The SBAS CMA-4124 GPS receiver module is designed for incorporation into all avionics applications such as Multi-Mode Receivers (MMRs). The SBAS CMA-4124 provides the guidance solutions for LP, LPV and SBAS/LNAV/VNAV with LOC and GS outputs compliant to ARINC 710.

The SBAS CMA-4124 has been designed to meet all requirements specified in RTCA/DO-229D for Beta-3 and Delta-4 equipment classes. It is supported with a card-based TSO-C145c Beta-3 and TSO-C146c Delta-4 certificate package as defined by the FAA.

The CMA-4124 provides digital ILS look-alike LOC and GS guidance solutions compliant to ARINC 710 for LP, LPV, and SBAS LNAV/VNAV approach modes. The SBAS CMA-4124 is a single aerial CAT-I certified, compliant to FAA Part-25 design requirements and supports Part-121 operations.

In addition, the SBAS CMA-4124 meets or exceeds all ADS-B requirements (including NAC_VEL=2), RNP.1 navigation with availability >99.999% when under suitable SBAS coverage, automatic SBAS incorporation maximizing HPL availability under all navigation conditions.

The growth path for GBAS/GPS GAST-D/CAT-II + CAT-IIIb has been provisioned with the appropriate software load.

**Design Requirements**

<table>
<thead>
<tr>
<th>Design</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARINC</td>
<td>ARINC 748B Characteristic</td>
</tr>
<tr>
<td>RTCA</td>
<td>DO-229D (planed)</td>
</tr>
<tr>
<td>FAA</td>
<td>TSO-C145c Beta-3 equivalent for all electronics card</td>
</tr>
</tbody>
</table>

**Receivers**

<table>
<thead>
<tr>
<th>Type</th>
<th>2-Axis Autobrake Ports with</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS</td>
<td>2 GPS/L1 RF channels</td>
</tr>
<tr>
<td>Inputs</td>
<td>9 ARINC 429</td>
</tr>
<tr>
<td>Outputs</td>
<td>5 Independent ARINC 429</td>
</tr>
</tbody>
</table>

**Software**

| Language | Ada |
| Level | DO-178B Level A design |
| DO-178B Level B certified |

**Hardware**

| Processor | Pentium Equivalent |
| Inputs | 0 ARINC 429 |
| Outputs | 0 Independent ARINC 429 |
| BIT | Continuous coverage, >95% fault detection |

**Physical**

- **Size**: 6.6” x 4” x 0.6” (168 x 102 x 15 mm)
- **Weight**: <0.5 lbs (0.23 kg)
- **Input Power**: +3.3, +5.0, +/-12.0 VDC
- **Consumption**: 10 W (typical, full configuration)
- **MTBF**: 60,000 hours

**Environmental**

- **Temperature**: -55°C to + 70°C
- **Humidity**: Supports DO-160E, Cat. C
- **Altitude**: 55,000 feet (16,500 meters)
- **MTBF**: 60,000 hours

**Interfaces**

- **Inputs**: 0 ARINC 429
- **Outputs**: 0 Independent ARINC 429
- **Discretes**: 2 discretes
- **Time Marks**: 3 time marks (1 Hz)

**Specifications**

- **Frequency**: L1, 1575.42 MHz, C/A code
- **Acquisition Sensitivity**: -134 dBm @ 32.87 dB Hz C/No
- **Tracking Sensitivity**: -134 dBm @ 31.04 dB Hz C/No
- **Hor. Position Accuracy**: 15 meters, 95%, S/A off
- **Hor. Velocity Accuracy**: 0.5 knots, 95%, S/A off
- **Altitude Accuracy**: 20 meters, 95%, S/A off
- **Altitude Velocity**: 0.5 knots, 95%, S/A off (35000 ft.
- **Differential**:
  - **Hor. Position Accuracy**: 15 meters, 95%, S/A off
  - **Hor. Velocity Accuracy**: 0.5 knots, 95%, S/A off
- **Position Update**: 10 independent solutions per seconds (10Hz solution rate)

**Other Features**

- **BITE**: Continuous coverage, >95% fault detection
- **Pressure Altitude**: Automatic calibration and use in navigation and RAIM
- **Data Loader**: On-aircraft software upload via ARINC 615 Data Loader (optional)
- **Pressure-Attitude**: Automatic calibration and use in navigation and RAIM
- **BITE**: Continuous coverage, >95% fault detection

**Others**

- **FDE & Predictive RAIM**: Fault detection and isolation incorporated. High-performance parity space technique uses pressure altitude automatically
- **Pressure-Attitude**: Automatic calibration and use in navigation and RAIM
- **BITE**: Continuous coverage, >95% fault detection

**Certification**

- **Airworthiness Certification**:
  - **TSO-C145c Beta-3 equivalent for all electronics card**
  - **TSO-C146c Delta-4 equivalent for an electronics card**

**Design**

- **Software**:
  - **DO-178B Level A design**
  - **DO-178B Level B certified**

**Hardware**

- **Processor**:
  - **Pentium Equivalent**

**Physical**

- **Size**: 6.6” x 4” x 0.6” (168 x 102 x 15 mm)
- **Weight**: <0.5 lbs (0.23 kg)
- **Input Power**: +3.3, +5.0, +/-12.0 VDC
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- **Pressure Altitude**: Automatic calibration and use in navigation and RAIM
- **Data Loader**: On-aircraft software upload via ARINC 615 Data Loader (optional)
- **Pressure-Attitude**: Automatic calibration and use in navigation and RAIM
- **BITE**: Continuous coverage, >95% fault detection

**Certification**

- **Airworthiness Certification**:
  - **TSO-C145c Beta-3 equivalent for all electronics card**
  - **TSO-C146c Delta-4 equivalent for an electronics card**

**Design**

- **Software**:
  - **DO-178B Level A design**
  - **DO-178B Level B certified**

**Hardware**

- **Processor**:
  - **Pentium Equivalent**

**Physical**

- **Size**: 6.6” x 4” x 0.6” (168 x 102 x 15 mm)
- **Weight**: <0.5 lbs (0.23 kg)
- **Input Power**: +3.3, +5.0, +/-12.0 VDC
- **Consumption**: 10 W (typical, full configuration)
- **MTBF**: 60,000 hours

**Environmental**

- **Temperature**: -55°C to + 70°C
- **Humidity**: Supports DO-160E, Cat. C
- **Altitude**: 55,000 feet (16,500 meters)
- **MTBF**: 60,000 hours

**Interfaces**

- **Inputs**: 0 ARINC 429
- **Outputs**: 0 Independent ARINC 429
- **Discretes**: 2 discretes
- **Time Marks**: 3 time marks (1 Hz)
SBAS CMA-4124 GNSSA Aviation Precision Approach SBAS/GPS Receiver Module

The SBAS CMA-4124 GPS receiver module is designed for incorporation into all avionics applications such as Multi-Mode Receivers (MMRs). The SBAS CMA-4124 provides the guidance solutions for LP, LPV and SBAS LNAV/VNAV with LOC and GS outputs compliant to ARINC 710.

The SBAS CMA-4124 has been designed to meet all requirements specified in RTCA DO-229D for Beta-3 and Delta-4 equipment classes. It is supported with a certified TSA-C146c Beta-3 and TSA-C146c Delta-4 certification package as defined by the FAA.

The CMA-4124 provides digital ILS look-alike LOC and GS guidance solutions compliant to ARINC 710 for LP, LPV, and SBAS LNAV/VNAV approach modes. The SBAS CMA-4124 is single string CAT-1 certified, compliant to FAA Part-25 design requirements and supports Part-121 operations.

In addition, the SBAS CMA-4124 meets or exceeds all ADS-B requirements (including NAC, VEL,2), RNAV, 1 navigation with availability >98.99% when under suitable SBAS coverage, automatic SBAS incorporation maximizing HPL availability under all navigation conditions.

The growth path for GBAS/LAAS GAST-C/CAT-I GAST-D/CAT-I + CAT-III has been provisioned for with the appropriate software load.

- 24-channel Narrow Correlator® tracking technology receiver which can be used for continuous GPS and SBAS/WAAS satellite tracking
- Two fully independent L1 RF input channels
- GPS and SBAS/WAAS carrier phase tracking
- Numerous inputs and outputs available to support all required aircraft interfaces for continuous GPS and SBAS/WAAS satellite tracking
- Automatic pressure altimeter incorporation per RTCA DO-229D
- Comprehensive end-to-end receiver Built-In-Test (BIT)
- Software upgradeable to GBAS GAST-C and GAST-D

CMA-4124 is the result of over 20 years of CMC Electronics experience in the design of certified airborne GPS and SBAS products and a collaborative effort with NovAtel Inc. for state-of-the-art RNP front-end and Narrow Correlator® tracking technology.

**CMA-4124 GNSSA Receiver Module — Specifications**

- **DEMONSTRATOR REQUIREMENTS**
  - **NAV**
    - 7408 Characteristic
    - 755-4 Characteristic
  - **RTCA**
    - DO-2450 (planned)
    - DO-255C (planned)
- **CERTIFICATION**
  - **FCC**
    - TSO-C146c Beta-3 equivalent for an electronics card
    - TSO-C146c Delta-4 equivalent for an electronics card
  - **TSA**
    - TSO-161a (planned)
    - TSO-C146c Delta-4 equivalent for an electronics card
    - TSO-C145c Beta-3 equivalent for an electronics card
- **RECEIVER**
  - **Type**
    - 2-Active Antenna Ports with 2 GPS L1 RF channels,
    - 24 parallel Narrow Correlator® digital processing channels
  - **Frequency**
    - L1: 102.0 MHz, C/A code
  - **Acquisition Sensitivity**
    - -134 dBm @ 32.07 dBHz C/No
  - **Tracking Sensitivity**
    - -134 dBm @ 31.34 dBHz C/No
  - **Time to First Fix**
    - < 75 seconds maximum, 95% confidence
  - **Hot Position Accuracy**
    - 15 meters, 95%, S/A off
  - **Differential**
    - Better than 1.5 meters, 95%
  - **Altitude Accuracy**
    - 20 meters, 95%, S/A off
  - **Velocity Accuracy**
    - 0.5 knots, 95%, S/A off
  - **Position Update**
    - 10 independent solutions per seconds (10Hz solution rate)
- **SOFTWARE**
  - **Language**
    - Ada
  - **Level**
    - DO-178B Level A design
    - DO-178B Level B certification
- **HARDWARE**
  - **Level**
    - DO-178B Level A design
    - DO-254 Level B certified
  - **Processor**
    - Pentium Equivalent

**OTHER FEATURES**
- **FDE & Predictive RAIM**
  - Fault detection and isolation incorporated
  - High performance parity space technique
  - Uses pressure altitude automatically

- **Data Loader**
  - On-aircraft software upload via ARINC 429 Data Loader (optional)

- **Pressure Attitude**
  - Automatic calibration and use in navigation and RAIM

- **BITE**
  - Continuous coverage >95% fault detection

**PHYSICAL**
- **Size**
  - 6.0” x 4.0” x 0.67” (152 x 102 x 15 mm)
- **Weight**
  - <0.5 lbs (0.23 kg)

- **Input Power**
  - +3.3, +5.0, +/-12 VDC
- **Consumption**
  - 10 W (typical, full configuration)
- **MTBF**
  - 60,000 hours

**ENVIRONMENTAL**
- **Temperature**
  - -55°C to + 70°C
- **Humidity**
  - Supports DO-160E, Cat. C
- **Altitude**
  - 55,000 feet (16,500 meters)
- **Pressure Altitude**
  - Automatic calibration and use in navigation and RAIM
- **PHYSICAL**
  - **Dimensions**
    - 6.6” x 4” x 0.6” (168 x 102 x 15 mm)
  - **Weight**
    - <0.5 lbs (0.23 kg)
  - **Input Power**
    - +3.3, +5.0, +/-12 VDC
  - **Consumption**
    - 10 W (typical, full configuration)
  - **MTBF**
    - 60,000 hours

**INTERFACES**
- **Inputs**
  - 0 ARINC 429
  - 4 RS-422/232
  - 11 discrete inputs
- **Outputs**
  - 0 Independent ARINC 429
  - 4 RS-422/232
  - 2 discretes
  - 3 time marks (1 Hz)

**Name** Correlator® tracking technology is a registered trademark of NovAtel Inc. IntegriFlight™ is a trademark of CMC Electronics Inc.

For more information, please visit www.esterline.com/avionicssystems.