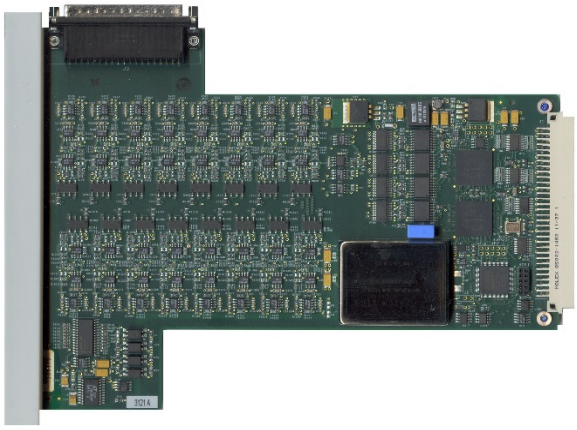
16-Channel Analog Output Card
Voltage/ Current

3121/3122

PRODUCT HIGHLIGHTS

- **Safety and Critical Control Applications**
- **Advanced Diagnostics**
- **Configurable Redundancy**
  Single, Dual, Triple
- **High 16-bit DAC accuracy**
- **ADC Readback**



3121/3122 16-Channel Analog Output Card

Product Overview

Compliant to the following standards: IEC61508:2010, IEC61511:2003, IEC61131-2, IEC61131-6, NFPA72, EN-54, NFPA85, ABS

Applications: The 16-Channel Analog Output Card is well suited for use in safety and critical control applications, power industry, process control and rotating machinery.

Benefits:
Advanced Diagnostics. A test of the analog outputs is implemented to verify proper operation. This test will periodically change the commanded value of the analog output by a small amount (< 1%) for one scan cycle. The output is verified to have changed via the analog readback. Diagnostics are performed extensively on all backplane communications to ensure the validity of commands, slot addressing, card ID and data. The data path is checked for a stuck at zero or stuck at one condition by performing an exclusive-or operation on 2 subsequent data transfers, the first being normal and second inverted. If a backplane error is detected, an error bit is set and the outputs are not transferred. There are 2 watchdog timers, one is a programmable and the other is a hardware watchdog timer. These allow the output to de-energize to a zero state in case of communications problems.

Configurable redundancy reduces costs as the redundant outputs are configured to the availability, integrity and system cost requirements. The flexible architectures allow redundant outputs to be on the same card or different cards. These cards may be placed in the same chassis or in different chassis.

Redundant current outputs use a current sharing scheme. Each card that is active drives current into the load. In a triple redundant configuration Card A drives 1/3 of the output current while Card B and C drive 1/3 of the output current. In a dual redundant configuration Card A drives ½ of the output current while Card B drives ½ of the output current. This approach guarantees that you will always know the status and functionality of the redundant cards before a switchover takes place.

RTP is the Best Technology for Your Investment,
Here's why:
The 3000 TAS is a multi-processor architecture that delivers exceptional Performance and Comprehensive Diagnostics. The results speak for themselves: A reaction time of 12 msec, true 1 msec SOE (Analog and Digital), an MBTF of greater than 50000 years an MTTFS of greater than 60000 years, and a PFDavg of $5x10^{-5}$. ***Compare these numbers to any other system.***
Built-in proof test diagnostics means it will never be necessary to shut down at the proof test interval. Unlimited online downloads of logic and configuration changes do not require a periodic shut down like other systems. ***Compare this functionality to any other system.***
NetSuite Software: One-time price includes unlimited use of Logic Development, Alarm Manager, Data Archive and Historian and HMI without hardware or software keys. ***Compare this functionality and price to all other systems.***
Finally, a Safety Instrumented System (SIS) should always take the process it protects to a safe state when it is required to do so, and it should never interfere with the operation of the process at the time. ***The 3000 TAS does this better than any other system.***

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Easy to maintain. The isolated analog input series cards are easy to maintain. There is no field calibration required. They are hot swappable and provide a front panel LED to indicate the status of the card. If this LED indicator is on, the card is online and communicating. Enhancements to the I/O card can be accomplished quickly and easily in the field. Card PLD updates are done as a simple file download/restart.

Online repair. The analog output cards are SIL-3 in a single configuration. In a redundant configuration, you may degrade to a single input card and maintain the SIL 3 rating indefinitely. Redundant configurations provide ease of replacement. There is never a need to stop the process. Replace and/or re-configure the output card without shutting off power. The output card is hot swappable in both single and redundant configurations.

Online modifications. If adding a new channel or new card, wire it into the redundant termination module, make the configuration change in the development software and download the new file online. This allows existing logic and IO to continue processing undisturbed while the new logic and IO is initialized.

RTP has established a widely known reputation of manufacturing robust, quality systems that meet the latest and most rigorous standards. The 3121 and 3122 cards are no exception. High performance and high availability, and high integrity are all achieved in the extremely flexible design architecture. RTP is not your traditional system. RTP is the Technologically Advanced System.

3121/3122 Specifications

Module Safety Integrity Level SIL-3

Electrical Specifications

Number of Outputs 16 channels

3121 Output Ranges -20 mA to 20 mA;
0 mA to 20 mA;
4 mA to 20 mA

3122 Output Ranges 0V to +10V;
–10V to +10V

Isolation:
500V DC maximum field to RTP chassis ground

Resolution 16 bits

3121 Accuracy:
Maximum error at 25ºC: ±0.08% of Full Scale Current
Temperature Coefficient: ±0.006% of Full Scale Current/K
Maximum error (0ºC to +55ºC): ±0.26% of Full Scale Current

3122 Accuracy:
Maximum error at +25ºC ±0.0275% of Full Scale Voltage
Temperature Coefficient ±0.0015% of Full Scale Voltage/K
Maximum error (0ºC to +55ºC) ±0.0725% of Full Scale Voltage

Non-Linearity ±0.0275% of Full Scale Current/Voltage

Repeatability ±0.0275% of Full Scale Current/Voltage fixed temperature

Settling Time Less than 190 µsec

3121 Slew Rate 0.2 mA/µsec current

3122 Slew Rate 0.1V/µsec

Monotonicity Monotonic over rated temperature range

3121 Load Resistance 100 Ω minimum, 500 Ω maximum

3122 Load Resistance 500 Ω minimum

Output Protection Outputs may be shorted to 0V indefinitely

Power Requirements +5V DC @ 500 mA, typical
+24V DC nominal @ 500 mA (from RTP backplane external voltage)

Environmental

Operating Temperature Range –20ºC to +60ºC

Storage Temperature Range –25ºC to +85ºC

Relative Humidity Range 10% to 95%, non-condensing