
<td>ATU for Loop antennas</td>
<td>115</td>
<td>323</td>
</tr>
<tr>
<td>SRT-470/L</td>
<td>400W HF system</td>
<td>115Vac / 400 Hz 3-phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SP-649/L</td>
<td>Receiver/Exciter</td>
<td>90</td>
<td>197.5</td>
</tr>
<tr>
<td></td>
<td>SP-484/L</td>
<td>Power Amplifier</td>
<td>257</td>
<td>193.5</td>
</tr>
<tr>
<td></td>
<td>SP-1325/L</td>
<td>Pre-post selector (optional) for loop and notch antennas. Used to meet severe constraints of co-location and simop requirements</td>
<td>92</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>SP-1325/L1</td>
<td>Pre-post selector (optional) for wire antennas. Used to meet severe constraints of co-location and simop requirements</td>
<td>92</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>SP-1992/LM4</td>
<td>ATU for 400W Wire antennas</td>
<td>257</td>
<td>193.5</td>
</tr>
<tr>
<td></td>
<td>SP-1999</td>
<td>ATU for Loop antennas</td>
<td>213</td>
<td>429</td>
</tr>
<tr>
<td></td>
<td>SP-1992/LN</td>
<td>ATU for Notch antennas</td>
<td>190.5</td>
<td>193.5</td>
</tr>
</tbody>
</table>
TECHNICAL CHARACTERISTICS

GENERAL

Frequency range 2 to 29.9999 MHz
Tuning time Typical 1s (including ATU); 50 ms on learned channel
Modes of operation Simplex Rx/Tx on any available channel
Modulation Clear and secure voice (USB/LSB/AM), CW (USB), Link-11 data (USB,LSB,ISB), TTY (USB), SELCAL (Arinc 714-6), ALE (8-FSK)

Preset channels 100 (stored in the Control Panel)
Frequency stability 1 part in 10
Power supply 115 Vac / 400 Hz 3-phase, except for SRT-170/M powered by +28 VDC

Power consumption dependent on system type (as an example, for a 400W, fully configured, system)

Dimensions & Mass See table 1

TRANSMISSION

RF output power for the 170 family: 175W PEP / 85W average
for the 270 family: 200W PEP / 100W average
for the 470 family: 400W PEP / 400W average

RF power selection 1/2 or 1/4 of max RF output power selectable

Intermodulation (linearity) Better than 30 dB below each of the two-tone

Harmonic attenuation (in band) Better than 50 dB below PEP

Spurious suppression Better than 60 dB below PEP

Carrier attenuation in SSB mode Better than 50 dB below PEP

Undesired sideband attenuation Better than 50 dB below PEP

Duty cycle 1 minutes Tx and 5 minutes Rx in CW,AM and Data mode; continuous in SSB Voice and Link-11 mode

Audio input Voice: 0 dBm/600 ohm balanced
Data: 0 dBm/600 ohm balanced
Crypto voice: 0 dBm/600 ohm balanced

RF Output Protection Automatic protection against short circuit or open circuit of the RF output path and against over temperature

RECEPTION

Sensitivity for 10 dB min. (S+N)/N

CW/SSB: 0.7 µV
AM: 2.5 µV

Selectivity not more than 3dB down from Fc ±300 Hz to Fc ±3050 Hz

Image rejection Better than 100 dB

IF rejection Better than 100 dB

Cross-modulation Better than 3% of nominal audio output

Input impedance 500 ohm (nominal) unbalanced

Intermodulation (linearity) Better than 35 dB below the output level of either tone

Desensitization 3 dB max.

AGC (figure of merit)

Voice: ±3 dB max output audio variation for input variations between 10 µVrms and 1 Vrms

Data: according to STANAG 5511 / MIL-STD-188-203-1A

AGC time constants

Voice: 12ms max rise time, 1.5s max fall time

Data: LINK-11 according to STANAG 5511

Audio output

Voice: 100 mW /600 ohm or 150 ohm balanced

Data: 0 dBm/600 ohm balanced

Audio distortion Better than 5%

Squelch Voice SSB: adjustable for (S+N)/N = 5 to 20 dB
This publication is issued to provide outline information only which (unless agreed by Marconi Selenia Communication S.p.A. in writing) may not be used, applied or reproduced for any purpose or form part of any order or contract or be regarded as a representation relating to the products or services concerned. Marconi Selenia Communication S.p.A. reserves the right to alter without notice the specification, design or conditions of supply of any product or service.

Marconi Selenia Communication logo is a trademark of Marconi Selenia Communication S.p.A.

Printed in Italy.
© Marconi Selenia Communication S.p.A. All Rights reserved.

CODE A-003/V1/03