



# OPERATION MANUAL

## T1203 DME, ATC, LRA DISCRETE FUNCTION INTERFACE UNIT

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**WARNING: INFORMATION SUBJECT TO EXPORT CONTROL LAWS**

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## ELECTROSTATIC DISCHARGE GENERAL WARNINGS FOR ALL EQUIPMENT

**CAUTION:** THIS EQUIPMENT MAY CONTAIN ELECTROSTATIC DISCHARGE (ESD) SENSITIVE COMPONENTS. TO PREVENT ESD SENSITIVE EQUIPMENT FROM POSSIBLE DAMAGE, OBSERVE THE FOLLOWING PRECAUTIONS WHEN HANDLING ANY ESD SENSITIVE COMPONENTS, OR UNITS CONTAINING ESD SENSITIVE COMPONENTS:

- a. Maintenance or service personnel must be grounded through a conductive wrist strap, or a similar grounding device, using a 1 M $\Omega$  series resistor for equipment protection against static discharge, and personal protection against electrical shock.
- b. All tools must be grounded (including soldering tools) that may come into contact with the equipment. Hand contact will provide sufficient grounding for tools that are not otherwise grounded, provided the operator is grounded through an acceptable grounding device such as a wrist strap.
- c. Maintenance or service of the unit must be done at a grounded, ESD workstation.
- d. Before maintenance or service of the equipment, disconnect all power sources, signal sources, and loads connected to the unit.
- e. If maintenance or service must be performed with power applied, take precautions against accidental disconnection of equipment components. Specifically, do not remove integrated circuits or printed circuit boards from equipment while the equipment has power applied.
- f. All ESD sensitive components are shipped in protective tubes or electrically conductive foam. The components should be stored using the original container/package when not being used or tested. If the original storage material is not available, use similar or equivalent protective storage material.
- g. When ESD sensitive components are removed from a unit, the components must be placed on a conductive surface, or in an electrically conductive container.
- h. When in storage or not being repaired, all printed circuits boards must be kept in electrically conductive bags, or other electrically conductive containers.
- i. Do not unnecessarily pick up, hold, or directly carry ESD sensitive devices.

Failure to comply with these precautions may cause permanent damage to ESD sensitive devices. This damage can cause devices to fail immediately, or at a later time without apparent cause.

### REVISION HISTORY BY DRAWING NUMBER

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Section I	00		
Section II	00		
Section III	00		
Section IV	00		
Section V	00		

## TABLE OF CONTENTS

### SECTION I GENERAL INFORMATION

<u>Paragraph</u>		<u>Page</u>
1.1	INTRODUCTION .....	1-1
1.2	EQUIPMENT DESCRIPTION .....	1-1
1.3	TECHNICAL CHARACTERISTICS .....	1-1
1.4	UNITS & ACCESSORIES SUPPLIED .....	1-1
1.5	OPTIONAL EQUIPMENT .....	1-2
1.6	RELATED INFORMATION .....	1-2

### SECTION II INSTALLATION

2.1	GENERAL INFORMATION .....	2-1
2.2	UNPACKING AND INSPECTING EQUIPMENT .....	2-1
2.3	EQUIPMENT SETUP .....	2-1

### SECTION III OPERATION

3.1	INTRODUCTION .....	3-1
3.2	CONTROL FUNCTIONS .....	3-1
3.2.1	Controls - Front Panel .....	3-1
3.2.2	Controls - Rear Panel .....	3-4

### SECTION IV THEORY OF OPERATION

4.1	GENERAL CIRCUIT THEORY .....	4-1
4.1.1	Audio Amp Board .....	4-1

### SECTION V MAINTENANCE

5.1	MAINTENANCE INFORMATION .....	5-1
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## SECTION I - GENERAL INFORMATION

### 1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical and electrical characteristics of the Aeroflex Model T1203 Discrete Function Interface Unit (DFIU), PN: 01-1203-00.

### 1.2 EQUIPMENT DESCRIPTION

The T1203 DFIU is designed to operate and test ARINC 700 Series DME - Distance Measuring Equipment (ARINC 709), ATCRBS - Air Traffic Control Radar Beacon System Transponder (ARINC 718) and LRA - Low Range Altimeter (ARINC 707) line replaceable units. Power control and protection, as well as all necessary discretes and monitoring points are provided. ARINC 429 transmission and reception to and from the LRU's is provided by the companion T1200 Control Display Unit (CDU) via a rear panel interface connector.

Detachable interface cable/breakout boxes are available which connect either the DME, ATC or LRA to the T1203. These units contain any unique requirements for each type LRU. Where applicable, magnetic overlays for each manufacturer's LRU are available which identify the ATE test point matrix.

### 1.3 TECHNICAL CHARACTERISTICS

Weight:	15 lbs. (6.82 Kg)
Height:	12.15 in. (30.86 cm)
Width:	19.00 in. (48.26 cm)
Depth:	9.00 in. (22.86 cm)
Power Requirements:	27.5VDC @ 2 Amps 115VAC/400Hz @ 2 Amps
Operating Temperature:	+10 to +45 deg. C

### 1.4 UNITS AND ACCESSORIES SUPPLIED

The Aeroflex Model T1203 DFIU, P/N 01-1203-00, consists of the main test panel and the following accessories:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>JcAir P/N</u>
1	T1203 Operation Manual CD	E6-1203-01
2	115V/400Hz Power Cable	55-2406-00

## 1.5 OPTIONAL EQUIPMENT

The following items are available as optional equipment with the T1203 DFIU. They must be ordered separately.

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>P/N</u>
1	T1203-01 DME Interface Cable	55-1203-01
2	T1203-02 ATC Interface Cable	55-1203-02
3	T1203-03 LRA Interface Cable	55-1203-03
4	T1203-04 TRT TSR-718 Interface Cable	55-1203-04
5	T1203-07 Bendix/King KXP-7510 Interface Cable	55-1203-07
6	T1203-09 TRT TDM-709 Interface Cable	55-1203-09
7	T1203-10 TRT ERT-530 Interface Cable	55-1203-10
8	Test Point Overlay - DME-700	58-1169-08
9	Test Point Overlay - LRA-700	58-1169-09
10	Test Point Overlay - TPR-710A	58-1169-10

## 1.6 RELATED INFORMATION

For information regarding the T1203 Interface Cables, refer to their individual maintenance manuals. For reference purposes, the Aeroflex part numbers for these manuals are as follows:

<u>INTERFACE CABLE</u>	<u>MANUAL P/N</u>
T1203-01	C6-1203-01
T1203-02	C6-1203-02
T1203-03	C6-1203-03
T1203-04	C6-1203-04
T1203-07	C6-1203-07
T1203-09	C6-1203-09
T1203-10	C6-1203-10

## SECTION II - INSTALLATION

### 2.1 GENERAL INFORMATION

This section contains information relating to the unpacking, inspection and setup of the T1203 DFIU and accessories.

### 2.2 UNPACKING AND INSPECTING EQUIPMENT

Carefully remove the T1203 DFIU and accessories from the packing box. Make a visual inspection of the unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim. When all equipment has been unpacked, return the packing material to the container for future use in storing or shipping the equipment.

### 2.3 EQUIPMENT SETUP

The T1203 DFIU may be installed free standing on a workbench table top or mounted in a 19-inch equipment rack using the integral rack mounting ears.

Connect 28VDC power to the banana jack/binding posts (J11) at the rear of the T1203.

Connect 115VAC/400Hz power to the receptacle (J10) at the rear of the T1203 using the power cord (JPN: 55-2406-00) provided with the test set.

**\*\*\* NOTE \*\*\***

The power cord provided is left unterminated at one end to accommodate wiring to your own particular 115VAC/400Hz supply. The wires should be connected as follows:

BLK Wire - 115VAC/400Hz Hot  
WHT Wire - 115VAC/400Hz Neutral  
GRN Wire - 115VAC/400Hz Ground

Connect a T1200 CDU to the T1200 Interface connector (P401) at the rear of the T1203 using the T1200 DFIU Cable, PN: 55-2401-00, supplied with the T1200.

The LRU is connected to the T1203 via the appropriate T1203 Interface Cable. Where applicable, install the appropriate magnetic test point overlay (See section 1.5) to the test point field on the front panel of the Interface Cable.

**IMPORTANT**

Refer to the appropriate Component Maintenance Manual (CMM) or test procedure for additional test equipment setup procedures.

## SECTION III - OPERATION

### 3.1 INTRODUCTION

This section contains the basic operating procedure for the T1203 DFIU.

### 3.2 CONTROL FUNCTIONS

The T1203 provides all the necessary signals for testing the ARINC 700 Series DME, ATC and LRA units. The following is a description of each of the controls provided on the DFIU.

#### NOTE

Some additional controls may be installed on the LRU Interface Cables.

#### 3.2.1 CONTROLS - FRONT PANEL (Fig. 3-1)

- |   |  |
|---|--|
| (1) DFIU POWER ON/OFF Switch (S39)                      | The T1203 power requirements are provided by an external 28VDC source connected to the T1203 through a set of banana jack/binding posts (J11) on the rear panel. The power to the DFIU is turned ON or OFF with a DPST toggle switch.              |
| (2) DFIU POWER Fuse (F2)                                | Provides over-current protection for the T1203 internal circuitry.   |
| (3) DFIU POWER Lamp (DS2)                               | Illuminates when the DFIU 28VDC power is switched on by S39.   |
| (4) UUT POWER ON/OFF Switch (S38)                       | The Unit Under Test power requirements are provided by an external 115VAC/ 400Hz source connected to the T1201 through a 3-conductor power receptacle (J10) on the rear panel. The power to the UUT is turned ON or OFF with a DPST toggle switch. |
| (5) UUT POWER Fuse (F1)                                 | Provides over-current protection for the unit under test.  |
| (6) UUT POWER Lamp (DS1)                                | Illuminates when the UUT 115VAC/400Hz power is switched on with S38.   |
| (7) CURRENT MONITOR Jacks (J8 & J9)                     | These test jacks allow the user to calculate the current drawn by the UUT by measuring the AC voltage dropped across a precision 1 ohm resistor (R1) in series with the connection to the UUT power input (1 volt = 1 amp).                        |
| (8) LRU Connector (J1)                                  | 156-pin DL connector used to connect with the DME, ATC and LRA LRU Interface Cables.   |
| (9) ARINC 429 OUTPUT BUS Jacks (J205, J206, J209, J210) | Four 1/4" stereo phone jacks allow monitoring of the ARINC 429 output buses from the UUT.  |
| (10) ARINC 429 INPUT BUS Jacks (J203, J204, J207, J208) | Four 1/4" stereo phone jacks allow monitoring of the ARINC 429 input buses to the UUT.   |
| (11) SDI CODE Switch (S36)                              | Allows changing the SDI input straps to each possible SDI code (0 - 3).  |



## Aeroflex Operation Manual

(12) LRU 115VAC OUTPUT Jacks (J4, J5, J6, J7)	Allows monitoring of the 115VAC/400Hz Indicator and Control Panel outputs from the DME.
(13) ATC MONITOR Enunciators (CR1, CR2)	Indicates the status of the Monitor A and B Lamp outputs from the ATC Transponder.
(14) DABS CAPABILITY BITS (S14-S23)	OPEN/GND switches reserved for the DABS Capability A through K discrete inputs to the ATC Transponder.
(15) PILOT ACKNOWLEDGE (PB) (S24, S25)	OPEN/GND switches reserved for the Pilot Acknowledgment PB (bit nos. 14 & 15) discrete inputs to the ATC Transponder.
(16) ALTITUDE SELECT Switch (S13)	OPEN/GND switch used to control the ALTITUDE SELECT discrete input to the ATC Transponder. (Parallel = OPEN, Serial = GND)
(17) MODE C Select Switches (S35)	Four thumb-wheel switches used to provide the Gillham altitude code to the ATC Transponder.
(18) MAX AIRSPEED Switch (S34)	Not currently provided.
(19) ANTENNA AVAILABILITY (S12)	OPEN/GND switch used to control the ANTENNA AVAILABILITY discrete input to the ATC Transponder. (Dual = OPEN, Single = GND)
(20) DABS ADDRESS Switch (S33)	Not currently provided.
(21) INPUT SELECT Switch (S11)	OPEN/GND switch used to control the CONTROL DATA INPUT PORT SELECT discrete input to the ATC Transponder. (PORT B = OPEN, PORT A = GND)
(22) AIR/GROUND Switch (S10)	OPEN/GND switch used to control the SQUITTER INHIBIT discrete input to the ATC Transponder. (AIR = OPEN, GROUND = GND)
(23) FUNCTIONAL TEST Switch (S9)	OPEN/GND switch used to control the FUNCTIONAL TEST discrete input to the ATC Transponder. (OFF = OPEN, ON = GND)
(24) DEFAULT SCAN INHIBIT Switch (S32)	OPEN/GND switch used to control the DEFAULT SCAN INHIBIT discrete input to the DME. (STBY = OPEN, SCAN = GND)
(25) INDICATOR STATUS Switches (S28, S29)	OPEN/GND switches used to control the INDICATOR STATUS #1 and #2 discrete inputs to the DME. (FAULT = OPEN, 1 or 2 = GND)
(26) MAINTENANCE RESET Switch (S31)	OPEN/GND switch used to control the MAINTENANCE RESET discrete input to the DME. (DOWN = OPEN, RESET = GND)
(27) AIR/GROUND Switch (S27)	OPEN/GND switch used to control the AIR/GROUND discrete input to the DME. (GROUND = OPEN, AIR = GND)

Aeroflex Operation Manual

(28) DATA SOURCE Switch (S30)	OPEN/GND switch used to control the DATA INPUT PORT SELECT discrete input. (PORT B = OPEN, PORT A = GND)
(29) FUNCTIONAL TEST Switch (S26)	OPEN/GND switch used to control the FUNCTIONAL TEST discrete input to the DME. (OFF = OPEN, ON = GND)
(30) AUDIO OUTPUT Jacks (J2, J3)	Allows monitoring of the audio output signal from the DME.
(31) AUDIO LOAD Switch (S37)	Allows selecting various loads for the DME audio output. The AMP position connects the audio output to the internal amplifier and speaker. In the EXT position, no internal load is applied so that an external load can be connected across the Audio Output jacks.
(32) VOLUME CONTROL (R2)	Controls the volume of the speaker.
(33) SPEAKER (LS1)	A 45 ohm speaker for reproducing the receiver audio from the DME.
(34) FUNCTIONAL TEST INHIBIT	OPEN/GND switch used to control the Switch (S2) FUNCTIONAL TEST INHIBIT discrete input to the LRA. (OFF = OPEN, ON = GND)
(35) FUNCTIONAL TEST Switch	OPEN/GND switch used to control the FUNCTIONAL TEST discrete input to the LRA. (OFF = OPEN, ON = GND)
(36) INDICATOR STATUS Switches (S3, S4)	OPEN/GND switches used to control the INDICATOR STATUS #1 and #2 discrete inputs to the LRA. (FAULT = OPEN, 1 or 2 = GND)
(37) AFS DATA Switch (S5)	Two position toggle switch which allows the operator to connect the AFS DATA CONTROL pin to either the INTERRUPTED AFS DATA program pin or the CONTINUOUS AFS DATA program pin on the LRA.
(38) AIR/GROUND Switch (S6)	OPEN/GND switch used to control the AIR/GROUND discrete input to the LRA. (GROUND = OPEN, AIR = GND)
(39) ANTENNA DISABLE Switch (S7)	Two position toggle switch which allows the user to jumper the ANTENNA MONITOR program pin to the ANTENNA MONITOR DISABLE program pin on the LRA. (OFF = OPEN, DISABLE = SHORTED)
(40) AID SELECT Switch (S8)	Allows connection of either the 40, 57 or 80 Ft. AID (Aircraft Installation Delay) program pin to the AID COMMON pin on the LRA.

### 3.2.2 CONTROLS - REAR PANEL (Fig. 3-2)

- |   |   |
|---|---|
| (1) 28VDC Power Input Jacks (J11)       | A set of banana jack/binding posts used to connect the DFIU to a 28VDC power source.                |
| (2) 115VAC/400Hz Power Receptacle (J10) | Used to connect the DFIU to a 115VAC/ 400Hz power source via the detachable 3-conductor power cord. |
| (3) REMOTE SELECTOR Switch (S40)        | This switch has no current function and is not operational.   |
| (4) T1200 INTERFACE Connector (P401)    | A 37-pin female D connector used to interface the DFIU to a T1200 CDU.                              |

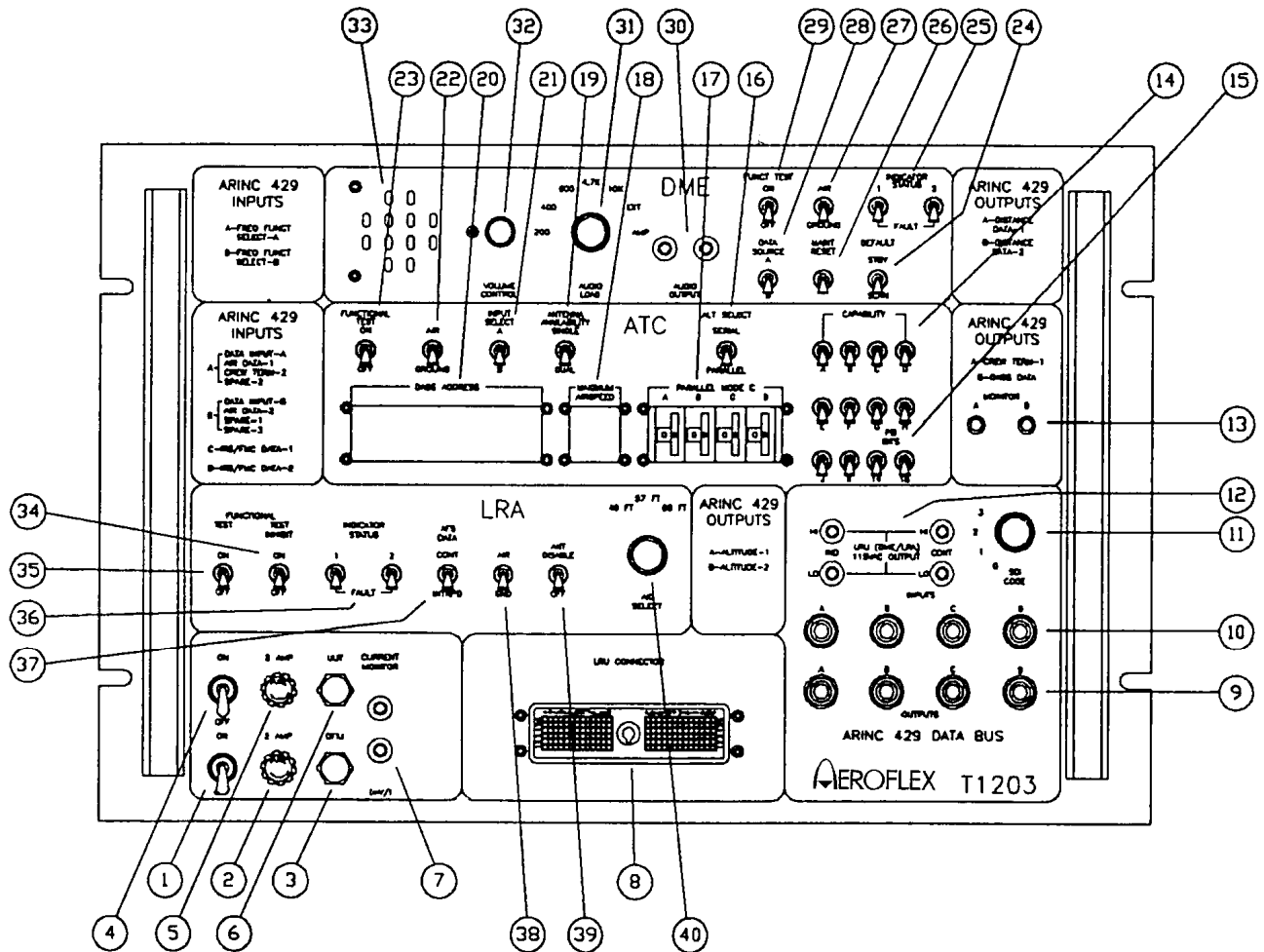


Fig. 3-1: T1203 Controls - Front Panel

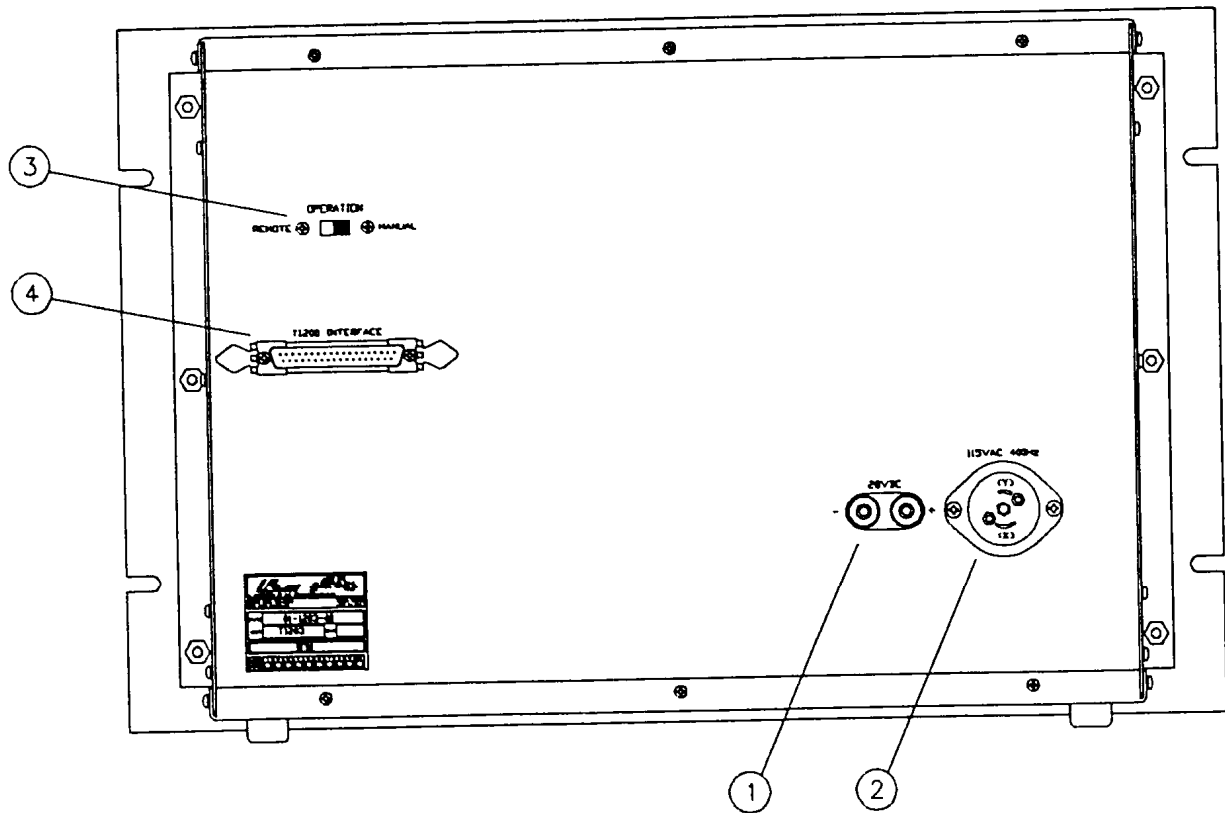


Fig. 3-2: T1203 Controls - Rear Panel

## **SECTION IV - THEORY OF OPERATION**

### **4.1 GENERAL CIRCUIT THEORY**

The only active circuitry contained in the T1203 is contained on the Audio Amp printed circuit board. The following is a brief description.

#### **4.1.1 AUDIO AMP BOARD**

The Audio Amp Board, PN 20-5625-00, is mounted to the inside of the front panel. It is used to provide the selectable loads for the receiver's audio output and to provide a variable amplified output to drive the panel mounted speaker.

## SECTION V - MAINTENANCE

### 5.1 MAINTENANCE INFORMATION

Bills of material, assembly drawings, schematics and a test procedure for the Aeroflex Model T1203 are contained in the T1203 Maintenance Manual (P/N 06-1203-00 for hard copy, E6-1203-00 for CD) available separately from Aeroflex.

For information regarding the T1203 Interface Cables, refer to their individual maintenance manuals. The part numbers for these manuals are as follows:

<u>INTERFACE CABLE</u>	<u>MANUAL P/N</u>
T1203-01	C6-1203-01
T1203-02	C6-1203-02
T1203-03	C6-1203-03
T1203-04	C6-1203-04
T1203-07	C6-1203-07
T1203-09	C6-1203-09
T1203-10	C6-1203-10