EQUIPMENT INSTALLATION MANUAL

For the

GDC22 DATA CONVERTER

P/N 1038-4000-01-001( )

ARINC 429 / GAMA 429 TO ARINC 429

DAC International
6702 McNeil Drive
Austin, TX 78729

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RECORD OF REVISIONS

REV	DESCRIPTION	DATE	APPROVED
IR	INITIAL RELEASE	11/13/02	JEM
A	Rev per ECO 124-01	11/21/02	JEM
B	Rev per ECO 125	11/25/02	LJW
C	REV PER ECO 129	4/9/03	JEM

INTRODUCTION:

This manual contains installation data and specifications for the DAC International Model GDC22 Data Converter, Part Number 1038-4000-01-001( ).

DESCRIPTION:

GDC22 Data Converters with software version 001( ) are designed to accept ARINC 429 and GAMA 429 data from a GPS400 then modify this data into ARINC 429 data compatible with a Thales Horizontal Situation Indicator.

PART NUMBERS:

The GDC22 Data Converter is available under the following part number:

    1038-4000-01-<u>001( )</u>   ARINC 429 to 429 Converter
                   |
                  Software part number, where ( ) contains the number zero for initial release, or any letter, A – Z to denote a minor change.

REGULATORY COMPLIANCE:

Software

The Model GDC22 software was developed in accordance with RTCA/DO-178B to criticality level C.

SUPPLIED EQUIPMENT

Each Data Converter is shipped with the following items:

Part Number	Description	Qty
1038-4000-01-001( )	GDC22 Data Converter	1
1038-4200-01	Installation Kit, GDC22 Data Converter	1

Complete installation kits are available under kit part number 1038-4200-01. Individual pieces are available under the part numbers shown. Contact DAC International sales to place orders.

Part Number	Description	Qty
1038-4200-01	Installation Kit, GDC22	
M24308/2-2F	Connector, Receptacle, 15 pin D-Sub	1
M39029/63-368	Socket, Crimp Style, female	15
P10053	Slide Latch Kit	1
P10067	Backshell, 15-Pin D-Sub	1
1038-2510-01	Equipment Installation Manual for the GDC22	1

SPECIFICATIONS:

Physical:

The GDC22 attaches to the airframe via four mounting holes. See the paragraph titled Outline Drawing for further details.

Height..1.25"

Width...5.22" (Includes mounting flange)

Depth...3.54"

Weight...less than 0.6 lb.

Electrical:

Input Voltage ....28 VDC Nominal

Input Current....................................0.05 Amp at 28 VDC

Data Input:

Format..ARINC 429, GAMA 429

Baud Rate..12.5 kBaud

Data Output:

Format..ARINC 429 (modified – see "ARINC 429 Output")

Baud Rate..12.5 kBaud

OPERATION:

The GDC22 Data Converter with software –001( ) is designed to receive ARINC 429 and GAMA 429 data sent from a Garmin model GPS400 and from this create ARINC 429 output data compatible with a Thales HSI.   Refer to the interconnect diagram and the following paragraphs for details.

ARINC 429 / GAMA 429 Input

The GDC22 accepts low speed ARINC 429 / GAMA429 data on pins J1-5 and J1-6 from a GPS400. The rate listed is the expected rate and is not critical so long as the time-out is not exceeded. If any label is not received with correct parity for longer than the listed time-out, then that label will not be transmitted in the output data set.

- Expected input labels and rates:
  - 001   rate 200mS
  - 012   rate 400mS
  - 114   rate 50mS
  - 116G   rate 50mS
  - 147G   rate 500 to 1000ms
  - 275G   rate 200mS
  - 314   rate 50mS
  - 321   rate 50mS
  - Several other labels which are not used – these are discarded.

Timeout of Input Data

If label 114, 116G, 314 or 321 is not received with odd parity for 250 ± 50 milliseconds, transmission of that label shall cease until new data is received.

If label 001 is not received with odd parity for 1000 ± 200 milliseconds, transmission of that label shall cease until new data is received.

If label 275G is not received with odd parity for 1000 ± 200 milliseconds, transmission of label 270 shall cease until new data is received.

If label 012 is not received with odd parity for 1600 ± 400 milliseconds, transmission of that label shall cease until new data is received.

If label 147G not received for 4000 ± 400 milliseconds, transmission of label 114 (Desired Track, MAG) shall cease.

ARINC 429 Output

The GDC22 transmits low speed data on pins J1-7 and J1-8 according to the following. Labels 114,116 and 270 are modified as described.

- Transmit ARINC 429 Low Speed:

001	rate 200mS (without modification)
012	rate 400mS (without modification)
114	rate 50mS (with modification)
116G	rate 50mS (modified)
270	rate 100mS (derived from 275G input data)
314	rate 50mS (without modification)
321	rate 50mS (without modification)

Data modifications:

Create label 275G from contents of 270 as follows:
* bit 11 from label 275G to bits 24 and 25 of label 270,
* bit 23 from label 275G to bit 28 of label 270,
* bits 11 to 29 of label 270 are set equal to 0,
* SDI (bits 9 & 10) transmitted without modification,
* SSM (bits 30 & 31) transmitted without modification,
* Parity (bit 32) shall be ODD as per ARINC 429,
* Label (bits 1 to 8) = label 270 per ARINC 429.

Create label 116 by:
Take the 2's complement of label 116G (a BNR label) to get the opposite value and multiply this value by 2 (e.g. –2.5NM becomes +5.0NM). As the range of label 116G is $\pm$128NM, the input values between -64 and -128 become +128 and the values between +64 and +128 become -128. Parity bit (bit 32) is modified as necessary to achieve ODD parity.

Create label 114 "Desired Track MAG" by subtracting MAG VAR (label 147) from the input label 114 (Desired Track TRUE). For example:
Input label 114 = +85°
Input label 147G = W2.5° = -2.5°
Output label 114 = +87.5°

Parity bit (bit 32) is modified as necessary to achieve ODD parity.

Environmental:

The GDC22 meets the environmental test categories detailed below in accordance with
RTCA/DO-160D, Environmental Conditions and Test Procedures for Airborne Equipment.

NOMENCLATURE: Model GDC22 Data Converter
PART NO: 1038-4000-01-XXXX
MANUFACTURER: DAC International
ADDRESS: 6702 McNeil Drive, Austin, TX 78729

| Section	Category	Remarks
4.0 Temperature and Altitude	D1	50,000 Ft Temperature controlled
5.0 Temperature Variation	B	Partially controlled temperature
6.0 Humidity	A	Standard Humidity
7.0 Operational Shock and Crash Safety	D	Fixed wing
8.0 Vibration	L, M, C	Fixed Wing – Turbojet, Turbofan, Turboprop and reciprocating
9.0 Explosion Proofness	X	Not Tested
10.0 Waterproofness	X	Not Tested
11.0 Fluids Susceptibility	X	Not Tested
12.0 Sand and Dust	X	Not Tested
13.0 Fungus Resistance	X	Not Tested
14.0 Salt Spray	X	Not Tested
15.0 Magnetic Effect	A	0.3 meter to 1.0 meter
16.0 Power Input	B	Alternator / Rectifiers
17.0 Voltage Spike	B	56 volts
18.0 AF Conducted Susceptibility – Power Inputs	B	Alternator / Rectifiers
19.0 Induced Signal Susceptibility	A	
20.0 Radio Frequency Susceptibility (Radiated and Conducted)	V	50 volts/meter
21.0 Emission of Radio Frequency Energy	B	
22.0 Lightning Induced Transient Susceptibility	X	Not Tested
23.0 Lightning Direct Effects	X	Not Tested
24.0 Icing	X	Not Tested
25.0 ESD	X	Not Tested

CONNECTOR PIN OUT:

The GDC22 contains a single 15-pin male connector, J1, per MIL-C-24308, part number M24308/4-260F. The mating connector, P1, is described previously under the section "Equipment Supplied".

| Pin	Signal	Function	
1	A+	28 Vdc Primary Power	
2		Reserved	(RS232 Output)
3		Reserved	(RS232 Input)
4		Reserved	(+12Vdc Vpp)
5	RX-A	429 Receive A	
6	RX-B	429 Receive B	
7	TX-A	429 Transmit A	
8	TX-B	429 Transmit B	
9	Power Common	28 Vdc Return	
10	Aircraft Common	Chassis ground	
11		Reserved	(RS232 return)
12		Reserved	(/PGM Enable)
13	Common	RX Shield	
14		Spare	(Common)
15	Common	TX Shield	

J1 Pin Description

NOTE: Do not use pins labeled Reserved. These are for factory test and In-Circuit-Programming

TYPICAL INTERCONNECT
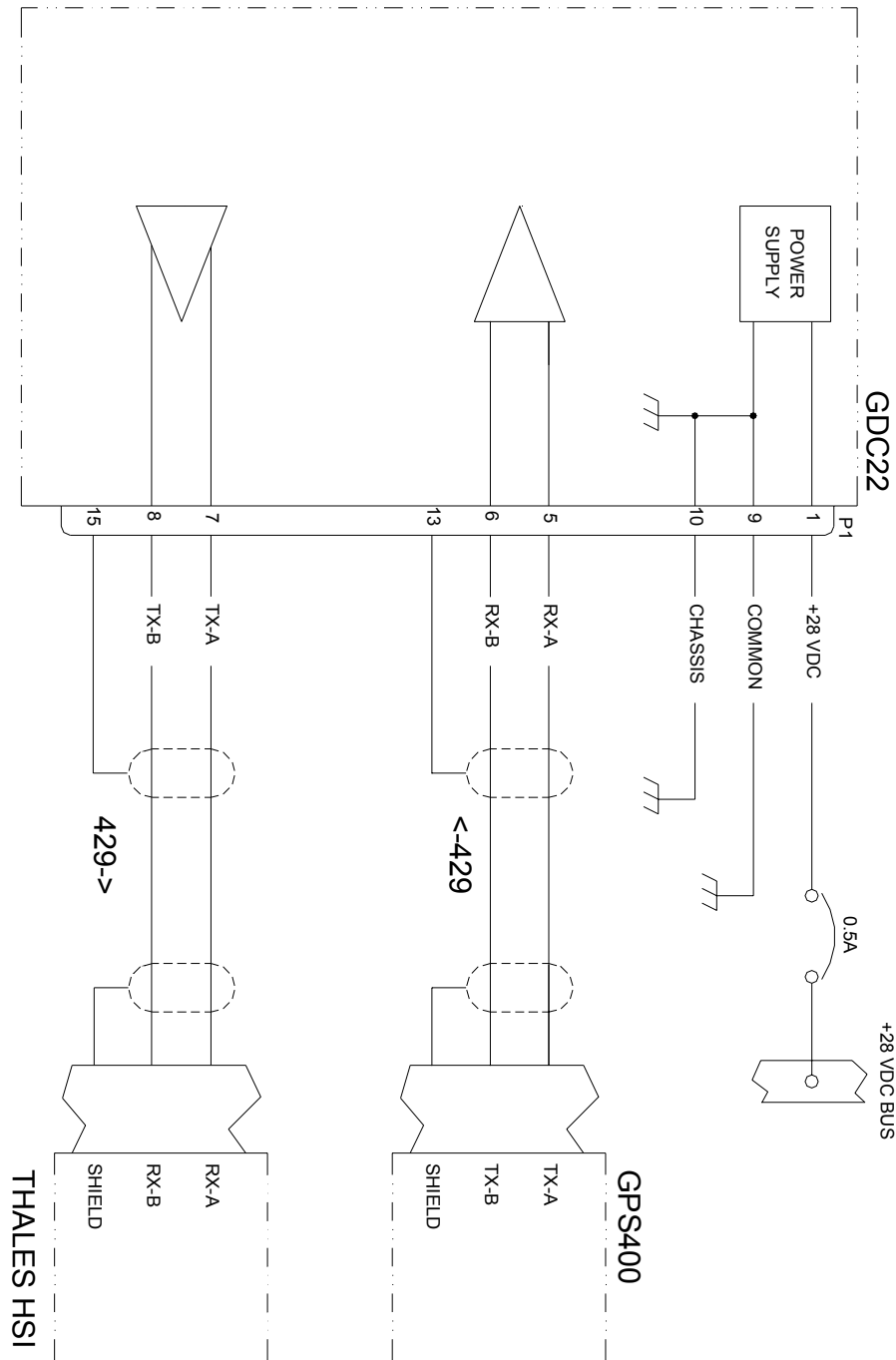
OUTLINE DRAWING
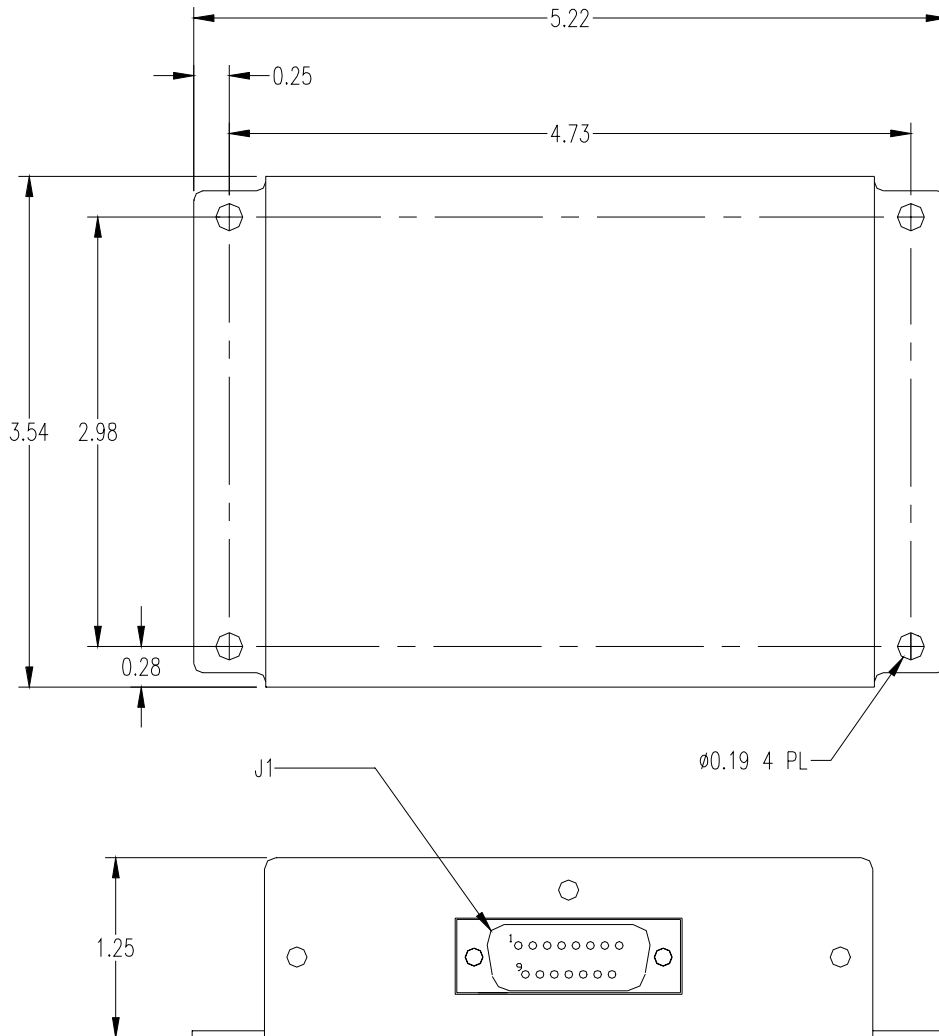
Note: Dimensions are in inches.

SLIDE LATCH ASSEMBLY

Assemble the slide latch mechanism, part number P10053, onto the mating connector as pictured using the hardware supplied with the slide latch.

NUT

LOCK WASHER

FLAT WASHER

CONNECTOR

SLIDE LATCH

SCREW