



Documentation for:

A429R1-SERIAL-T1

ARINC429 to RS232/RS422 Converter (\$GPRMC & \$GPGGA)



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1 INTRODUCTION AND OPERATION

The purpose of this document is to provide information on the use of the YED/A429R1-SERIAL-T1 ARINC-429 Converter.

This converter is in use by many companies who have a requirement to extract navigational data from an ARINC429 data bus and translate it onto an RS232 or RS422 (dependent upon ordered option) serial data bus. The exact format for the converted data is NMEA0183 - a marine GPS ASCII format. The typical labels processed by this converter are shown in the table below. The converter adapts automatically to high or low speed (12.5/100kHz) ARINC429 data and the inputs are opto-coupled for electrical isolation purposes. The unit is powered from an external 28 VDC (18-72V) nominal supply with internal current and thermal (102 °C) fuse. The inputs are also reverse polarity protected.

The YED/A429R1-SERIAL-T1 has the following features: -

- Automatic ARINC429 Rx Bus rate adaptation (12.5/100kbs)
- Power Requirements: 18-72VDC (28VDC @ 25mA)
- 1 Amp on PCB Fuse (non-resettable)
- 102 Degrees centigrade safety thermal fuse. (non-resettable)
- Reverse polarity protected.
- Opto-coupled ARINC429 Rx inputs.
- ARINC429 input with automatic High/Low bit detection.
- RS232 output: 4800 baud, 1-Stop bit, no Parity.
- Size: 140 (L) x 65 (W) x 30 (H) mm
- Weight: 250 grams
- Conformally coated for protection against moisture. (95% RH)
- Operating Temperature range: -20 to +70 degrees C.

1.1 ARINC429 reception

Reception of the following ARINC429 Labels:-

- L125 - UTC Time
- L147 - Magnetic Variation
- L260 - Date
- L310 - Latitude
- L311 - Longitude
- L312 - Speed over Ground
- L314 - Course over Ground
- L203 - Pressure Altitude

High or low speed ARINC data is receivable without user intervention. ARINC429 data words must have Odd Parity and the correct SSM (bits 30 & 31) field status otherwise the data will not be included in the output RS232 data stream.

1.2 Serial transmission of received data

Serial data (RS232 or RS422 dependent upon option ordered) is transmitted at a rate of once per second (1 Hz) at a baud rate of 4800. There is no hardware handshake and no parity. Transmitted data is in ASCII format and conforms to NMEA0183 data format standards. The Sentence header will consist of two ASCII strings "\$GPRMC" and "GPGGA". Each line will begin with a '\$' and terminate with a Carriage Return (0x0d) and Line Feed Character (0x0a). The ',' comma delimiters are used to separate each particular field.

The various outputs are as follows:-

- (i) No ARINC429 data being received:-

```
$GPRMC,,V,,,,,,,,,W*1D
$GPGGA,,,,,,,,,M,,M,,*56
```

This line shows the comma delimiters for each of the missing parameters. The 'V' shown is a flag to indicate that the UTC time is not valid.

- (ii) If all the ARINC429 parameters are being correctly received then the following data will be available at the serial output port:-

```
EqID. HHMMSS V LATITUDE LONGITUDE G.Spd Hding DATE Brg CHKSUM
$GPRMC,173200,A,0051.4160,N,0051.2924,W,200.0,360.0,230997,128.7,W*72
EqID Alt(Meters) CHKSUM
$GPGGA,,,,,,,,,00099.5,M,,M,,*1D
```

The arrangement of the transmitted parameters is as follows (\$GPRMC):-

1. Sentence header string - \$GPRMC,
2. UTC Time from Label 125,
3. UTC data validity flag - 'A' is active. 'V' is not active,
4. Latitude from label 310 in DDMM.SSSS format,
5. North/South indicator,
6. Longitude from label 311 in DDMM.SSSS format,
7. East/West indicator,
8. Speed over ground in knots from Label 312,
9. Course over ground from Label 314,
10. Date (DDMMYY) from Label 260,
11. Checksum

The arrangement of the transmitted parameters is as follows (\$GPGGA):-

1. Sentence header string - \$GPGGA,
2. Pressure Altitude (Metres) from Label 203,
3. Checksum.

(iii) The following line shows the Pressure Altitude parameter missing. This could be due to the label being unavailable, or the SSM is incorrect, or if the parity is incorrect:-

```

EqID. HMMSS V LATITUDE LONGITUDE G.Spd Hding DATE Brg CHKSUM
$GPRMC,173200,A,0051.4160,N,0051.2924,W,200.0,360.0,230997,128.7,W*72
EqID Alt (Meters) CHKSUM
$GPGGA,,,,,,,,,M,,M,,*56

```

(iv) The following lines show the typical output when all parameters are present.

```

$GPRMC,173200,A,0051.4160,N,0051.2924,W,200.0,360.0,230997,128.7,W*72
$GPGGA,,,,,,,,,00099.5,M,,M,,*1D
{1 second GAP}
$GPRMC,173200,A,0051.4160,N,0051.2924,W,200.0,360.0,230997,128.7,W*72
$GPGGA,,,,,,,,,00099.5,M,,M,,*1D
{1 second GAP}
$GPRMC,173200,A,0051.4160,N,0051.2924,W,200.0,360.0,230997,128.7,W*72
$GPGGA,,,,,,,,,00099.5,M,,M,,*1D
{1 second GAP}
$GPRMC,173200,A,0051.4160,N,0051.2924,W,200.0,360.0,230997,128.7,W*72
$GPGGA,,,,,,,,,00099.5,M,,M,,*1D
{1 second GAP}
$GPRMC,,,,,,,,,*67 - Occurs when no ARINC data received
$GPGGA,,,,,,,,,M,,M,,*2F - Occurs when no ARINC data received

```

Where a parameter is absent then only the comma delimiter will be present.

2 APPENDIX A

A429R1-SERIAL-T1 D9 connections

D9 Plug is employed on the converter unit.

Description	Pin #
+28VDC	1
0VDC	2
ARINC429 Rx +Ve input	3
ARINC429 Rx -Ve input	4
RESERVED	5
RS422+ Signal output	6
RS422- Signal output	7
SERIAL GROUND	8
RS232 Data Output	9



NOTE: RS232 or RS422 may not be available if not specified at time of ordering.

3 EMC

Manufacturer's Name: YED Limited
Manufacturer's Address: Thorne House
Eastville
Yeovil
Somerset BA21 4JD
UK

Declares, that the product(s):
Product Name: ARINC429 to Analogue Converter
Model Numbers(s): YED/A429R1-SERIAL-T1
Product Options: None

Conforms to the following Product Specifications:

EMC: EN50081-1:92,
Radiated Emissions Class B
EN50082-1:92,
Radiated Immunity, ESD

Supplementary Information:

The product(s) herewith comply with the requirements of the Low Voltage Directive 72/23/EEC and EMC Directive 89/336/EEC.

Tests carried out by Y.E.D. Limited against known proven model.

On: 18th August 2001

Note: This apparatus must be used with twisted-screened cable with a screened D9 connector.

18th August 2001.
George Brownett,
Managing Director



G. Brownett

3.1 FCC Regulations

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by Yeovil Electronic Developments could void the user's authority to operate this equipment.