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**EQUIPMENT INSTALLATION MANUAL**

**for the**

**GDC20 DATA CONVERTER**

**P/N 1034-4000-01-001( )**

**HT9100 to TAWS**

**REV A**

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RECORD OF REVISIONS

REV	DESCRIPTION	DATE	APPROVED
IR	INITIAL RELEASE E256	3/22/04	LW
A	Omit "Approval Pending" page 4 E 314	9/16/04	<i>LW</i>



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## INTRODUCTION

This manual contains installation data and specifications for the DAC International Model GDC20 ARINC Data Converter, Part Number 1034-4000-01-001( ).

## DESCRIPTION

GDC20 Data Converters with software version 001( ) are designed to receive ARINC 429 / 743 data from a Honeywell Model HT9100 Flight Management Unit, modify certain data, and then transmit the modified data in formats and at transmission rates compatible with a Universal Avionics Systems Corporation Terrain Awareness Warning System.

- Conversion of time data from BCD to Binary.
- Conversion of date data from BCD to Binary.
- Conversion of HT9100 status labels to ARINC 743, label 273 format.
- Transmission rates compatible with Universal TAWS.

## PART NUMBERS

The GDC20 Data Converter is available under the following part number:

1034-4000-01-001( )

HT9100 to UNS TAWS 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 GDC20 software was developed in accordance with RTCA/DO-178B to criticality level C.

### PMA

The Model GDC20 is approved via PMA.

### Environmental

The Model GDC20 meets the DO-160D environmental categories listed later in this manual.



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**SUPPLIED EQUIPMENT**

Each Data Converter is shipped with the following items:

<b>Part Number</b>	<b>Description</b>	<b>Qty</b>
1034-4000-01-001()	GDC20 Data Converter	1
1034-4200-01	Installation Kit, GDC20 Data Converter	1

Complete installation kits are available under kit part number 1034-4200-01. Individual pieces are available under the part numbers shown. Contact DAC International sales to place orders.

<b>Part Number</b>	<b>Description</b>	<b>Qty</b>
1034-4200-01	Installation Kit, GDC20	
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
1034-2510-01	Equipment Installation Manual for the GDC20	1



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## SPECIFICATIONS

### Physical:

The GDC20 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 / ARINC 743  
Baud Rate.....12.5 kBaud

### Data Output:

Format .....ARINC 743 Low Speed  
Baud Rate.....12.5 kBaud

### MTBF:

MIL-HDBK-217 .....53,000 hours



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## OPERATION

### Overview

The GDC20 Data Converter receives ARINC 429 and ARINC 743 data from a Honeywell Model HT9100 Flight Management Unit. It expects eight input labels and produces twelve output labels that are sent to a Universal Avionics Systems Corporation Terrain Awareness Warning System (TAWS), in order to make the HT9100 appear to the TAWS as an ARINC 743 compatible GPS sensor.

### ARINC 429 Input

The GDC20 accepts low speed ARINC 429 data on pins J1-5 and J1-6. The following labels, when received, are saved for retransmission on the output port or are used to create new labels to be transmitted on the output port.

<b>Label (octal)</b>	<b>Parameter</b>	<b>Data Format</b>	<b>Expected RX Rate (ms)</b>
103	True Track	743 BNR	200
110	GPS Latitude	743 BNR	200
111	GPS Longitude	743 BNR	200
112	Groundspeed	743 BNR	200
125	GMT	429 BCD	200
130	GPS Horizontal Integrity	743 BNR	200
260	Date	429 BCD	200
271	Status	429 DSC	200

The GDC20 ignores any additional labels received from the HT9100.

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### ARINC 743 Output

The GDC20 transmits low speed data on pins J1-7 and J1-8 according to document EP0782G, Universal Avionics Systems Corporation Interface Description for the Terrain Awareness Warning System.

<b>Label (octal)</b>	<b>Parameter</b>	<b>Data Format</b>	<b>Expected TX Rate (ms)</b>
103	True Track	743 BNR	200
110	GPS Latitude	743 BNR	200
111	GPS Longitude	743 BNR	200
112	Groundspeed	743 BNR	200
120	GPS Latitude Fine	743 BNR	200
121	GPS Longitude Fine	743 BNR	200
150	GMT	743 BNR	200
130	GPS Horizontal Integrity	743 BNR	200
261	Date	743 BNR	200
273	Status	743 DSC	200
371	General Aviation Equipment ID	743 BNR	200
377	Equipment ID	743 BCD	200

Label 150 is constructed using the received data of label 125.

Label 261 is constructed using the received data of label 260.

Label 273 is constructed using the received data of label 271.

Label 120 is internally generated with a GPS Latitude of 00.0° and an SSM matching label 110.

Label 121 is internally generated with a GPS Longitude of 00.0° and an SSM matching label 111.

Label 371 is internally generated, zero filled with a normal SSM.

Label 377 is internally generated, zero filled with a normal SSM.



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## INSTALLATION

This section provides details for the installation of the GDC20 Data Converter, including configuration, wiring, mounting and checkout procedures. Follow the procedures and recommendations found in this section to assure a successful installation.

Read this entire section before beginning the installation.

Complete an electrical load analysis in accordance with AC 43.13-1B, Chapter 11 prior to starting the aircraft modification to insure the aircraft has sufficient load capability.

Complete an aircraft weight and balance prior to aircraft modification to insure the aircraft has sufficient weight and CG margin.

### Material Not Supplied

The following items are required for the installation but not supplied:

- Wire: MIL-W-22759/16 or equivalent
- Shielded Wire: MIL-C-27500 or equivalent
- Mounting screws: MS35206 6-32, 4 each
- Circuit Breaker: Klixon 7277-2-1 or equivalent
- Tie straps or lacing cord
- Ring terminals (for grounding)
- Splices

### Special Tools

Use the following crimp tool to ensure reliable crimp contact connections to connector J1.

- Crimp tool M22520/2-01
- Positioner M22520/2-08



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### Mounting Considerations

The GDC20 Data Converter can mount in the avionics bay, shelf or other suitable structure. It can be mounted in any orientation.

### Wiring Considerations

Wiring should be done in accordance with AC 43.13-1B, Chapter 11. Refer to the typical interconnect diagram later in this manual for specifics. Use 22 to 24 AWG wire for all connections.

Fabricate wiring harness, refer to the interconnect diagrams and pin description. Test all the wiring for continuity and for shorts. Insure aircraft power is on the correct pins of J1; refer to Table 6. Install slide latch assembly onto J1 using instructions found later in this manual.



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## REMOVAL AND REPLACEMENT

### Removal

1. Open the circuit breaker powering the GDC20.
2. Remove the connector by disengaging the slide latch then pulling the connector free.
3. Remove four (4) screws securing the unit to the airframe.

### Replacement

4. Open the circuit breaker powering the GDC20.
5. Attach the unit to the airframe with four (4) screws.
6. Seat the connector then engage the slide latch to secure.
7. Close circuit breaker.
8. Perform ground functional test found under Equipment Checkout in this manual.



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## EQUIPMENT CHECKOUT

The GDC20 provides conversion of input data from an HT9100 to a TAWS in order to make the HT9100 appear to the TAWS as an ARINC 743 compatible GPS sensor. There are no other operator controls associated with the GDC20 unit.

### Ground Functional Test

1. Insure that the HT9100 Flight Management Unit is fully operational.
2. Insure that the Universal Avionics Systems Terrain Awareness Warning System is fully operational.
3. Apply power to the Flight Management Unit, the Terrain Awareness Warning System, and the GDC20.
4. Perform a ground functional test on the FMS and the TAWS according to approved operational manuals.
5. Ground test complete. Secure aircraft power.

### Flight Functional Test

The following flight tests are intended to verify the proper operation of the TAWS system after installation of the GDC20 Data Converter, and are taken from the Federal Aviation Administration's Advisory Circular 23-18, *Installation of Terrain Awareness and Warning System*, 14 June 2000. The actual requirement for flight-testing needs to be evaluated for each installation on a case-by-case basis.

1. Excessive Rates of Decent – This test can be conducted at any location, but descents toward near level terrain are recommended for best results.
2. Excessive Closure Rate to Terrain – This test must be conducted in an area of known rising terrain. It is recommended that one level test run at an altitude between 500-1000 feet above the terrain elevation be conducted.
3. Negative Climb rate or Altitude Loss After Takeoff – This test is conducted immediately after takeoff before climbing above 700 AGL or above runway elevation.
4. Flight Into Terrain When Not In Landing Configuration – This test should be conducted while on a visual approach to a runway and include evaluation of the flap override function.
5. Excessive Downward Deviation From an ILS Glideslope – This test should be conducted during an ILS approach and include evaluation of the glideslope cancel function.
6. Voice Callout “Five Hundred.” – This test is conducted during an approach to a runway.
7. Terrain Display Flight-Test Requirement – Flight-testing to verify the proper operation of the terrain display should be conducted while verifying all the other required TAWS functions.



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CONTINUED AIRWORTHINESS

This section provides data intended to assist the installer with establishing Instructions for Continued Airworthiness as required by FARs 23.1529, 25.1529, 27.1529 and 29.1529.

1. Maintenance Manual information for the GDC20, which includes system description, removal instructions, installation instructions and functional testing instructions, is contained in DAC International Installation Manual, 1034-2510-01 (this document).
2. Line Replaceable Unit (LRU) part numbers and other parts contained in the installation data package should be placed in the aircraft operator's appropriate airplane illustrated Parts Catalog (IPC).
3. Wiring diagram information contained in the installation data package should be placed in the aircraft operator's appropriate airplane Wiring Diagram Manual.
4. Scheduled Maintenance Program tasks are as follows:
  - a. Recommended Periodic Scheduled Servicing: ..... None required
  - b. Recommended Periodic Scheduled Preventive Maintenance Tests..... None Required
  - c. Recommended Periodic Inspections: ..... None Required
  - d. Recommended Periodic Overhaul Period ..... None Required
  - e. Special Inspection Requirements ..... None Required
5. Application of Protective Treatments ..... None Required
6. Special Tools..... None Required
7. Electrical Loads for this appliance are as specified in the DAC International Installation Manual, 1034-2510-01 (this manual).
8. There are no Airworthiness limitations associated with the installation of this appliance.



**ENVIRONMENTAL**

The GDC20 meets the environmental test categories detailed below in accordance with RTCA/DO-160D, Environmental Conditions and Test Procedures for Airborne Equipment.

NOMENCLATURE: Model GDC20 Data Converter  
 PART NO: 1034-4000-01-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	A3E3	
23.0 Lightning Direct Effects	X	Not Tested
24.0 Icing	X	Not Tested
25.0 ESD	X	Not Tested




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**CONNECTOR PIN OUT**

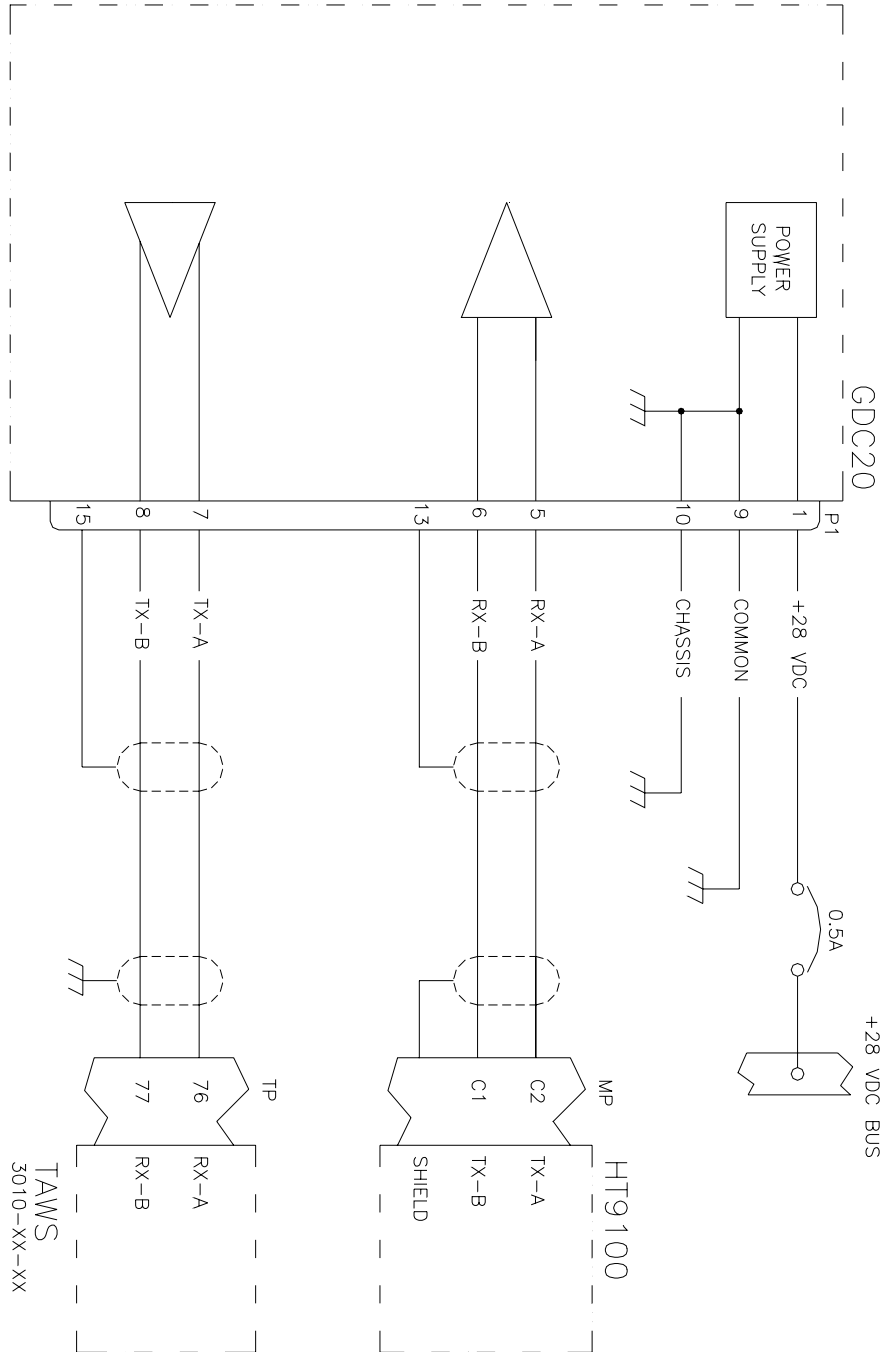
The GDC20 contains a single 15-pin male connector, J1, per MIL-C-24308, part number M24308/4-260F. The mating connector, P1, is described previously under the section “Equipment Supplied”.

<b>Pin</b>	<b>Signal</b>	<b>Function</b>
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	743 Transmit A
8	TX-B	743 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

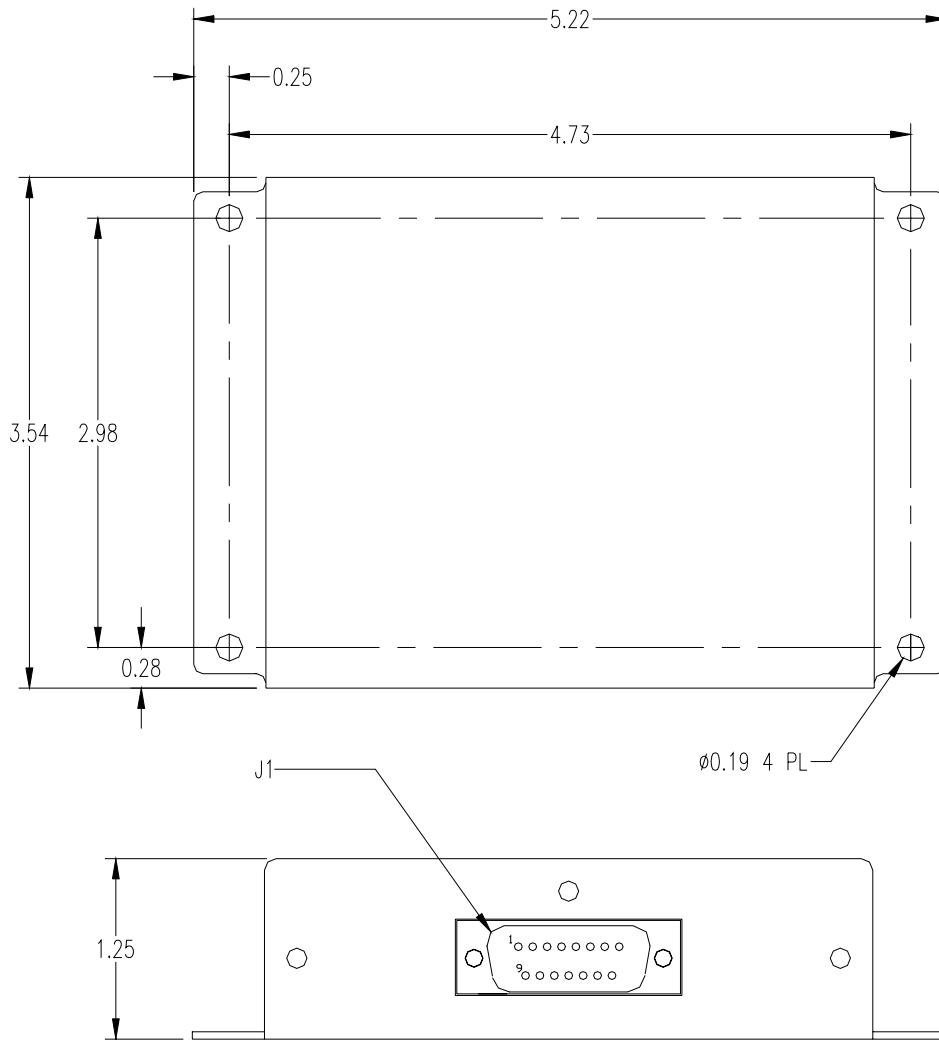
NOTE: Do not use pins labeled Reserved. These are for factory test and In-Circuit-Programming

TYPICAL INTERCONNECT





OUTLINE DRAWING



Note: Dimensions are in inches.

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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.

