

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Visit our website - *Click HERE*

OPERATION MANUAL

T1200B
CONTROL DISPLAY UNIT

MANUAL NUMBER: 06-1200-B1 (Hard Copy)
E6-1200-B1 (CD-ROM)
REVISION: 0
DATE: 02/08/2007

WARNING: INFORMATION SUBJECT TO EXPORT CONTROL LAWS

This manual may contain information subject to the International Traffic in Arms Regulation (ITAR) or the Export Administration Regulation (EAR) which may not be exported, released, or disclosed to foreign nationals inside or outside of the United States without first obtaining an export license. A violation of the ITAR or EAR may be subject to a penalty of imprisonment and/or fines under 22 U.S.C.2778 of the Arms Export Control Act or section 2410 of the Export Administration Act. Include this notice with any reproduced portion of this document.

This document is proprietary to Aeroflex, and is not to be reproduced or otherwise disseminated without the written consent of Aeroflex.

400 New Century Parkway – New Century, Kansas – 66031
Telephone: (800) 237-2831 / (913) 764-2452 Fax: (913) 782-5104
www.aeroflex.com

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 though a conductive wrist strap, or a similar grounding device, using a 1 MΩ 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.

Safety and Regulatory Information

Review this product and related documentation to familiarize yourself with safety markings and instructions before you operate this equipment.

WARNING The **WARNING** notice denotes a hazard. It calls attention to a procedure, practice, or the like, that, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

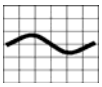
CAUTION The **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.



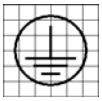
Caution (refer to accompanying documents). Attention – refer to the manual. This symbol indicates that information about usage of a feature is contained in the manual.

Equipment Markings

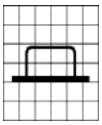
The following markings may appear on this equipment:



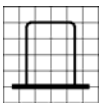
Alternating current. This symbol indicates that the equipment requires alternating current input.



Protective conductor terminal. This symbol indicates the protective ground (earth) terminal.



In-position of a bistable push control. This symbol indicates the in (on) position of a bistable push control.



Out-position of a bistable push control. This symbol indicates the out (off) position of a bistable push control.

CE Mark. ™ of the European Community.



Fuse Symbol. To indicate a fuse.

Datalight
110 © 1989-2004
ALL RIGHTS RESERVED

Datalight and **ROM-DOS** are registered trademarks of Datalight, Inc. Copyright 1989-2002 Datalight, Inc. All Rights Reserved.

Warnings

PROPER FUSE



To avoid fire hazard, use only a fuse identical in type, voltage rating, and current rating as specified on the fuse rating label and/or in the manual.

PROPER POWER CORD

Use only the power cord and connector appropriate for the voltage and plug configuration in your country. Use only a power cord that is in good condition. Refer cord and connector changes to qualified personnel.

DO NOT OPERATE IN EXPLOSIVE ATMOSPHERES

To avoid explosion, do not operate the equipment in an atmosphere of explosive gas.

DO NOT REMOVE COVER

To avoid personal injury or death, do not remove the equipment cover. Do not operate the equipment without the cover properly installed. There are no user-serviceable parts inside the equipment. So there is no need for the operator to ever remove the cover. Access procedures and the warnings for such procedures are contained in the manual. Service procedures are for qualified service personnel only.

DO NOT ATTEMPT TO OPERATE IF PROTECTION MAY BE IMPAIRED

If the equipment appears damaged or operates abnormally, protection may be impaired. Do not attempt to operate it. When in doubt, have the equipment serviced.

CLEANING WARNING

Keep the equipment dry to avoid electrical shock to personnel or damage to the equipment. To prevent damage, never apply solvents to the equipment housing. For cleaning, wipe the equipment with a cloth that is lightly dampened with water, mild detergent, or alcohol. Do not use aromatic hydrocarbons, chlorinated solvents, or methanol-based fluids.

OPERATING POSITION

This equipment is suitable for bench top or rack mount purposes. When used as a bench top unit, normal operating position is flat on the bench, with the appliance inlet clear of any obstructions. Vertical use is NOT considered a normal operating condition.

CAUTION It is recommended to lift and carry this equipment by the handles provided on the front panel.

VENTILATION REQUIREMENT

Equipment has an exhaust fan on the Rear Panel. Keep this area clear and do not restrict airflow to openings for air intake.

WARNING Equipment should only be serviced by authorized personnel.

WARNING This is a Safety Class 1 Product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall only be inserted in a socket-outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the product is likely to make the product dangerous. Intentional interruption is prohibited.

WARNING Equipment is not intended for wet locations. Miscellaneous liquids on or in the equipment could cause hazardous conditions.

SAFETY MAINTENANCE

The operator should check the detachable power supply cord condition. The equipment should not be operated if the mains inlet is cracked or broken. Any obvious damage to the case (from a drop or fall) should be checked by service personnel for loose or damaged parts inside. See individual parts lists for approved replacement parts.

WARNING Do not use the equipment in a manner not specified in this manual!

WARNING The Power switch on the Front Panel is not the mains disconnect. Mains disconnect is accomplished by disconnecting the detachable power supply cord at the appliance coupler or at the mains plug. Ensure the power cord is easily accessible and removable, in the event of an emergency, which requires immediate disconnection.

AC Power Source

The equipment is intended to operate from an ac power source that will not apply more than 264 V ac between the supply conductors or between either supply conductor and ground. A protective ground connection by way of the grounding conductor in the power cord is required for safe operation.

Grounding the Equipment

The equipment utilizes controlled overvoltage techniques that require the equipment to be grounded whenever normal mode or common mode ac voltages or transient voltages may occur. The enclosure must be grounded through the grounding conductor of the power cord, or if operated on battery with the power cord unplugged, through the earth (safety) ground binding post.

Operating Position

Normal operating position is horizontal, on a flat surface. Do not operate in vertical position. Rubber feet on back panel are for protection of connectors, not for operating position. Equipment has option of being mounted in a rack or cabinet.

Batteries

Equipment contains internal battery for CMOS memory. This battery is not operator replaceable.

Rack Mounting

When the T1200 is installed in the standard 19" rack, ensure there is a minimum of 2.54 cm (1 inch) clearance on the sides and 5.08 cm (2 inches) behind the Rear Panel. When rack mounted or in a cabinet, ambient air must not exceed 40 degrees C.

WARNING TO SERVICE PERSONNEL

Ensure that power is disconnected before removal of any covers.

EU DECLARATION OF CONFORMITY

Manufacturer's Name:	JcAIR Test Systems
Manufacturer's Address:	400 New century Parkway New Century, KS 66031-1111 USA

Declares that the products

Product Name:	T1200B Control Display Unit
Model Number(s):	01-1200-B0, 01-1200-B1 01-1200-B2, 01-1200-B3
Product Options:	N/A

Conform to the following product specifications and carry the CE-marking accordingly.

Low Voltage Directive 73/23/EEC:	IEC61010-1:2001 / EN61010-1:2001
EMC Directive 89/336/EEC:	IEC61326-1:2000 EN61326-1:2000

Don Grossman — Printed Name

 — Signature

June 16, 2004 — Date

Manager, Quality Assurance — Printed Title

REVISION HISTORY BY DRAWING NUMBER

MANUAL: T1200B Control Display Unit

REVISION: 0 – February 8, 2007

DRAWING NO.	REV. LEVEL	DRAWING NO.	REV. LEVEL
Safety and Regulatory	00		
Introduction	00		
Table of Contents	00		
Chapter I			
Section I	00		
Section II	00		
Section III	00		
Section IV	00		
Section V	00		
Chapter II			
Section I	00		

INTRODUCTION

A. Content

This manual provides operational procedures, calibration procedures, and maintenance information for the Aeroflex T1200B CDU - ARINC 429 Bus Analyzer. The T1200B Control Display Unit (CDU) is used to test various types of ARINC 700 series line replaceable units (LRU) and other avionics equipment.

B. Arrangement

This manual is divided into chapters/sections with applicable major headings compliant with the intent of *ATA Specification 101*.

Chapter One covers General Information and Operating Instructions.

Chapter Two covers Maintenance.

TABLE OF CONTENTS

SAFETY AND REGULATORY INFORMATION
DECLARATION OF CONFORMITY
REVISION HISTORY
INTRODUCTION

CHAPTER ONE - GENERAL INFORMATION AN OPERATING INSTRUCTIONS

SECTION 1. EQUIPMENT DESCRIPTION 1-1-1

A. T1200B DESCRIPTION 1-1-1
B. ARINC 429 FUNDAMENTALS 1-1-4
C. FRONT PANEL 1-1-6
D. REAR PANEL 1-1-6

SECTION 2. SPECIFICATIONS 1-2-1

SECTION 3. INSTALLATION 1-3-1

A. UNPACKING AND INSPECTING EQUIPMENT 1-3-1
B. EQUIPMENT INSTALLATION 1-3-1
C. POST INSTALLATION CHECK 1-3-1
D. T1200B ARINC PCB SETUP INSTRUCTIONS 1-3-2

SECTION 4. OPERATING INSTRUCTIONS 1-4-1

ARINC 719 HF RMP 1-4-22
ARINC 719 HFDU RMP 1-4-22
ARINC 719 HFDR RMP 1-4-23
ARINC 579 VOR 1-4-24
ARINC 755 MMR 1-4-24
ARINC 709 DME 1-4-25
DME Standard Nav Configuration 1-4-26

SECTION 4. OPERATING INSTRUCTIONS 1-4-1

A. GENERAL OPERATION DESCRIPTION 1-4-1
T1200A POWER UP & SELF-TEST 1-4-1
DFIU SECURITY FEATURE 1-4-3

B. STANDARD MODE 1-4-5

C. VHF ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-900 LRUS) 1-4-34

D. VDL MODE (ONLY APPLIES TO COLLINS VHF-920 LRUS) 1-4-48

E. VHF2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 LRUS) 1-4-61

F. CFDS MODE 1-4-86

G. CMC MODE 1-4-116

H. DEFINED LABELS AND DEFAULT DATA 1-4-140

SECTION 5. THEORY OF OPERATION 1-5-1

A. GENERAL INFORMATION 1-5-1

B. CPU BOARD 1-5-1
- 68B09E MPU 1-5-1
- ADDRESS PLD 1-5-4
- RAM 1-5-4
- EPROMS 1-5-4
- 68B50 ACIA 1-5-5
- 68B40 PTM 1-5-5
- 68B21 PIA 1-5-5

C. TRANSMITTER BOARD 1-5-6
- ADDRESS DECODING 1-5-6
- PTM 1-5-8
- 8 x 16 FIFOs 1-5-8
- 8 BIT PARALLEL TO SERIAL CONVERSION 1-5-9
- BIT COUNTER 1-5-9
- SEQUENCE LOGIC 1-5-9
- PARITY GENERATOR 1-5-12
- OUTPUT LATCH 1-5-13
- OUTPUT DRIVERS 1-5-13

D. RECEIVER BOARD 1-5-14
- ADDRESS DECODING 1-5-16
- BIT DETECTION 1-5-16
- 4x8 BIT SHIFT REGISTERS 1-5-18
- ACTIVE ONE SHOT 1-5-18
- BIT COUNTER 1-5-19
- PARITY GENERATOR 1-5-19
- IRQ INTERRUPT 1-5-19
- FAULT ONE-SHOT 1-5-19

E. TOUCH SCREEN DISPLAY & SINGLE BOARD COMPUTER 1-5-20

F. SECURITY 1-5-20

CHAPTER TWO - MAINTENANCE

SECTION 1. MAINTENANCE INFORMATION 2-1-1

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 1. EQUIPMENT DESCRIPTION

This manual provides operational procedures for the Aeroflex T1200B CDU - ARINC 429 Bus Analyzer. The T1200B Control Display Unit (CDU) is used to test various types of ARINC 700 series line replaceable units (LRUs) and avionics equipment.

A. T1200B DESCRIPTION

The Aeroflex T1200B Control Display Unit (CDU) is an ARINC 429 bus analyzer. It is designed to transmit and receive ARINC 429 digital signals in order to simulate inputs and/or measure and interpret outputs from various digital avionics LRUs. The T1200B can be configured to have four transmit channels (two low speed and two high speed) and four receive channels (two low speed and two high speed). In the USER CONFIGURE MODE, the T1200B can simultaneously transmit ten ARINC 429 words from each transmit channel. The four receiver channels will receive any incoming words and can display their real time data. The T1200B software includes screens designed specifically for testing several 700 series LRUs and avionics containing Built In Test Equipment (BITE) which uses either the Centralized Fault Display System (CFDS) or the Central Maintenance Computer (CMC). These screens setup transmitter and receiver channels for default conditions which simulate those that would be encountered in an operating aircraft. The types of avionics included in these screens are:

ARINC:	
579	VOR
707	LRA
709	DME
710	ILS
711	VOR
712	ADF
716	VHF
718	ATC
719	HF
719	HF RMP
719	HF ACARS
750	VDR
753	HFDR
753	HFDR RMP
753	HFDU
753	HFDU RMP
755	MMR
719	VDL MODE

CFDS and CMC:	
707	VOR
708	WXR
709	DME
710	ILS
711	VOR
712	ADF
716	VHF
718	ATC
718	ATC/S
719	HF
723	GPWS
724	ACARS
727	MLS
735	TCAS
740	PRNTR
741	SATCM

CFDS and CMC:	
750	VDR
753	HFDU
753	HFDR
755	MMR

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 1. EQUIPMENT DESCRIPTION

A. T1200B DESCRIPTION

The operator enters commands via a touch screen display and keyboard. The touch screen feature relieves the operator from typing in commands or moving a cursor around the screen. The operator now merely touches the menu selection or data field to be modified. This method of allowing the operator to actually touch an area on the screen makes the T1200B easy to operate and reduces testing time. A PS/2 mouse may also be used as an input device.

The Aeroflex T1200B can be used as part of an integrated test system specifically designed for testing ARINC 700 series of digital avionics. The other members of the system are a series of Discrete Function Interface Units or DFIUs and interface cables. The DFIU interfaces to the UUT and provides test points for ARINC defined signals and functions.

In addition, the T1200B contains special software and interface capabilities that greatly simplifies the testing of any new generation of frequency agile DMEs. The multi-channel DME mode allows the T1200B to transmit up to six DME channel words (five directed frequency words and one scan command word) and receive and display the DME distance outputs.

NOTE: The SQUAWK/NAUT interface is not supported by the T1200B.

The following is a list of abbreviations used in this manual or by the T1200B.

ADF	Automatic Direction Finder
ADVAN	Advance
ALT	Altitude, Altimeter
ANGL	Angle
ASPD	Airspeed
ATC	Air Traffic Control
BCD	Binary Coded Decimal
B/F	Background/Foreground
BNR	Binary BRG (Bearing)
CLBS	100 pounds
CMD	Command

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 1. EQUIPMENT DESCRIPTION

A. T1200B DESCRIPTION

List of abbreviations continued.

CRS	Coarse
CTL	Control
DDM	Difference is Depth of Modulation
DECR	Decrement
DEG	Degrees
DEV	Deviation
DF	Directed Frequency
DG	Degrees
DG/S	Degrees per Second
DISP	Display
DIST	Distance
DME	Distance Measuring Equipment
EFF	Efficiency
ENG	Engineering
EVN	Even
FNL	Final
FT	Functional Test, Feet
FW	Failure Warning
GLS	Glide Slope
GND	Ground
GRS	Gross
HDG	Heading
HF	High Frequency
HFDR	HF Data Radio
HFDU	HF Data Unit
ILS	Instrument Landing System
INC	Increment
INT	Intermediate
KBPS	1000 Bits Per Second
KT	Knot
KTS	Knots
LBL	Label
LRA	Low Range Altimeter
LRU	Line Replaceable Unit
MAG	Magnetic
MEM	Memory
MLS	Microwave Landing System
mMach	Millimach
MNS	Minus
MOD	Modulation
NAV	Navigation
NCD	No Computed Data
NM	Nautical Miles
NML	Normal
N.O.	Normal Operation
NXT	Next
PAR	Parity
PLS	Plus
PRES	Pressure
PWR	Power
RALT	Radio Altimeter
RDMI	Radio Distance Magnetic Indicator
RHDG	Runway Heading
RPLY	Reply
RWY	Runway
SDI	Source/Destination Identifier
SEL	Selected
SNGL	Single
SPD	Speed
SQ/NT	SQUAWK/NAUT
SQK	Squawk
SSM	Sign Status Matrix
STAND	Standard
STBY	Standby
TAS	True Airspeed
TCAS	Traffic Alert and Collision Avoidance System
THRL	Throttle
TOT	Total
UND	Undefined
UNKN	Unknown
VHF	Very High Frequency
VDR	VHF Data Radio
VOR	VHF Omni Range
WGT	Weight
WYPT	Waypoint
XPDR	Transponder

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 1. EQUIPMENT DESCRIPTION

B. ARINC 429 FUNDAMENTALS

This section will present a brief discussion of the ARINC 429 Digital Information Transfer System (DITS). In order to better understand the operation of the T1200B, it is important that the operator have a fair knowledge of the fundamentals of DITS, including an understanding of the various data fields within the 32 bit word as well as the timing constraints of the system.

The ARINC 429 specification describes a unidirectional data transmission system wherein a single data source (the transmitter) transmits signals over a single, shielded, twisted-pair to a maximum of twenty paralleled data sinks (the receivers). A differential, bipolar return-to-zero (RZ) modulation scheme is used that allows the receiver to be self-clocking. The nominal voltage at open-circuited transmitter terminals, measured from the high side (line A) to the low side (line B) are: HI (logical '1') +10 V ±1 V; LO (logical '0') -10 V ±1 V; NULL 0 V ±0.5 V. There are two bus speeds that have been defined. A low speed operating at between 12.0 kbps and 14.5 kbps, and a high speed operating at 100 kbps. Successive words are expected to maintain a timing gap of no less than four bit intervals between the final bit of one word and the beginning bit of the next word. Additionally, the last bit of every word is the parity bit, always as odd parity.

There are five basic application groups for the 32 bit digital word: binary numeric data (BNR), BCD numeric data, maintenance (general) and maintenance (ISO Alphabet) data, and AIM data. For a complete discussion of each data type, refer to the most recent ARINC 429 specification.

Each data type is identified by the first eight bits, known as the label. By convention, when a DITS word is depicted, the 32nd bit (MSB) is on the left and the first transmitted bit (LSB) is on the right. The DITS word appears opposite to this on an oscilloscope because the LSB is transmitted first. Figure 1 is an example.

32	31 30	29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11	10 9	8 7 6 5 4 3 2 1
P	SSM	DATA	SDI	LABEL
1	0 0	0 0 0 0 0 1 1 1 0 1 0 0 0 1 0 1 0 0 0	0 0	0 0 1 1 1 0 0 1

Figure 1

The eight bit label is generally referred to in octal, with bits 1 and 2 alone making up the most significant bits of the most significant character, being read from right to left. The octal label in the above example is 234 octal. A two bit Source/Designation Identifier (SDI) follows the label field for most information types. The SDI field is useful for directing the data word to specific system or unit within a multi-system installation, or to identify the particular data source in such a system. Up to four units (or three units and an "all call") can be identified by the SDI. The data field that follows the SDI varies in definition among the data types. Numeric data is encoded in either BNR or BCD formats, alpha-numeric data is ISO alphabet #5 format, and discrete data in defined discrete formats. Any bits that are not used or not required are referred to as pad bits, and are generally filled with zeros. In some data types, pad bits are assigned discrete functions (e.g. to turn on the BFO in an ADF receiver).

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 1. EQUIPMENT DESCRIPTION

B. ARINC 429 FUNDAMENTALS cont.

A two bit Sign/Status Matrix (SSM) is always encoded in bits 31 and 30 (BNR numeric words include bit 29 as a sign bit). The SSM contains the coded operational status of the unit and/or the accompanying data. The following tables show the encoding of the SSM for the various data types.

31 30 BNR DATA

0 0 Failure Warning
0 1 No Computed Data (NCD)
1 0 Functional Test (FT)
1 1 Normal Operation

31 30 BCD DATA

0 0 Plus, North, East, Right, To, Above
0 1 No Computed Data (NCD)
1 0 Functional Test (FT)
1 1 Minus, South, West, Left, From, Below

31 30 AIM DATA

0 0 Intermediate Word
0 1 Initial Word
1 0 Final Word
1 1 Control Word

31 30 FILE TRANSFER APPLICATIONS

0 0 Intermediate Word, Plus, North, East, Right, To, Above
0 1 Initial Word
1 0 Final Word
1 1 Intermediate Word

Finally, bit 32 is the Parity bit, a one in this example, keeping the total number of ones odd in this word (odd parity).

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 1. EQUIPMENT DESCRIPTION

C. FRONT PANEL

Figure 2 shows the front panel of the T1200B and the following is a description of the controls.

POWER SWITCH

This switch is used to turn on and off the T1200B. (FIGURE#2, ITEM #1)

AUXILIARY POWER INDICATION

When the T1200B is on, the power switch is illuminated, otherwise it is extinguished.

TX OUTPUT JACKS

Three conductor 1/4" phone jacks are used to provide transmitter outputs for the transmitter channels A through D.

RX INPUT JACKS

Three conductor 1/4" phone jacks are used to provide receiver inputs for the receiver channels A through D.

D. REAR PANEL

Figure 3 shows the rear panel of the T1200B and the following is a description of the controls.

DFIU INTERFACE CONNECTOR

This connector allows the T1200B to be connected to one of several JcAIR Test Systems DFIUs via an interface cable. This allows the T1200B to control the DFIUs. (FIGURE#3, ITEM#2)

VIDEO CONNECTOR

The 15 pin D high-density video connector is a standard SVGA output. This output is connected to the touch screen video input. Any standard SVGA-compatible monitor may be connected.

TOUCH SCREEN CONNECTOR

The 9 pin D connector is a standard serial port and is used to communicate with the touch screen.

MOUSE INPUT CONNECTOR

A PS/2 mouse input is provided. The mouse may be used with or without the touch screen. Any Microsoft-compatible mouse may be used.

NOTE: Only the left mouse button input is used.

TRANSMIT/RECEIVE SYNC OUTPUTS

These terminals (connectors) provide sync signals when an ARINC 429 word is received or transmitted.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 1. EQUIPMENT DESCRIPTION

E. EXTERNAL DISPLAY

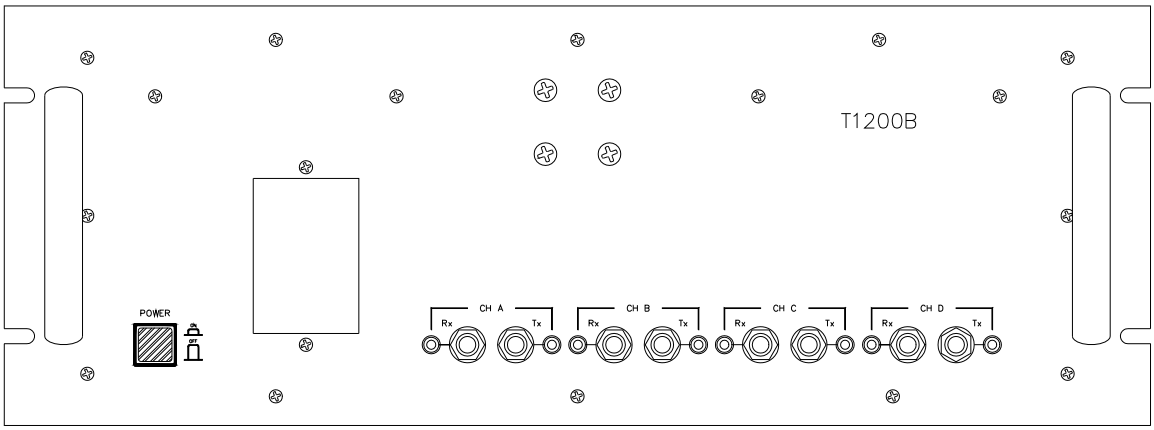
Figure 4 shows the external display of the T1200B and the following is a description of the controls.

TOUCH SCREEN DISPLAY

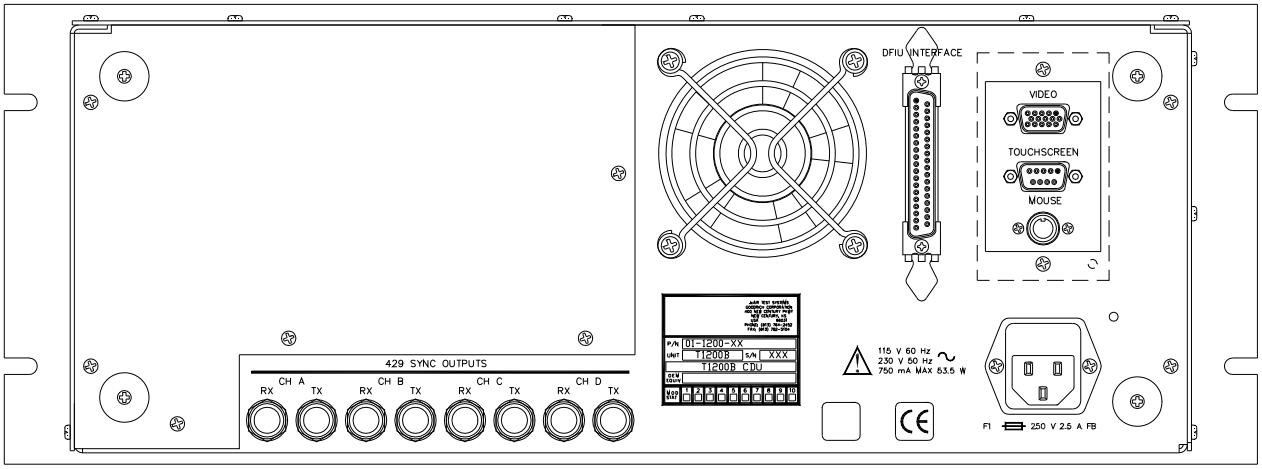
The touch screen display serves a dual purpose. First, it displays all information for the operator. Secondly, the operator may make selections by actually touching the screen.

KEYBOARD

The keyboard is used by the operator to enter information into the T1200B. The keyboard is displayed on the touch screen.



T1200B FRONT PANEL - FIGURE #2



T1200B REAR PANEL - FIGURE #3



T1200B DISPLAY - FIGURE #4

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 2. SPECIFICATIONS

Size	17.8 cm H x 58.2 cm W x 46.5 cm D (7.0" H x 22.9" W x 18.3" D) Rack mount 48.26 cm (19")
Mass (Weight)	18.0 lb (8.2 kg)
Alternating Current	100 - 240 VAC 47 - 63 Hz 750 mA max, 53.5 W 
Environmental	The environmental specifications are as follows.
Cooling	Internal Fans with side air intake, exhaust to rear.
Ventilation Requirements	Equipment requires 2.54 cm clear distance on sides and 5.08 cm on rear. When rack mounted or in a cabinet, ambient air must not exceed 40 °C
Operating Temperature .	5 °C to 40 °C.
Relative Humidity	5% to 95%, non-condensing
Operating Altitude	≤ 2 000 m.
IEC Overvoltage Category	II.
Pollution Degree	1
Nonvolatile Memory Life	>10 unpowered equipment years for 0 °C to 28 °C >3 unpowered equipment years for 0 °C to 50 °C >2 unpowered equipment years for 50 °C to 70 °C Stores: Real-time clock, setup configuration, and measurement data.
Batteries	Equipment contains internal battery for CMOS memory. This battery is not operator replaceable.
Display	
Size	12.1" diagonal 12.2" H x 12.3" W x 5.7" D
Mass (Weight)	7.3 lb (3.3 kg)
Alternating Current	100 - 240 VAC 47 - 63 Hz 25 W max 
Operating Temperature	5 °C to 35 °C.
Relative Humidity	10% to 80%, non-condensing

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 2. SPECIFICATIONS cont.

Cables and Wires

1. For external connections to the Front Panel, CH A through CH D, Rx and Tx terminals (A10J303 through A10J310), it is recommended that twisted pair with braided shield cable be used. The shield shall fold back on itself and be terminated 360° at the connector. See Figures 2-1 and 2-2.

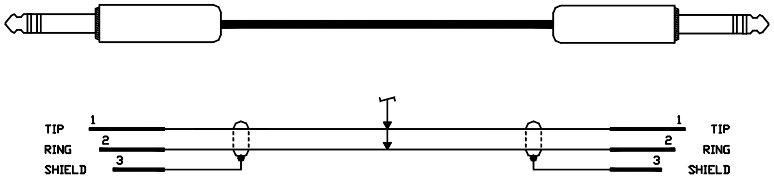


Figure 2-1. Cable Assembly Schematic

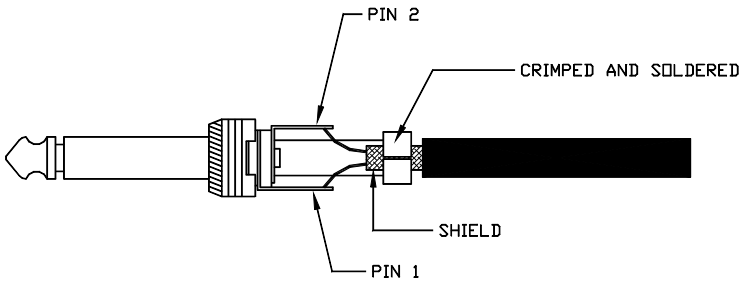


Figure 2-2. Phone Plug Termination

2. For external connections to the Rear Panel, 429 SYNC OUTPUTS, CH A through CH D, TX and RX terminals (A2J119 through A2J126), it is recommended that M17/84-RG223 double shielded coaxial cable, or equivalent, be used. The shield must be properly terminated 360° to BNC connectors.

The equipment uses the following fuses:
F1 is a 250 V, 2.5 A, cartridge 5 mm X 20 mm fuse

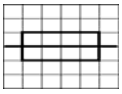
The T1200B's power supply has a non-serviceable internal line fuse. If this fuse opens, the power supply must be repaired or replaced.

To replace the fuse(s), located on the rear panel inside the appliance Inlet (FL1):

1. Disconnect the appliance coupler.
2. Remove FL1 front cover/fuse subassembly with a small flat blade screwdriver or similar tool.
3. Remove fuse(s) from holder and replace with value as indicated above.
4. Replace the front cover/fuse subassembly into the appliance inlet (push with fingers to snap in place).

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 2. SPECIFICATIONS cont.



The equipment uses the following internal fuses, which are not replaceable by the operator:
Power Supply fuse PS1F1 is 250 V, 2.5 A, cartridge type, 5 mm X 20 mm, fast blow, IEC type.

AC Power Source. The equipment is intended to operate from an ac power source that will not apply more than 253 V ac between the supply conductors or between either supply conductor and ground. A protective ground connection by way of the grounding conductor in the power cord is required for safe operation.

Equipment Meets These Listed Standards.

EN 61010-1
EN 61326-1
EN 50082-1:1992
EN 55011 Class A
FCC

Rack Mounting — Additional testing will be required for certification of a rack mount system. Consultation with a third party approving authority is HIGHLY recommended.

When the T1200B is installed in the standard 19" rack, ensure there is a minimum of 2.54 cm (1 inch) clearance on the sides and 5.08 cm (2 inches) behind the Rear Panel.

The display may be mounted on the chassis using the 50-1200-B5 Display Pivot Bracket.

Operating Position — Normal operating position is horizontal, on a flat surface. Do not operate in vertical position. Rubber feet on back panel are for protection of connectors, not for operating position. Equipment has option of being mounted in a rack or cabinet. The feet may also be installed on the bottom of the chassis for table top operation.

Cooling — The T1200B employs internal fans to circulate cooling air. The air is drawn into the unit along the sides and is exhausted out the rear. Do not allow the airflow to be impeded. If the unit is in a rack without a ventilated rear cover, 60 CFM of air flow is required across the unit.

ARINC 429 OUTPUTS

Channels A and B (low speed)

Output Impedance: 75 ± 5 Ω (line A to B)

Output Voltage (line A to B):

HI	+10.0 V ± 1.0 V
NULL	0.0 V ± 0.5 V
LO	-10.0 V ±1.0 V

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 2. SPECIFICATIONS cont.

Pulse Rise/Fall time	10 ± 5 μs 10% - 90% measurement method
Bit Rates	8.0, 9.4, 11.1, 12.5, 13.9, 15.1, 17.2, 18.5, and 20.0 KBPS ±1%
Channels C and D (high speed)	
Output Impedance	75 ± 5 Ω
Output Voltage (line A to B)	HI +10.0 V ± 1.0 V NULL 0.0 V ± 0.5 V LO -10.0 V ± 1.0 V
Pulse Rise/Fall time	1.5 ±0.5 μs 10% - 90% measurement method
Bit Rates	83.33, 100.00, and 125.00 KBPS ± 1%
Fault Tolerance	Will indefinitely withstand shorts from high to low terminals; high or low or both terminals to ground.
Maximum Channel Capacity	0.8 x channel bit rate/36

ARINC 429 INPUTS

Differential Input Impedance	12 kΩ minimum (balanced)
Receiver Threshold Levels	
	HI +6.5 V to +13.00 V NULL +2.5 V to -2.5 V LO -6.5 V to -13.00 V

429 SYNC OUTPUTS

Waveform	Positive going pulse
Voltage Level	+5 V to GND

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 3. INSTALLATION

A. UNPACKING AND INSPECTING EQUIPMENT

Exercise extreme care when unpacking the unit and accessories. 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 equipment has been unpacked, return all the packing material to the container for future use in storing or shipping the equipment.

B. EQUIPMENT INSTALLATION

The T1200B CDU is manufactured for 19 inch rack mounting, but can also be operated as bench test equipment.

The display may be installed on the front of the chassis using optional pivot bracket (50-1200-B5).

NOTE: Bracket should only be used when unit is mounted securely in a rack.

To mount the T1200B into a rack:

CAUTION: VISUAL INSPECTION OF ALL INTERFACE CONNECTORS MUST BE DONE BEFORE MOUNTING THE EQUIPMENT. INSURE THAT ALL CONNECTORS ARE SECURE AND FLUSH.

CAUTION: INSPECT CONNECTORS FOR DAMAGE TO CONTACTS OR PINS. DO NOT ATTEMPT TO MATE CONNECTORS IF CONTACTS OR PINS ARE DAMAGED.

1. Verify rubber feet are mounted on rear of chassis.
2. Position the T1200B into desired position within the rack assembly, taking care to route wires and cables before securing the unit to the rack-mount.
3. Insert and tighten all rack mounting screws.

C. POST INSTALLATION CHECK

TESTING PROCEDURE:

1. Connect the proper detachable power supply cord to the T1200B.
2. Connect the display to the chassis using the supplied cables.
3. Connect the display power adapter.
4. Turn the unit ON by pressing the POWER switch, located on the lower right side of the front panel.
5. Turn display on by using the button on front of display.
6. The opening SELF-TEST COMPLETE screen shall appear within 60 seconds.

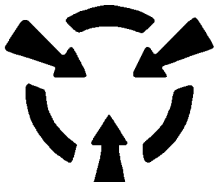
NOTE: It may be necessary to adjust the intensity control on the top center of the rear panel for optimum viewing of the display.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 3. INSTALLATION

D. T1200B ARINC PCB SETUP INSTRUCTIONS

CAUTION: ELECTROSTATIC DISCHARGE CAN DAMAGE ELECTRONIC COMPONENTS. SERVICE THE T1200B ONLY AT AN ESD STATION OR AREA.



For proper operation, configure the ARINC board dip switches according to the tables below.

Tx BOARD

(JPN: 20-5577-00= Lo Speed; JPN: 20-5577-01= Hi Speed)

S1-1 (0=closed; 1=open)	S1-2 (0=closed; 1=open)	FUNCTION
0	0	C/D - LO SPEED
0	1	C/D - HI SPEED
1	0	A/B - HI SPEED
1	1	A/B - LO SPEED

Rx BOARD

(JPN: 20-5578-00= Lo Speed; JPN: 20-5578-01= Hi Speed)

S1-1 (0=closed; 1=open)	S1-2 (0=closed; 1=open)	FUNCTION
1	1	A/B
0	1	C/D

NOTE: DIP SWITCHES DETERMINE CHANNEL SELECTION ONLY - NOT SPEED

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

A. GENERAL OPERATION DESCRIPTION

This section contains the basic operating procedures for the Aeroflex T1200B CDU. The operation of the T1200B is simple. The screens and menus are easily and logically accessible to the operator via the touch screen display. Figure 4 shows a menu tree of the T1200B menus. This figure may be helpful in negotiating the T1200B menus.

The following discussions provide a description of each screen displayed by the three modes of the T1200B. The three operating modes are: Standard, CFDS, and CMC. Please note that this is a general operation discussion, designed to acquaint the operator with the available screens and their characteristics.

The Standard mode of operation allows the operator to manually configure the transmitters/receivers, to test avionics LRUs, and to align VHF900 transceivers.

New technology commercial aircraft are currently being equipped with avionics systems that incorporate Built In Test Equipment (BITE). Depending upon the aircraft, this BITE system will either be the Centralized Fault Display System (CFDS), which is used in the A320 and MD11 aircraft, or the Central Maintenance Computer (CMC), which is used in the 747-400 and 777 aircraft. Additional information on these systems can be found in the following documents:

AIRBUS Specification ABD0048 REV C
BOEING Specification D243W201-1
ARINC Specification 604-1

In order to facilitate testing of the BITE circuitry in the avionics in these aircraft, Aeroflex has added two additional operating modes (CFDS and CMC) to the T1200B CDU.

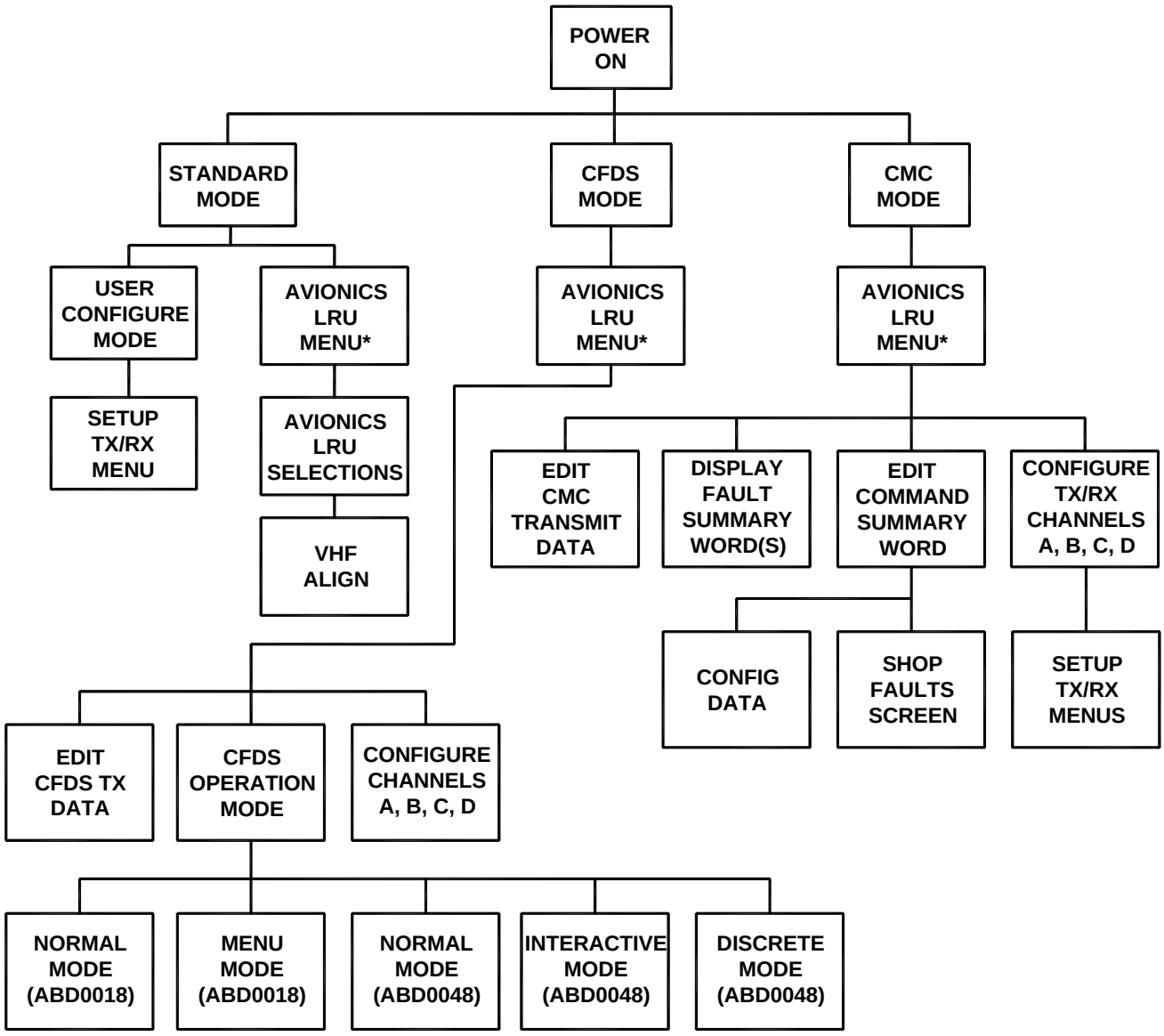
When performing tests on an actual unit, the test procedures found in the CMM (Component Maintenance Manual) for the particular LRU (Line Replaceable Unit) should be followed.

NOTE: The T1200B incorporates a protection feature to prevent unintentional loss of operator input data. On some screens, pressing the PRIOR PAGE key on the DATA ENTRY KEYPAD will generate an audible "beep" and the present screen will remain. This indicates to the operator that going to a "prior page" will cause all data entered to be lost. To bypass this feature, it is necessary to press the PRIOR PAGE key twice in rapid succession.

NOTE: The optional SQUAWK/NAUT supported by the T1200A is not supported by the T1200B. Some software screens will still show SQUAWK/NAUT. However, these screens are not functional in the T1200B.

T1200B POWER UP & SELF-TEST

The T1200B automatically initiates a self-test and then displays the Power Up & Self-Test Screen as shown in Figure 5 (if the self-test is successful). The operator then has the option of pressing the highlighted areas of the screen to select either the STANDARD, CFDS, or CMC modes of operation.



***** DFIU Security Feature may be required to continue past this menu.

Figure 4 - T1200B Touch Screen Menu Tree

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

A. GENERAL OPERATION DESCRIPTION cont.

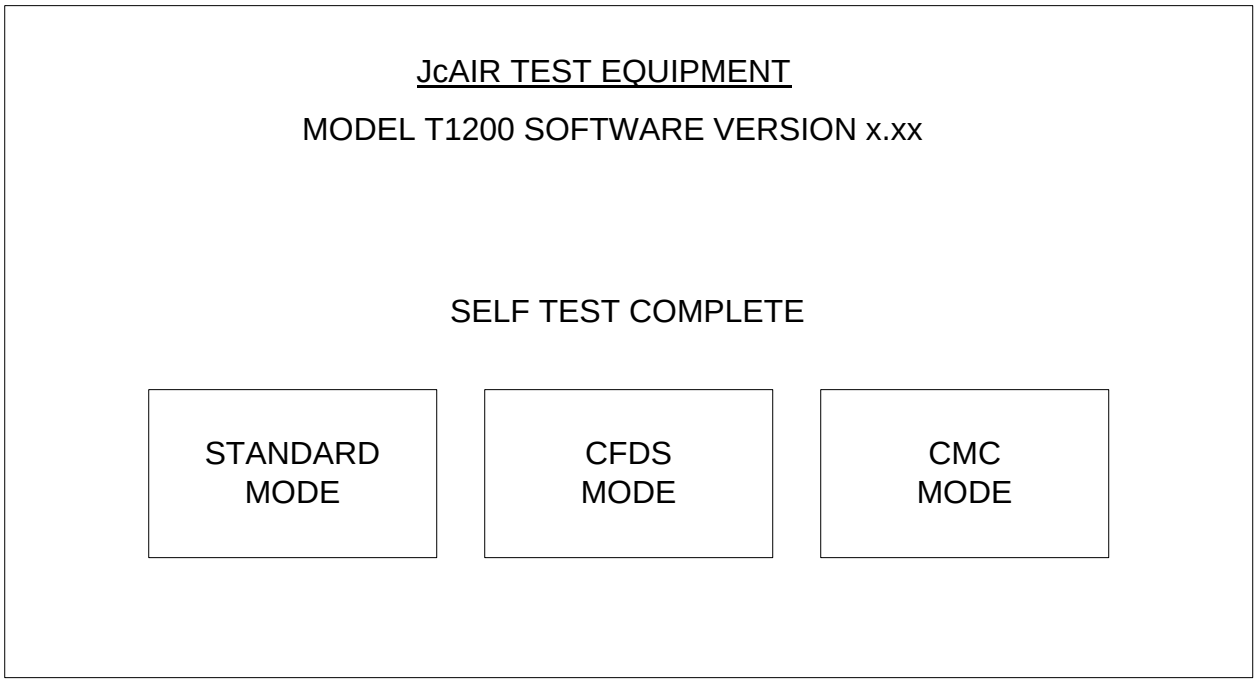


Figure 5A POWER UP & SELF-TEST SCREEN

DFIU SECURITY FEATURE

The T1200B incorporates a security feature to verify the correct DFIU is connected for the menu selected. Figure 4 shows the menus that may require a DFIU with a security device.

The security is only active for specific menu selections in the LRU AVIONICS, CFDS and CMC menus. The presents of a DFIU is not checked when the USER CONFIGURE menu has been selected. When a LRU is selected that requires a security feature, the CPU Board requests that the SBC checks the DFIU type. The SBC attempts to find the DFIU. If a DFIU is connected, the type is checked and reported back to the CPU. If the DFIU is not connected or an incorrect DFIU is connected, an error message is displayed and the user is not allowed to continue.

A warning screen similar to Figure 5B is displayed if a menu is selected that requires a different DFIU than the one attached.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

A. GENERAL OPERATION DESCRIPTION

DFIU SECURITY FEATURE cont.

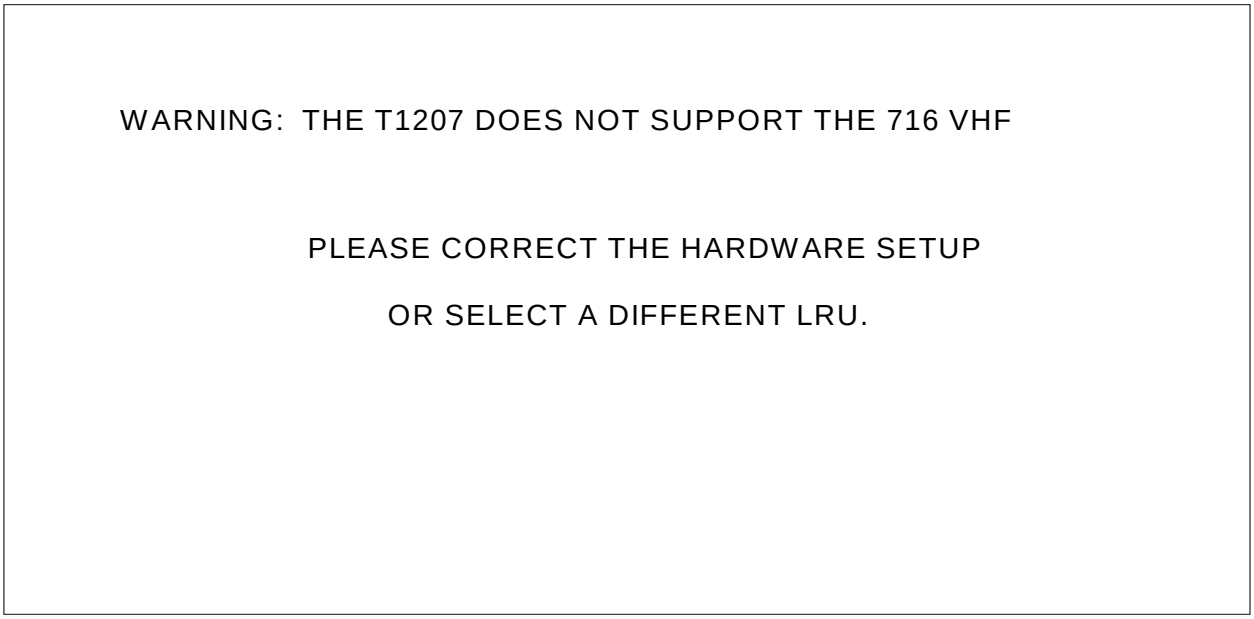


Figure 5B SECURITY WARNING SCREEN

An error screen similar to Figure 5C is displayed if a hardware error is detected. Error code 52 is the most common error indicating that no DFIU is attached or the security token is missing.

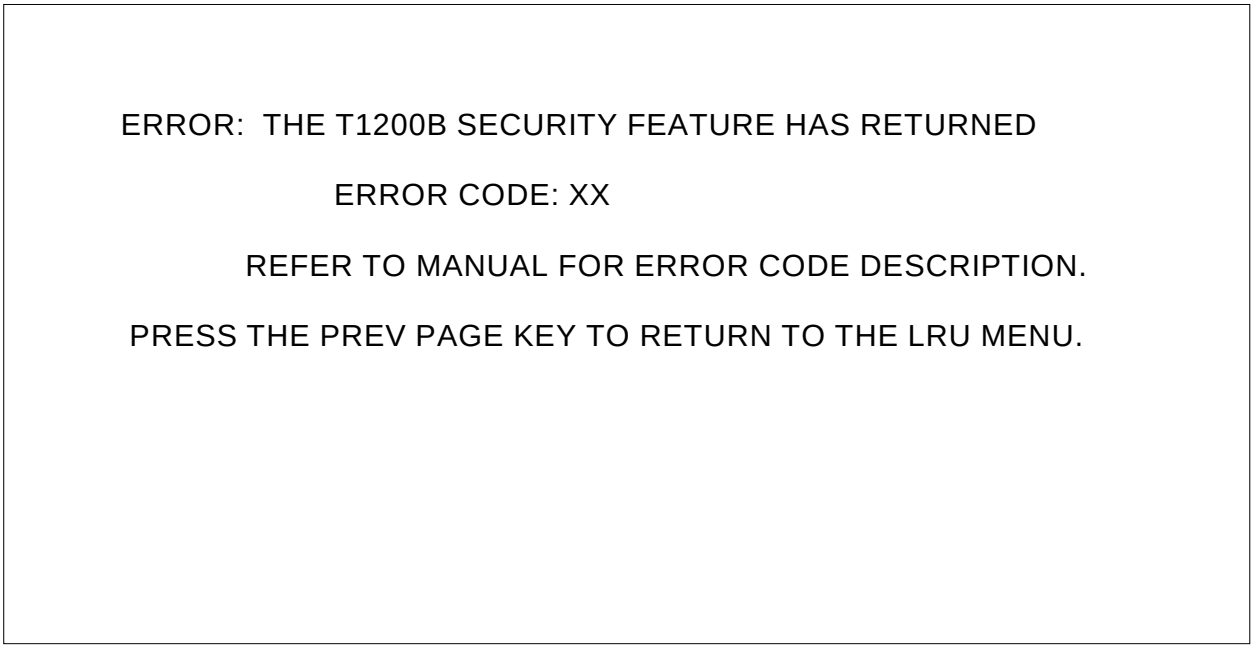


Figure 5C SECURITY ERROR SCREEN

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

A. GENERAL OPERATION DESCRIPTION cont.

DFIU SECURITY FEATURE cont.

One of the following error codes should be displayed if there is a failure detected in the security hardware:

50 Could not open com port
51 Could not find security coprocessor
52 Could not find DFIU security token
53 Could not validate DFIU security token
54 Single Board Computer did not respond to the security check in the allotted time

B. STANDARD MODE

This selection is made to gain access to the Standard Mode Select Menu Screen shown in Figure 6. The two selections on this screen are: USER CONFIGURE MENU and the AVIONICS LRU MENU. Pressing the PRIOR PAGE key on the keypad will return you to the Power Up & Self Test Screen shown in Figure 5.

USER CONFIGURE MENU

This selection is made to gain access to the Configure Channels Screen shown in Figure 7. The Configure Channels Screen allows the operator to configure the transmit and receive channels. Additionally, each transmitted ARINC 429 word may be individually configured for label, data, SDI, PAD, SSM, parity, and transmit rate. The receiver channels may be programmed to trap words and view their data.

Pressing the PRIOR PAGE key on the keypad twice will return you to the Standard Mode Select Menu Screen shown in Figure 6.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

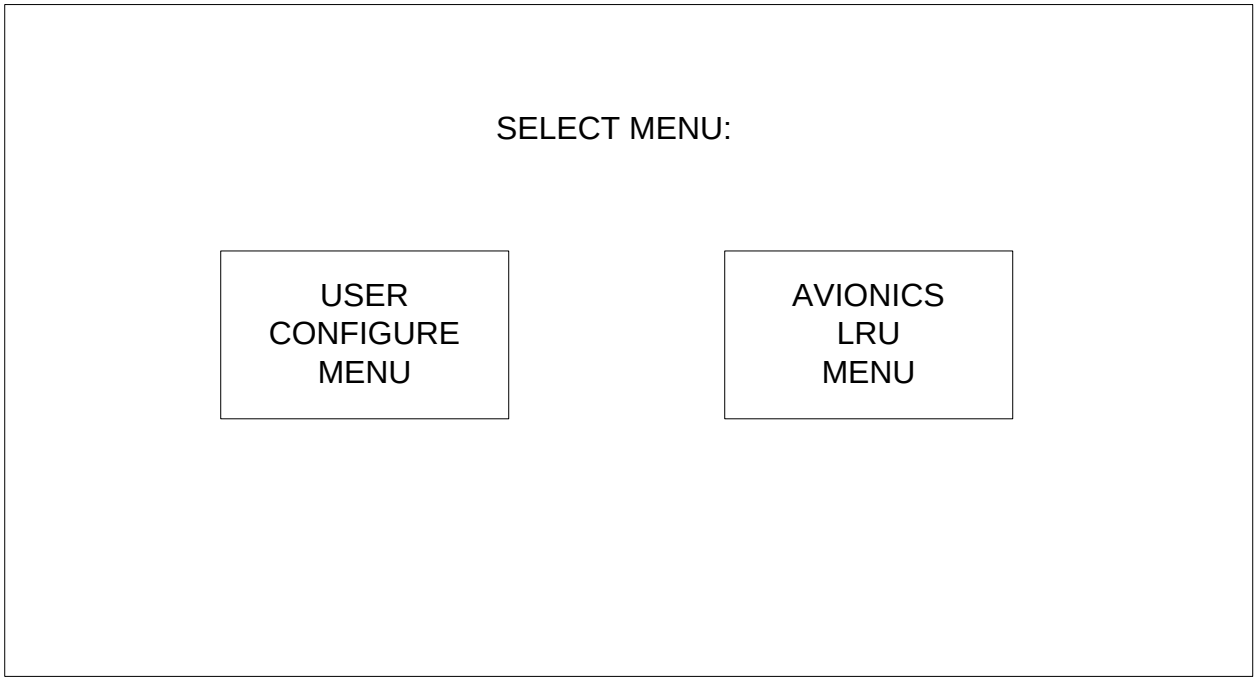


Figure 6 STANDARD MODE SELECT MENU SCREEN

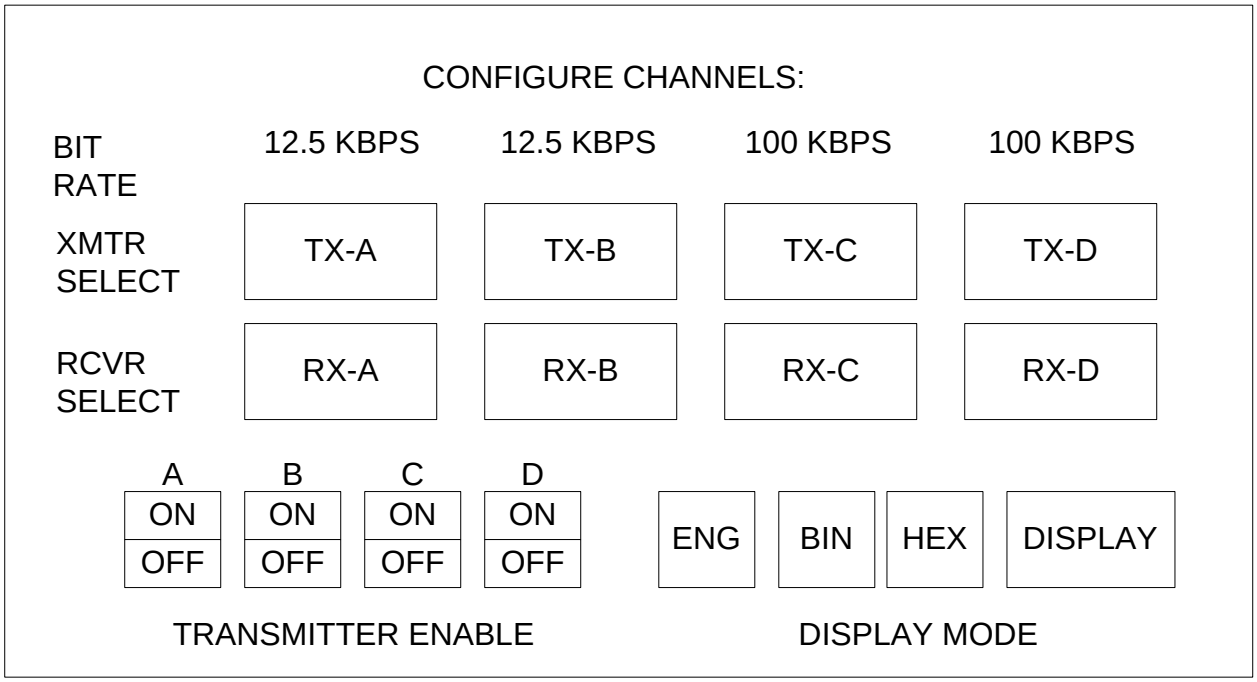


Figure 7 CONFIGURE CHANNELS SCREEN

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

There are several touch areas on the screen which allow the operator to configure the channels. The following is a description of these areas:

BIT RATE

The bit rate for each transmitter is displayed above each transmitter select area. When the number is pressed, the rate scrolls through a list of low speed transmitter rates: 20.0, 18.5, 17.2, 15.1, 13.9, 12.5, 11.1, 9.4, and 8.1 KBPS, or high speed transmitter rates: 125, 100, and 83 KBPS.

XMTR SELECT

These touch areas will display one of the three Transmitter Screens as seen in Figures 8 through 10. The transmitter select areas are highlighted if any non-zero labels have been programmed.

RCVR SELECT

These touch areas will display one of the three Receiver Screens as seen in Figures 11 through 13. Like the transmitter select areas, the receiver select areas will be highlighted if the channel has been configured.

TRANSMITTER ENABLE

Pressing the area below the transmitter designator A, B, C, or D will toggle the transmitter channel off and on. The current state of the channel is shown in highlighted inverse video.

DISPLAY MODE

Pressing one of the DISPLAY MODE areas will select the manner in which the ARINC 429 data will be displayed in the Transmitter, Receiver, and Display screens. Again, the currently selected mode is shown in highlighted inverse video. The ENG selection displays the data in engineering format, while the BIN displays the data in binary format, and HEX displays it in hexadecimal format.

DISPLAY

This touch area will display a Transmitter screen. However, line 1 contains the last configured transmitter channel and line 2 contains the last configured receiver channel. If no channels have been configured, then transmitter channel A and receiver channel A are displayed.

TRANSMITTER SCREEN

Figures 8 through 11 show the three different data display formats used in the Transmitter Screen. Any of the fields within any of the transmitted words can be changed by the operator without interrupting transmission.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

TRANSMITTER SCREEN cont.

A word can be added to the transmitter by pressing an OFF in the label list located in the center of the screen. The current label line, located at the top of the screen, will erase and the label field is highlighted. The label may be entered using the keyboard and pressing the ENTER key when finished. The remaining fields in the current label line are filled in with default data and are ready for additional editing.

Any word in the label list may be edited by simply pressing it. The label will then occupy the current label line. The label, SDI, data, PAD, SSM, parity, and transmit rate may all be changed using the touch screen and keyboard. A word may be deleted from the transmit label list by editing the label and entering the label 000.

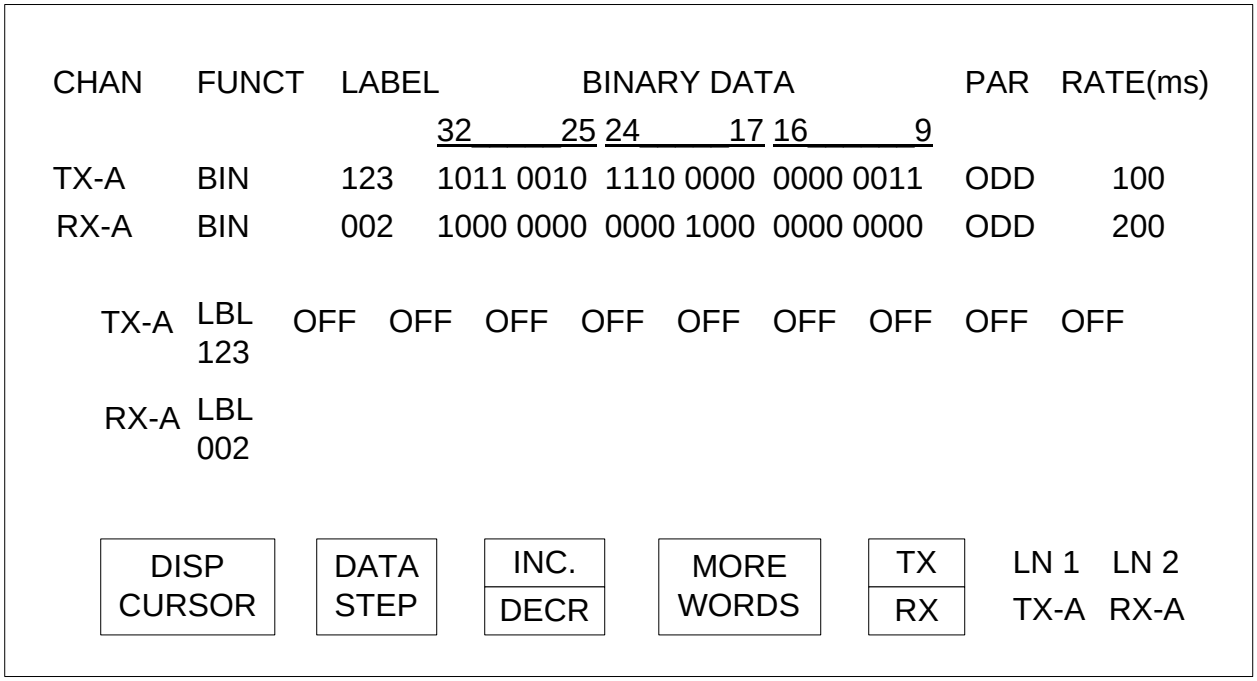


Figure 8 TRANSMITTER (BIN) SCREEN

DATA FIELD

The data field can be edited in two ways. First by pressing the data field and entering the data via the keyboard and pressing the ENTER key. The second way is to press the DISP CURSOR field. This displays an arrow below the data field (see Figure 10). The digit to be altered is selected by repeatedly pressing the DISP CURSOR field until the arrow is directly below it. The direction in which to alter the digit can be selected by pressing the INC./DECR field. Then, by pressing the DATA STEP field, the digit is incremented or decremented, as selected by the INC./DECR field. The data will continuously increment/decrement if the operator presses and holds the DATA STEP field. This feature is handy when using the ENG display mode to change the data.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

DATA FIELD cont.

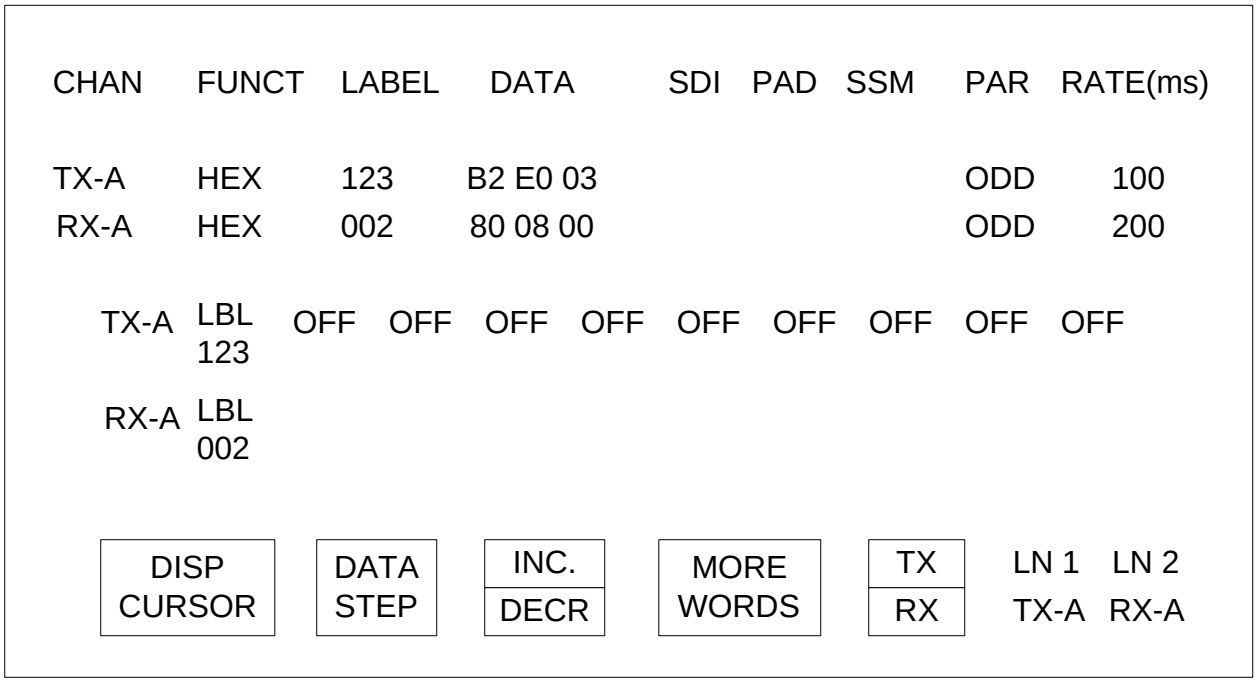


Figure 9 TRANSMITTER (HEX) SCREEN

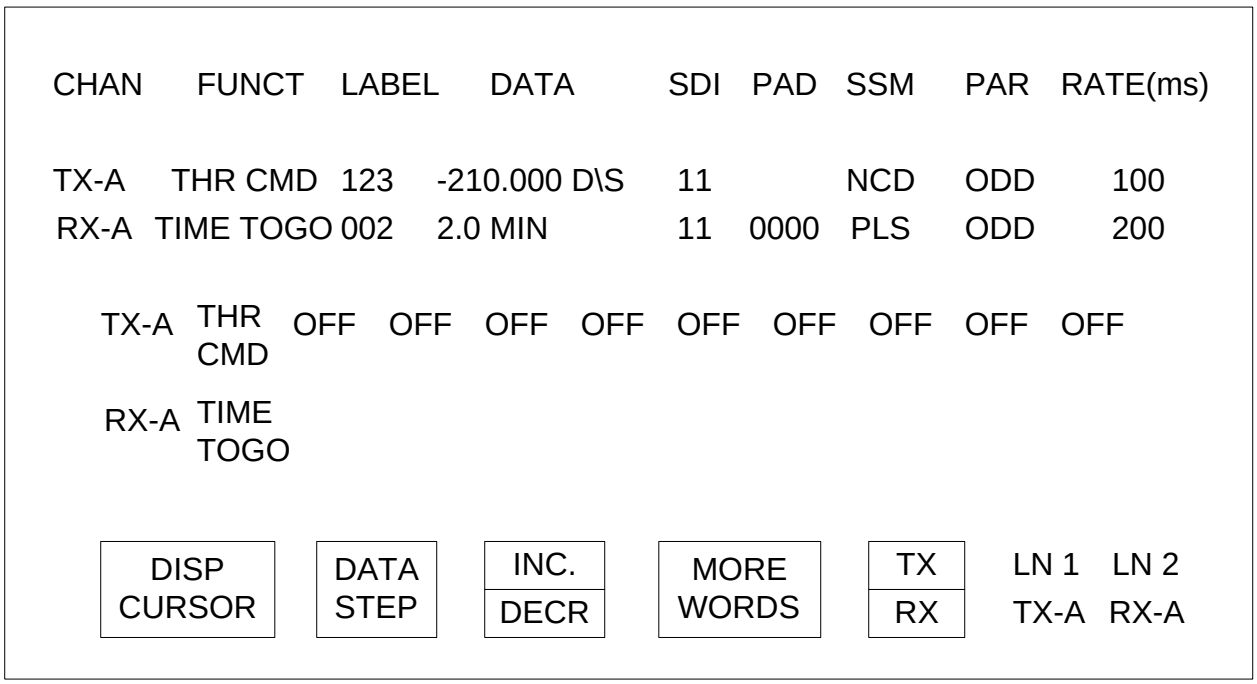


Figure 10 TRANSMITTER (ENG) SCREEN

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

SDI FIELD

The SDI field can be edited in two ways. First by pressing the SDI field and entering the SDI via the keyboard and pressing the ENTER key. The second way is to press the DISP CURSOR field, then press the SDI field. This displays an arrow below the SDI field. The digit to be altered is selected by repeatedly pressing the DISP CURSOR field until the arrow is directly below it. The direction of which to alter the digit can be selected by pressing the INC./DECR field. Then, by pressing the DATA STEP field, the digit is incremented or decremented as selected by the INC./DECR field. The data will continuously increment/decrement if the operator presses and holds the DATA STEP field.

PAD FIELD

The PAD field can be edited in two ways. First by pressing the PAD field and entering the PAD via the keyboard and pressing the ENTER key. The second way is to press the DISP CURSOR field then press the PAD field. This displays an arrow below the PAD field. The digit to be altered is selected by repeatedly pressing the DISP CURSOR field until the arrow is directly below it. The direction of which to alter the digit can be selected by pressing the INC./DECR field. Then, by pressing the DATA STEP field, the digit is incremented or decremented as selected by the INC./DECR field. The data will continuously increment/decrement if the operator presses and holds the DATA STEP field.

SSM FIELD

The SSM field can be edited in two ways. First by pressing the SSM field and entering the SSM via the keyboard and pressing the ENTER key. The second way is to press the DISP CURSOR field then press the SSM field. This displays an arrow below the SSM field. The direction of which to alter the SSM field can be selected by pressing the INC./DECR field. Then, by pressing the DATA STEP field, the SSM is incremented or decremented as selected by the INC./DECR field. The data will continuously increment/decrement if the operator presses and holds the DATA STEP field.

PAR FIELD

The PAR field, when pressed, toggles the transmitted word from even to odd or from odd to even parity.

RATE FIELD

The RATE field can be edited by pressing the RATE field and entering the RATE via the keyboard and pressing the ENTER key.

TX/RX FIELD

The TX/RX field allows the operator to select whether the line 1 (LN 1) or line 2 (LN 2) fields will select transmit or receive channels the next time they are edited. The highlighted area indicates the current selection. Pressing the area will toggle the current selection.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

LN 1 FIELD

The LN 1 field allows the operator to select what will be displayed on line 1. A transmitter or receiver and channel may be selected. This field changes depending on the TX/RX field.

LN 2 FIELD

The LN 2 field allows the operator to select what will be displayed on line 2. A transmitter or receiver and channel may be selected. This field changes depending on the TX/RX field.

MORE WORDS FIELD

The MORE WORDS field is used to scroll through a list of labels received. A receiver must be active on the screen and have more than 10 labels being received before pressing this area. Each time this area is pressed, a label shown on the screen is replaced by a label not shown on the screen. If more than 10 labels are being received, a message displayed on the right side of the screen will indicate the number of labels being received.

RECEIVER SCREEN

Figures 11 through 13 show the three different data display formats in the Receiver screen. Once one of these screens is displayed, any label listed in the received labels list may be examined. This is accomplished by pressing on the screen just below the "ENTER LABEL/SDI TO SET TRAP" message on the right side of the screen. Enter the label and press the ENTER key. Next, enter a specific SDI. If the SDI doesn't matter, then simply press the ENTER key. The label is added to the label list with a preceding asterisk which denotes the trap status. The T1200B waits until the receiver channel receives the selected word. Until it is received, the "XXX WAITING FOR TRIGGER" message is displayed (XXX is the octal label). When the word is received, the real time data received is displayed. To remove the trap from a label, press the screen just below the "ENTER LABEL TO CLEAR TRAP" message on the right side of the screen. Enter the label and press the ENTER key. The label is removed from the trap mode.

CHAN	FUNCT	LABEL	BINARY DATA			PAR	RATE(ms)
			32 25	24 17	16 9		
RX-A	BIN	002	1000 0000	0000 1000	0000 0000	ODD	200

RX-A RECIEVED LABELS

*002

ENTER LABEL/SDI TO SET TRAP
XX

ENTER LABEL TO CLEAR TRAP

Figure 11 RECEIVER (BIN) SCREEN

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

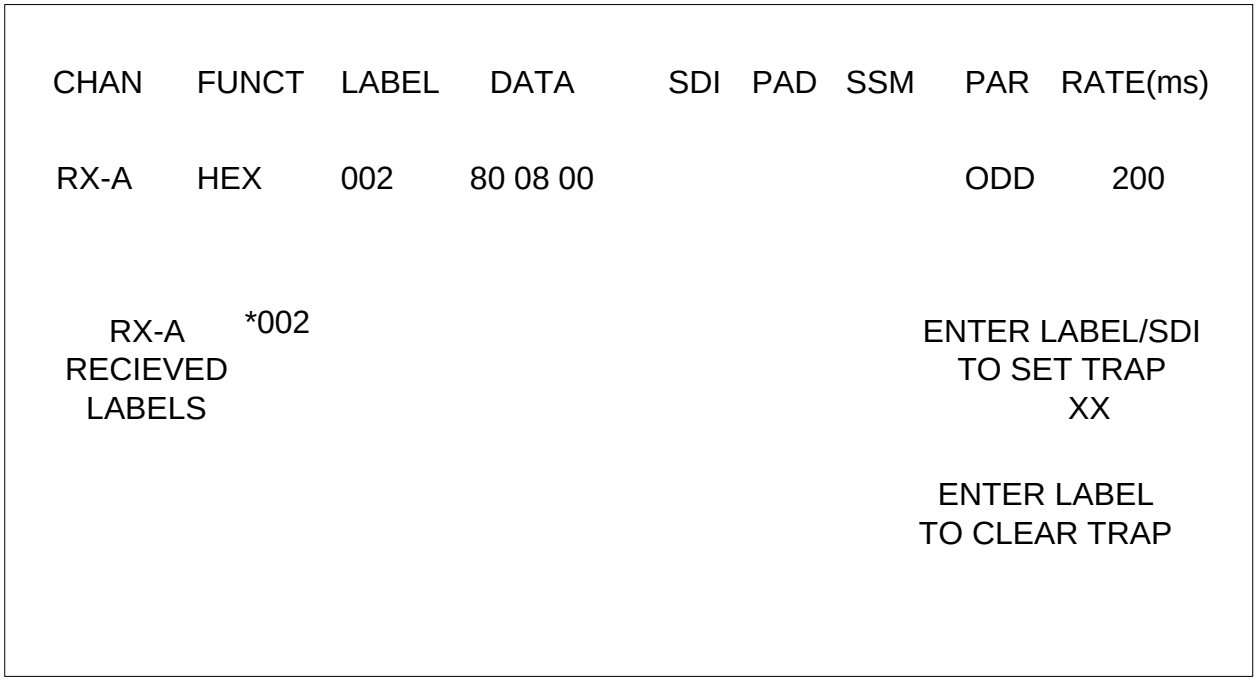


Figure 12 RECEIVER (HEX) SCREEN

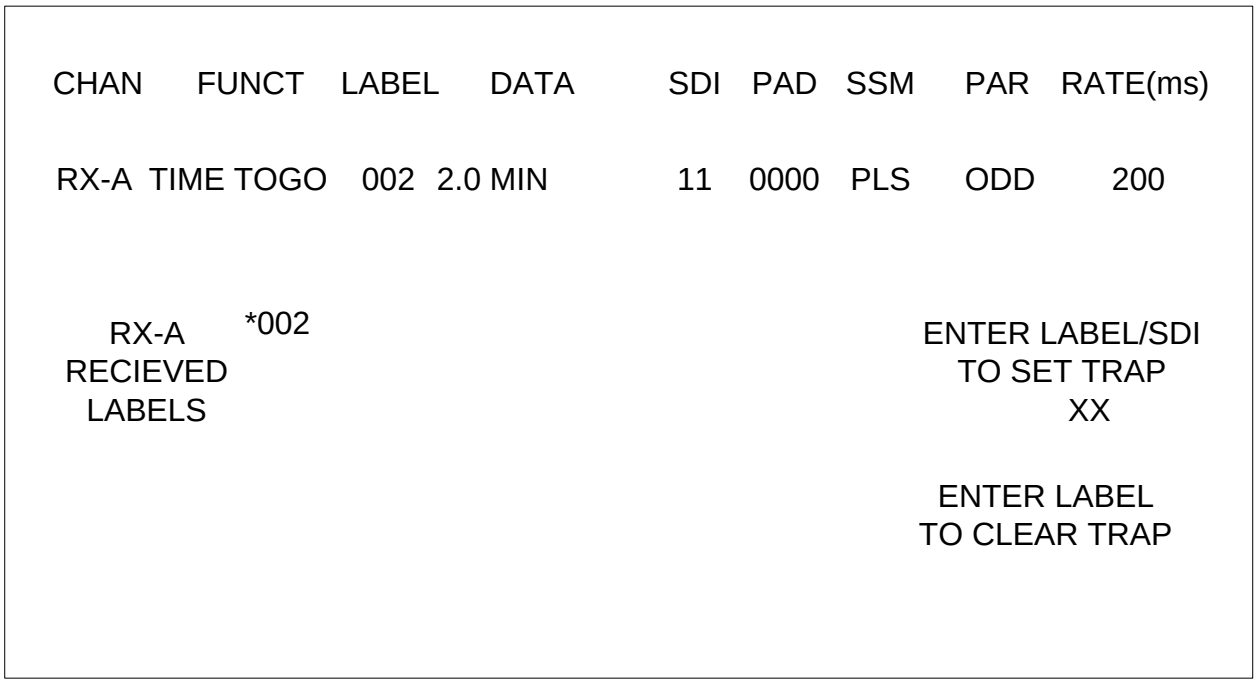


Figure 13 RECEIVER (ENG) SCREEN

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

LRU SELECTION SCREEN

Pressing the AVIONICS LRU MENU area of the Standard Mode Select Menu Screen will display the LRU Selection Screen as shown in Figure 14.

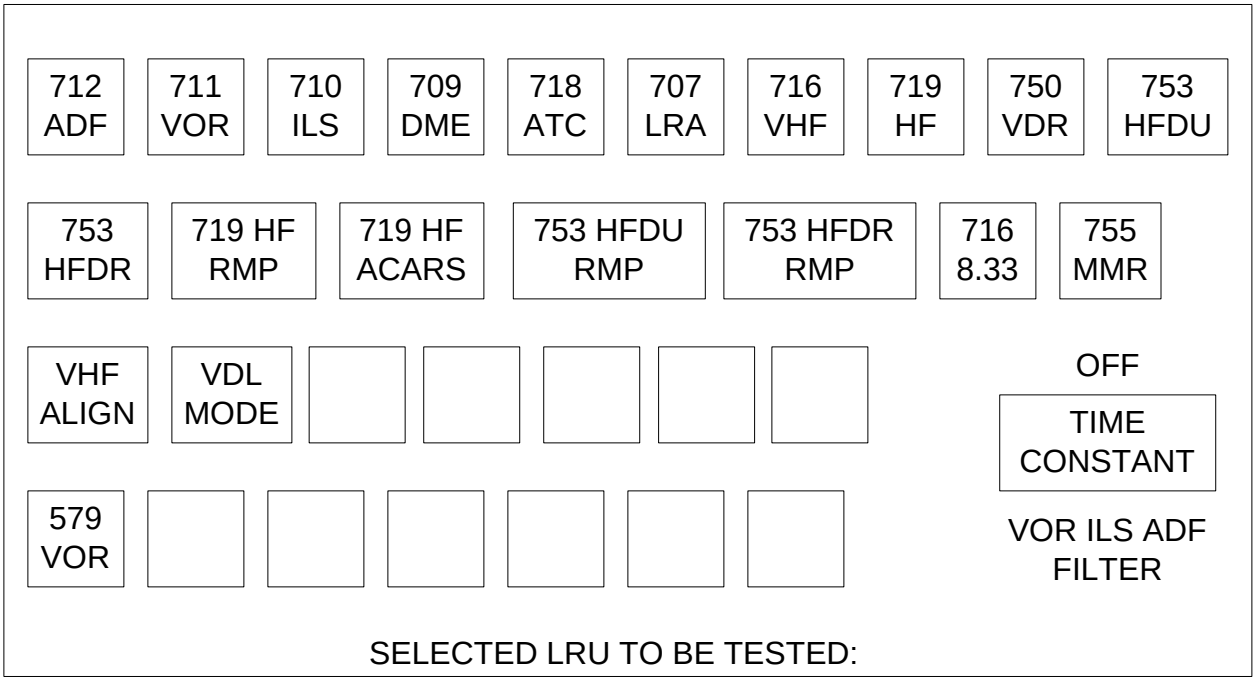


Figure 14 LRU SELECTION SCREEN

The purpose of this screen is to allow the operator to select the type of LRU being tested. When any one of the LRU selections is pressed, the T1200B advances to another selection menu or displays a Standard LRU Format Screen with the appropriate default words being transmitted and the receivers programmed to look for specific words from the LRU.

Standard LRU Format Screen

Figure 15 shows an example of the Standard LRU Format Screen. This screen allows the operator to quickly identify and view transmitted and received words when testing the selected LRU.

Abbreviations of the ARINC 429 words being transmitted and received are displayed in the upper portion of the screen. Any received or transmitted words may be selected, to view its data, by pressing its abbreviation. The abbreviation of each word being actively received are highlighted. If a word has not been received within 2.5 s, it is displayed using normal intensity and the receive rate is 0.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

Standard LRU Format Screen cont.

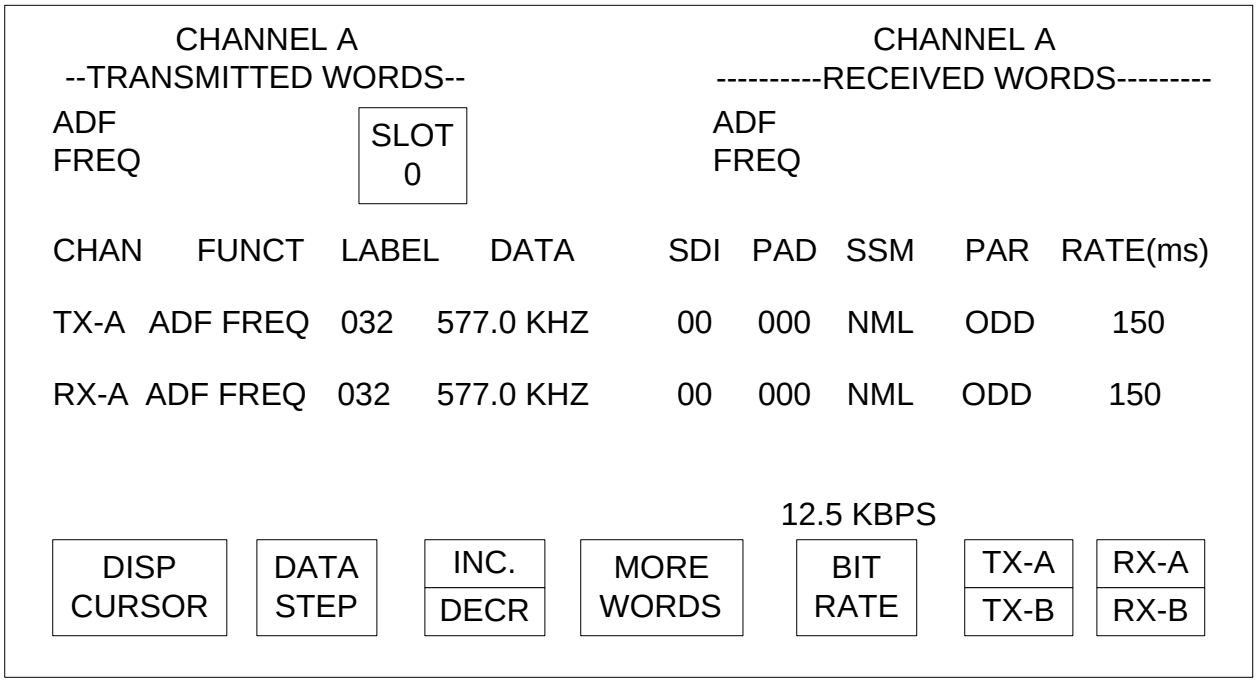


Figure 15 STANDARD LRU FORMAT SCREEN

Any transmitter words in the label list may be edited by simply pressing its abbreviation at the top of the screen. The word will then occupy the transmitter line. The label, data, SDI, PAD, SSM, parity, and rate may all be changed using the touch screen and keyboard. A word may be deleted from the transmit label list by editing the label and entering the label 000. When a label is turned off, the abbreviation for that label displays OFF.

SLOT FIELD

The SLOT field is used to scroll through 10 transmitter slots numbered 0 - 9. Each slot contains one transmit word which can be modified according to the following paragraphs. If SLOTS 0, 1, or 2 contains a non-zero label, an abbreviation for that label will be displayed at the top under the TRANSMITTED WORDS heading. The SLOT field is not available on 719 HF, 753 HFDU, and 753 HFDR screens.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

DATA FIELD

The data field can be edited in two ways. First by pressing the data field and entering the data via the keyboard and pressing the ENTER key. The second way is to press the DISP CURSOR field. This displays an arrow below the data field. The digit to be altered is selected by repeatedly pressing the DISP CURSOR field until the arrow is directly below it. The direction of which to alter the digit can be selected by pressing the INC./DECR field. Then, by pressing the DATA STEP field, the digit is incremented or decremented as selected by the INC./DECR field. The data will continuously increment/decrement if the operator presses and holds the DATA STEP field. This feature is handy when using the ENG display mode to change the data.

SDI FIELD

The SDI field can be edited in two ways. First by pressing the SDI field and entering the SDI via the keyboard and pressing the ENTER key. The second way is to press the DISP CURSOR field then press the SDI field. This displays an arrow below the SDI field. The digit to be altered is selected by repeatedly pressing the DISP CURSOR field until the arrow is directly below it. The direction of which to alter the digit can be selected by pressing the INC./DECR field. Then, by pressing the DATA STEP field, the digit is incremented or decremented as selected by the INC./DECR field. The data will continuously increment/decrement if the operator presses and holds the DATA STEP field.

PAD FIELD

The PAD field can be edited in two ways. First by pressing the PAD field and entering the PAD via the keyboard and pressing the ENTER key. The second way is to press the DISP CURSOR field then press the PAD field. This displays an arrow below the PAD field. The digit to be altered is selected by repeatedly pressing the DISP CURSOR field until the arrow is directly below it. The direction of which to alter the digit can be selected by pressing the INC./DECR field. Then, by pressing the DATA STEP field, the digit is incremented or decremented as selected by the INC./DECR field. The data will continuously increment/decrement if the operator presses and holds the DATA STEP field.

SSM FIELD

The SSM field can be edited in two ways. First by pressing the SSM field and entering the SSM via the keyboard and pressing the ENTER key. The second way is to press the DISP CURSOR field then press the SSM field. This displays an arrow below the SSM field. The direction of which to alter the SSM field can be selected by pressing the INC./DECR field. Then, by pressing the DATA STEP field, the SSM is incremented or decremented as selected by the INC./DECR field. The data will continuously increment/decrement if the operator presses and holds the DATA STEP field.

PAR FIELD

The PAR field, when pressed, toggles the transmitted word from even to odd or from odd to even parity.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

RATE FIELD

The RATE field can be edited by pressing the RATE field and entering the RATE via the keyboard and pressing the ENTER key.

TX-A/TX-B FIELD

The TX-A/TX-B field allows the operator to select which transmitter channel is used to transmit the words. The highlighted area indicates the current channel selected. Pressing the area will toggle the current selection.

RX-A/RX-B

The RX-A/RX-B field allows the operator to select which receiver channel is used to receive words. The highlighted area indicates the current channel selected. Pressing the area will toggle the current selection.

MORE WORDS FIELD

The MORE WORDS field is used to scroll through the list of labels received. The receiver must have more than 6 labels being received before pressing this area. Each time this area is pressed, a label shown on the screen is replaced by a label not shown on the screen. If more than 6 labels are being received, a message displayed on the right side of the screen will indicate the number of labels being received.

BIT RATE FIELD

The BIT RATE field is used to set the bit rate of the transmitter. When the BIT RATE field is pressed, the rate increments or decrements (depending on the INC./DECR field) through the following list: 8.1, 9.4, 11.1, 12.5, 13.9, 15.1, 17.2, 18.5, and 20.0 KBPS.

TIME CONSTANT FIELD

The TIME CONSTANT field is used to setup a first order low pass software filter. The T1200B will filter received data when testing VOR, ILS, and ADF LRUs. Pressing the TIME CONSTANT area will select the time constants of: OFF (0), 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 s.

The higher the time constant, the lower the rate of change of the data displayed. The data displayed is an average of the data from the labels that were received in the selected time period. As new data is received, the old data is purged, creating a running average. When the filter is inactive (off), whatever data that is currently in the receiver buffer is displayed without averaging. The display is updated up to four times a second.

The following labels are filtered as shown below.

LRU Type	Label
VOR	222
ADF	162
ILS	173, 174

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

ARINC 712 ADF

When the 712 ADF area is selected from the LRU Selection Screen, the Standard LRU Format Screen is displayed. The channel A transmitter is automatically programmed to transmit the following word:

```
Function: ADF Frequency       Label: 032        Data: 577.0 kHz
      SDI: 00                 PAD: 000          SSM: NML
      PAR: ODD                Rate: 150 ms
```

The word may be edited as described in Chapter 1-3, Section 3, Paragraph B.

The first two words recognized by receiver channel A will be displayed both in the label list and listed next to the RX-A area. Any more labels received will be added to the labels list.

ARINC 711 VOR

When the 711 VOR area is selected from the LRU Selection Screen, the Standard LRU Format Screen is displayed. The channel A transmitter is automatically programmed to transmit the following words:

```
Function: VOR Frequency       Label: 034        Data: 108.00 MHz
      SDI: 00                 PAD: 0000         SSM: NML
      PAR: ODD                Rate: 200 ms

Function: Sel Coarse #1 BCD   Label: 024        Data: 0E
      SDI: 00                 PAD: 00000000     SSM: PLS
      PAR: ODD                Rate: 200 ms

Function: Sel Coarse #2 BCD   Label: 027        Data: 0E
      SDI: 00                 PAD: 00000000     SSM: PLS
      PAR: ODD                Rate: 200 ms

Function: Sel Coarse #1 BNR   Label: 100        Data: 0.00E
      SDI: 00                 PAD: 00000000     SSM: NML
      PAR: ODD                Rate: 200 ms

Function: Sel Coarse #2 BNR   Label: 110        Data: 0.00E
      SDI: 00                 PAD: 00000000     SSM: NML
      PAR: ODD                Rate: 200 ms
```

The word may be edited as described in Chapter 1-3, Section 3, Paragraph B.

The first two words recognized by receiver channel A will be displayed both in the label list and listed next to the RX-A area. Any more labels received will be added to the labels list.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

ARINC 710 ILS

When the 710 ILS area is selected from the LRU Selection Screen, the Standard LRU Format Screen is displayed. The channel A transmitter is automatically programmed to transmit the following words:

```
Function: ILS Frequency        Label: 033        Data: 110.30 MHz
      SDI: 00                  PAD: 0000         SSM: NML
      PAR: ODD                 Rate: 200 ms

Function: Runway Heading BCD   Label: 017        Data: 0.0E
      SDI: 00                  PAD: 0000         SSM: PLS
      PAR: ODD                 Rate: 200 ms

Function: ISO ALPHA #5         Label: 357        Data: KQE
      SDI:                     PAD:              SSM: INT
      PAR: ODD                 Rate: 100 ms

Function: Runway Heading BNR   Label: 105        Data: 0.00E
      SDI: 00                  PAD: 00000000     SSM: NML
      PAR: ODD                 Rate: 200 ms
```

The word may be edited as described in Chapter 1-3, Section 3, Paragraph B.

The first two words recognized by receiver channel A will be displayed both in the label list and listed next to the RX-A area. Any more labels received will be added to the labels list.

ARINC 718 ATC

When the 718 ATC area is selected from the LRU Selection Screen, the Standard LRU Format Screen is displayed. The channel A transmitter is automatically programmed to transmit the following words:

```
Function: ATC Reply            Label: 031        Data: 1234 SQWK
      SDI: 00                  PAD: 0000001      SSM: NML
      PAR: ODD                 Rate: 150 ms

Function: Pressure Altitude    Label: 203        Data: 0 FT
      SDI: 00                  PAD: 0            SSM: NML
      PAR: ODD                 Rate: 50 ms
```

The word may be edited as described in Chapter 1-3, Section 3, Paragraph B.

The first two words recognized by receiver channel A will be displayed both in the label list and listed next to the RX-A area. Any more labels received will be added to the labels list.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

ARINC 707 LRA

When the 707 LRA area is selected from the LRU Selection Screen, the Standard LRU Format Screen is displayed. The channel A transmitter is automatically programmed to transmit the following words:

```
Function: Radio Altitude BCD  Label: 165        Data: 1000.0 FT
      SDI: 00                 PAD:              SSM: PLS
      PAR: ODD                Rate: 100 ms

Function: Radio Altitude BNR  Label: 164        Data: 125.0000 FT
      SDI: 00                 PAD: 00           SSM: NML
      PAR: ODD                Rate: 37 ms
```

The word may be edited as described in Chapter 1-3, Section 3, Paragraph B.

The first two words recognized by receiver channel A will be displayed both in the label list and listed next to the RX-A area. Any more labels received will be added to the labels list.

ARINC 716 8.33

When the 716 8.33 area is selected from the LRU Selection Screen, the Standard LRU Format Screen is displayed. The channel A transmitter is automatically programmed to transmit the following word:

```
Function: VHF COMM 8.33 KHz Frequency     Label:  047       Data: 117.992 MHz
      SDI: 00                             PAD:              SSM: NML
      PAR: ODD                            Rate: 150 ms
```

The word may be edited as described in Chapter 1-3, Section 3, Paragraph B.

The first two words recognized by receiver channel A will be displayed both in the label list and listed next to the RX-A area. Any more labels received will be added to the labels list.

ARINC 716 VHF

When the 716 VHF area is selected from the LRU Selection Screen, the Standard LRU Format Screen is displayed. The channel A transmitter is automatically programmed to transmit the following word:

```
Function: VHF COMM Frequency  Label: 030        Data: 118.000 MHz
      SDI: 00                 PAD:              SSM: NML
      PAR: ODD                Rate: 150 ms
```

The word may be edited as described in Chapter 1-3, Section 3, Paragraph B.

The first two words recognized by receiver channel A will be displayed both in the label list and listed next to the RX-A area. Any more labels received will be added to the labels list.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

ARINC 750 VDR

When the 750 VDR area is selected from the LRU Selection Screen, the Standard LRU Format Screen is displayed. The channel C transmitter is automatically programmed to transmit the following HIGH SPEED WORDS:

```
Function: VDR SAL            Label: 172        Data: 000000 HEX
      SDI: 00                PAD:              SSM: 00
      PAR: ODD               Rate: 100 ms

Function: DSCR DAT1          Label: 270        Data: 000000 HEX
      SDI: 00                PAD:              SSM: 00
      PAR: ODD                Rate: 100 ms
```

The word may be edited as described in Chapter 1-3, Section 3, Paragraph B.

The first two words recognized by receiver channel A will be displayed both in the label list and listed next to the RX-A area. Any more labels received will be added to the labels list.

ARINC 719 HF

When the 719 HF area is selected from the LRU Selection Screen, the Standard LRU Format Screen is displayed. The channel A transmitter is automatically programmed to transmit the following word:

```
Function: HF COMM Frequency  Label: 037        Data: 10.0000 MHz
      SB: LSB                MOD: AM           CW: OFF
      SSM: NML               PAR: ODD          Rate: 200 ms
```

This word actually consists of two separate words using the same label. There are no SDI bits, but bit 9 indicates whether the word is the #1 or #2 word. These words are transmitted with a 75 ms spacing between them. In addition, bit 10 is dedicated to a separate discrete function which is toggled separately.

The SB field refers to bit 11 of word #1 and the MOD field refers to bit 10 word #1. The CW field refers to bit 10 of word #2.

The word may be edited as described in Chapter 1-3, Section 3, Paragraph B.

Due to the uniqueness of this screen, no label other than 037 can be transmitted. Therefore, the touch screen for the label field is inactive.

The first two words recognized by receiver channel A will be displayed both in the label list and listed next to the RX-A area. Any more labels received will be added to the labels list.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

ARINC 753 HFDU

When the 753 HFDU area is selected from the LRU Selection Screen, the Standard LRU Format Screen is displayed. The channel A transmitter is automatically programmed to transmit the following word:

```
Function: HF COMM Frequency   Label: 037        Data: 10.0000 MHz
      SB: LSB                 MOD: AM           CW: OFF
      SSM: NML                PAR: ODD          Rate: 200 ms
```

This word actually consists of two separate words using the same label. There are no SDI bits, but bit 9 indicates whether the word is the #1 or #2 word. These words are transmitted with a 75 ms spacing between them. In addition, bit 10 is dedicated to a separate discrete function which is toggled separately.

The SB field refers to bit 11 of word #1 and the MOD field refers to bit 10 word #1. The CW field refers to bit 10 of word #2.

The word may be edited as described in Chapter 1-3, Section 3, Paragraph B.

Due to the uniqueness of this screen, no label other than 037 can be transmitted. Therefore, the touch screen for the label field is inactive.

The first two words recognized by receiver channel A will be displayed both in the label list and listed next to the RX-A area. Any more labels received will be added to the labels list.

ARINC 753 HFDR

When the 753 HFDR area is selected from the LRU Selection Screen, the Standard LRU Format Screen is displayed. The channel A transmitter is automatically programmed to transmit the following word:

```
Function: HF COMM Frequency   Label: 037        Data: 10.0000 MHz
      SB: LSB                 MOD: AM           CW: OFF
      SSM: NML                PAR: ODD          Rate: 200 ms
```

This word actually consists of two separate words using the same label. There are no SDI bits, but bit 9 indicates whether the word is the #1 or #2 word. These words are transmitted with a 75 ms spacing between them. In addition, bit 10 is dedicated to a separate discrete function which is toggled separately.

The SB field refers to bit 11 of word #1 and the MOD field refers to bit 10 word #1. The CW field refers to bit 10 of word #2.

The word may be edited as described in Chapter 1-3, Section 3, Paragraph B.

Due to the uniqueness of this screen, no label other than 037 can be transmitted. Therefore, the touch screen for the label field is inactive.

The first two words recognized by receiver channel A will be displayed both in the label list and listed next to the RX-A area. Any more labels received will be added to the labels list.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

ARINC 719 HF ACARS

When the 719 HF ACARS area is selected from the LRU Selection Screen, the Standard LRU Format Screen is displayed. The channel A transmitter is automatically programmed to transmit the following words:

```
Function: HF-A COMM Frequency Label: 206        Data: 10.0000 MHz
      SDI: 00                 PAD:              SSM: NML
      PAR: ODD                Rate: 200 ms

Function: HF-A COMM Frequency Label: 206        Data: 0.0000 MHz
      SDI: 00                 PAD:              SSM: NML
      PAR: ODD                Rate: 200 ms

Function: HF MODE             Label: 207        Data: 000000 HEX
      SDI: 00                 PAD:              SSM: 00
      PAR: ODD                Rate: 200 ms
```

The second label 206 is used to send the .1 kHz part of the tuning frequency. Bit 11 of the label 206 word indicates whether the word is the #1 or #2 word. The word may be edited as described in Chapter 1-3, Section 3, Paragraph B.

THE #2 FREQUENCY WORD SHOULD NOT BE EDITED.

The first two words recognized by receiver channel A will be displayed both in the label list and listed next to the RX-A area. Any more labels received will be added to the labels list.

ARINC 719 HF RMP

When the 719 HF RMP area is selected from the LRU Selection Screen, the Standard LRU Format Screen is displayed. The channel A transmitter is automatically programmed to transmit the following words:

```
Function: HF-A COMM Frequency Label: 205        Data: 10.0000 MHz
      SDI: 00                 PAD:              SSM: NML
      PAR: ODD                Rate: 200 ms

Function: HF-A COMM Frequency Label: 205        Data: 0.0000 MHz
      SDI: 00                 PAD:              SSM: NML
      PAR: ODD                Rate: 200 ms

Function: HF MODE             Label: 207        Data: 000000 HEX
      SDI: 00                 PAD:              SSM: 00
      PAR: ODD                Rate: 200 ms
```

The second label 205 is used to send the .1 kHz part of the tuning frequency. Bit 11 of the label 205 word indicates whether the word is the #1 or #2 word. The word may be edited as described in Chapter 1-3, Section 3, Paragraph B. THE #2 FREQUENCY WORD SHOULD NOT BE EDITED.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

The first two words recognized by receiver channel A will be displayed both in the label list and listed next to the RX-A area. Any more labels received will be added to the labels list.

ARINC 719 HFDU RMP

When the 719 HFDU RMP area is selected from the LRU Selection Screen, the Standard LRU Format Screen is displayed. The channel A transmitter is automatically programmed to transmit the following words:

```
Function: HF-A COMM Frequency Label: 205        Data: 10.0000 MHz
      SDI: 00                 PAD:              SSM: NML
      PAR: ODD                Rate: 200 ms

Function: HF-A COMM Frequency Label: 205        Data: 0.0000 MHz
      SDI: 00                 PAD:              SSM: NML
      PAR: ODD                Rate: 200 ms

Function: HF MODE             Label: 207        Data: 000000 HEX
      SDI: 00                 PAD:              SSM: 00
      PAR: ODD                Rate: 200 ms
```

The second label 205 is used to send the .1 kHz part of the tuning frequency. Bit 11 of the label 205 word indicates whether the word is the #1 or #2 word. The word may be edited as described in Chapter 1-3, Section 3, Paragraph B. THE #2 FREQUENCY WORD SHOULD NOT BE EDITED.

The first two words recognized by receiver channel A will be displayed both in the label list and listed next to the RX-A area. Any more labels received will be added to the labels list.

ARINC 719 HFDR RMP

When the 719 HFDR RMP area is selected from the LRU Selection Screen, the Standard LRU Format Screen is displayed. The channel A transmitter is automatically programmed to transmit the following words:

```
Function: HF-A COMM Frequency Label: 205        Data: 10.0000 MHz
      SDI: 00                 PAD:              SSM: NML
      PAR: ODD                Rate: 200 ms

Function: HF-A COMM Frequency Label: 205        Data: 0.0000 MHz
      SDI: 00                 PAD:              SSM: NML
      PAR: ODD                Rate: 200 ms

Function: HF MODE             Label: 207        Data: 000000 HEX
      SDI: 00                 PAD:              SSM: 00
      PAR: ODD                Rate: 200 ms
```

The second label 205 is used to send the .1 kHz part of the tuning frequency. Bit 11 of the label 205 word indicates whether the word is the #1 or #2 word. The word may be edited as described in Chapter 1-3, Section 3, Paragraph B.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

THE #2 FREQUENCY WORD SHOULD NOT BE EDITED.

The first two words recognized by receiver channel A will be displayed both in the label list and listed next to the RX-A area. Any more labels received will be added to the labels list.

ARINC 579 VOR

When the 579 VOR area is selected from the LRU Selection Screen, the Standard LRU Format Screen is displayed. The channel A transmitter is automatically programmed to transmit the following word:

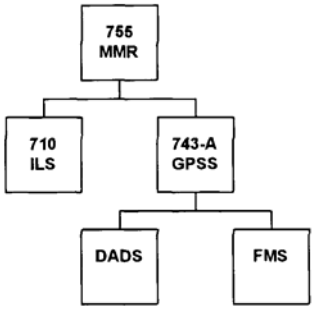
```
Function: VOR Frequency      Label: 034        Data: 108.00 MHz
      SDI: 00                PAD: 0000         SSM: NML
      PAR: ODD               Rate: 200 ms
```

The word may be edited as described in Chapter 1-3, Section 3, Paragraph B.

The first two words recognized by receiver channel A will be displayed both in the label list and listed next to the RX-A area. Any more labels received will be added to the labels list.

ARINC 755 MMR

When the 755 MMR is selected from the LRU selection screen, the following menus become accessible.



The default labels transmitted by the T1200 in the 710 ILS, DADS, & FMS menus are as follows:

Channel A (12.5KHz)	Channel B (12.5KHz)	Channel C (100KHz)
033 Landing System Mode / Freq	040 Set Altitude	040 Set Altitude
017 Selected Runaway Heading (BCD)	041 Set Latitude	041 Set Latitude
	042 Set Longitude	042 Set Longitude
	125 UTCI	125 UTCI
	203 Set Altitude	203 Set Altitude
	210 True Air Speed	210 True Air Speed
	260 DATE	260 DATE
	320 Magnetic Heading	320 Magnetic Heading

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

ARINC 755 MMR cont.

In addition to the transmitted labels displayed on the screen, the default labels for the other two menus are also transmitted. For example, if the user selects the ILS button the display shows labels 033 and 017 as being transmitted on channel A. In addition, the default labels for the DADS / FMS (Channel B and the IRS (channel C) menu selections are also transmitted. The displayed labels may be edited as usual, but no changes may be made to the default labels being transmitted on the other channels. The purpose of transmitting the default labels in the background is to simulate the real-world environment which the 755-MMR operates in.

Automatic time increment of labels 125 &150 occurs when the INC TIME button is highlighted. This button is only present in the MMR sub-menus. This automatic time increment applies to the time labels for other channels as well. Editing label data is not available when the INC TIME button is highlighted.

ARINC 709 DME

The ARINC 429 I/O requirements of the ARINC 709 frequency scanning DME are entirely met by the T1200B. Special software has been written specifically for the 709 DME to channel it to several directed frequencies and/or free scan and to sort and display the BNR and BCD distance outputs that correspond to each frequency. The T1200B also monitors the simulated distance, compares it with the DME BNR distance outputs, and displays the difference. This feature is particularly useful for monitoring DME tracking error at high velocities. When the 709 DME area is selected from the LRU Selection Screen, the DME Test Configuration Screen is displayed (see Figure 16). This screen allows the operator to chose one of three screen formats. The Standard LRU Test Format is displayed when the STANDARD NAV CONFIGURATION is chosen. The Single Channel DME Test Screen is displayed when the SINGLE CHANNEL MODE is pressed and the Multi Channel DME Test Screen is displayed when the MULTI CHANNEL MODE is selected.

NOTE: Optional SQUAWK/NAUT is not supported by the T1200B.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

DME Single Channel Mode

When the SINGLE CHANNEL MODE area is selected from the DME Test Configuration Screen, the Single Channel DME Test Screen (Figure 17) is displayed.

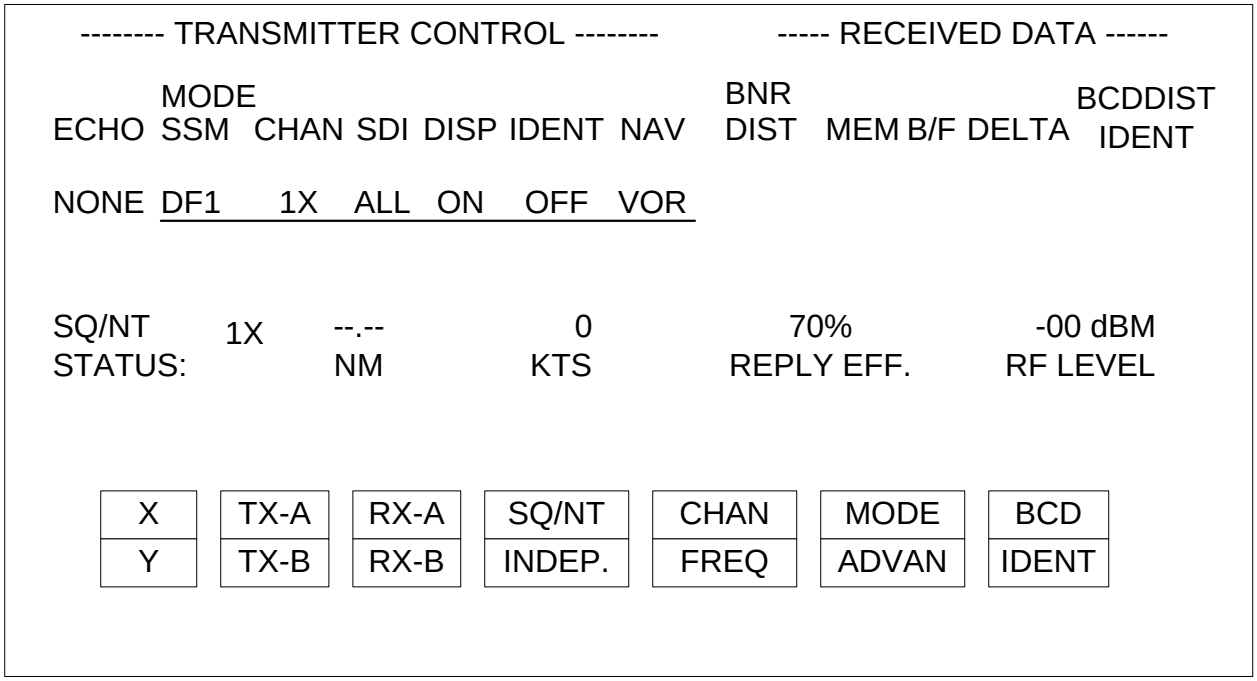


Figure 17 SINGLE CHANNEL DME TEST SCREEN

Transmitter

The channel A transmitter is automatically programmed to transmit the following word:

```
Function: DME Frequency      Label: 035        Data: 134.40 MHz
      SDI: 00                SSM: 00
      PAR: ODD               Rate: 100 ms
```

The operator can edit the word as well as several programmable SQUAWK/NAUT parameters. Distance outputs from the DME are displayed on the right side of the screen.

The DME mode bits (11-13) and SSM bits of the transmitted word are controllable by the touch screen. Simply touch the MODE SSM field. This causes the DME mode bits to be toggled through a list of options. The options, in order, are: DF1, STBY, OFF, NCD, FT, and UND. A description of each option follows:

DF1-5 The SSM becomes 00 for normal operation and the DME mode bits 13-11 are set to 001.Pressing the MODE/ADVAN field toggles to the next directed frequency.

SCAN The SSM becomes 00 for normal operation and the DME mode bits 13-11 are set to 110 for the SCAN command.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

DME Single Channel Mode cont.

NCD The SSM becomes 01 for No Computed Data and the DME mode bits 13-11 remain the same.

FT The SSM becomes 10 for Functional Test and the DME mode bits 13-11 remain the same.

UND The SSM becomes 11 for Undefined and the DME mode bits 13-11 remain the same.

STBY The SSM becomes 00 for normal operation and the DME mode bits 13-11 are set to 000 for Standby.

OFF The T1200B stops transmitting the word.

CHAN FIELD

The frequency data of the transmitted word can be modified by pressing the CHAN field. The channel number can then be entered. The valid channels are 0 - 126. The state of the X/Y field sets the channel to the X or Y channel. The CHAN/FREQ field allows the operator to select either a frequency or channel number format. The current selection is highlighted.

SDI FIELD

The SDI field allows the operator to select the SDI (bits 10 and 9) of the transmitted word. Pressing the SDI field toggles through the list of valid SDIs: ALL (00 all call), 1 (01 unit #1), 2 (10 unit #2), and 3 (11 unit #3).

DISP FIELD

The DISP field allows the operator to program the Display Bit (bit 16). This bit may be toggled OFF (0) or ON (1) by pressing the DISP field.

IDENT FIELD

The IDENT field allows the operator to program the IDENT Bit (bit 17). This bit may be toggled OFF (0) or ON (1) by pressing the IDENT field.

NAV FIELD

The NAV field allows the operator to program the State Bits (bits 15 and 14). These bits are determined by a scrolled list. The list is scrolled each time the NAV field is pressed. The State Bits can be set to the following States:

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

NAV FIELD cont.

BIT	15	14
VOR	0	0
ILS	0	1
MLS	1	0
Undefined	1	1

TX-A/TX-B FIELD

The TX-A/TX-B field allows the operator to select the transmitter channel to transmit the ARINC 429 word. The current transmitter channel is highlighted and can be changed by pressing the TX-A/TX-B field.

1 X FIELD

The 1 X field allows the operator to change the output frequency of the SQUAWK/NAUT. When the INDEP. part of the SQ/NT/INDEP. field is highlighted, the output frequency of the SQUAWK/NAUT is set to the channel/frequency listed in the 1 X field. Pressing the 1 X field and changing the channel/frequency will program the SQUAWK/NAUT to the channel/frequency entered. However, when the SQ/NT part of the SQ/NT/INDEP. field is highlighted, the SQUAWK/NAUT frequency is set to the channel/frequency listed in the CHAN field of the transmitter word.

NM FIELD

The NM field allows the operator to program the distance to be simulated by the SQUAWK/NAUT. The distance can range from 0.00 to 399.99 NM. To edit the distance, simply press the NM field, enter the distance, and then press the ENTER key. Once the distance has been entered, the T1200B continually monitors the distance in the SQUAWK/NAUT display window and updates the value displayed in the NM field. If the display select switch on the SQUAWK/NAUT is set to any position other than Test Dist, dashes are displayed on the T1200B indicating that a valid distance cannot be read from the SQUAWK/NAUT.

KTS FIELD

The KTS field allows the operator to program the velocity to be simulated by the SQUAWK/NAUT. The velocity can range from 0 to 3999 KTS. To edit the velocity, simply press the KTS field, enter the velocity, and then press the ENTER key. The T1200B cannot monitor the velocity as it can the distance, although the displayed value is correct as long as the velocity load or clear buttons on the SQUAWK/NAUT are not pressed.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

REPLY EFF. FIELD

The REPLY EFF. field allows the operator to program the reply efficiency to be simulated by the SQUAWK/NAUT. The reply efficiency can range from 0 to 100%. To edit the reply efficiency, simply press the REPLY EFF. field, enter the reply efficiency, and then press the ENTER key. The T1200B cannot monitor the reply efficiency, but the displayed value is correct as long as the SQUAWK/NAUT Reply Efficiency switch remains at 0%.

RF LEVEL FIELD

The RF LEVEL field allows the operator to program the RF output level of the SQUAWK/NAUT. The output level can range from -109 to -10 dBm. To edit the RF output level, simply press the RF LEVEL field, enter the RF output level (minus sign assumed), and then press the ENTER key. Once the RF LEVEL has been entered, the T1200B continually monitors the RF level in the SQUAWK/NAUT display window and updates the value displayed in the RF LEVEL field.

RECEIVER

The ARINC 709 DME outputs a burst of ARINC 429 words containing the following data: DME frequency (label 035), BNR distance (label 202), Ground Station Ident #1 (label 246), Ground with a SSM of NCD unless the display bit (bit 16) of the frequency word is set. The T1200B receives these data bursts, translates the distance data into engineering units, and computes the difference (delta) between the simulated and measured BNR distance.

The DME frequency word is checked for a normal operation SSM. Any word that has an SSM other than 00 is highlighted on the line directly under the transmit control line. The received frequency word is displayed using the same format as the transmitted word, but is highlighted to signify that the word is being received rather than transmitted. An example of an abnormal frequency word SSM being received is shown in the example below.

```
      MODE                              BNR                BCD
ECHO SSM  CHAN  SDI DISP IDENT NAV DIST MEM B/F DELTA DIST

NONE DF1 134.40  1  OFF   OFF  VOR
      NCD 108.00 ALL OFF   OFF  VOR NCD  OFF  F
```

If the SSM of the received word is normal, the T1200B compares it with the DME mode of the frequency word being transmitted. If the DME modes are not the same, the received word is displayed under the transmit line and highlighted. Only when the received word has a normal SSM and the same DME mode as the transmitted word, is a full comparison of all the other fields made (CHAN, DISP, IDENT, NAV, and parity). The SDI field of the DME frequency words from the DME is always 00. The result of the comparison is displayed under the ECHO field as one of the following:

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

RECEIVER cont.

NONE: No frequency word is being received that corresponds with the transmitted word.

OK: The received frequency word exactly matches (except SDI) the transmitted word.

ERR: The received frequency word does not match the transmitted word in either the SSM, frequency, IDENT, DISP, NAV, or parity bit.

Received SCAN mode (bits 13 - 11 = 110) frequency words are handled in a slightly different manner. When the transit word is a SCAN command, the CHAN field is used to display the received scan channels. No comparison is made for SCAN frequency words, so the ECHO field is blank. The received background scan channels are displayed and highlighted in the CHAN field of the transmit line. The received foreground scan channels are fully displayed and highlighted.

```
      MODE                              BNR                 BCD
ECHO SSM  CHAN  SDI DISP IDENT NAV DIST  MEM B/F DELTA DIST

      SCAN  23X  ALL OFF   OFF  VOR 20.32 OFF  B
      SCAN  12X  ALL OFF   OFF  VOR 20.95 OFF  F
```

A received BNR Distance word is decoded and displayed under the BNR DIST, MEM, and B/F fields. The BNR DIST field displays the following data according to the conditions listed:

BNR DIST CONDITIONS

PAR.ERR	Displayed when an even parity word is received, regardless of the SSM and data fields.
FW	Displayed when the received BNR word has a Failure Warning SSM.
NCD	Displayed when the received word has a No Computed Data SSM.
53.69T	The decoded distance data followed by a T is displayed when the received BNR word has a Functional Test SSM.
53.69	The decoded distance data is displayed when the received BNR word has a normal operation SSM.

The MEM field displays the state of bit 11. This is the memory bit in the BNR distance word (ON=1, OFF=0). The B/F field displays the state of bit 12, which is the background foreground bit in the received BNR word (F=1, B=0).

If a BCD distance word is received as the fifth word in the data burst and the BCD part of the BCD/IDENT field is highlighted, it is decoded and displayed. Similar to the BNR distance word, the PAR.ERR, NCD, XX.XXT, and XX.XX are displayed according to the same conditions. An error condition results when the display bit (bit 16) in the received DME frequency word is set and no BCD distance word is included in the burst. This is enunciated in the BCD DIST field as "No BCD". This remains on the screen until a BCD is included in the burst, or until the display bit is reset to 0.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

Receiver cont.

When the IDENT part of the BCD/IDENT field is highlighted, the ground station ident words (labels 246 and 247) are decoded. This four character code is displayed in the BCDDIST IDENT field.

The T1200B automatically compares the incoming DME frequency words with the SQUAWK/NAUT frequency. When these frequencies match, the BNR distance is compared to the currently displayed distance being simulated by the SQUAWK/NAUT and the difference is displayed under the DELTA field. This requires that the Display Select switch on the SQUAWK/NAUT be set to TEST DIST.

DME Multi Channel Mode

When the MULTI CHANNEL MODE area is selected from the DME Test Configuration Screen, the Multi Channel DME Test Screen (Figure 18) is displayed.

TRANSMITTER

The channel A transmitter is automatically programmed to transmit the following six label 035 DME frequency words (with SDI 00, SSM 00, and odd parity at 100 ms rate):

		Bits 13	12	11
Data: 134.40 Mhz	Mode: Directed scan 1st frequency	0	0	1
Data: 109.75 Mhz	Mode: Directed scan 2nd frequency	0	1	0
Data: 133.70 Mhz	Mode: Directed scan 3rd frequency	0	1	1
Data: 114.65 Mhz	Mode: Directed scan 4th frequency	1	0	0
Data: 117.90 Mhz	Mode: Directed scan 5th frequency	1	0	1
Data: 108.00 Mhz	Mode: Free scan	1	1	0

Each word being transmitted is displayed on the Multi Channel DME Test Screen. The operator can edit each word as well as several programmable SQUAWK/NAUT parameters. To gain access to the next transmit word in the list, press the LINE ADVANCE field. The cursor line will move to the next word and enables each field for editing. The fields are edited in the same way as described for the Single Channel DME Test Screen in section B. Refer to figure 17 for more information. Distance outputs from the DME are displayed on the right side of the screen.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

DME Multi Channel Mode cont.

Transmitter cont.

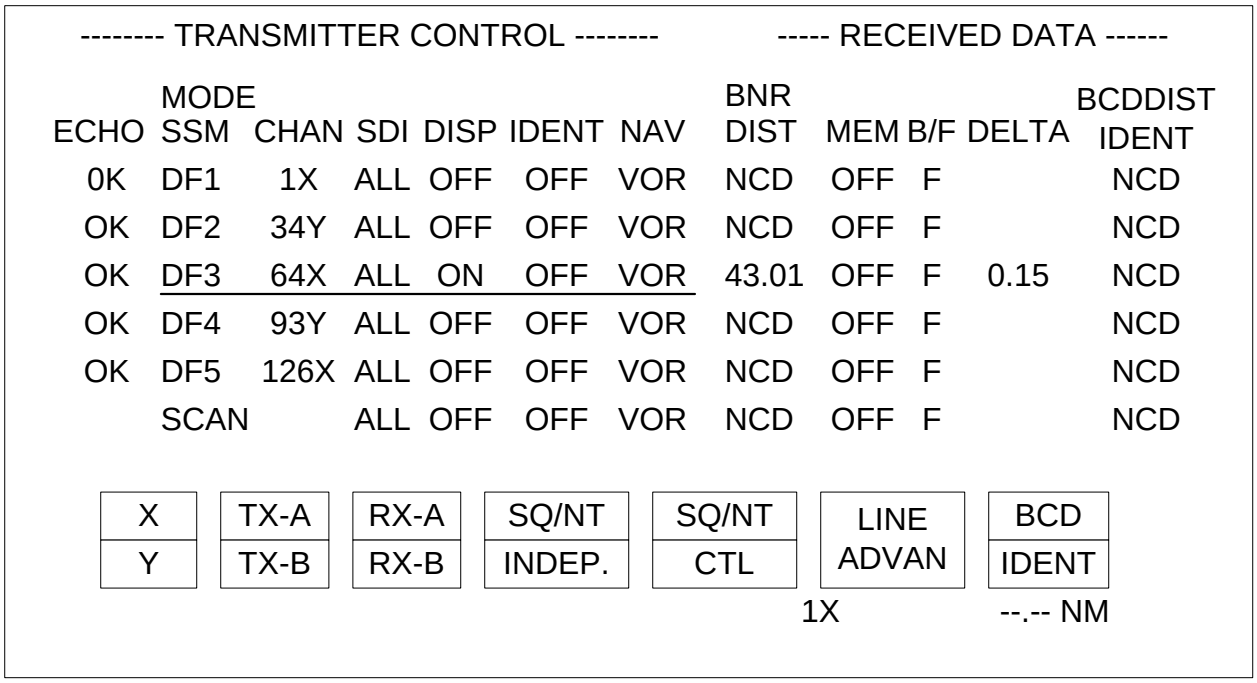


Figure 18 MULTI CHANNEL DME TEST SCREEN

The Multi Channel DME Test Screen transmits all six modes. Any one of the five directed frequencies can be changed to standby mode by pressing the MODE SSM field until the STBY mode is shown, then pressing the ENTER key. Likewise, any word may be set to OFF, NCD (No Computed Data), FT (Functional Test), and UND (undefined SSM).

For easy operator access to programming the output frequency and distance simulation of the SQUAWK/NAUT, two fields are located on the bottom line the Multi Channel DME Test Screen. To change the frequency or distance, press the desired field, enter the new data, and press the ENTER key.

The SQUAWK/NAUT can be controlled by the T1200B or directly by the operator using the SQUAWK/NAUT controls built in the T1200B. When the SQ/NT part of the SQ/NT/INDEP. field is highlighted, the output frequency of the SQUAWK/NAUT is programmed automatically to the frequency specified by the word being edited. However, when the INDEP. part of the SQ/NT/INDEP. field is highlighted, the SQUAWK/NAUT is under operator control. To switch between these modes, press the SQ/NT/INDEP. field.

To gain access to the SQUAWK/NAUT controls, press the SQ/NT CTL field. The SQUAWK/NAUT Control Screen appears as shown in Figure 19. This screen allows the operator to edit the SQUAWK/NAUT parameters in the same manner as the Single Channel DME Test Screen. Only one transmitter word is displayed, however all are still active and the next word (in the list on the Multi Channel DME Test Screen) can be displayed by pressing the LINE ADVAN field. To return to the Multi Channel DME Test Screen, press the DME RETURN field.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

B. STANDARD MODE cont.

DME Multi Channel Mode cont.

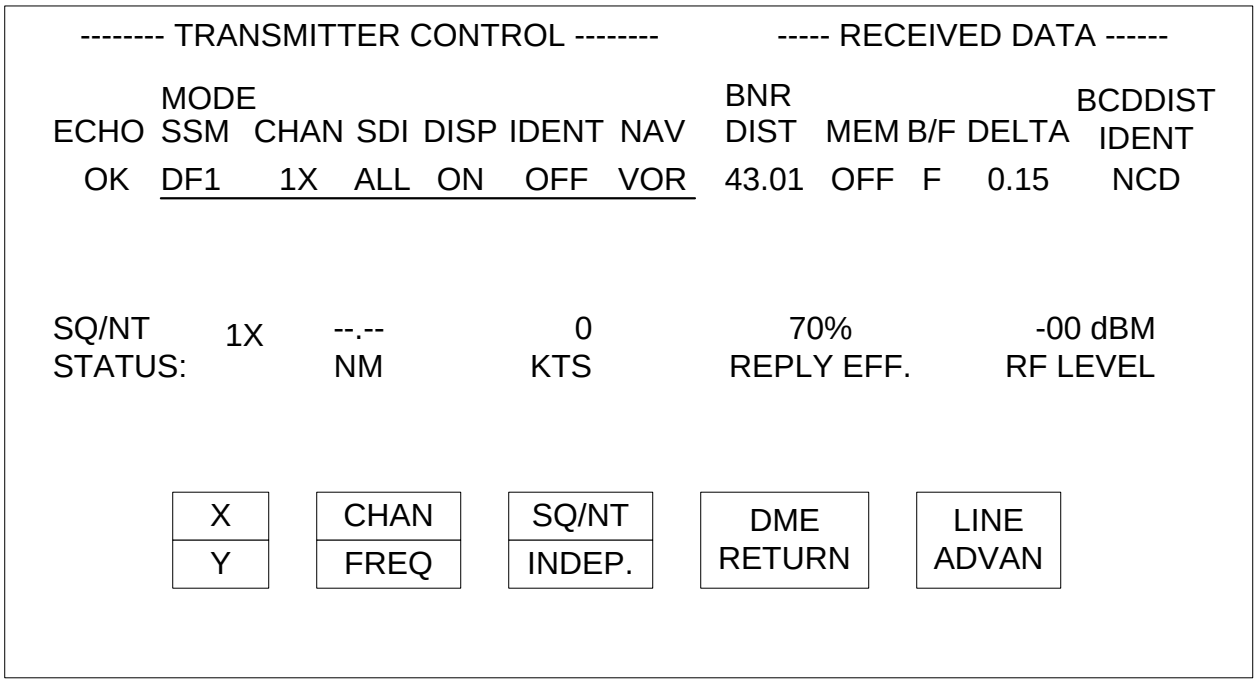


Figure 19 SQUAWK/NAUT CONTROL SCREEN

RECEIVER

The DME frequency words received while in the Multi Channel DME Test Screen are displayed in the same manner described in the Single Channel DME Test Screen.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

C. VHF ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-900 SERIES LRU'S)

The T1200B VHF ALIGNMENT MODE software has been designed to aid in the alignment of COLLINS VHF-900 series transceivers. The VHF-900 series transceiver has forty CALIBRATION VARIABLES and forty TFM variables (variables that change with Temperature Frequency or Mode) that can be modified via a high speed 429 bus. The T1200B ALIGNMENT MODE software allows the operator to modify all 80 variables through easy to use touch screen menus. The following discussion provides a more detailed description of the screens displayed in the VHF ALIGNMENT mode of operation.

When ALIGNING A COLLINS VHF-900 series transceiver, the instructions in the PTR (Production Test Requirement) for the VHF-900 series transceiver should be followed. DO NOT connect the T1200B to other test sets or LRUs while performing this procedure unless instructed to do so.

NOTE: THE TERMS ROM (Read Only Memory) AND NVM (Non-Volatile Memory) ARE USED SYNONYMOUSLY THROUGHOUT THE DISCUSSION OF THE VHF900 ALIGNMENT MODE.

SELECT VHF900 ALIGNMENT MODE SCREEN

Press the VHF ALIGN portion of the SELECT LRU TO BE TESTED SCREEN to access the SELECT VHF900 ALIGNMENT MODE SCREEN shown in Figure 20.

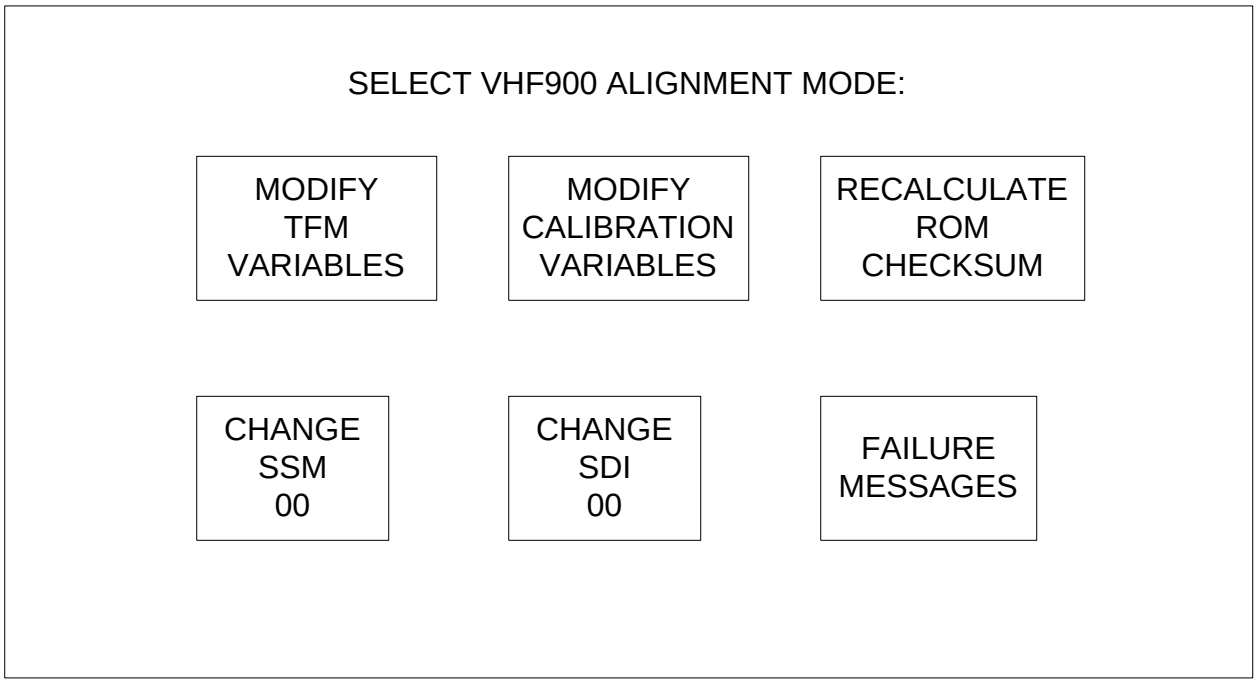


Figure 20 SELECT VHF900 ALIGNMENT MODE SCREEN

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

C. VHF ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-900 SERIES LRU'S) cont.

SELECT VHF900 ALIGNMENT MODE SCREEN cont.

The VHF900 ALIGNMENT MODE requires high speed transmit channel C and high speed receive channel C to be installed to work; if the high speed cards are not installed, the T1200B will display the warning message shown in figure 21. If the warning message is displayed, turn off the T1200B and install a high speed transmit card and a high speed receive card before attempting to continue VHF-900 Alignment.

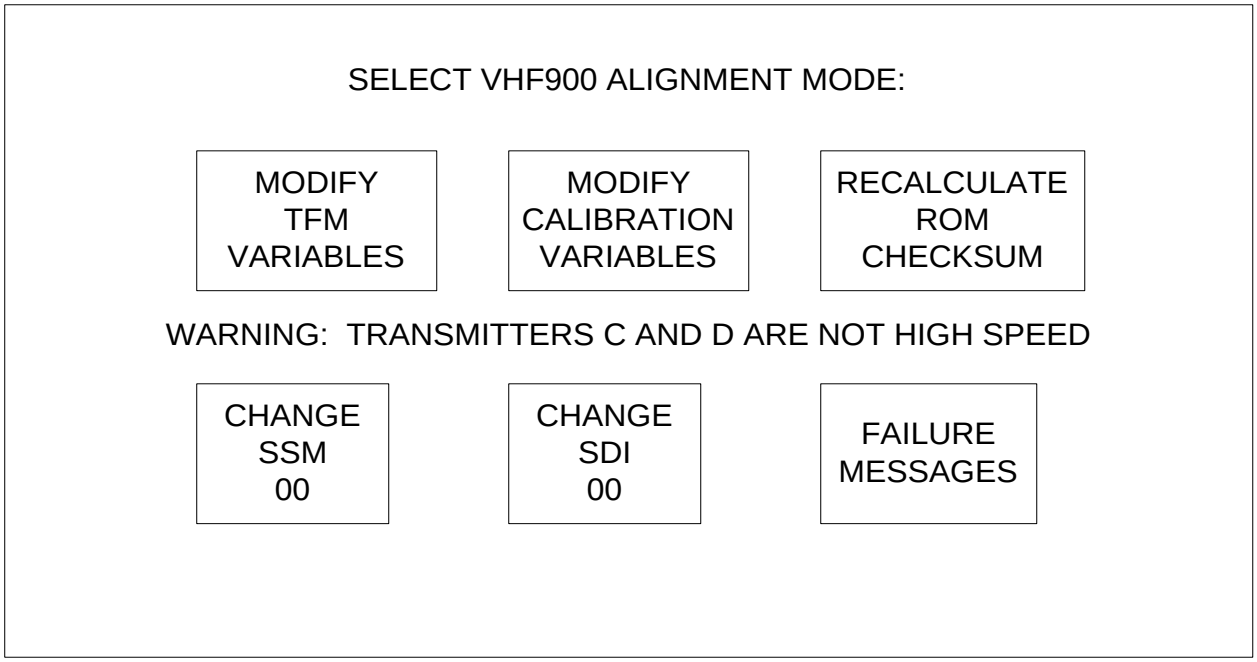


Figure 21 VHF900 ALIGNMENT MODE (NO HIGH SPEED TX MESSAGE)

The SELECT VHF900 ALIGNMENT MODE screen serves as the main menu for VHF-900 alignment mode. Its six touch screen fields and the LRU frequency tuning word are discussed further in the following paragraphs.

LRU FREQUENCY TUNING WORD

The LRU frequency tuning word is continuously transmitted during VHF900 ALIGNMENT MODE from T1200B Transmit CH C. The frequency tuning word defaults to 118.000 MHz and has a range of 118.000 to 136.975 MHz. The LRU FREQUENCY TUNING WORD can only be changed in the MODIFY TFM VARIABLES and MODIFY CALIBRATION VARIABLES screens. The structure of the word is as follows:

```
Bits  1-8         : Label 030 or Label 047
Bits  9-10        : Source Destination Identifier (SDI)
                    SDI is determined by CHANGE SDI field
Bits 11-14        : .001 Mhz                    BCD  e.g.  0
Bits 15-18        : .01  Mhz                    BCD  e.g.  0
Bits 19-22        : .1   Mhz                    BCD  e.g.  0
Bit  23-26        : 1    Mhz                    BCD  e.g.  8
Bits 27-29        : 10   Mhz                    BCD  e.g.  1
Bits 30-31        : Sign/Status Matrix (SSM)
                    SSM is determined by CHANGE SSM field
```

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

C. VHF ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-900 SERIES LRU'S) cont.

```
Bit  32            : Parity (ODD)
RATE               : 100/s
```

CHANGE SSM FIELD

The SSM field allows the operator to change the SSM used by one of the three 429 words transmitted by the T1200B during VHF900 alignment mode, labels 030 or labels 047. In the words, label 130 and label 131, the SSM bits are used as part of the data. Each time the SSM field is pressed, the SSM will increment by 1. When the SSM reaches three (11 binary), the next press of the field will cause the SSM to revert back to zero (00 binary).

CHANGE SDI FIELD

The SDI field allows the operator to change the SDI used by all three 429 words transmitted by the T1200B during VHF900 alignment mode (label 030, or 047,130, and 131). Each time the SDI field is pressed, the SDI will increment by 1. When the SDI reaches three (11 binary), the next press of the field will cause the SDI to revert back to zero (00 binary).

RECALCULATE ROM CHECKSUM

The RECALCULATE ROM CHECKSUM field allows the operator to command the VHF-900 to recalculate its NVM (Non-Volatile Memory) checksum. After an operator has finished modifying NVM data in the VHF-900, the RECALCULATE ROM CHECKSUM command should be executed. Else, the VHF-900 will generate an error.

When the RECALCULATE ROM CHECKSUM field is pressed, the T1200B displays the CHECKSUM MESSAGE shown in figure 22. The T1200B then builds the 429 words to send DATA 5A HEX to NVM ADDRESS 78123 HEX. The words are transmitted on transmit CH C for 1 s. The structures of the words are shown below:

```
Bits  1-8          : Label 130
Bits  9-10         : Source Destination Identifier (SDI)
                     SDI is determined by CHANGE SDI field
Bits 11-30         : VHF-900 ADDRESS (11 IS LSB) HEX   78123
Bit  31            : TRANSMIT INHIBIT            BIN   0
Bit  32            : Parity (ODD)
RATE               : 200/s

Bits  1-8          : Label 131
Bits  9-10         : Source Destination Identifier (SDI)
                     SDI is determined by CHANGE SDI field
Bits 11-18         : VHF-900 DATA    (11 IS LSB) HEX   5A
Bits 19-27         : PAD                         HEX   00
Bit  28            : TRANSMIT PHASE              BIN   0
Bit  29            : NORMAL/ALIGNMENT            BIN   0
Bits 30-31         : SSM (WRITE DATA)            BIN   10
Bit  32            : Parity (ODD)
RATE               : 200/s
```

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

C. VHF ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-900 SERIES LRU'S) cont.

RECALCULATE ROM CHECKSUM cont.

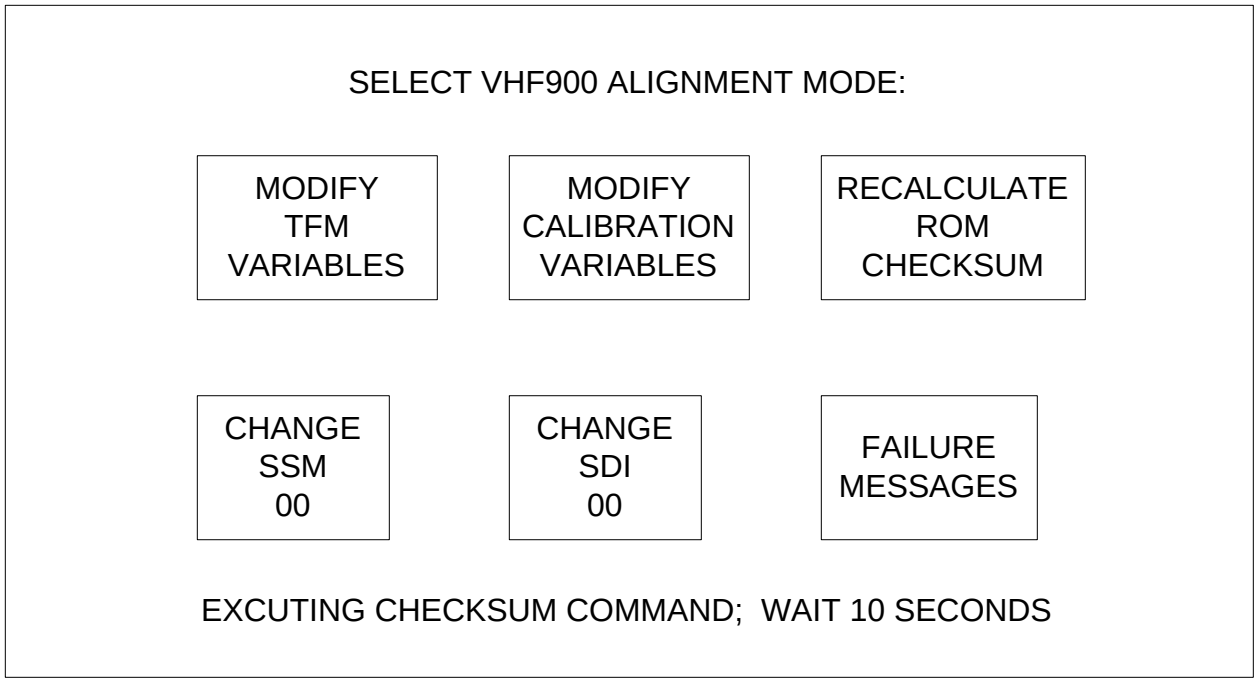


Figure 22 VHF900 ALIGNMENT MODE (CHECKSUM MESSAGE)

After 1 s the T1200B changes label 130 and 131 to send DATA A5 HEX to NVM ADDRESS 78321 HEX. The words are transmitted on transmit CH C for approximately 9 s. The T1200B then erases the checksum message and disables transmit words label 130 and 131.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

C. VHF ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-900 SERIES LRU'S) cont.

VHF900 ALIGNMENT MODE FAILURE MESSAGES SCREEN

The FAILURE MESSAGES field allows the operator to see the fault code messages received from the VHF-900 series transceiver during ALIGNMENT MODE. The messages are encoded in a label 350 BITE word. The structure of the BITE word is shown below followed by the FAILURE MESSAGES SCREEN, figure 23. Pressing the PRIOR PAGE key, will return the T1200B to SELECT VHF900 ALIGNMENT MODE SCREEN.

```
Bits  1-8          : Label 350
Bits  9-10         : Source Destination Identifier (SDI)
Bits 11-13         : PAD
Bits 14-21         : FAULT CODE MESSAGE 1  (BIT 14 IS LSB)
Bit  22-29         : FAULT CODE MESSAGE 2  (BIT 22 IS LSB)
Bits 30-31         : SSM
Bit  32            : Parity (ODD)
RATE               : 10/s
```

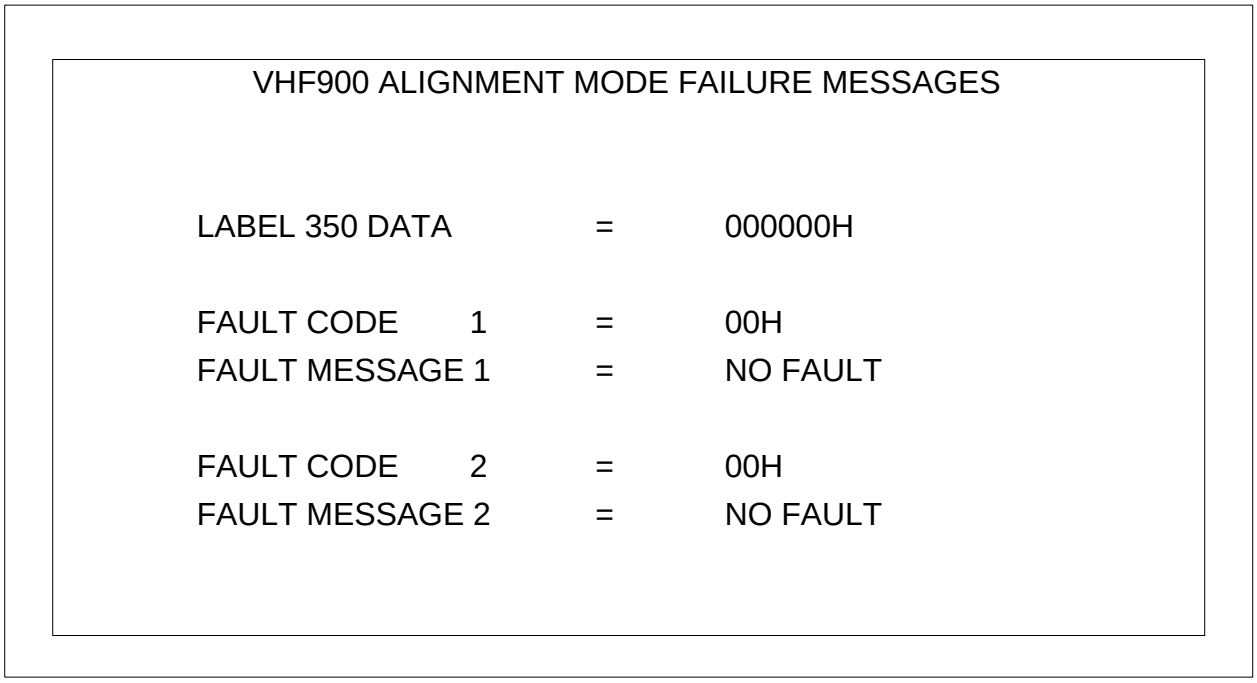


Figure 23 VHF900 ALIGNMENT MODE FAILURE MESSAGES

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

C. VHF ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-900 SERIES LRU'S) cont.

TFM VARIABLES PAGES 1/4 - 4/4 SCREENS

The TFM VARIABLES PAGES 1/4 - 4/4 allow the operator to read in the value currently used for a variable, modify it, and then write the modified value to NVM. The first TFM VARIABLE PAGE is shown in figure 24 followed by a discussion of its touch screen fields. TFM VARIABLE PAGE 1/4 is accessed through the MODIFY TFM VARIABLES FIELD on the SELECT VHF900 MODE SCREEN.

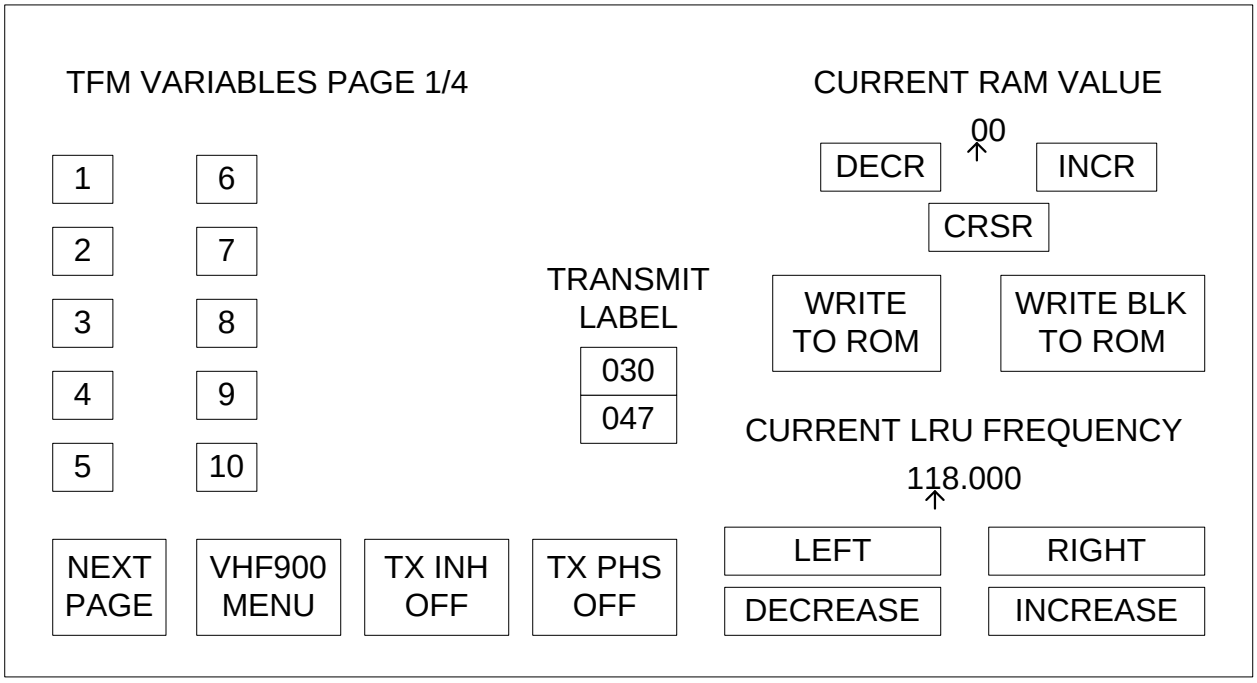


Figure 24 TFM VARIABLES PAGE 1/4

TFM VARIABLES FIELDS

The VARIABLE FIELDS allow the operator to select a VARIABLE and to see its current RAM value. The RAM value is the RAM value for the currently selected frequency range. Refer to COLLINS document "PRODUCTION TEST REQUIREMENTS FOR THE VHF-900B" for more information.

When a VARIABLE's field is pressed, the T1200B changes the VARIABLE's field to inverse high-intensity text and the current RAM value to inverse, blinking, high-intensity text. The T1200B then builds the 429 words to ask the VHF-900 for the current RAM value for the selected variable. The structures of those words are shown below:

```
Bits  1-8              : Label 130
Bits  9-10             : Source Destination Identifier (SDI)
                         SDI is determined by CHANGE SDI field
Bits  11-30            : VARIABLE'S ADDR.(11 IS LSB) e.g.  01000
Bit   31               : TRANSMIT INHIBIT            BIN   0
Bit   32               : Parity (ODD)
RATE                   : 200/s
```

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

C. VHF ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-900 SERIES LRU'S) cont.

continued from previous page

```
Bits  1-8              : Label 131
Bits  9-10             : Source Destination Identifier (SDI)
                         SDI is determined by CHANGE SDI field
Bits 11-18             : DATA (DON'T CARE)          e.g   00 hex
Bits 19-27             : PAD                        HEX   00
Bit  28                : TRANSMIT PHASE             BIN   0
Bit  29                : NORMAL/ALIGNMENT           BIN   0
Bits 30-31             : SSM (READ DATA)            BIN   00
Bit  32                : Parity (ODD)
RATE                   : 200/s
```

The T1200B will continue to transmit the label 130 and 131 words until it receives the echo of the label 130 word from the VHF-900 transceiver twice. After the T1200B receives the second echo of the label 130 word, it will extract the current RAM data from the next received label 131 word (bits 11-18, 11 is the LSB) and display the value on the screen in regular text. The T1200B will also turn labels 130 and 131 off. If the T1200B does not receive the echo of the label 130 word twice or it does receive a label 131 word from the VHF-900, it will continue to display the current RAM value in inverse, high-intensity, blinking text. If the blinking RAM value continues for longer than the 30 s, this indicates a communication error between the T1200B and the VHF-900 TRANSCEIVER.

CURRENT RAM VALUE

For each TFM variable in the VHF-900, there is a NVM (Non-Volatile Memory) location for each 1 MHz step from 118.000 MHz to 136.975 MHz, but there is only one RAM location. The CURRENT RAM VALUE is a two digit hex representation of the data in that RAM location. The data can modified to be any value between 00 hex to FF hex. IT IS THE OPERATOR'S RESPONSIBILITY TO KNOW THE LIMITS ON THE TFM VARIABLE THEY ARE TRYING TO MODIFY.

CURRENT RAM VALUE DECR FIELD

The CURRENT RAM VALUE DECR field allows the operator to modify the current RAM value. Each time the field is pressed, the current ram value digit pointed at by the cursor, decrements by one. If the digit was 0 hex, it will change to F hex. The T1200B will then build the 429 words to write the current RAM value into the VHF-900's RAM. The words are transmitted on transmit CH C, and have the structures that are shown below:

```
Bits  1-8              : Label 130
Bits  9-10             : Source Destination Identifier (SDI)
                         SDI is determined by CHANGE SDI field
Bits 11-30             : RAM ADDRESS (11 IS LSB)     e.g.  01000 hex
Bit  31                : TRANSMIT INHIBIT
                       : Bit 31 is determined by TX INHIBIT field
Bit  32                : Parity (ODD)
RATE                   : 200/s
```

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

C. VHF ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-900 SERIES LRU'S) cont.

continued from previous page

```
Bits  1-8              : Label 131
Bits  9-10             : Source Destination Identifier (SDI)
                         SDI is determined by CHANGE SDI field
Bits 11-18             : RAM DATA    (11 IS LSB)     e.g   5A hex
Bits 19-27             : PAD                         HEX   00
Bit  28                : TRANSMIT PHASE              BIN   0
                       : Bit 28 is determined by TX PHASE field
Bit  29                : NORMAL/ALIGNMENT            BIN   0
Bits 30-31             : SSM (WRITE DATA)            BIN   10
Bit  32                : Parity (ODD)
RATE                   : 200/s
```

CURRENT RAM VALUE INCR FIELD

The CURRENT RAM VALUE INCR field allows the operator to modify the current RAM value. Each time the field is pressed, the current ram value digit pointed at by the cursor, increments by one. If the digit was F hex, it will change to 0 hex. The T1200B will then build the 429 words to write the current RAM value into the VHF-900's RAM. The words are transmitted on transmit CH C, and have the same structures as the words used in the CURRENT RAM VALUE DECR FIELD.

CURRENT RAM VALUE CRSR FIELD

The CURRENT RAM VALUE CRSR FIELD allows the operator to move the current RAM value cursor. Each time the field is pressed, the cursor will move to the other digit.

WRITE TO ROM FIELD

The WRITE TO ROM field allows the operator to write the CURRENT RAM VALUE into the VHF-900 Non-Volatile Memory address for the selected TFM variable. If a TFM variable is not selected, the WRITE TO ROM field is INACTIVE.

When the WRITE TO ROM field is pressed the first time, it writes the message to the bottom of the screen that is shown in figure 25. It then changes the text in the WRITE TO ROM field to inverted, high-intensity, blinking text. If the field is pressed a second time, the T1200B erases the message at the bottom of the screen, converts the selected variable's field back to inverted text, converts the WRITE TO ROM field back to inverted text, erases the current RAM value, and finally generates the 429 commands to write the current RAM value to NVM in the VHF-900. The NVM address is dependent upon which TFM variable was selected and the current LRU frequency. The structure of the 429 words is the same as CURRENT RAM VALUE DECR FIELD, except that the label 130 word bits 11-30 will contain the NVM address. The 429 words are transmitted from CH C transmitter on the T1200B. The operator should wait at least 2 s before selecting another TFM VARIABLE.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

C. VHF ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-900 SERIES LRU'S) cont.

WRITE TO ROM FIELD

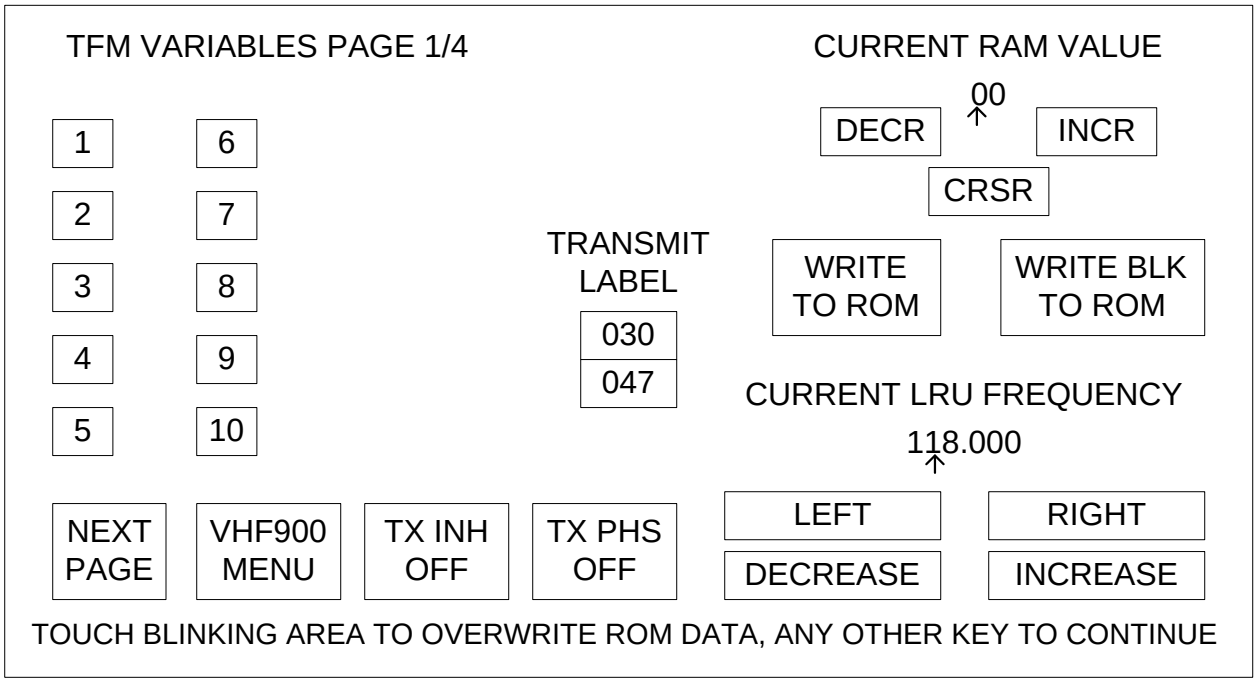


Figure 25 TFM VARIABLES PAGE 1/4 (WRITE TO ROM MESSAGE)

WRITE BLK TO ROM FIELD

The WRITE BLK TO ROM field allows the operator to write the CURRENT RAM VALUE into all nineteen VHF-900 Non-Volatile Memory locations for the selected TFM variable. If a TFM variable is not selected, the WRITE BLK TO ROM field is INACTIVE.

When the WRITE BLK TO ROM field is pressed the first time, it writes the message to the bottom of the screen that is shown in figure 26. It then changes the text in the WRITE BLK TO ROM field to inverted, high-intensity, blinking text. If the field is pressed a second time, the T1200B converts the selected variable's field back to inverted text, converts the WRITE BLK TO ROM field back to inverted text, erases the current RAM value, changes the message at the bottom of the screen to the message shown in figure 26, and finally enters a loop for writing the CURRENT RAM VALUE to the nineteen NVM addresses for the selected TFM variable.

On each pass of the WRITE BLK TO ROM loop, the T1200B generates the 429 commands to write the current RAM value to one NVM address, displays bits 32 - 9 of label 130 on the screen (label 130 contains the NVM address), and then decrements the address by 20 hex to prepare for next pass of the loop. On the final pass of the loop, the T1200B clears the message off the bottom of the screen and stops transmitting labels 130 and 131. The structure of the 429 words is the same as CURRENT RAM VALUE DECR FIELD, except that the label 130 word bits 11-30 will contain the NVM address. The 429 words are transmitted from CH C transmitter on the T1200B. After the message has been removed from the screen, the operator should wait at least 2 s before selecting another TFM VARIABLE to ensure that the T1200B has completed transmission of 429 words for the last NVM address.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

C. VHF ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-900 SERIES LRU'S) cont.

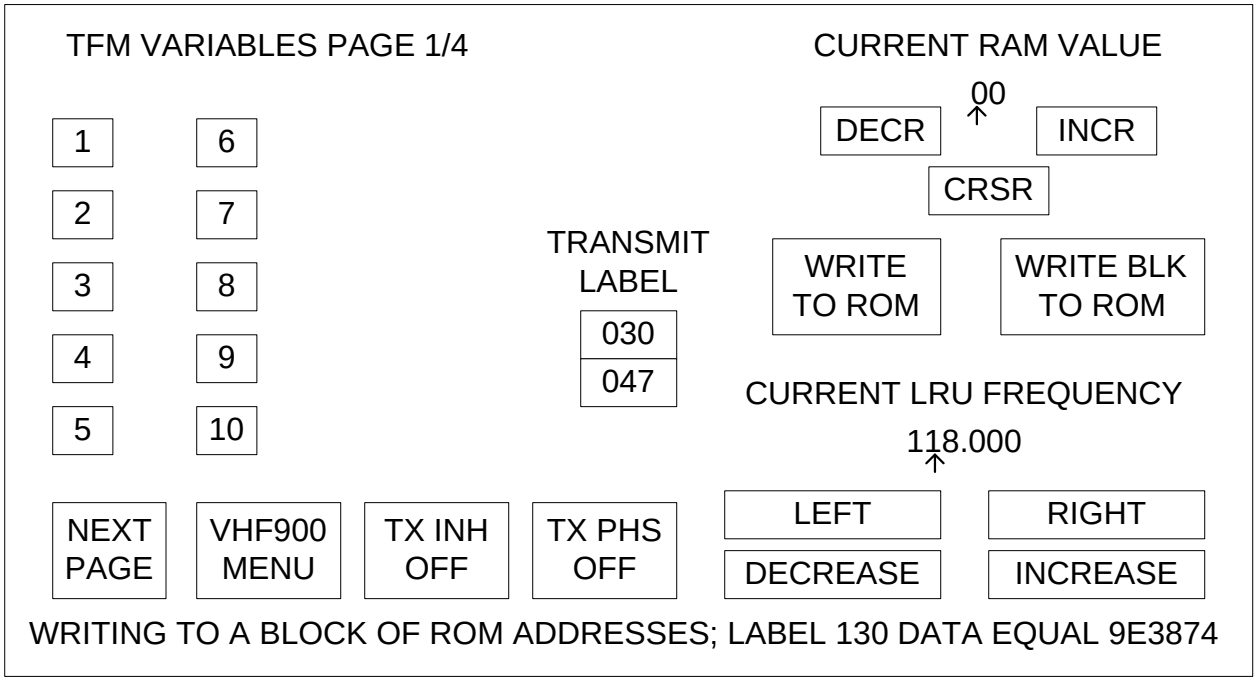


Figure 26 TFM VARIABLES PAGE 1/4 (WRITE BLK TO ROM MESSAGE)

TRANSMIT LABEL

The TRANSMIT LABEL FIELD allows the operator to select the frequency tuning label for the frequency tuning word. The current label is highlighted and can be changed by pressing the 030/047 field. When the label is changed the frequency tuning word defaults to 118.000 MHz. When label 030 is selected the spacing value associated with the frequency tuning word is 25 kHz. When label 047 (VHF-900B ONLY) is selected the spacing value associated with the frequency tuning word is 8.33 kHz.

CURRENT LRU FREQUENCY LEFT FIELD

The CURRENT LRU FREQUENCY LEFT FIELD allows the operator to move the CURRENT LRU FREQUENCY cursor. Each time the field is pressed, the T1200B will move the cursor one position to the left. If the cursor is under the tens digit and the field is pressed, the cursor will wrap around to under the hundredths digit.

CURRENT LRU FREQUENCY RIGHT FIELD

The CURRENT LRU FREQUENCY RIGHT FIELD allows the operator to move the CURRENT LRU FREQUENCY cursor. Each time the field is pressed, the T1200B will move the cursor one position to the right. If the cursor is under the hundredths digit and the field is pressed, the cursor will wrap around to under the tens digit.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

C. VHF ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-900 SERIES LRU'S) cont.

CURRENT LRU FREQUENCY DECREASE FIELD

The CURRENT LRU FREQUENCY DECREASE FIELD allows the operator to decrease the LRU FREQUENCY. Each time the field is pressed the T1200B decreases the CURRENT LRU FREQUENCY by ten, one, one hundredth, twenty-five thousandths, or a rounded eight and one-third thousandths, depending on the location of the LRU FREQUENCY cursor and which TRANSMIT LABEL is selected. The T1200B then modifies the frequency tuning word (label 030 or label 047) to select the new frequency. The structure of the label 030 or label 047 word is shown following the FREQUENCY TUNING WORD SECTION. If the CURRENT LRU FREQUENCY equals 118.000, the DECREASE field will have no effect.

CURRENT LRU FREQUENCY INCREASE FIELD

The CURRENT LRU FREQUENCY INCREASE FIELD allows the operator to increase the LRU FREQUENCY. Each time the field is pressed the T1200B increases the CURRENT LRU FREQUENCY by ten, one, one hundredth, twenty-five thousandths, or a rounded eight and one-third thousandths depending on the location of the LRU FREQUENCY cursor and which TRANMIT LABEL is selected. The T1200B then modifies the frequency tuning word (label 030 or label 047) to select the new frequency. The structure of the label 030 or label 047 word is shown following the FREQUENCY TUNING WORD SECTION. If the CURRENT LRU FREQUENCY equals 136.975, the INCREASE FIELD will have no effect.

TX INHIBIT FIELD

The TX INHIBIT FIELD allows the operator to set or clear the TX DRIVE INHIBIT BIT in label 130 transmissions. The bit defaults to OFF (TX DRIVE INHIBIT BIT CLEARED). Pressing this field, causes the T1200B to toggle the TX INHIBIT BIT between OFF (Bit 31 CLEARED), and ON (Bit 31 SET). The structure of the label 130 word is shown following the CURRENT RAM DECR FIELD discussion.

TX PHASE

The TX PHASE FIELD allows the operator to set or clear the TX DRIVE PHASE BIT in label 131 transmissions. The bit defaults to OFF (TX DRIVE PHASE BIT CLEARED). Pressing this field, causes the T1200 to toggle the TX PHASE BIT between OFF (Bit 28 CLEARED), and ON (Bit 28 SET). The structure of the label 131 word is shown following the CURRENT RAM DECR FIELD discussion.

NEXT PAGE FIELD

The NEXT PAGE field allows the operator to go to the next page of TFM VARIABLES. Each time this field is pressed the TFM variable page, advances by one. If on TFM VARIABLES PAGE 4/4, pressing the NEXT PAGE FIELD will change the page to TFM VARIABLES PAGE 1/4. To go to the previous page, hit the PRIOR PAGE key on the keypad.

VHF900 MENU FIELD

The VHF900 MENU field allows the operator to return to the SELECT VHF900 ALIGNMENT SCREEN from any TFM VARIABLES PAGE. See figure 24.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

C. VHF ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-900 SERIES LRU'S) cont.

CALIBRATION VARIABLES PAGES 1/4 - 4/4 SCREENS

The CALIBRATION VARIABLES PAGES 1/4 - 4/4 allow the operator to read in the value currently used for a CALIBRATION VARIABLE, modify it, and then write the modified value to NVM. The first CALIBRATION VARIABLE PAGE is shown in figure 27 followed by a discussion of its touch screen fields. CALIBRATION VARIABLES PAGE 1/4 is accessed through the MODIFY CALIBRATION VARIABLES FIELD on the SELECT VHF900 ALIGNMENT MODE SCREEN.

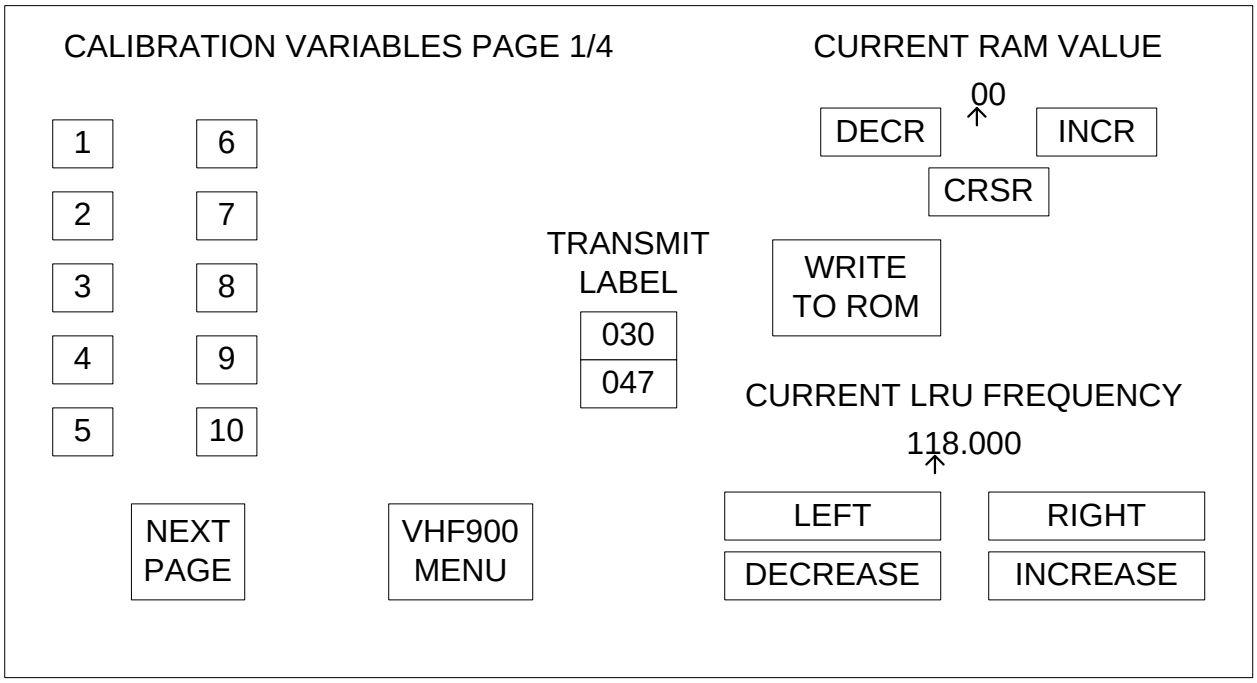


Figure 27 CALIBRATION VARIABLES PAGE 1/4

CALIBRATION VARIABLES FIELDS

The CALIBRATION VARIABLES FIELDS allow the operator to select a VARIABLE and to see its current ROM value. When a VARIABLE's field is pressed, the T1200B changes the VARIABLE's field to inverse high-intensity text and the current ROM value to inverse, blinking, high-intensity text. The T1200B then builds the 429 words to ask the VHF-900 for the current ROM value for the selected variable. The structures of the words are the same as those that follow the discussion of the TFM VARIABLES FIELDS.

The T1200B will transmit the label 130 and 131 words until it receives the echo of the label 130 word from the VHF-900 transceiver twice. After the T1200B receives the second echo of the label 130 word, it will extract the current ROM data from the next received label 131 word (bits 11-18, 11 is the LSB) and display the value on the screen in regular text. The T1200B will also turn labels 130 and 131 off. If the T1200B does not receive the echo of the label 130 word twice or it does receive a label 131 word from the VHF-900, it will continue to display the current ROM value in inverse, high-intensity, blinking text. If the blinking ROM value continues for longer than the 30 s, this indicates a communication error between the T1200B and the VHF-900 TRANSCEIVER.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

C. VHF ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-900 SERIES LRU'S) cont.

CURRENT ROM VALUE

The CURRENT ROM VALUE is a two digit hex representation of the data in the ROM location for the selected CALIBRATION VARIABLE. The data can be modified to be any value between 00 hex to FF hex. IT IS THE OPERATOR'S RESPONSIBILITY TO KNOW THE LIMITS ON THE CALIBRATION VARIABLE THEY ARE TRYING TO MODIFY.

CURRENT ROM VALUE DECR FIELD

The CURRENT ROM VALUE DECR field allows the operator to modify the current ROM value. Each time the field is pressed, the current ROM value digit pointed at by the cursor, decrements by one. If the digit was 0 hex, it will change to F hex. The T1200B will then build the 429 words to overwrite the ROM value at the address of the selected CALIBRATION VARIABLE with the CURRENT ROM VALUE. The words are transmitted on transmit CH C, and have the structures that are shown below:

```
Bits  1-8              : Label 130
Bits  9-10             : Source Destination Identifier (SDI)
                         SDI is determined by CHANGE SDI field
Bits 11-30             : ROM ADDRESS (11 IS LSB)     e.g.  78420 hex
Bit  31                : TRANSMIT INHIBIT            BIN   0
Bit  32                : Parity (ODD)
RATE                   : 200/s

Bits  1-8              : Label 131
Bits  9-10             : Source Destination Identifier (SDI)
                         SDI is determined by CHANGE SDI field
Bits 11-18             : ROM DATA (11 IS LSB)        e.g   5A hex
Bits 19-27             : PAD                         HEX   00
Bit  28                : TRANSMIT PHASE              BIN   0
Bit  29                : NORMAL/ALIGNMENT            BIN   0
Bits 30-31             : SSM (WRITE DATA)            BIN   10
Bit  32                : Parity (ODD)
RATE                   : 200/s
```

CURRENT ROM VALUE INCR FIELD

The CURRENT ROM VALUE INCR field allows the operator to modify the current ROM value. Each time the field is pressed, the current ROM value digit pointed at by the cursor, increments by one. If the digit was F hex, it will change to 0 hex. The T1200B will then build the 429 words to overwrite the ROM value at the address of the selected CALIBRATION VARIABLE with the CURRENT ROM VALUE. The words are transmitted on transmit CH C, and have the same structures as those used in CURRENT ROM VALUE DECR FIELD.

CURRENT ROM VALUE CRSR FIELD

The CURRENT ROM VALUE CRSR FIELD allows the operator to move the current ROM value cursor. Each time the field is pressed, the cursor will move to the other digit.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

C. VHF ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-900 SERIES LRU'S) cont.

WRITE TO ROM FIELD

The T1200B does not write to ROM every time a variable is changed. For some calibration variables, the value is held in a RAM or DAC address. Therefore, the WRITE TO ROM field must be pushed after editing a variable's data to ensure that the new value is then stored in the T1200B.

NOTE: AFTER EDITING A VARIABLE'S DATA, PUSH THE WRITE TO ROM FIELD TO STORE THE NEW VALUE IN ROM.

TRANSMIT LABEL FIELD

The TRANSMIT LABEL FIELD allows the operator to select the frequency tuning label for the frequency tuning word. The current label is highlighted and can be changed by pressing the 030/047 field. When the label is changed the frequency tuning word is 25 kHz. When label 047 (VHF-900B ONLY) is selected the spacing value associated with the frequency tuning word is 8.33 kHz.

CURRENT LRU FREQUENCY FIELDS

The CURRENT LRU FREQUENCY FIELDS (LEFT, RIGHT, DECREASE, INCREASE) function exactly the same as the CURRENT LRU FREQUENCY FIELDS in Chapter 1-4, paragraph C. Refer to Figure 26 for more information.

NEXT PAGE FIELD

The NEXT PAGE field allows the operator to go to the next page of CALIBRATION VARIABLES. Each time this field is pressed the CALIBRATION VARIABLE page, advances by one. If on CALIBRATION VARIABLES PAGE 4/4, pressing the NEXT PAGE FIELD will change the page to CALIBRATION VARIABLES PAGE 1/4. To go to the previous page, hit the PRIOR PAGE key on the keypad.

VHF900 MENU FIELD

The VHF900 MENU field allows the operator to return to the SELECT VHF900 ALIGNMENT SCREEN from any CALIBRATION VARIABLES PAGE. See Figure 27.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

D. VDL MODE (ONLY APPLIES TO COLLINS VHF-920 SERIES LRU's)

The T1200B VDL MODE software has been designed to aid in the testing of a COLLINS VHF-920 series transceivers in VDL mode 2. The VHF-920 series transceiver has specific handshaking in order to place the LRU into VDL mode 2. Once the VHF-920 series transceiver is in VDL mode 2 then the user is able to send a 429 test message or verify that a signal test message has been received by the LRU. The following discussion provides a more detailed description of the screens displayed in the VDL MODE of operation.

When testing a COLLINS VHF-920 series transceiver in VDL mode 2, the instructions in the PTR (Production Test Requirement) for the VHF-920 series transceiver should be followed. Do NOT connect the T1200B to other test sets or LRUs while performing this procedure unless instructed to do so.

VDL MODE 2 SELECTION SCREEN

Press the VDL MODE portion of the SELECT LRU TO BE TESTED SCREEN to access the VDL MODE 2 SELECTION SCREEN shown in Figure 28.

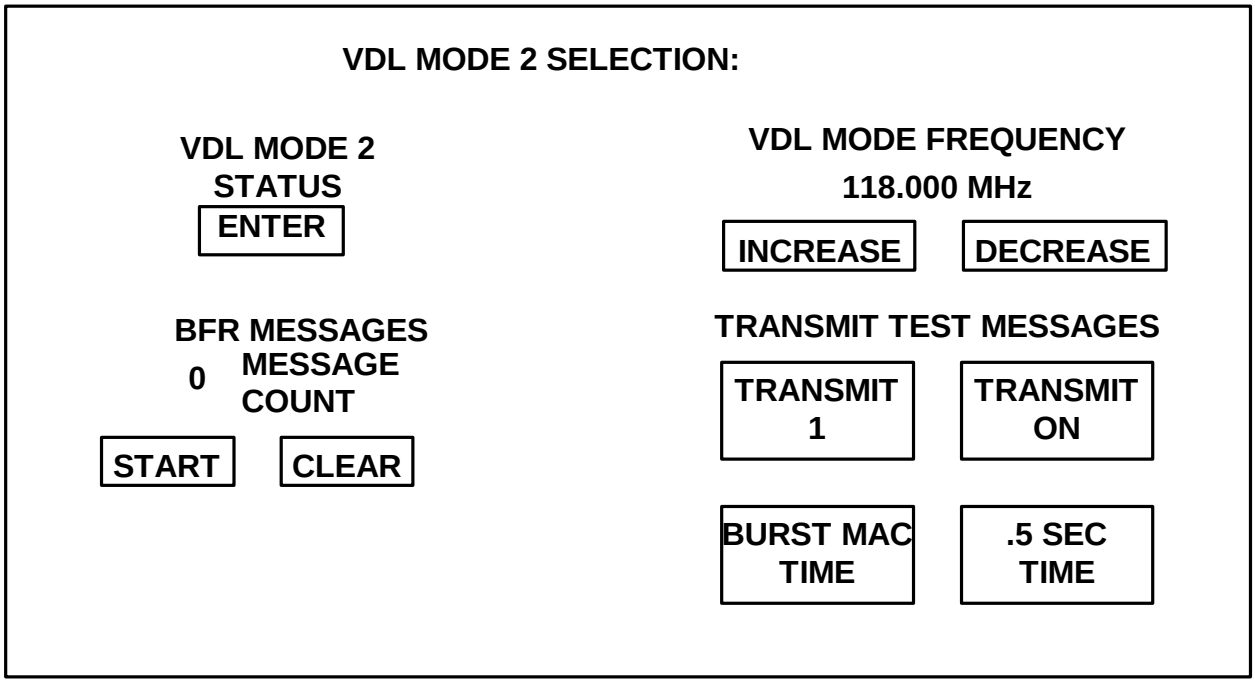


Figure 28 VDL MODE 2 SELECTION SCREEN

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

D. VDL MODE (ONLY APPLIES TO COLLINS VHF-920 SERIES LRU's) cont.

The VDL MODE requires high speed transmit channel C and high speed receive channel C to be installed to work; if the high speed cards are not installed, the T1200B will display the warning message shown in Figure 29. If the warning message is displayed, turn off the T1200B and install a high speed transmit card and a high speed receive card before attempting to continue in VDL MODE.

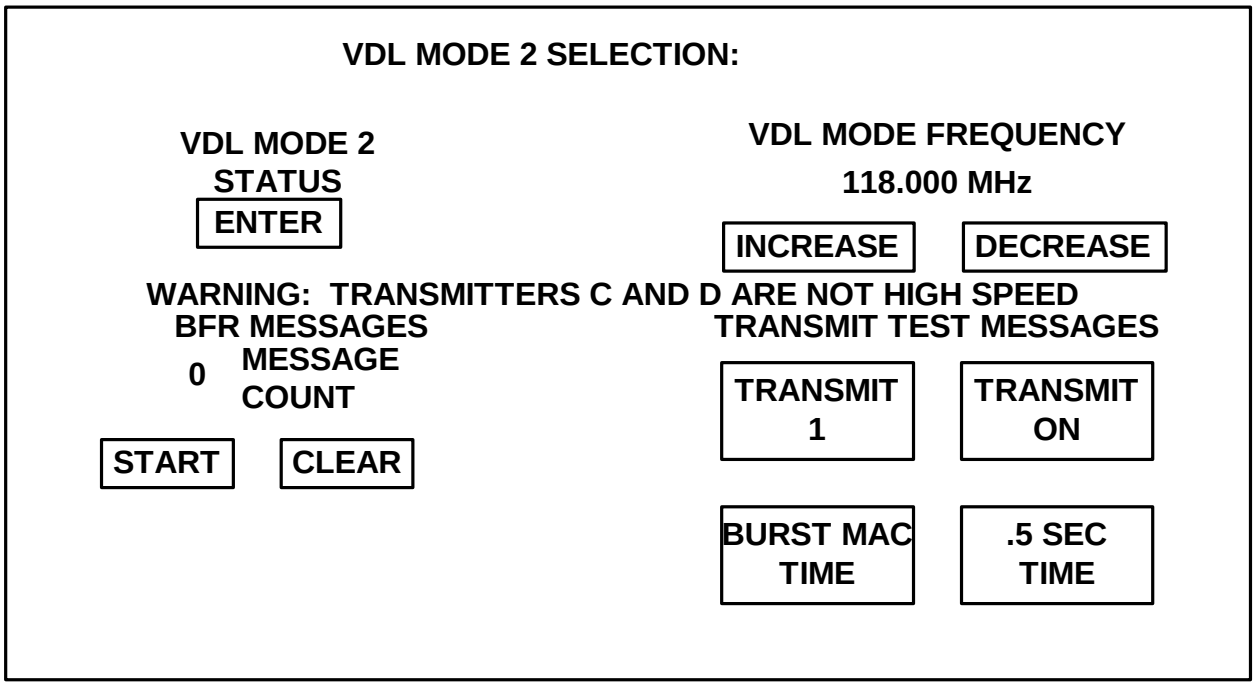


Figure 29 VDL MODE 2 (NO HIGH SPEED TX MESSAGE)

The VDL MODE 2 SELECTION screen serves as the main menu. Its six touch screen fields are discussed further in the following paragraphs.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

D. VDL MODE (ONLY APPLIES TO COLLINS VHF-920 SERIES LRU's) cont.

VDL MODE 2 STATUS ENTER/EXIT FIELD

The VDL MODE 2 STATUS ENTER/EXIT field allows the user to perform the handshaking to place the LRU in VDL mode 2 or remove the LRU from VDL mode 2.

When the ENTER field is pressed, the T1200B changes the ENTER field to an EXIT field in inverse high-intensity text and the message "WAITING FOR VDL MODE 2 INITIALAZATION" will be displayed as shown in Figure 30.

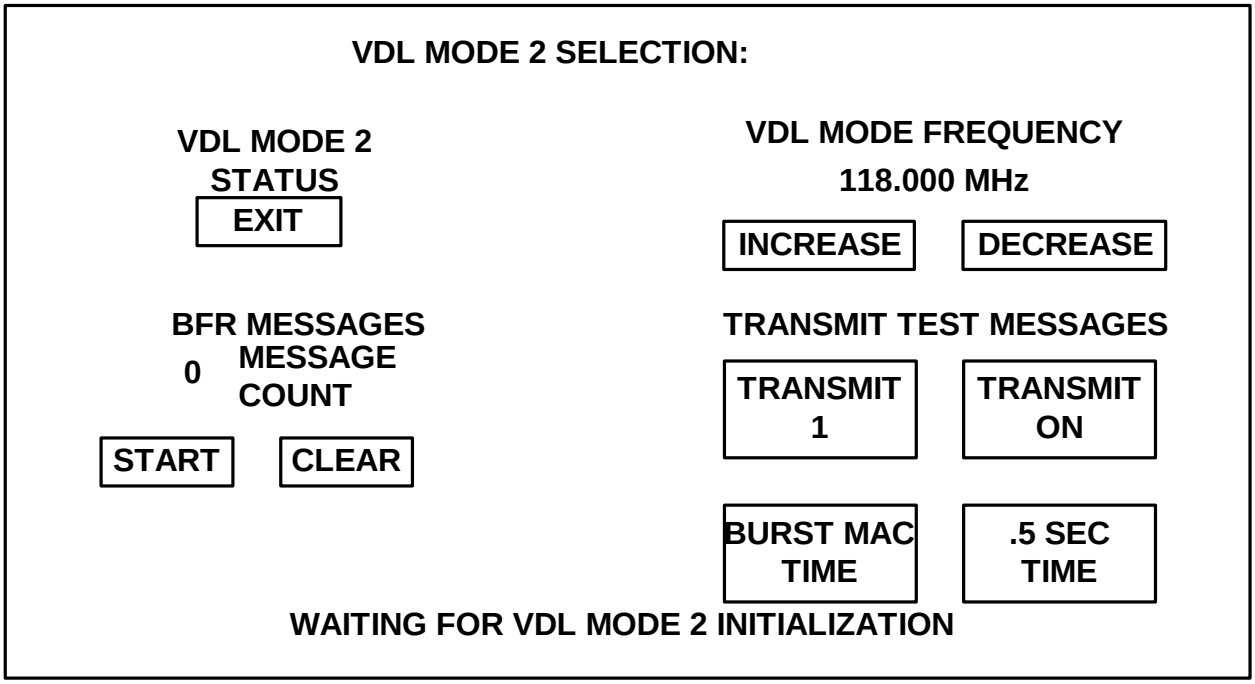


Figure 30 VDL MODE 2 ENTER

The T1200B will then transmit the 429 word of 0008001D# (Label 270) and the 429 word of 8000235E# (Label 172) on channel C with and update rate of 1 second.

Then the T1200B will monitor receiver channel C for the following 429 word:
xxxx xxxx 0100 xxxx xxxx xxSS 0001 1101 (Label 270 SS is the SDI field used to define the LRU SDI).

After that data was received, the T1200B will transmit the 429 word with the data of 470003#. The label of that word depends on the LRU SDI mentioned above, SDI of 00 the label will be 250, the SDI of 01 the label will be 251, the SDI of 10 the label will be 252, and the SDI of 11 the label will be 253.

Then the T1200B will monitor receiver channel C for the following 429 word:
XX6XXX1D# (Label 270).

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

D. VDL MODE (ONLY APPLIES TO COLLINS VHF-920 SERIES LRU's) cont.

VDL MODE 2 STATUS ENTER/EXIT FIELD cont.

After that data was received, the T1200B will transmit the 429 word with the data of D20500#. The label of that word depends on the LRU SDI mentioned above, SDI of 00 the label will be 250, the SDI of 01 the label will be 251, the SDI of 10 the label will be 252, and the SDI of 11 the label will be 253.

Then the T1200B will monitor receiver channel C for the following 429 word:
XX7XXX1D# (Label 270).

After that data was received, the T1200B will transmit the 429 word with the data of D201F1#. The label of that word depends on the LRU SDI mentioned above, SDI of 00 the label will be 250, the SDI of 01 the label will be 251, the SDI of 10 the label will be 252, and the SDI of 11 the label will be 253.

Then the T1200B will monitor receiver channel C for the following 429 word:
xxxx xxxx xxxx xxxx xx1x x1xx 0001 1101 (Label 270).

After that data was received, the T1200B will transmit a 429 word table containing the selected frequency command word. See VDL MODE FREQUENCY for the available 429 frequency command words. The label of those words depend on the LRU SDI mentioned above, SDI of 00 the label will be 250, the SDI of 01 the label will be 251, the SDI of 10 the label will be 252, and the SDI of 11 the label will be 253.

The T1200B will monitor receiver channel C for the following 429 word:
xxxx xxxx xxxx xxxx xx1x x0xx 0001 1101 (Label 270).

After that data was received, the T1200B will clear the message "WAITING FOR VDL MODE 2 INITIALAZATION".

If the EXIT button is pressed all of the transmissions will be stopped, if the "WAITING FOR VDL MODE 2 INITIALAZATION" message is being displayed then it will be cleared, and all of the different VDL mode functions will be reset.

VDL MODE FREQUENCY INCREASE and DECREASE FIELDS

The VDL MODE FREQUENCY INCREASE and DECREASE fields allows the user to change the VDL mode frequency. To change the frequency press the INCREASE or DECREASE fields to scroll through all of the available VDL Mode 2 frequencies. If the LRU is in VDL Mode 2 the new frequency command words are transmitted to the LRU on transmitter channel C, or else the new frequency command words are transmitted during the initialization process. See VDL MODE 2 STATUS ENTER/EXIT FIELD. The following table lists the available frequency and the 429 command words associated with that frequency if the LRU SDI is 00 or else the label changes:

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

D. VDL MODE (ONLY APPLIES TO COLLINS VHF-920 SERIES LRU's) cont.

VDL MODE FREQUENCY INCREASE and DECREASE FIELDS cont.

VDL FREQUENCY COMMAND WORDS

Frequency (MHz)	Command Words
118.000	2F040715# 0020F115# 01207015# 0C090015# 08700315# 1900FF15# 31604315#
118.425	2F040715# 0020F115# 01207015# 0C092A15# 08700315# 1900FF15# 31CC2D15#
119.425	2F040715# 0020F115# 01307015# 0C092A15# 08700315# 1900FF15# 3153F815#
120.425	2F040715# 0020F115# 01407015# 0C092A15# 08700315# 1900FF15# 3194E015#
121.425	2F040715# 0020F115# 01507015# 0C092A15# 08700315# 1900FF15# 310B3515#
122.425	2F040715# 0020F115# 01607015# 0C092A15# 08700315# 1900FF15# 31A35B15#
123.425	2F040715# 0020F115# 01707015# 0C092A15# 08700315# 1900FF15# 313C8E15#
124.425	2F040715# 0020F115# 01807015# 0C092A15# 08700315# 1900FF15# 31257A15#
125.425	2F040715# 0020F115# 01907015# 0C092A15# 08700315# 1900FF15# 31BAAF15#
126.000	2F040715# 0020F115# 01A07015# 0C090015# 08700315# 1900FF15# 31BEAF15#
126.425	2F040715# 0020F115# 01A07015# 0C092A15# 08700315# 1900FF15# 3112C115#
127.425	2F040715# 0020F115# 01B07015# 0C092A15# 08700315# 1900FF15# 318D1415#
128.425	2F040715# 0020F115# 01C07015# 0C092A15# 08700315# 1900FF15# 314A0C15#
129.425	2F040715# 0020F115# 01D07015# 0C092A15# 08700315# 1900FF15# 31D5D915#
130.425	2F040715# 0020F115# 01E07015# 0C092A15# 08700315# 1900FF15# 317DB715#
131.425	2F040715# 0020F115# 01F07015# 0C092A15# 08700315# 1900FF15# 31E26215#
132.425	2F040715# 0020F115# 02007015# 0C092A15# 08700315# 1900FF15# 312DDC15#
133.425	2F040715# 0020F115# 02107015# 0C092A15# 08700315# 1900FF15# 31B20915#
134.425	2F040715# 0020F115# 02207015# 0C092A15# 08700315# 1900FF15# 311A6715#
135.425	2F040715# 0020F115# 02307015# 0C092A15# 08700315# 1900FF15# 3185B215#
136.425	2F040715# 0020F115# 02407015# 0C092A15# 08700315# 1900FF15# 3142AA15#
136.975	2F040715# 0020F115# 02407015# 0C096115# 08700315# 1900FF15# 316D5E15#

BFR MESSAGES START/STOP FIELD

The BFR MESSAGES START/STOP field allows the user to count the number of times the LRU reports receiving a signal test message.

The LRU must be in VDL Mode 2 and not transmitting a test message in order for this field to work. When the BFR MESSAGES START field is pressed, the T1200B changes

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

D. VDL MODE (ONLY APPLIES TO COLLINS VHF-920 SERIES LRU's) cont.

BFR MESSAGES START/STOP FIELD cont.

the START field to a STOP field in inverse high-intensity text will be displayed as shown in Figure 31.

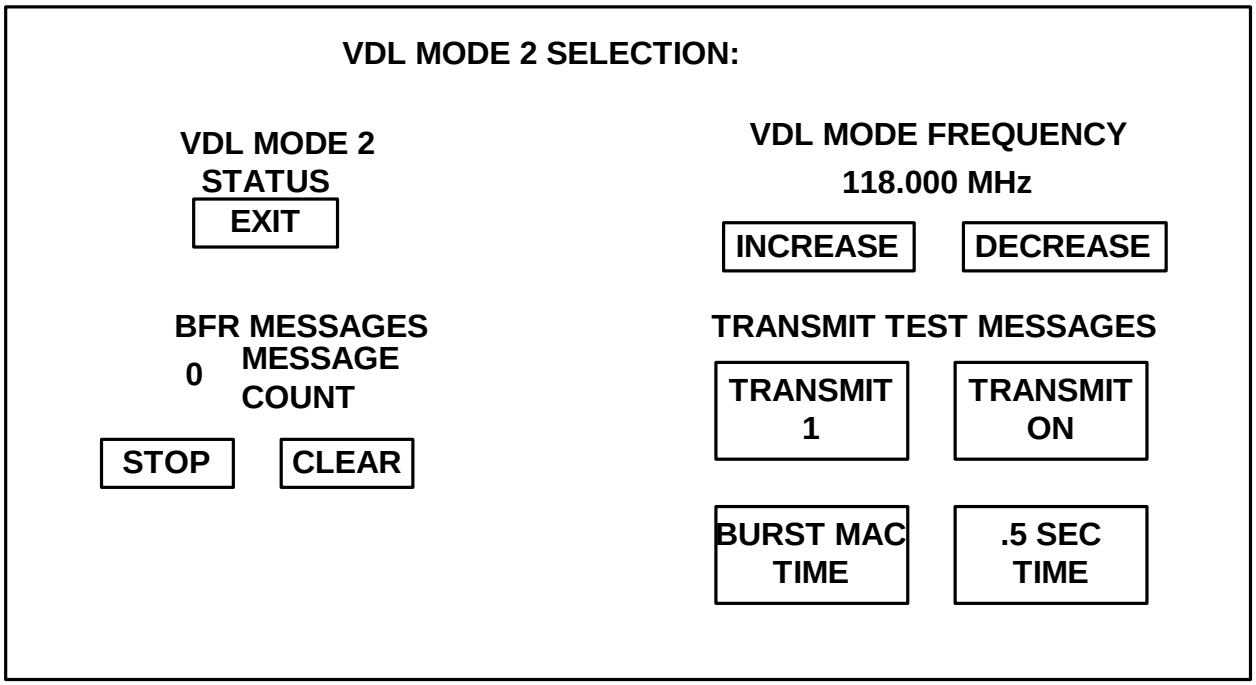


Figure 31 VDL MODE 2 BFR MESSAGES START

The T1200B will transmit the address request message 429 word table on transmitter channel C (2F040915#, 8022F115#, 0010D015#, 05555515#, 8FE55515#, 8EFEFE15#, 0FEF2F15#, 1BFEFE15#, 31D31115# if the LRU SDI is 00 or else the label changes). Then the T1200B will monitor receiver channel C for the following 429 word: XX51F123# (Label 304). If the specified data is received the displayed message count will be incremented to a maximum of 255 counts.

If the BFR MESSAGES STOP field is pressed the T1200B will quit monitoring label 304.

BFR MESSAGES CLEAR FIELD

The BFR MESSAGES CLEAR field allows the user to clear the BFR MESSAGES MESSAGE COUNT.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

D. VDL MODE (ONLY APPLIES TO COLLINS VHF-920 SERIES LRU's) cont.

TRANSMIT TEST MESSAGES TRANSMIT 1 FIELD

The TRANSMIT 1 field allows the user to send a 429 test message to the LRU.

The LRU must be in VDL Mode 2 and not performing a BFR messages count in order for this field to work. When the TRANSMIT 1 field is pressed, the T1200B displays the message "SENDING TEST MESSAGE" as shown in Figure 32.

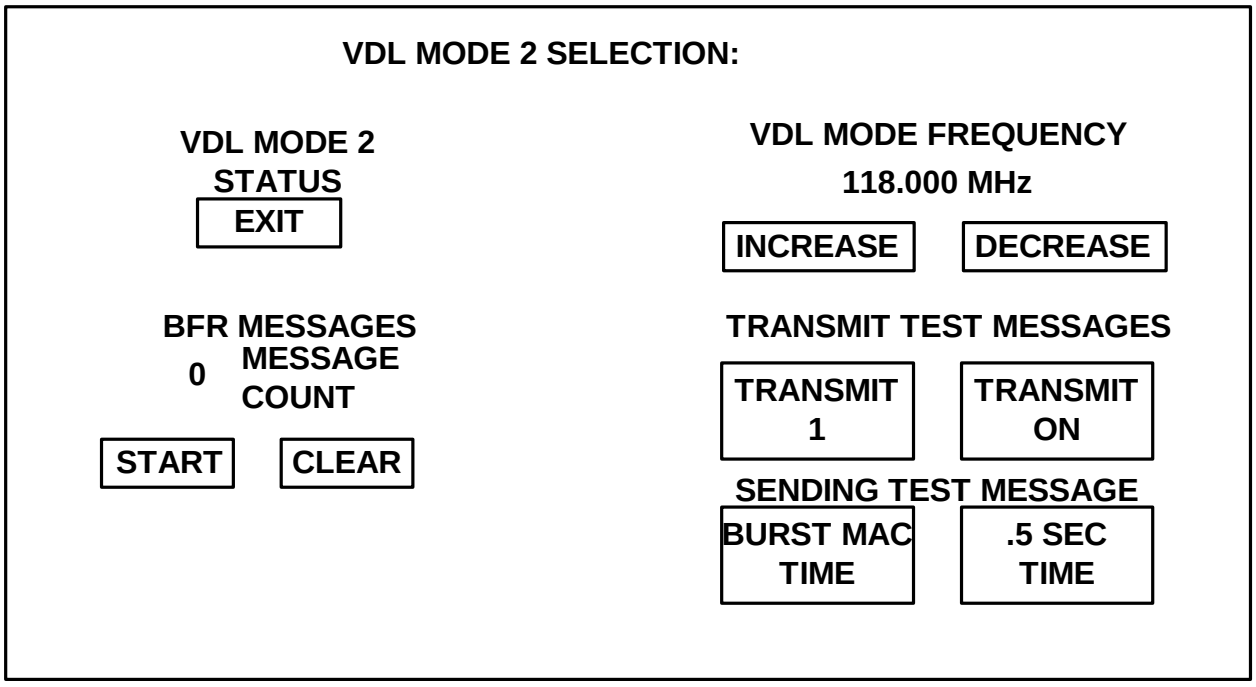


Figure 32 VDL MODE 2 TRANSMIT 1

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

D. VDL MODE (ONLY APPLIES TO COLLINS VHF-920 SERIES LRU's) cont.

TRANSMIT TEST MESSAGES TRANSMIT 1 FIELD cont.

Then the 429 test message table will be transmitted out of the T1200B channel C. Then the "SENDING TEST MESSAGE" message will be cleared. The following table lists the 429 test message that will be sent if the LRU SDI is 00 or else the label changes:

AF446615#	8021F115#	000F5015#	05555515#	05555515#	05555515#	03055515#	01303115#
83332315#	86353415#	03837315#	82413915#	04443415#	8D464515#	0300A015#	01303115#
83332315#	86353415#	03837315#	82413915#	04443415#	8D464515#	0300A015#	01303115#
83332315#	86353415#	03837315#	82413915#	04443415#	8D464515#	0300A015#	01303115#
83332315#	86353415#	03837315#	82413915#	04443415#	8D464515#	0300A015#	01303115#
83332315#	86353415#	03837315#	82413915#	04443415#	8D464515#	0300A015#	01303215#
83332315#	86353415#	03837315#	82413915#	04443415#	8D464515#	0300A015#	01303215#
83332315#	86353415#	03837315#	82413915#	04443415#	8D464515#	0300A015#	01303215#
83332315#	86353415#	03837315#	82413915#	04443415#	8D464515#	0300A015#	01303215#
83332315#	86353415#	03837315#	82413915#	04443415#	8D464515#	0300A015#	01303215#
83332315#	86353415#	03837315#	82413915#	04443415#	8D464515#	0300A015#	81303315#
83332315#	86353415#	03837315#	82413915#	04443415#	8D464515#	0300A015#	81303315#
03E32315#	8E3E3E15#	03E3E315#	8D3E3E15#	9A00A015#	3138B415#		

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

D. VDL MODE (ONLY APPLIES TO COLLINS VHF-920 SERIES LRU's) cont.

TRANSMIT TEST MESSAGES TRANSMIT ON/OFF FIELD

The TRANSMIT ON/OFF field allows the user to send a 429 test message to the LRU at a 1 second update rate.

The LRU must be in VDL Mode 2 and not performing a BFR messages count in order for this field to work. When the TRANSMIT ON field is pressed, the T1200B changes the ON field to an OFF field in inverse high-intensity text as shown in Figure 33.

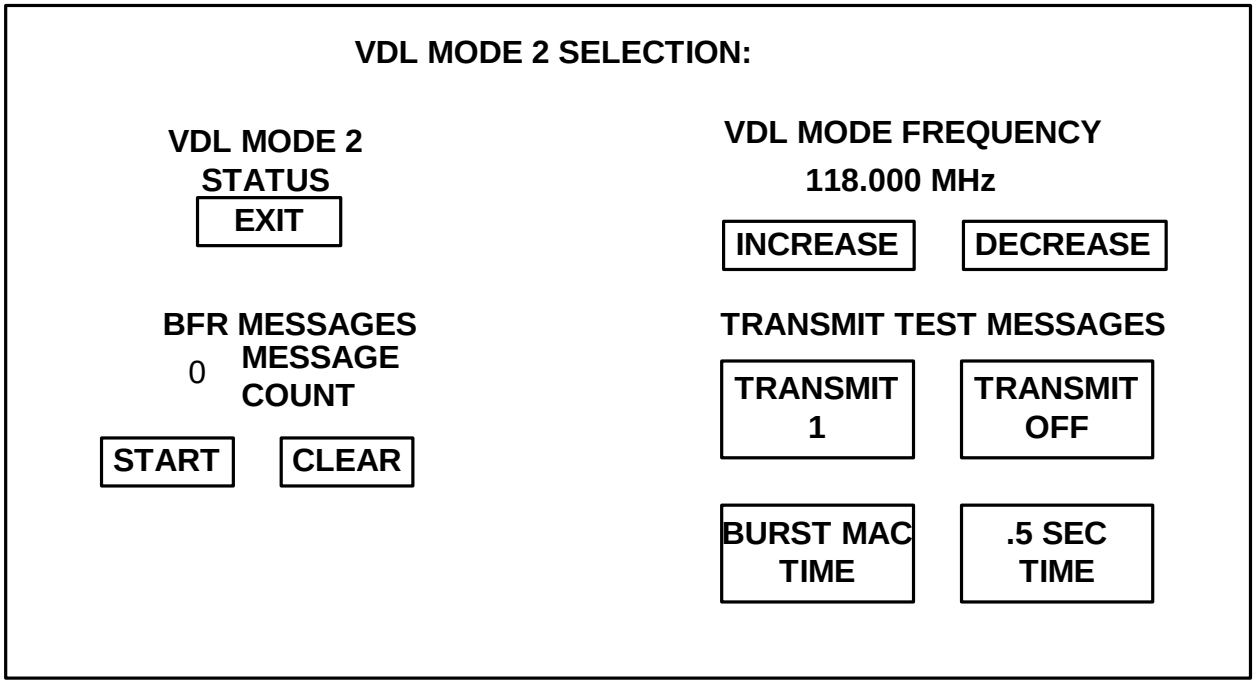


Figure 33 VDL MODE 2 TRANSMIT OFF

Then the 429 test message table will be transmitted out of the T1200B channel C at a 1 second update rate. The 429 test message the same message that is sent when the TRANSMIT 1 Field is pressed. If the TRANSMIT OFF field is pressed then the T1200B will stop transmitting the test message.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

D. VDL MODE (ONLY APPLIES TO COLLINS VHF-920 SERIES LRU's) cont.

TRANSMIT TEST MESSAGES BURST MAC TIME FIELD

The BURST MAC TIME field allows the user to send a 429 test message to the LRU.

The LRU must be in VDL Mode 2 and not performing a BFR messages count in order for this field to work. When the BURST MAC TIME field is pressed, the T1200B displays the message "SENDING TEST MESSAGE" as shown in Figure 34.

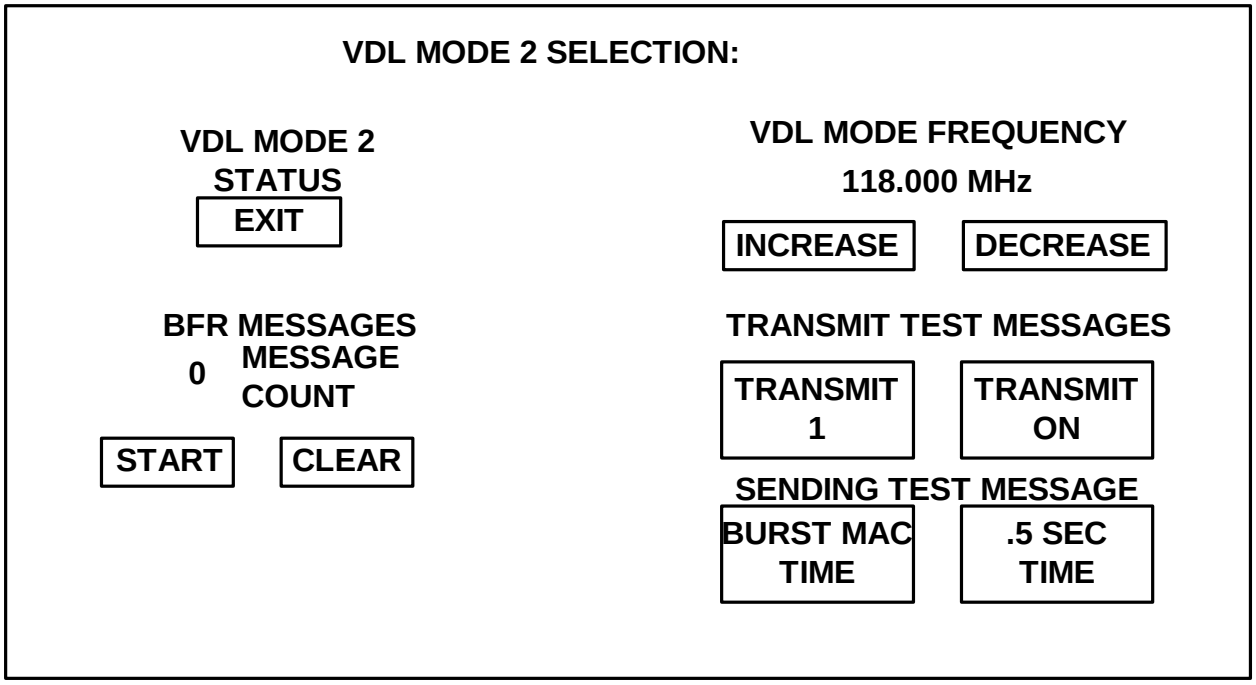


Figure 34 VDL MODE 2 BURST MAC TIME

Then the 429 test message table will be transmitted out of the T1200B channel C. Then the "SENDING TEST MESSAGE" message will be cleared. The following table lists the 429 test message that will be sent if the LRU SDI is 00 or else the label changes:

AF040715# 0020F115# 82407015# 08096115# 88700715# 9900FF15# B1CC1115#

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

D. VDL MODE (ONLY APPLIES TO COLLINS VHF-920 SERIES LRU's) cont.

TRANSMIT TEST MESSAGES .5 SEC TIME FIELD

The .5 SEC TIME field allows the user to send a 429 test message to the LRU.

The LRU must be in VDL Mode 2 and not performing a BFR messages count in order for this field to work. When the .5 SEC TIME field is pressed, the T1200B displays the message "SENDING TEST MESSAGE" as shown in Figure 35.

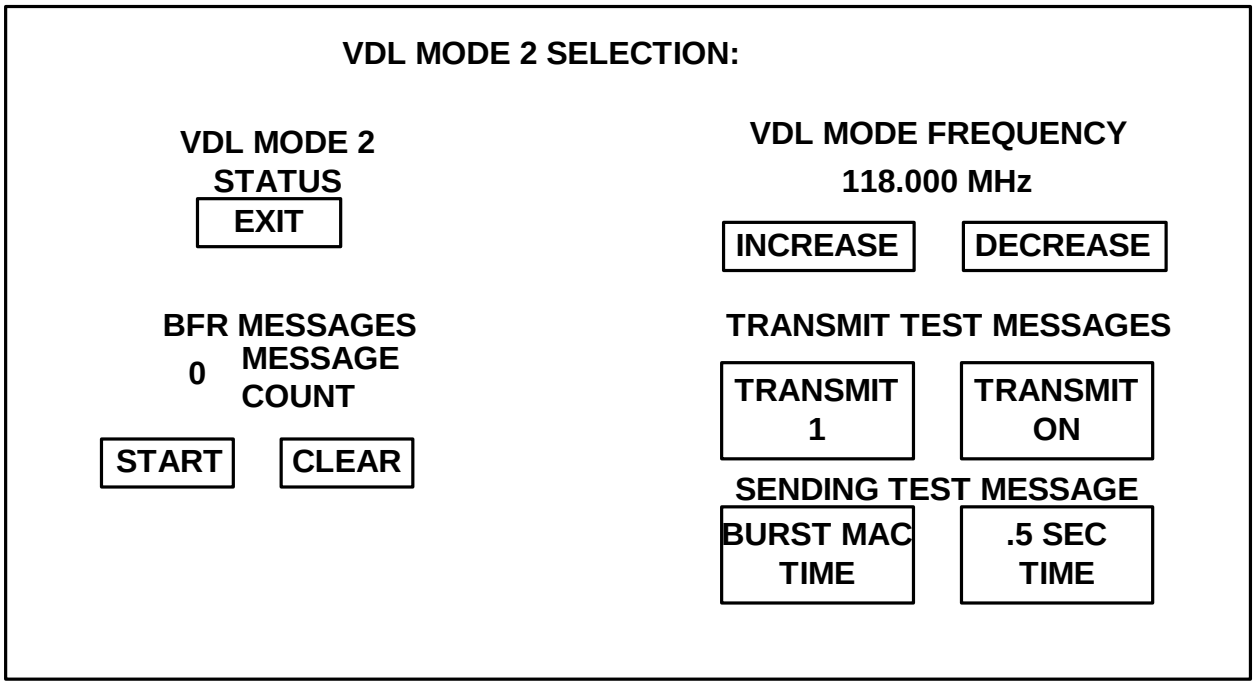


Figure 35 VDL MODE 2 .5 SEC TIME

Then the 429 test message table will be transmitted out of the T1200B channel C. Then the "SENDING TEST MESSAGE" message will be cleared. The following table lists the 429 test message that will be sent if the LRU SDI is 00 or else the label changes:

2F473E15#	0821F115#	80010015#	8610B215#	09484715#	0F348A15#	81508115#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#

0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#
8D502415#	094CD015#	8CBCE415#	81432015#	0D020315#	8E495215#	04554C15#	8D205215#
0D345C15#	87C1D315#	08345C15#	8E320115#	0B3CEA15#	05313115#	815D0D15#	05314315#

8D502415# 094CD015# 8CBCE415# 81432015# 0D020315# 8E495215# 04554C15# 8D205215#
0D345C15# 87C1D315# 08345C15# 8E320115# 0B3CEA15# 05313115# 815D0D15# 05314315#
8D502415# 094CD015# 8CBCE415# 81432015# 0D020315# 8E495215# 04554C15# 8D205215#
0D345C15# 87C1D315# 08345C15# 8E320115# 0B3CEA15# 05313115# 815D0D15# 05314315#
8D502415# 094CD015# 8CBCE415# 81432015# 0D020315# 8E495215# 04554C15# 8D205215#
0D345C15# 87C1D315# 08345C15# 8E320115# 0B3CEA15# 05313115# 815D0D15# 05314315#
8D502415# 094CD015# 8CBCE415# 81432015# 0D020315# 8E495215# 04554C15# 8D205215#
0D345C15# 87C1D315# 08345C15# 8E320115# 0B3CEA15# 05313115# 815D0D15# 05314315#
8D502415# 094CD015# 8CBCE415# 81432015# 0D020315# 8E495215# 04554C15# 8D205215#
0D345C15# 87C1D315# 08345C15# 8E320115# 0B3CEA15# 05313115# 815D0D15# 05314315#
8D502415# 094CD015# 8CBCE415# 81432015# 0D020315# 8E495215# 04554C15# 8D205215#
0D345C15# 87C1D315# 08345C15# 8E320115# 0B3CEA15# 05313115# 815D0D15# 05314315#
8D502415# 094CD015# 8CBCE415# 81432015# 0D020315# 8E495215# 04554C15# 8D205215#
0D345C15# 87C1D315# 08345C15# 8E320115# 0B3CEA15# 05313115# 815D0D15# 05314315#
8D502415# 094CD015# 8CBCE415# 81432015# 0D020315# 8E495215# 04554C15# 8D205215#
0D345C15# 87C1D315# 08345C15# 8E320115# 0B3CEA15# 05313115# 815D0D15# 05314315#
8D502415# 094CD015# 8CBCE415# 81432015# 0D020315# 8E495215# 04554C15# 8D205215#
0D345C15# 87C1D315# 08345C15# 8E320115# 0B3CEA15# 05313115# 815D0D15# 05314315#
8D502415# 094CD015# 8CBCE415# 81432015# 0D020315# 8E495215# 04554C15# 8D205215#
0D345C15# 87C1D315# 08345C15# 8E320115# 0B3CEA15# 05313115# 815D0D15# 05314315#
8D502415# 094CD015# 8CBCE415# 81432015# 0D020315# 8E495215# 04554C15# 8D205215#
0D345C15# 87C1D315# 08345C15# 8E320115# 0B3CEA15# 05313115# 815D0D15# 05314315#
8D502415# 094CD015# 8CBCE415# 81432015# 0D020315# 8E495215# 04554C15# 8D205215#
0D345C15# 87C1D315# 08345C15# 8E320115# 0B3CEA15# 05313115# 815D0D15# 05314315#
8D502415# 094CD015# 8CBCE415# 81432015# 0D020315# 8E495215# 04554C15# 8D205215#
0D345C15# 87C1D315# 08345C15# 8E320115# 0B3CEA15# 05313115# 815D0D15# 05314315#
8D502415# 094CD015# 8CBCE415# 81432015# 0D020315# 8E495215# 04554C15# 8D205215#
0D345C15# 87C1D315# 08345C15# 8E320115# 0B3CEA15# 05313115# 815D0D15# 05314315#
8D502415# 094CD015# 8CBCE415# 81432015# 0D020315# 8E495215# 04554C15# 8D205215#
0D345C15# 87C1D315# 08345C15# 8E320115# 0B3CEA15# 05313115# 815D0D15# 05314315#
8D502415# 094CD015# 8CBCE415# 81432015# 18000315# B1E99715#

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S)

The T1200B VHF ALIGNMENT MODE software has been designed to aid in the alignment of COLLINS VHF-2100 series transceivers. The VHF-2100 series transceiver has fifty-three CALIBRATION VARIABLES and forty-two TFM variables (variables that change with Temperature Frequency or Mode) that can be modified via a high speed 429 bus. The T1200B ALIGNMENT MODE software allows the operator to modify all 95 variables through easy to use touch screen menus. The following discussion provides a more detailed description of the screens displayed in the VHF ALIGNMENT mode of operation.

When ALIGNING A COLLINS VHF-2100 series transceiver, the instructions in the PTR (Production Test Requirement) for the VHF-2100 series transceiver should be followed. DO NOT connect the T1200B to other test sets or LRUs while performing this procedure unless instructed to do so.

NOTE: THE TERMS ROM (Read Only Memory) AND NVM (Non-Volatile Memory) ARE USED SYNONYMOUSLY THROUGHOUT THE DISCUSSION OF THE VHF-2100 ALIGNMENT MODE.

SELECT VHF 2100 ALIGNMENT MODE SCREEN

Press the VHF 2100 ALIGN portion of the SELECT LRU TO BE TESTED SCREEN to access the SELECT VHF 2100 ALIGNMENT MODE SCREEN shown in Figure 36.

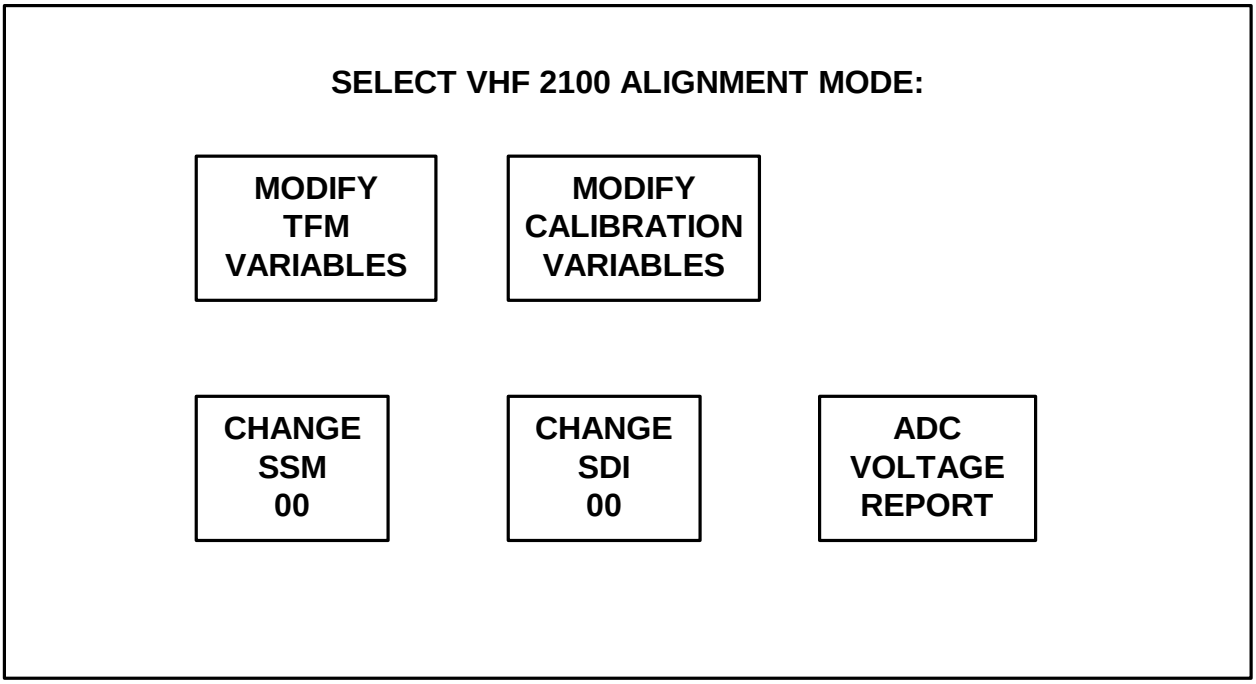


Figure 36 VHF 2100 Alignment Screen

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

The VHF 2100 ALIGNMENT MODE requires high speed transmit channel C and high speed receive channel C to be installed to work; if the high speed cards are not installed, the T1200B will display the warning message shown in figure 37. If the warning message is displayed, turn off the T1200B and install a high speed transmit card and a high speed receive card before attempting to continue VHF-2100 Alignment.

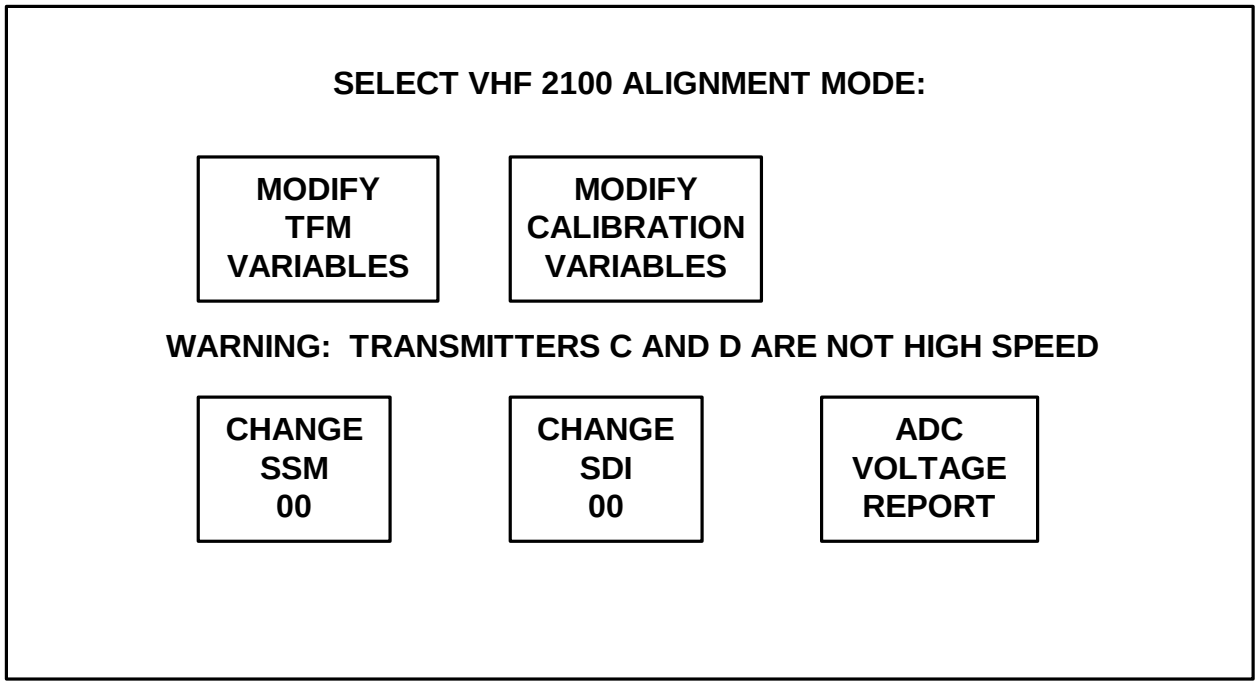


Figure 37 VHF 2100 Alignment Screen (TX Error)

The SELECT VHF 2100 ALIGNMENT MODE screen serves as the main menu for VHF-2100 alignment mode. Its five touch screen fields and the LRU frequency tuning word are discussed further in the following paragraphs.

LRU FREQUENCY TUNING WORD

The LRU frequency tuning word is continuously transmitted during VHF 2100 ALIGNMENT MODE from T1200B Transmit CH C. The frequency tuning word defaults to 118.000 MHz and has a range of 118.000 to 151.975 MHz for Label 030 and to 136.975 MHz for Label 047. The LRU FREQUENCY TUNING WORD can only be changed in the MODIFY TFM VARIABLES and MODIFY CALIBRATION VARIABLES screens. The structure of the word is as follows:

```
Bits  1-8     : Label 030 or Label 047
Bits  9-10    : Source Destination Identifier (SDI)
              : SDI is determined by CHANGE SDI field
Bits 11-14    : .001 Mhz    BCD  e.g.  0
Bits 15-18    : .01  Mhz    BCD  e.g.  0
Bits 19-22    : .1   Mhz    BCD  e.g.  0
Bit  23-26    : 1    Mhz    BCD  e.g.  8
Bits 27-29    : 10   Mhz    BCD  e.g.  1
Bits 30-31    : Sign/Status Matrix (SSM)
              : SSM is determined by CHANGE SSM field
Bit  32       : Parity (ODD)
RATE          : 100/s
```

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

The VHF 2100 ALIGNMENT MODE requires that the transmitted frequency control label will be tested to make sure that they are received on channel C, if not an error will be displayed. If the frequency control label was not received correctly the T1200B will display the warning message shown in figure 38. If the warning message is displayed verify proper connection between the LRU and the T1200. The T1200 will perform this test at a 2 second rate.

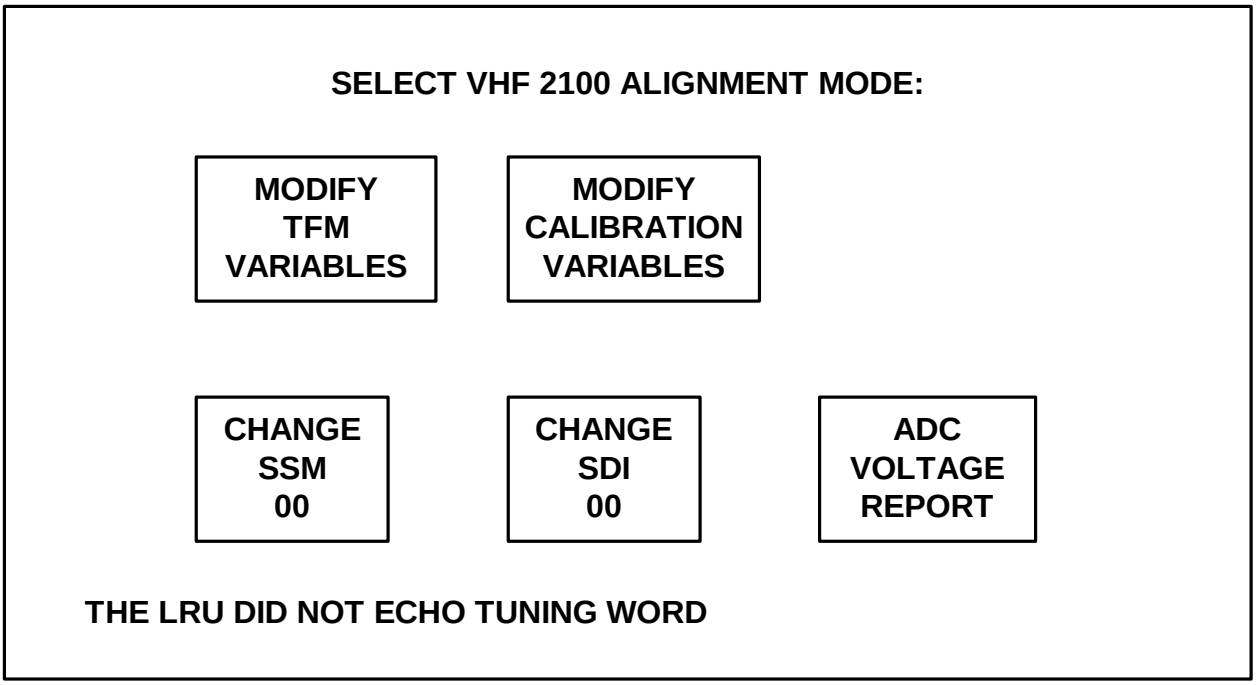


Figure 38 VHF 2100 Alignment (Tuning Error)

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

ENTER ALIGNMENT MODE

The T1200 will request the LRU to enter Alignment Mode. If the LRU does not enter alignment correctly the T1200B will display the warning message shown in figure 39.

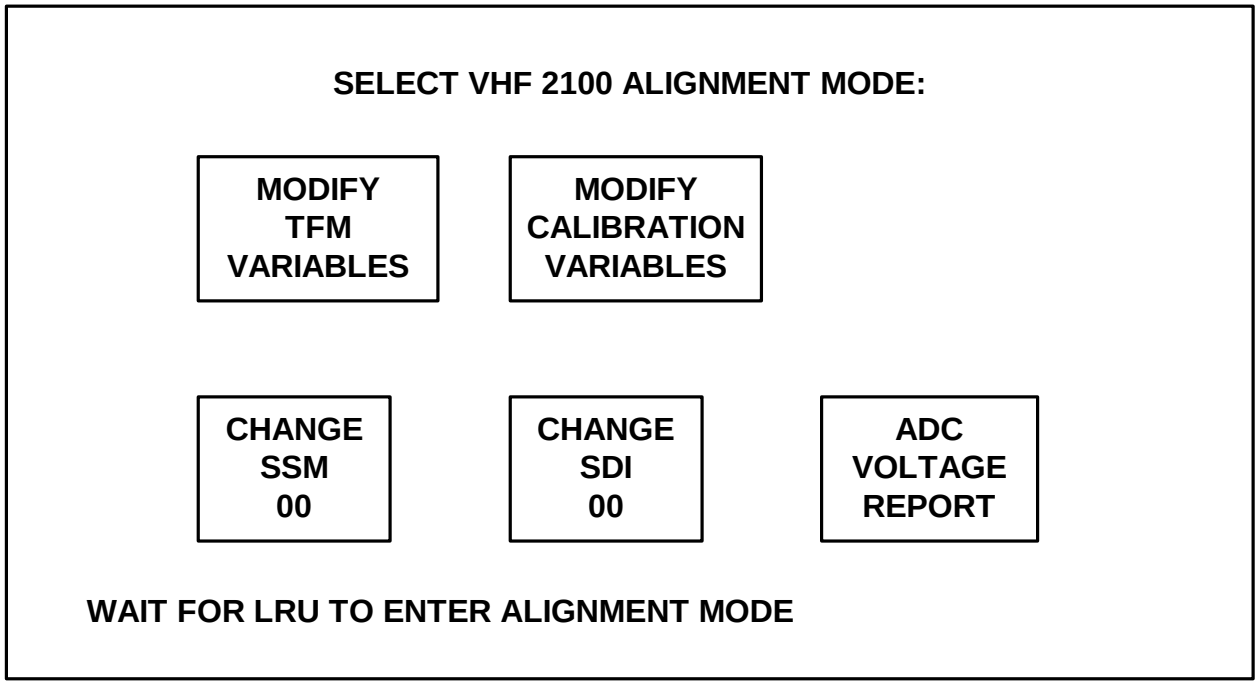


Figure 39 VHF 2100 Alignment (Alignment Error)

The T1200B will transmit the 429 word of 440000FD# (Label 277) on channel C with an update rate of 5 seconds. The T1200B will monitor receiver channel C for the 429 word of C0000097# (Label 351). After the word has been received the T1200 will stop transmitting the 429 alignment word. Then the displayed warning message will be cleared.

CHANGE SSM FIELD

The SSM field allows the operator to change the SSM used by the 429 frequency tuning word transmitted by the T1200B during VHF-2100 alignment mode, labels 030 or labels 047. Each time the SSM field is pressed, the SSM will increment by 1. When the SSM reaches three (11 binary), the next press of the field will cause the SSM to revert back to zero (00 binary).

CHANGE SDI FIELD

The SDI field allows the operator to change the SDI used by the 429 frequency tuning word transmitted by the T1200B during VHF-2100 alignment mode, labels 030 or labels 047. Each time the SDI field is pressed, the SDI will increment by 1. When the SDI reaches three (11 binary), the next press of the field will cause the SDI to revert back to zero (00 binary).

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

ADC VOLTAGE REPORT FIELD

The ADC Voltage Report field displays the internal ADC voltages of the LRU. The ADC Voltages are encoded on Label 353 transmitted from the LRU. The LRU only transmits the Label 353 data in alignment mode. The ADC VOLTAGE REPORT display is shown in Figure 40.

ADC VOLTAGE REPORT:	**MIC AUDIO SAMPLE 1**	**NCD**	**VDC**
	Q DETECT LEVEL	**NCD**	**VDC**
	FORWARD VOLTAGE LEVEL	**NCD**	**VDC**
	REVERSE VOLTAGE LEVEL	**NCD**	**VDC**
	MIC AUDIO SAMPLE 2	**NCD**	**VDC**
	HW AGC LEVEL	**NCD**	**VDC**
	POWER SUPPLY +3.3 VDC	**NCD**	**VDC**
	POWER SUPPLY +8.0 VDC	**NCD**	**VDC**
	POWER SUPPLY -8.0 VDC	**NCD**	**VDC**
	POWER SUPPLY +5.0 VDC	**NCD**	**VDC**
	POWER SUPPLY +15 VDC	**NCD**	**VDC**
	PA TEMPERATURE LEVEL	**NCD**	**C**
	POWER SUPPLY +28.0 VDC	**NCD**	**VDC**

Figure 40 ADC VOLTAGE REPORT display

The following information describes the label 353 data received and how the data is decoded for each item in the ADC VOLTAGE REPORT.

MIC AUDIO SAMPLE 1

Then the T1200B will monitor receiver channel C for the following 429 word:
xxx0 0000 xxdd dddd dddd ddxx 1101 0111 (Label 353).
x - Don't Care d - Data
The data is then processed through the following formula and displayed:
Display = ((Data * 625) / 1024) / 1000

Q DETECT LEVEL

Then the T1200B will monitor receiver channel C for the following 429 word:
xxx0 0001 xxdd dddd dddd ddxx 1101 0111 (Label 353).
x - Don't Care d - Data
The data is then processed through the following formula and displayed:
Display = ((Data * 625) / 1024) / 1000

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

FORWARD VOLTAGE LEVEL

Then the T1200B will monitor receiver channel C for the following 429 word:
xxx0 0010 xxdd dddd dddd ddxx 1101 0111 (Label 353).
x - Don't Care d - Data
The data is then processed through the following formula and displayed:
Display = ((Data * 625) / 1024) / 1000

REVERSE VOLTAGE LEVEL

Then the T1200B will monitor receiver channel C for the following 429 word:
xxx0 0011 xxdd dddd dddd ddxx 1101 0111 (Label 353).
x - Don't Care d - Data
The data is then processed through the following formula and displayed:
Display = ((Data * 625) / 1024) / 1000

MIC AUDIO SAMPLE 2

Then the T1200B will monitor receiver channel C for the following 429 word:
xxx0 0100 xxdd dddd dddd ddxx 1101 0111 (Label 353).
x - Don't Care d - Data
The data is then processed through the following formula and displayed:
Display = ((Data * 625) / 1024) / 1000

HW AGC LEVEL

Then the T1200B will monitor receiver channel C for the following 429 word:
xxx0 0101 xxdd dddd dddd ddxx 1101 0111 (Label 353).
x - Don't Care d - Data
The data is then processed through the following formula and displayed:
Display = ((Data * 625) / 1024) / 1000

POWER SUPPLY +3.3 VDC

Then the T1200B will monitor receiver channel C for the following 429 word:
xxx0 1000 xxdd dddd dddd ddxx 1101 0111 (Label 353).
x - Don't Care d - Data
The data is then processed through the following formula and displayed:
Display = ((Data * 3275) / 2048) / 1000

POWER SUPPLY +8.0 VDC

Then the T1200B will monitor receiver channel C for the following 429 word:
xxx0 1001 xxdd dddd dddd ddxx 1101 0111 (Label 353).
x - Don't Care d - Data
The data is then processed through the following formula and displayed:
Display = ((Data * 15275) / 4096) / 1000

POWER SUPPLY -8.0 VDC

Then the T1200B will monitor receiver channel C for the following 429 word:
xxx0 1010 xxdd dddd dddd ddxx 1101 0111 (Label 353).
x - Don't Care d - Data
The data is then processed through the following formula and displayed:
Display = (((Data * 35125) / 8448) / 1000) * -1

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

POWER SUPPLY +5.0 VDC

Then the T1200B will monitor receiver channel C for the following 429 word:
xxx0 1011 xxdd dddd dddd ddxx 1101 0111 (Label 353).
x - Don't Care d - Data
The data is then processed through the following formula and displayed:
Display = ((Data * 8025) / 4096) / 1000

POWER SUPPLY +15 VDC

Then the T1200B will monitor receiver channel C for the following 429 word:
xxx0 1101 xxdd dddd dddd ddxx 1101 0111 (Label 353).
x - Don't Care d - Data
The data is then processed through the following formula and displayed:
Display = ((Data * 6875) / 1024) / 1000

PA TEMPERATURE LEVEL

Then the T1200B will monitor receiver channel C for the following 429 word:
xxx1 0000 xxdd dddd dddd ddxx 1101 0111 (Label 353).
x - Don't Care d - Data
The data is then processed through the following formula and displayed:
Display = ((Data * 3125 / 32) - 67840) / 1000

POWER SUPPLY +28.0 VDC

Then the T1200B will monitor receiver channel C for the following 429 word:
xxx1 0101 xxdd dddd dddd ddxx 1101 0111 (Label 353).
x - Don't Care d - Data
The data is then processed through the following formula and displayed:
Display = ((Data * 28875) / 2048) / 1000

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

TFM VARIABLES PAGES 1/3 - 3/3 SCREENS

The TFM VARIABLES PAGES 1/3 - 3/3 allow the operator to read in the value currently used for a variable, modify it, and then write the modified value to NVM. The first TFM VARIABLE PAGE is shown in figure 41 followed by a discussion of its touch screen fields. TFM VARIABLE PAGE 1/3 is accessed through the MODIFY TFM VARIABLES FIELD on the SELECT VHF-2100 MODE SCREEN.

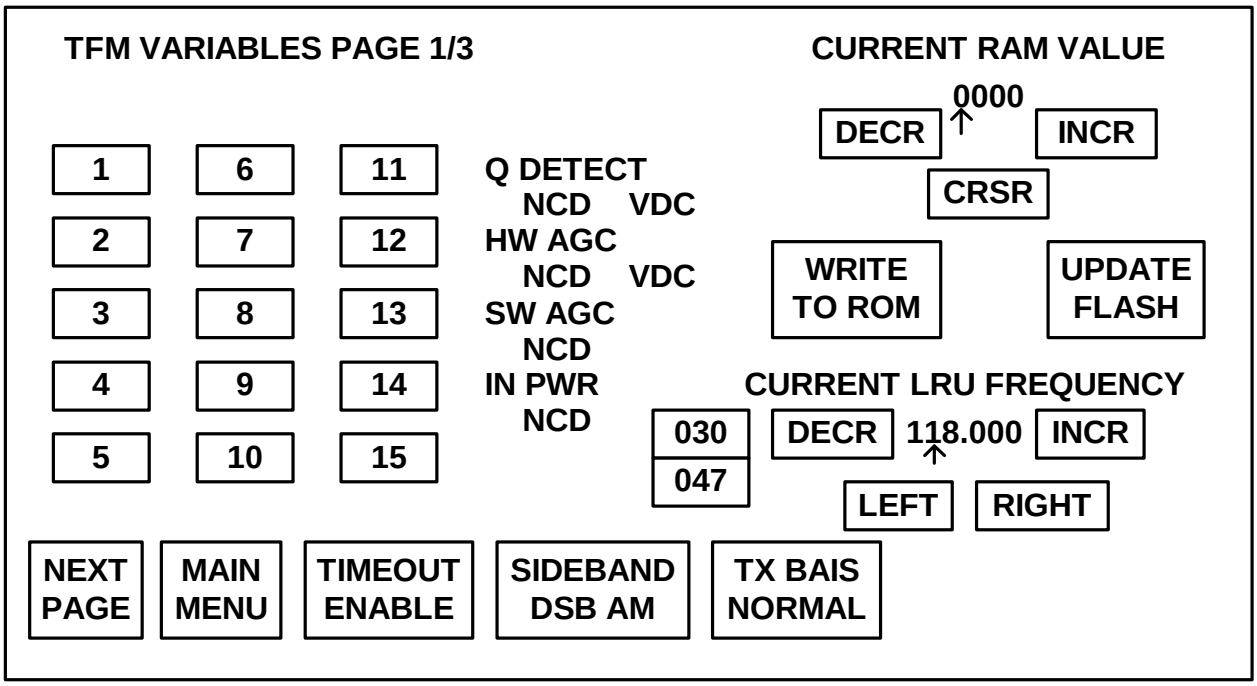


Figure 41 TFM VARIABLES PAGE display

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

TFM VARIABLES FIELDS

The VARIABLE FIELDS allow the operator to select a VARIABLE and to see its current RAM value. The RAM value is the RAM value for the currently selected frequency range. Refer to COLLINS document "PRODUCTION TEST REQUIREMENTS FOR THE VHF-2100" for more information.

When a VARIABLE's field is pressed, the T1200B changes the VARIABLE's field to inverse high-intensity text. The T1200B then builds the 429 words to ask the VHF-2100 for the current RAM value for the selected variable. The current RAM value is then displayed in the CURRENT RAM VALUE on the display.

The T1200B will transmit the 429 words of C003ppFD# (Label 277), and 480000FD# (Label 277) on channel C with an update rate of 5 seconds. The pp represents the alignment parameter code used to distinguish between the TFM variables. The following table represents the alignment parameter code used for each variable:

Var #	Alignment Parameter Code	Var #	Alignment Parameter Code	Var #	Alignment Parameter Code	Var #	Alignment Parameter Code
1	00h	12	0Bh	23	16h	34	21h
2	01h	13	0Ch	24	17h	35	22h
3	02h	14	0Dh	25	18h	36	23h
4	03h	15	0Eh	26	19h	37	24h
5	04h	16	0Fh	27	1Ah	38	25h
6	05h	17	10h	28	1Bh	39	26h
7	06h	18	11h	29	1Ch	40	27h
8	07h	19	12h	30	1Dh	41	28h
9	08h	20	13h	31	1Eh	42	29h
10	09h	21	14h	32	1Fh		
11	0Ah	22	15h	33	20h		

The T1200B will monitor receiver channel C for the 429 words of C0000097# (Label 351), and C8dddd97# (Label 351). The data that will be displayed is represented by dddd. The data will be displayed in hex format on the screen. After the words have been received the T1200 will stop transmitting the 429 variable request words.

NEXT PAGE FIELD

The NEXT PAGE field allows the operator to go to the next page of TFM VARIABLES. Each time this field is pressed the TFM variable page, advances by one. If on TFM VARIABLES PAGE 3/3, pressing the NEXT PAGE FIELD will change the page to TFM VARIABLES PAGE 1/3. To go to the previous page, hit the PRIOR PAGE key on the keypad.

MAIN MENU FIELD

The MAIN MENU field allows the operator to return to the SELECT VHF-2100 ALIGNMENT SCREEN from any TFM VARIABLES PAGE. See figure 41.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

TIMEOUT FIELD

The TIMEOUT FIELD allows the operator to enable or inhibit the TX TIMER mode in the LRU. The bit defaults to ENABLE (Enable TX Timeout). Pressing this field, causes the T1200B to toggle the TX TIMER mode between ENABLE (Enable TX Timeout), and INHIBIT (Inhibit TX Timeout).

The procedure for changing the LRU mode is as follows:
On the T1200 the TFM VARIABLES screen, when the TIMEOUT button is pressed the button will display INHIBIT. The T1200 will request the LRU to enter Alignment Mode. If the LRU does not enter alignment correctly the T1200B will display the warning message "WAIT FOR LRU TO ENTER ALIGNMENT MODE" shown in figure 39. The T1200B will transmit the 429 word of C48000FD# (Label 277) on channel C with an update rate of 5 seconds. The T1200B will monitor receiver channel C for the 429 word of 40040097# (Label 351). After the word has been received the T1200 will stop transmitting the 429 alignment word. Then the displayed warning message "WAIT FOR LRU TO ENTER ALIGNMENT MODE" will be cleared.

On the T1200 the TFM VARIABLES screen, when the TIMEOUT button is pressed the button will display ENABLE. The T1200 will request the LRU to enter Alignment Mode. If the LRU does not enter alignment correctly the T1200B will display the warning message "WAIT FOR LRU TO ENTER ALIGNMENT MODE" shown in figure 39. The T1200B will transmit the 429 word of 440000FD# (Label 277) on channel C with an update rate of 5 seconds. The T1200B will monitor receiver channel C for the 429 word of C0000097# (Label 351). After the word has been received the T1200 will stop transmitting the 429 alignment word. Then the displayed warning message "WAIT FOR LRU TO ENTER ALIGNMENT MODE" will be cleared.

SIDEBAND FIELD

The SIDEBAND FIELD allows the operator to select between DSB-AM or single-sideband in the SIDEBAND mode in the LRU. The bit defaults to DSB-AM. Pressing this field, causes the T1200B to toggle the SIDEBAND mode between DSB-AM, and single-sideband.

The procedure for changing the LRU mode is as follows:
On the T1200 the TFM VARIABLES screen, when the SIDEBAND button is pressed the button will display SINGLE. The T1200 will request the LRU to enter Alignment Mode. If the LRU does not enter alignment correctly the T1200B will display the warning message "WAIT FOR LRU TO ENTER ALIGNMENT MODE" shown in figure 39. The T1200B will transmit the 429 word of C50000FD# (Label 277) on channel C with an update rate of 5 seconds. The T1200B will monitor receiver channel C for the 429 word of 40020097# (Label 351). After the word has been received the T1200 will stop transmitting the 429 alignment word. Then the displayed warning message "WAIT FOR LRU TO ENTER ALIGNMENT MODE" will be cleared.

On the T1200 the TFM VARIABLES screen, when the SIDEBAND button is pressed the button will display DSB-AM. The T1200 will request the LRU to enter Alignment Mode. If the LRU does not enter alignment correctly the T1200B will display the warning message "WAIT FOR LRU TO ENTER ALIGNMENT MODE" shown in figure 39. The T1200B will transmit the 429 word of 440000FD# (Label 277) on channel C with an update rate of 5 seconds. The T1200B will monitor receiver channel C for the 429 word of C0000097# (Label 351). After the word has been received the T1200 will stop transmitting the 429 alignment word. Then the displayed warning message "WAIT FOR LRU TO ENTER ALIGNMENT MODE" will be cleared.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

TX BIAS FIELD

The TX BIAS FIELD allows the operator to select between normal TX or TX bias only in the TX BIAS mode in the LRU. The bit defaults to normal TX. Pressing this field, causes the T1200B to toggle the TX BIAS mode between normal TX, and TX bias only.

The procedure for changing the LRU mode is as follows:
On the T1200 the TFM VARIABLES screen, when the TX BIAS button is pressed the button will display BIAS. The T1200 will request the LRU to enter Alignment Mode. If the LRU does not enter alignment correctly the T1200B will display the warning message "WAIT FOR LRU TO ENTER ALIGNMENT MODE" shown in figure 39. The T1200B will transmit the 429 word of C60000FD# (Label 277) on channel C with an update rate of 5 seconds. The T1200B will monitor receiver channel C for the 429 word of 40080097# (Label 351). After the word has been received the T1200 will stop transmitting the 429 alignment word. Then the displayed warning message "WAIT FOR LRU TO ENTER ALIGNMENT MODE" will be cleared.

On the T1200 the TFM VARIABLES screen, when the TX BIAS button is pressed the button will display NORMAL. The T1200 will request the LRU to enter Alignment Mode. If the LRU does not enter alignment correctly the T1200B will display the warning message "WAIT FOR LRU TO ENTER ALIGNMENT MODE" shown in figure 39. The T1200B will transmit the 429 word of 440000FD# (Label 277) on channel C with an update rate of 5 seconds. The T1200B will monitor receiver channel C for the 429 word of C0000097# (Label 351). After the word has been received the T1200 will stop transmitting the 429 alignment word. Then the displayed warning message "WAIT FOR LRU TO ENTER ALIGNMENT MODE" will be cleared.

Q DETECT FIELD

The Q DETECT FIELD allows the operator to monitor the Q Detect value of the VHF-2100. The procedure for updating the Q DETECT field is as follows:

The T1200B will transmit the 429 words of C00600FD# (Label 277), and 480000FD# (Label 277) on channel C with an update rate of 5 seconds.

The T1200B will monitor receiver channel C for the 429 words of C0000097# (Label 351), and C8dddd97# (Label 351). The data is represented by dddd.

The data is then processed through the following formula and displayed:
Display = ((Data * 625) / 1024) / 1000

HW AGC FIELD

The HW AGC FIELD allows the operator to monitor the Hardware AGC value of the VHF-2100. The procedure for updating the HW AGC field is as follows:

The T1200B will transmit the 429 words of C00A00FD# (Label 277), and 480000FD# (Label 277) on channel C with an update rate of 5 seconds.

The T1200B will monitor receiver channel C for the 429 words of C0000097# (Label 351), and C8dddd97# (Label 351). The data is represented by dddd.

The data is then processed through the following formula and displayed:
Display = ((Data * 625) / 1024) / 1000

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

SW AGC FIELD

The SW AGC FIELD allows the operator to monitor the Software AGC value of the VHF-2100. The procedure for updating the SW AGC field is as follows:

The T1200B will transmit the 429 words of C00700FD# (Label 277), and 480000FD# (Label 277) on channel C with an update rate of 5 seconds.

The T1200B will monitor receiver channel C for the 429 words of C0000097# (Label 351), and C8dddd97# (Label 351). The data that will be displayed is represented by dddd. The data will be displayed in hex format on the screen.

IN PWR FIELD

The IN PWR FIELD allows the operator to monitor the input power level value of the VHF-2100. The procedure for updating the IN PWR field is as follows:

The T1200B will transmit the 429 words of C00E00FD# (Label 277), and 480000FD# (Label 277) on channel C with an update rate of 5 seconds.

The T1200B will monitor receiver channel C for the 429 words of C0000097# (Label 351), and C8dddd97# (Label 351). The data that will be displayed is represented by dddd. The data will be displayed in hex format on the screen.

CURRENT LRU FREQUENCY FIELDS

The current LRU frequency tuning word is displayed in the current LRU frequency field. The frequency tuning word can be changed in the MODIFY TFM VARIABLES screen.

030/047 FIELD

The 030/047 FIELD allows the operator to select the frequency tuning label for the frequency tuning word. The current label is highlighted and can be changed by pressing the 030/047 field. When the label is changed the frequency tuning word defaults to 118.000 MHz. When label 030 is selected the spacing value associated with the frequency tuning word is 25 kHz. When label 047 is selected the spacing value associated with the frequency tuning word is 8.33 kHz.

CURRENT LRU FREQUENCY LEFT FIELD

The CURRENT LRU FREQUENCY LEFT FIELD allows the operator to move the CURRENT LRU FREQUENCY cursor. Each time the field is pressed, the T1200B will move the cursor one position to the left. If the cursor is under the tens digit and the field is pressed, the cursor will wrap around to under the hundredths digit.

CURRENT LRU FREQUENCY RIGHT FIELD

The CURRENT LRU FREQUENCY RIGHT FIELD allows the operator to move the CURRENT LRU FREQUENCY cursor. Each time the field is pressed, the T1200B will move the cursor one position to the right. If the cursor is under the hundredths digit and the field is pressed, the cursor will wrap around to under the tens digit.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

CURRENT LRU FREQUENCY DECR FIELD

The CURRENT LRU FREQUENCY DECR FIELD allows the operator to decrease the LRU TUNING FREQUENCY. Each time the field is pressed the T1200B decreases the CURRENT LRU FREQUENCY by ten, one, one hundredth, twenty-five thousandths, or a rounded eight and one-third thousandths, depending on the location of the LRU FREQUENCY cursor and which 030/047 LABEL is selected. The T1200B then modifies the frequency tuning word (label 030 or label 047) to select the new frequency. The structure of the label 030 or label 047 word is shown following the FREQUENCY TUNING WORD SECTION. If the CURRENT LRU FREQUENCY equals 118.000, the DECREASE field will have no effect.

CURRENT LRU FREQUENCY INCR FIELD

The CURRENT LRU FREQUENCY INCR FIELD allows the operator to increase the LRU TUNING FREQUENCY. Each time the field is pressed the T1200B increases the CURRENT LRU FREQUENCY by ten, one, one hundredth, twenty-five thousandths, or a rounded eight and one-third thousandths depending on the location of the LRU FREQUENCY cursor and which 030/047 LABEL is selected. The T1200B then modifies the frequency tuning word (label 030 or label 047) to select the new frequency. The structure of the label 030 or label 047 word is shown following the FREQUENCY TUNING WORD SECTION. If the CURRENT LRU FREQUENCY equals 151.975 for Label 030 or 136.975 for Label 047, the INCREASE FIELD will have no effect.

CURRENT RAM VALUE

For each TFM variable in the VHF-2100, there is a NVM (Non-Volatile Memory) location and working register RAM for each 1 MHz step from 118.000 MHz to 136.975 MHz, and 4 temperature zones The CURRENT RAM VALUE is a four digit hex representation of the data in that working register location. The data can modified to be any value between 0000 hex to FFFF hex. IT IS THE OPERATOR'S RESPONSIBILITY TO KNOW THE LIMITS ON THE TFM VARIABLE THEY ARE TRYING TO MODIFY.

CURRENT RAM VALUE CRSR FIELD

The CURRENT RAM VALUE CRSR FIELD allows the operator to move the current RAM value cursor. Each time the field is pressed, the cursor will move to the other digit.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

CURRENT RAM VALUE DECR FIELD

The CURRENT RAM VALUE DECR field allows the operator to modify the current RAM value. Each time the field is pressed, the current ram value digit pointed at by the cursor, decrements by one. If the digit was 0 hex, it will change to F hex.

The T1200B will then build the 429 words to write the current RAM value into the VHF-2100's RAM. The words are transmitted on transmit CH C, the procedure is shown below:

The T1200B will transmit the 429 words of C001ppFD# (Label 277), and 48ddddFD# (Label 277) on channel C with an update rate of 5 seconds. The pp represents the alignment parameter code used to distinguish between the TFM variables. The following table represents the alignment parameter code used for each variable:

Var #	Alignment Parameter Code	Var #	Alignment Parameter Code	Var #	Alignment Parameter Code	Var #	Alignment Parameter Code
1	00h	12	0Bh	23	16h	34	21h
2	01h	13	0Ch	24	17h	35	22h
3	02h	14	0Dh	25	18h	36	23h
4	03h	15	0Eh	26	19h	37	24h
5	04h	16	0Fh	27	1Ah	38	25h
6	05h	17	10h	28	1Bh	39	26h
7	06h	18	11h	29	1Ch	40	27h
8	07h	19	12h	30	1Dh	41	28h
9	08h	20	13h	31	1Eh	42	29h
10	09h	21	14h	32	1Fh		
11	0Ah	22	15h	33	20h		

The dddd represents the data that will be sent to the working register in the LRU.

The T1200B will monitor receiver channel C for the 429 words of C0000097# (Label 351), and C8dddd97# (Label 351). The data that will be displayed is represented by dddd. The data will be displayed in hex format on the screen. After the words have been received the T1200 will stop transmitting the 429 variable request words.

CURRENT RAM VALUE INCR FIELD

The CURRENT RAM VALUE INCR field allows the operator to modify the current RAM value. Each time the field is pressed, the current ram value digit pointed at by the cursor, increments by one. If the digit was F hex, it will change to 0 hex. The T1200B will then build the 429 words to write the current RAM value into the VHF-2100's RAM. The words are transmitted on transmit CH C, and have the same procedure as used in the CURRENT RAM VALUE DECR FIELD.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

WRITE TO ROM FIELD

The WRITE TO ROM field allows the operator to prepare the CURRENT RAM VALUE to write to the VHF-2100 Non-Volatile Memory address for the selected TFM variable. If a TFM variable is not selected, the WRITE TO ROM field is INACTIVE.

When the WRITE TO ROM field is pressed the first time, it writes the message "HIT KEY TO OVERWRITE ROM DATA, ANY OTHER KEY TO CONTINUE" to the bottom of the screen that is shown in figure 42. It then changes the text in the WRITE TO ROM field to inverted, high-intensity text. If the field is pressed a second time, the T1200B changes the message at the bottom of the screen to "PLEASE WAIT.", generates the 429 commands to write the current RAM value to NVM in the VHF-2100, the T1200B erases the message at the bottom of the screen, and converts the WRITE TO ROM field back to inverted text. The NVM address is dependent upon which TFM variable was selected and the current LRU frequency. The 429 words are transmitted from CH C transmitter on the T1200B, the procedure is shown below:

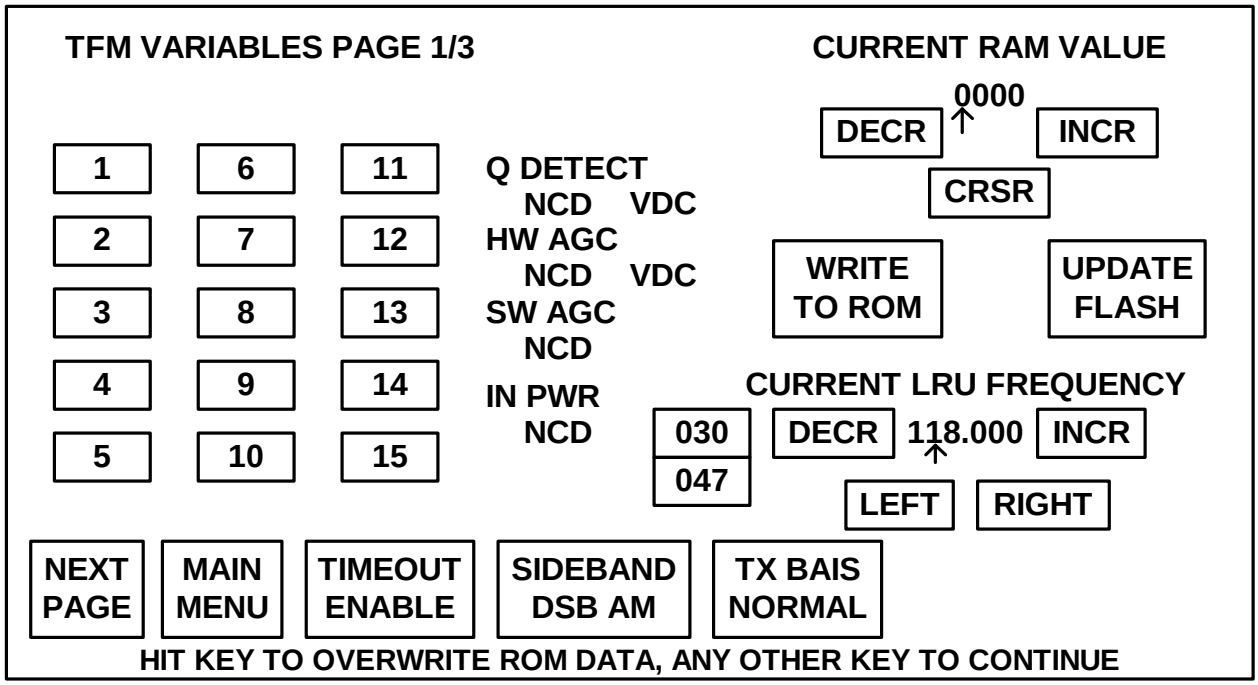


Figure 42 TFM VARIABLES PAGE display

The T1200B will transmit the 429 words of C004ppFD# (Label 277), and 48ddddFD# (Label 277) on channel C with an update rate of 5 seconds. The dddd represents the data that will be sent to the working register in the LRU.

The T1200B will monitor receiver channel C for the 429 words of C0000097# (Label 351), and C8dddd97# (Label 351). After the words have been received the T1200 will stop transmitting the 429 variable request words.

The T1200B will transmit the 429 words of C014ppFD# (Label 277), and 48ddddFD# (Label 277) on channel C with an update rate of 5 seconds. The dddd represents the data that will be sent to the working register in the LRU.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

The T1200B will monitor receiver channel C for the 429 words of C0000097# (Label 351), and C8dddd97# (Label 351). After the words have been received the T1200 will stop transmitting the 429 variable request words.

The T1200B will transmit the 429 words of C024ppFD# (Label 277), and 48ddddFD# (Label 277) on channel C with an update rate of 5 seconds. The dddd represents the data that will be sent to the working register in the LRU.

The T1200B will monitor receiver channel C for the 429 words of C0000097# (Label 351), and C8dddd97# (Label 351). After the words have been received the T1200 will stop transmitting the 429 variable request words.

The T1200B will transmit the 429 words of C034ppFD# (Label 277), and 48ddddFD# (Label 277) on channel C with an update rate of 5 seconds. The dddd represents the data that will be sent to the working register in the LRU.

The T1200B will monitor receiver channel C for the 429 words of C0000097# (Label 351), and C8dddd97# (Label 351). The data that will be displayed is represented by dddd. The data will be displayed in hex format on the screen. After the words have been received the T1200 will stop transmitting the 429 variable request words.

The pp represents the alignment parameter code used to distinguish between the TFM variables. The following table represents the alignment parameter code used for each variable:

Var #	Alignment Parameter Code	Var #	Alignment Parameter Code	Var #	Alignment Parameter Code	Var #	Alignment Parameter Code
1	00h	12	0Bh	23	16h	34	21h
2	01h	13	0Ch	24	17h	35	22h
3	02h	14	0Dh	25	18h	36	23h
4	03h	15	0Eh	26	19h	37	24h
5	04h	16	0Fh	27	1Ah	38	25h
6	05h	17	10h	28	1Bh	39	26h
7	06h	18	11h	29	1Ch	40	27h
8	07h	19	12h	30	1Dh	41	28h
9	08h	20	13h	31	1Eh	42	29h
10	09h	21	14h	32	1Fh		
11	0Ah	22	15h	33	20h		

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

UPDATE FLASH FIELD

The UPDATE FLASH field allows the operator to write any temporary stored working registers to the VHF-2100 FLASH Memory locations for the selected TFM variable. If a TFM variable is not selected, the UPDATE FLASH field is INACTIVE.

When the UPDATE FLASH field is pressed the first time, it writes the message "HIT KEY TO OVERWRITE ROM DATA, ANY OTHER KEY TO CONTINUE" to the bottom of the screen that is shown in figure 43. It then changes the text in the WRITE TO ROM field to inverted, high-intensity text. If the field is pressed a second time, the T1200B changes the message at the bottom of the screen to "PLEASE WAIT.", generates the 429 commands to write the current RAM value to FLASH in the VHF-2100, the T1200B erases the message at the bottom of the screen, and converts the UPDATE FLASH field back to inverted text. The FLASH address is dependent upon which TFM variable was selected and the current LRU frequency. The 429 words are transmitted from CH C transmitter on the T1200B, the procedure is shown below:

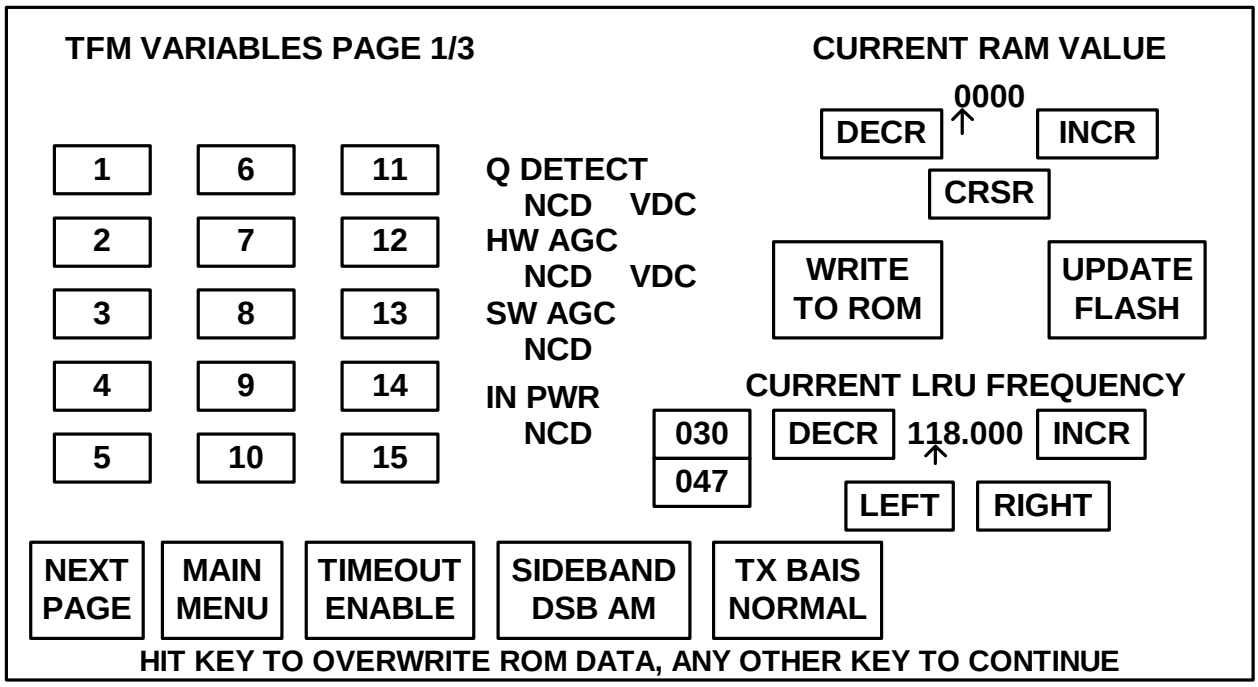


Figure 43 TFM VARIABLES PAGE display

The T1200B will transmit the 429 words of C00900FD# (Label 277) on channel C with an update rate of 5 seconds.

The T1200B will monitor receiver channel C for the 429 words of C0000097# (Label 351). After the words have been received the T1200 will stop transmitting the 429 variable request words.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

CALIBRATION VARIABLES PAGES 1/4 - 4/4 SCREENS

The CALIBRATION VARIABLES PAGES 1/4 - 4/4 allow the operator to read in the value currently used for a CALIBRATION VARIABLE, modify it, and then write the modified value to NVM. The first CALIBRATION VARIABLE PAGE is shown in figure 44 followed by a discussion of its touch screen fields. CALIBRATION VARIABLES PAGE 1/4 is accessed through the MODIFY CALIBRATION VARIABLES FIELD on the SELECT VHF-2100 ALIGNMENT MODE SCREEN.

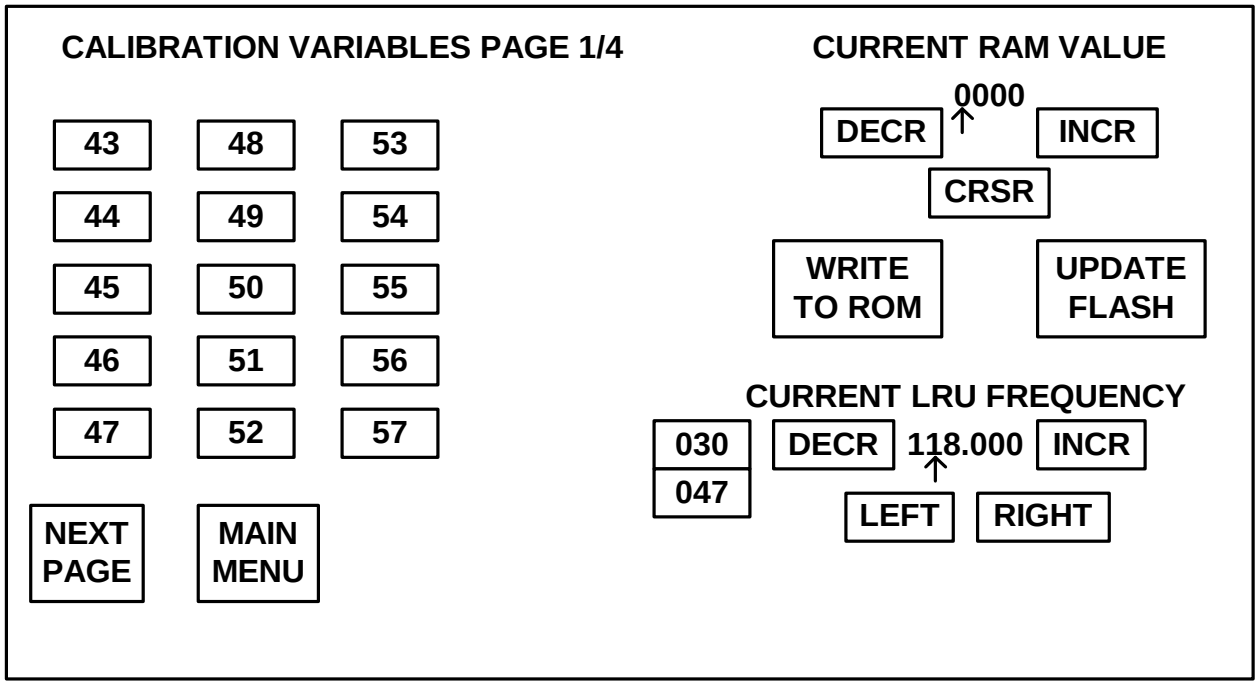


Figure 44 TFM VARIABLES PAGE display

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

CALIBRATION VARIABLES FIELDS

The VARIABLE FIELDS allow the operator to select a VARIABLE and to see its current RAM value. The RAM value is the RAM value for the currently selected frequency range. Refer to COLLINS document "PRODUCTION TEST REQUIREMENTS FOR THE VHF-2100" for more information.

When a VARIABLE's field is pressed, the T1200B changes the VARIABLE's field to inverse high-intensity text. The T1200B then builds the 429 words to ask the VHF-2100 for the current RAM value for the selected variable. The current RAM value is then displayed in the CURRENT RAM VALUE on the display.

The T1200B will transmit the 429 words of C003ppFD# (Label 277), and 480000FD# (Label 277) on channel C with an update rate of 5 seconds. The pp represents the alignment parameter code used to distinguish between the CALIBRATION variables. The following table represents the alignment parameter code used for each variable:

Var #	Alignment Parameter Code	Var #	Alignment Parameter Code	Var #	Alignment Parameter Code	Var #	Alignment Parameter Code
43	80h	57	8Eh	71	9Ch	85	AAh
44	81h	58	8Fh	72	9Dh	86	ABh
45	82h	59	90h	73	9Eh	87	ACh
46	83h	60	91h	74	9Fh	88	ADh
47	84h	61	92h	75	A0h	89	AEh
48	85h	62	93h	76	A1h	90	AFh
49	86h	63	94h	77	A2h	91	B0h
50	87h	64	95h	78	A3h	92	B1h
51	88h	65	96h	79	A4h	93	B2h
52	89h	66	97h	80	A5h	94	B3h
53	8Ah	67	98h	81	A6h	95	B4h
54	8Bh	68	99h	82	A7h		
55	8Ch	69	9Ah	83	A8h		
56	8Dh	70	9Bh	84	A9h		

The T1200B will monitor receiver channel C for the 429 words of C0000097# (Label 351), and C8dddd97# (Label 351). The data that will be displayed is represented by dddd. The data will be displayed in hex format on the screen. After the words have been received the T1200 will stop transmitting the 429 variable request words.

NEXT PAGE FIELD

The NEXT PAGE field allows the operator to go to the next page of CALIBRATION VARIABLES. Each time this field is pressed the CALIBRATION VARIABLE page, advances by one. If on CALIBRATION VARIABLES PAGE 4/4, pressing the NEXT PAGE FIELD will change the page to CALIBRATION VARIABLES PAGE 1/4. To go to the previous page, hit the PRIOR PAGE key on the keypad.

MAIN MENU FIELD

The MAIN MENU field allows the operator to return to the SELECT VHF-2100 ALIGNMENT SCREEN from any CALIBRATION VARIABLES PAGE. See Figure 44.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

CURRENT LRU FREQUENCY FIELDS

The current LRU frequency tuning word is displayed in the current LRU frequency field. The frequency tuning word can be changed in the MODIFY CALIBRATION VARIABLES screen.

030/047 FIELD

The 030/047 FIELD allows the operator to select the frequency tuning label for the frequency tuning word. The current label is highlighted and can be changed by pressing the 030/047 field. When the label is changed the frequency tuning word defaults to 118.000 MHz. When label 030 is selected the spacing value associated with the frequency tuning word is 25 kHz. When label 047 is selected the spacing value associated with the frequency tuning word is 8.33 kHz.

CURRENT LRU FREQUENCY LEFT FIELD

The CURRENT LRU FREQUENCY LEFT FIELD allows the operator to move the CURRENT LRU FREQUENCY cursor. Each time the field is pressed, the T1200B will move the cursor one position to the left. If the cursor is under the tens digit and the field is pressed, the cursor will wrap around to under the hundredths digit.

CURRENT LRU FREQUENCY RIGHT FIELD

The CURRENT LRU FREQUENCY RIGHT FIELD allows the operator to move the CURRENT LRU FREQUENCY cursor. Each time the field is pressed, the T1200B will move the cursor one position to the right. If the cursor is under the hundredths digit and the field is pressed, the cursor will wrap around to under the tens digit.

CURRENT LRU FREQUENCY DECR FIELD

The CURRENT LRU FREQUENCY DECR FIELD allows the operator to decrease the LRU TUNING FREQUENCY. Each time the field is pressed the T1200B decreases the CURRENT LRU FREQUENCY by ten, one, one hundredth, twenty-five thousandths, or a rounded eight and one-third thousandths, depending on the location of the LRU FREQUENCY cursor and which 030/047 LABEL is selected. The T1200B then modifies the frequency tuning word (label 030 or label 047) to select the new frequency. The structure of the label 030 or label 047 word is shown following the FREQUENCY TUNING WORD SECTION. If the CURRENT LRU FREQUENCY equals 118.000, the DECREASE field will have no effect.

CURRENT LRU FREQUENCY INCR FIELD

The CURRENT LRU FREQUENCY INCR FIELD allows the operator to increase the LRU TUNING FREQUENCY. Each time the field is pressed the T1200B increases the CURRENT LRU FREQUENCY by ten, one, one hundredth, twenty-five thousandths, or a rounded eight and one-third thousandths depending on the location of the LRU FREQUENCY cursor and which 030/047 LABEL is selected. The T1200B then modifies the frequency tuning word (label 030 or label 047) to select the new frequency. The structure of the label 030 or label 047 word is shown following the FREQUENCY TUNING WORD SECTION. If the CURRENT LRU FREQUENCY equals 151.975 for Label 030 or 136.975 for Label 047, the INCREASE FIELD will have no effect.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

CURRENT RAM VALUE

For each calibration variable in the VHF-2100, there is a NVM (Non-Volatile Memory) location and working register RAM. The CURRENT RAM VALUE is a four digit hex representation of the data in that working register location. The data can modified to be any value between 0000 hex to FFFF hex. IT IS THE OPERATOR'S RESPONSIBILITY TO KNOW THE LIMITS ON THE TFM VARIABLE THEY ARE TRYING TO MODIFY.

CURRENT RAM VALUE CRSR FIELD

The CURRENT RAM VALUE CRSR FIELD allows the operator to move the current RAM value cursor. Each time the field is pressed, the cursor will move to the other digit.

CURRENT RAM VALUE DECR FIELD

The CURRENT RAM VALUE DECR field allows the operator to modify the current RAM value. Each time the field is pressed, the current ram value digit pointed at by the cursor, decrements by one. If the digit was 0 hex, it will change to F hex.

The T1200B will then build the 429 words to write the current RAM value into the VHF-2100's RAM. The words are transmitted on transmit CH C, the procedure is shown below:

The T1200B will transmit the 429 words of C001ppFD# (Label 277), and 48ddddFD# (Label 277) on channel C with an update rate of 5 seconds. The pp represents the alignment parameter code used to distinguish between the TFM variables. The following table represents the alignment parameter code used for each variable:

Var #	Alignment Parameter Code	Var #	Alignment Parameter Code	Var #	Alignment Parameter Code	Var #	Alignment Parameter Code
43	80h	57	8Eh	71	9Ch	85	AAh
44	81h	58	8Fh	72	9Dh	86	ABh
45	82h	59	90h	73	9Eh	87	ACh
46	83h	60	91h	74	9Fh	88	ADh
47	84h	61	92h	75	A0h	89	AEh
48	85h	62	93h	76	A1h	90	AFh
49	86h	63	94h	77	A2h	91	B0h
50	87h	64	95h	78	A3h	92	B1h
51	88h	65	96h	79	A4h	93	B2h
52	89h	66	97h	80	A5h	94	B3h
53	8Ah	67	98h	81	A6h	95	B4h
54	8Bh	68	99h	82	A7h		
55	8Ch	69	9Ah	83	A8h		
56	8Dh	70	9Bh	84	A9h		

The dddd represents the data that will be sent to the working register in the LRU.

The T1200B will monitor receiver channel C for the 429 words of C0000097# (Label 351), and C8dddd97# (Label 351). The data that will be displayed is represented by dddd. The data will be displayed in hex format on the screen. After the words have been received the T1200 will stop transmitting the 429 variable request words.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

CURRENT RAM VALUE INCR FIELD

The CURRENT RAM VALUE INCR field allows the operator to modify the current RAM value. Each time the field is pressed, the current ram value digit pointed at by the cursor, increments by one. If the digit was F hex, it will change to 0 hex. The T1200B will then build the 429 words to write the current RAM value into the VHF-2100's RAM. The words are transmitted on transmit CH C, and have the same procedure as used in the CURRENT RAM VALUE DECR FIELD.

WRITE TO ROM FIELD

The WRITE TO ROM field allows the operator to prepare the CURRENT RAM VALUE to write to the VHF-2100 Non-Volatile Memory address for the selected calibration variable. If a calibration variable is not selected, the WRITE TO ROM field is INACTIVE.

When the WRITE TO ROM field is pressed the first time, it writes the message "HIT KEY TO OVERWRITE ROM DATA, ANY OTHER KEY TO CONTINUE" to the bottom of the screen that is shown in figure 45. It then changes the text in the WRITE TO ROM field to inverted, high-intensity text. If the field is pressed a second time, the T1200B changes the message at the bottom of the screen to "PLEASE WAIT.", generates the 429 commands to write the current RAM value to NVM in the VHF-2100, the T1200B erases the message at the bottom of the screen, and converts the WRITE TO ROM field back to inverted text. The NVM address is dependent upon which calibration variable was selected and the current LRU frequency. The 429 words are transmitted from CH C transmitter on the T1200B, the procedure is shown below:

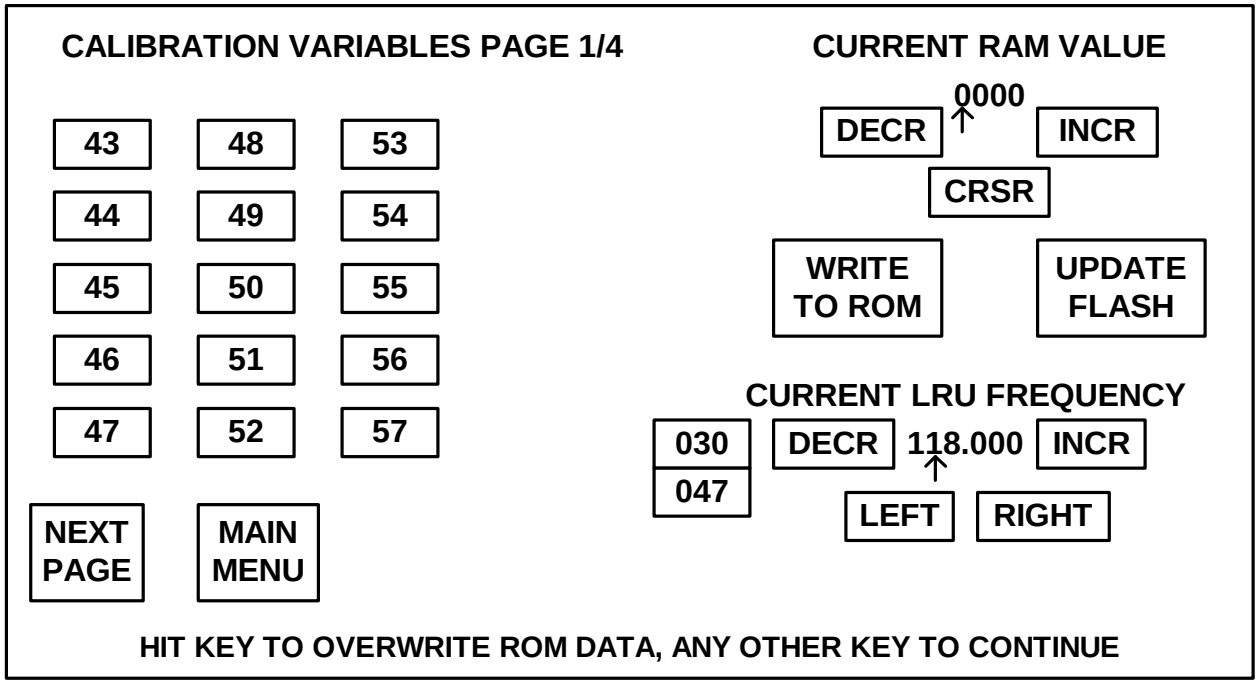


Figure 45 CALIBRATION VARIABLES PAGE display

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

The T1200B will transmit the 429 words of C002ppFD# (Label 277), and 480000FD# (Label 277) on channel C with an update rate of 5 seconds. The pp represents the alignment parameter code used to distinguish between the TFM variables. The following table represents the alignment parameter code used for each variable:

Var #	Alignment Parameter Code	Var #	Alignment Parameter Code	Var #	Alignment Parameter Code	Var #	Alignment Parameter Code
43	80h	57	8Eh	71	9Ch	85	AAh
44	81h	58	8Fh	72	9Dh	86	ABh
45	82h	59	90h	73	9Eh	87	ACh
46	83h	60	91h	74	9Fh	88	ADh
47	84h	61	92h	75	A0h	89	AEh
48	85h	62	93h	76	A1h	90	AFh
49	86h	63	94h	77	A2h	91	B0h
50	87h	64	95h	78	A3h	92	B1h
51	88h	65	96h	79	A4h	93	B2h
52	89h	66	97h	80	A5h	94	B3h
53	8Ah	67	98h	81	A6h	95	B4h
54	8Bh	68	99h	82	A7h		
55	8Ch	69	9Ah	83	A8h		
56	8Dh	70	9Bh	84	A9h		

The T1200B will monitor receiver channel C for the 429 words of C0000097# (Label 351), and C8dddd97# (Label 351). The data that will be displayed is represented by dddd. The data will be displayed in hex format on the screen. After the words have been received the T1200 will stop transmitting the 429 variable request words.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

E. VHF 2100 ALIGNMENT MODE (ONLY APPLIES TO COLLINS VHF-2100 SERIES LRU'S) (CONT)

UPDATE FLASH FIELD

The UPDATE FLASH field allows the operator to write any temporary stored working registers to the VHF-2100 FLASH Memory locations for the selected calibration variable. If a calibration variable is not selected, the UPDATE FLASH field is INACTIVE.

When the UPDATE FLASH field is pressed the first time, it writes the message "HIT KEY TO OVERWRITE ROM DATA, ANY OTHER KEY TO CONTINUE" to the bottom of the screen that is shown in figure 46. It then changes the text in the WRITE TO ROM field to inverted, high-intensity text. If the field is pressed a second time, the T1200B changes the message at the bottom of the screen to "PLEASE WAIT.", generates the 429 commands to write the current RAM value to FLASH in the VHF-2100, the T1200B erases the message at the bottom of the screen, and converts the UPDATE FLASH field back to inverted text. The FLASH address is dependent upon which calibration variable was selected and the current LRU frequency. The 429 words are transmitted from CH C transmitter on the T1200B, the procedure is shown below:

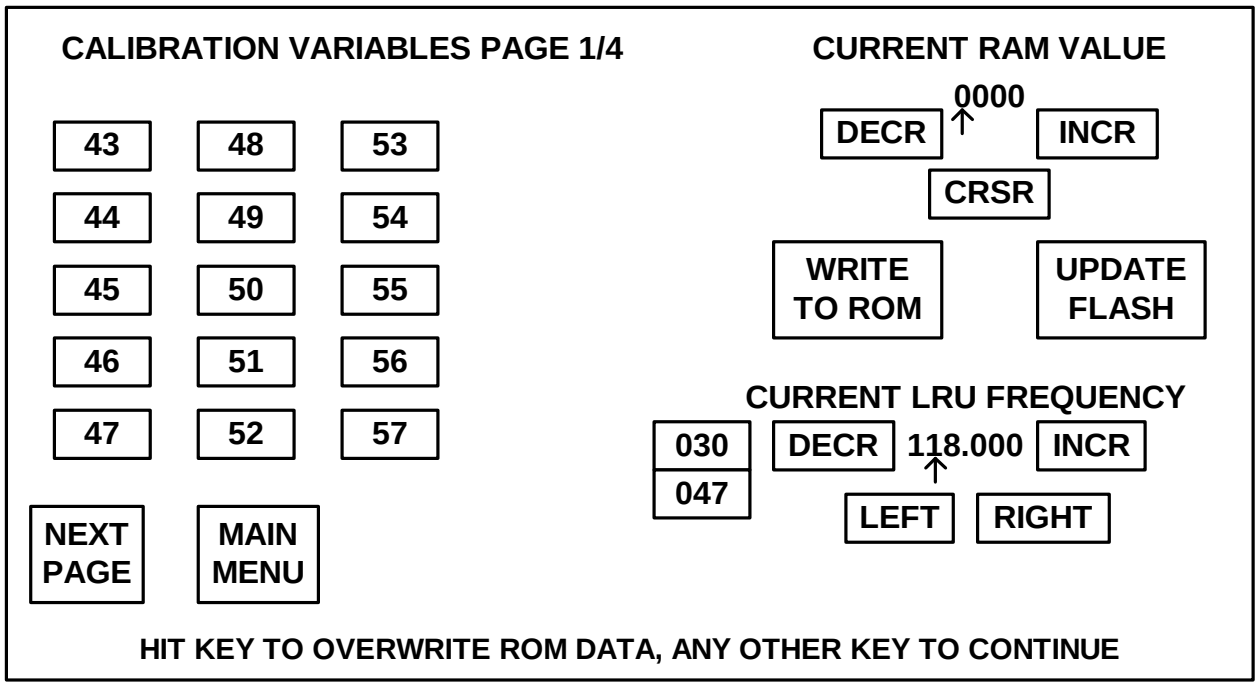


Figure 46 CALIBRATION VARIABLES PAGE display

The T1200B will transmit the 429 words of C00900FD# (Label 277) on channel C with an update rate of 5 seconds.

The T1200B will monitor receiver channel C for the 429 words of C0000097# (Label 351). After the words have been received the T1200 will stop transmitting the 429 variable request words.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE

The operation of the CFDS mode is consistent with the other portions of the T1200B in that the screens and menus are easily and logically accessible to the operator via the touch screen display. The following discussion provides a description of each screen displayed by the CFDS mode of operation.

When performing tests to an actual unit, the test procedures found in the CMM (Component Maintenance Manual) for the particular LRU (Line Replaceable Unit) should be followed. Do NOT connect the T1200B to other test sets or LRUs while performing this procedure unless instructed to do so.

After power up, the operator then has the option of pressing the highlighted areas of the screen to select either the STANDARD MODE, CFDS MODE, or the CMC MODE from the Power Up & Self-Test Screen (Figure 5).

LRU SELECTION SCREEN

Press the CFDS MODE portion of the screen to test an LRU containing a CFDS interface. The LRU SELECTION screen is displayed as shown in Figure 47.

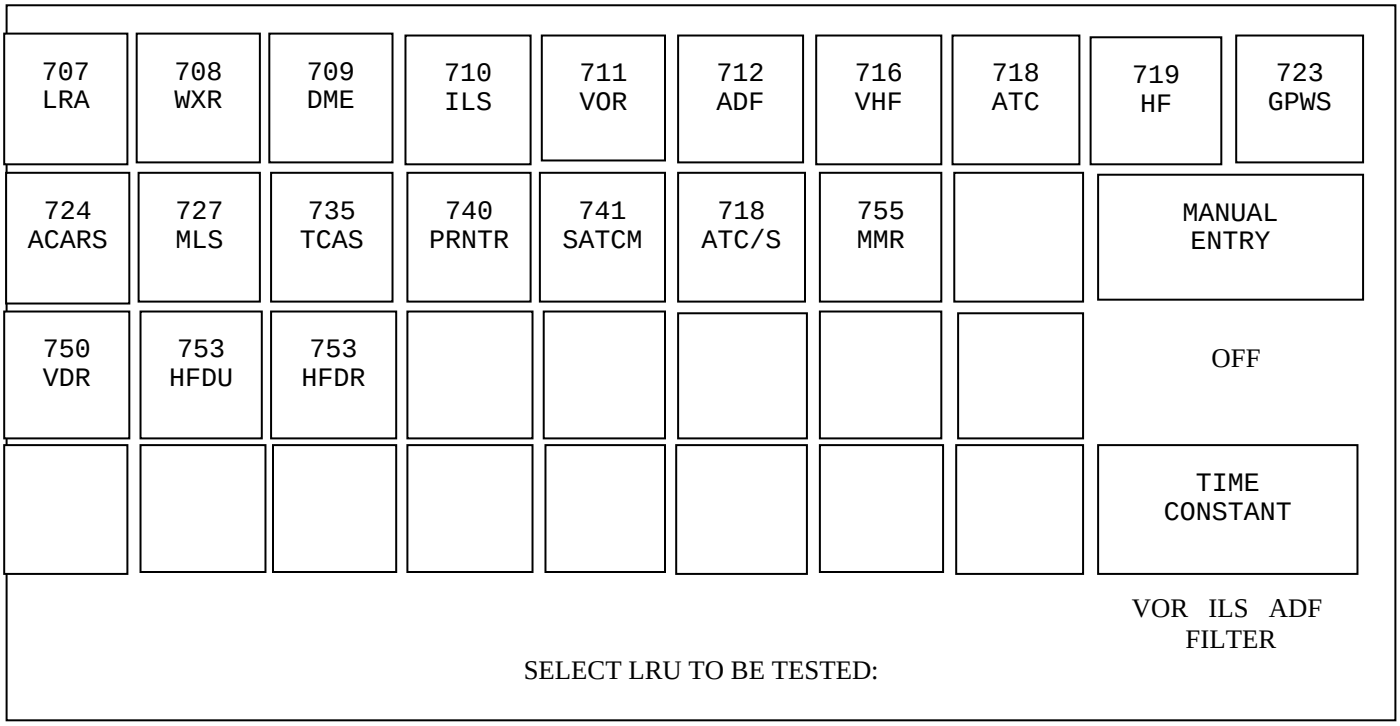


Figure 47 LRU SELECTION SCREEN

The purpose of this screen is to allow the operator to select the type of LRU being tested. Whichever selection is pressed will cause the T1200B to encode the appropriate Equipment Code into bits 13 (LSB) through 24 (MSB) of label 227, which is transmitted to the LRU under test. Commands are addressed to the receiving equipment by combinations of Equipment Code and SDI. Should you be testing an LRU that is not among those listed on the screen, you can press the MANUAL ENTRY selection and manually enter any three digit code from 000 - FFF (Hex) via the keypad.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

CFDS MODE SELECT SCREEN

For purposes of this discussion, press the 707 LRA selection at the top left corner of the screen to proceed to the CFDS MODE SELECT screen as shown in Figure 48.

This screen allows the operator to proceed directly to the CFDS OPERATION MODE by pressing the center selection or to perform changes to the default settings of the data being transmitted to the LRU by selecting either EDIT CFDS TX DATA or CONFIGURE CHANNELS A,B,C,D.

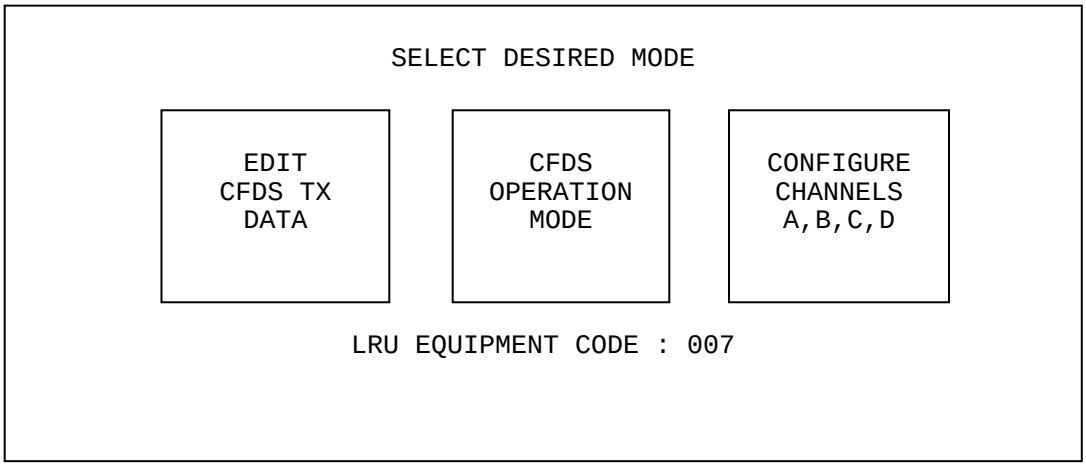


Figure 48 CFDS MODE SELECT SCREEN

EDIT CFDS TX DATA

At this time, press the EDIT CFDS TX DATA selection to proceed to the screen as shown in Figure 49.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

EDIT CFDS TX DATA cont.

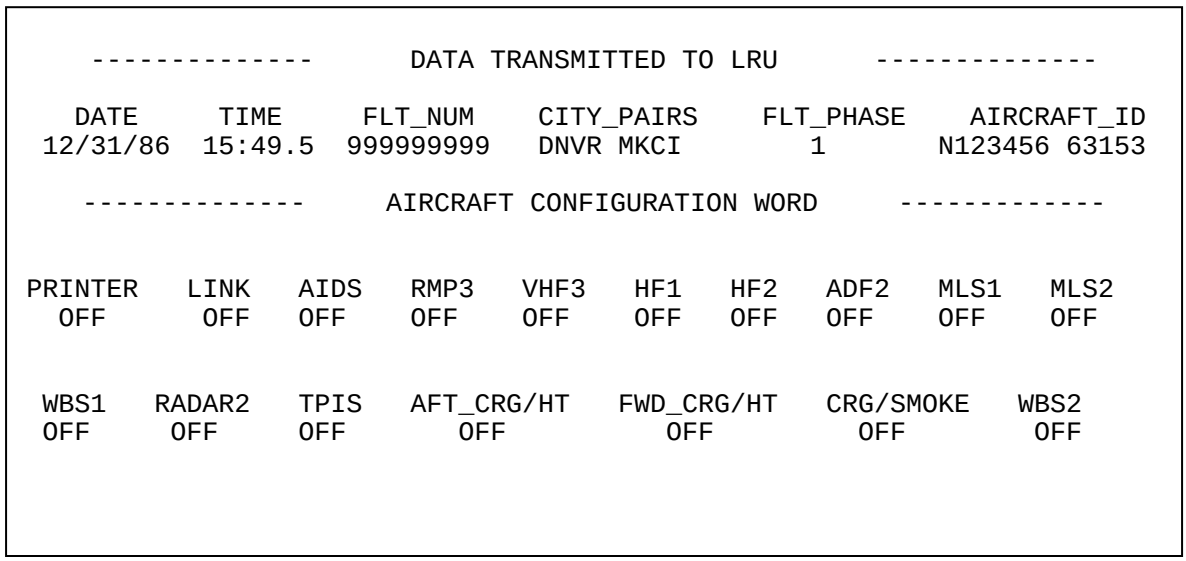


Figure 49 EDIT CFDS TX DATA SCREEN

This screen allows the operator to edit the data of any of the 18 labels that are being transmitted to the LRU from the T1200B (except for label 227 which is edited from other screens). While the T1200B software is designed to eliminate the need for the operator to know which label performs what function, for information purposes only, the 18 labels are as follows:

LABEL	DESCRIPTION	REFRESH RATE
040	CITY PAIRS (Word #1)	3000 ms
041	CITY PAIRS (Word #2)	3000 ms
042	CITY PAIRS (Word #3)	3000 ms
125	TIME (GMT)	1000 ms
126	FLIGHT PHASE	1000 ms
155	AIRCRAFT CONFIGURATION WORD	1000 ms
156	AIRCRAFT TYPE	1000 ms
227	BITE COMMAND	100 ms
233	FLIGHT NUMBER (Word #1)	5000 ms
234	FLIGHT NUMBER (Word #2)	5000 ms
235	FLIGHT NUMBER (Word #3)	5000 ms
236	FLIGHT NUMBER (Word #4)	5000 ms
237	FLIGHT NUMBER (Word #5)	5000 ms
260	DATE	1000 ms
301	AIRCRAFT ID (Word #1)	4000 ms
302	AIRCRAFT ID (Word #2)	4000 ms
303	AIRCRAFT ID (Word #3)	4000 ms
304	AIRCRAFT ID (Word #4)	4000 ms

NOTE: FOR AN EXPLANATION OF LABEL 156 REFER TO AIRBUS DOCUMENT "ANNEX 1 APPLICATION NOTE - ABD 0048 C"

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

EDIT CFDS TX DATA cont.

The transmitted CFDS information can easily be edited by the operator without interrupting transmission. This is accomplished by touching the desired CFDS information word, i.e. DATE, TIME, FLT NUM, CITY PAIRS, FLT PHASE or AIRCRAFT ID, and then entering the new data via the keypad.

DATE

The DATE (label 260) is edited by pressing the word DATE on the upper row of the screen. Once pressed, a reverse video box will appear below it prompting you to enter the new date. The data should be entered as MONTH/DAY/YEAR. The structure of the data word is as follows:

```
Bits  1-8              : Label 260
Bits  9-10             : Source Destination Identifier (SDI)
Bits 11-14             : The units of the year       BCD   e.g.  6
Bits 15-18             : The tens of the year        BCD   e.g.  8
Bits 19-22             : The units of the month      BCD   e.g.  2
Bit  23                : The tens of the month       BCD   e.g.  1
Bits 24-27             : The units of the day        BCD   e.g.  1
Bits 28-29             : The tens of the day         BCD   e.g.  3
Bits 30-31             : Sign/Status Matrix (SSM)
Bit  32                : Parity
```

The example given is 31 December 1986. The refresh rate is 1000 ms.

TIME (GMT)

The TIME (label 125) is edited by pressing the word TIME on the upper row of the screen. Once pressed, a reverse video box will appear below it prompting you to enter the new time. The data should be entered as HOURS/MINUTES using 24 hour military time. The structure of the data word is as follows:

```
Bits  1-8              : Label 125
Bits  9-10             : SDI
Bits 11-14             : Tenths of minutes          BCD   e.g.  0.5
Bits 15-18             : The units of the minutes   BCD   e.g.  9
Bits 19-22             : The tens of the minutes    BCD   e.g.  4
Bit  23-26             : The units of the hours     BCD   e.g.  5
Bits 27-29             : The tens of the hours      BCD   e.g.  1
Bits 30-31             : SSM
Bit  32                : Parity
```

The example given is 15:49.5. The refresh rate is 1000 ms.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

FLIGHT NUMBER

When editing FLIGHT NUMBER (labels 233, 234, 235, 236, 237), the alphanumeric screen shown in Figure 50 will appear. This will allow any necessary letters (A-Z) to be entered that are not available on the keypad. Enter the ten digit identifier, i.e. 1A2B3C4D5E, for the desired FLIGHT NUMBER. The scratch pad on the screen above the letters will show entered data. If a mistake is made, press the CLEAR button on the keypad and start over. When the data entry is complete, press the ENTER key on the keypad and the screen will revert back to Figure 49. Any new data entered by the operator for the FLIGHT NUMBER will be displayed.

1st Word :	Bits 1-8	:	Label 233
	Bits 9-10	:	Spare (zeros)
	Bits 11-17	:	1st Character ISO
	Bit 18	:	0 (Constant value)
	Bits 19-25	:	2nd Character ISO
	Bit 26	:	0 (Constant value)
	Bits 27-29	:	spare (zeros)
	Bits 30-31	:	SSM
	Bit 32	:	Parity
2nd Word :	Bits 1-8	:	Label 234
	Bits 9-10	:	Spare (zeros)
	Bits 11-17	:	3rd Character ISO
	Bit 18	:	0 (Constant value)
	Bits 19-25	:	4th Character ISO
	Bit 26	:	0 (Constant value)
	Bits 27-29	:	spare (zeros)
	Bits 30-31	:	SSM
	Bit 32	:	Parity
3rd Word :	Bits 1-8	:	Label 235
	Bits 9-10	:	Spare (zeros)
	Bits 11-17	:	5th Character ISO
	Bit 18	:	0 (Constant value)
	Bits 19-25	:	6th Character ISO
	Bit 26	:	0 (Constant value)
	Bits 27-29	:	spare (zeros)
	Bits 30-31	:	SSM
	Bit 32	:	Parity
4th Word :	Bits 1-8	:	Label 236
	Bits 9-10	:	Spare (zeros)
	Bits 11-17	:	7th Character ISO
	Bit 18	:	0 (Constant value)
	Bits 19-25	:	8th Character ISO
	Bit 26	:	0 (Constant value)
	Bits 27-29	:	spare (zeros)
	Bits 30-31	:	SSM
	Bit 32	:	Parity

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

```
5th Word :        Bits  1-8   :     Label 237
                  Bits  9-10  :     Spare (zeros)
                  Bits 11-17  :     7th Character ISO
                  Bit  18     :     0 (Constant value)
                  Bits 19-25  :     8th Character ISO
                  Bit  26     :     0 (Constant value)
                  Bits 27-29  :     spare (zeros)
                  Bits 30-31  :     SSM
                  Bit  32     :     Parity  The refresh rate is 5000 ms.
```

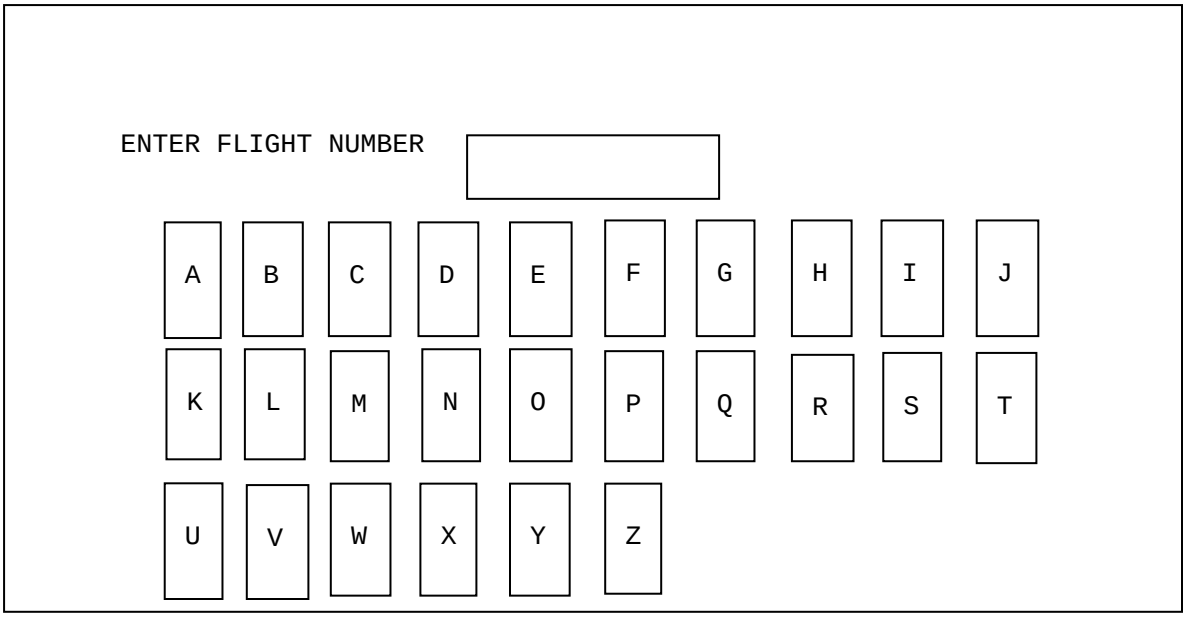


Figure 50 FLIGHT NUMBER ALPHANUMERIC EDIT SCREEN

FLIGHT PHASE

The FLIGHT PHASE (label 126) is edited by pressing the word FLIGHT PHASE on the upper row of the screen. Once pressed, a reverse video box will appear below it prompting you to enter the new flight phase. The data should be entered in up to two consecutive numeric characters (1-10). The structure of the data word is as follows:

```
Bits  1-8              : Label 126
Bits  9-10             : SDI
Bits 11-14             : Flight Phase Count    BNR
                           (LSB=11, MSB=14)
Bits 15-29             : Spare (zeros)
Bits 30-31             : SSM
Bit  32                : Parity    The refresh rate is 1000 ms.
```

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

CITY PAIRS & AIRCRAFT ID

In the case where alphanumeric data is required, i.e. CITY PAIRS or AIRCRAFT ID, one of two slightly different alphanumeric screens will appear.

CITY PAIRS

When editing CITY PAIRS (labels 040, 041, 042), the alphanumeric screen shown in Figure 51 will appear. This will allow any necessary letters (A-Z) to be entered that are not available on the keypad. Enter the two 4-digit identifiers, i.e. DNVR MKCI, for the desired CITY PAIRS. The scratch pad on the screen above the letters will show entered data. Note that a space will automatically be inserted between the two 4-digit identifiers. If a mistake is made, press the CLEAR button on the keypad and start over. When the data entry is complete, press the ENTER key on the keypad and the screen will revert back to Figure 49. Any new data entered by the operator for the CITY PAIRS will be displayed.

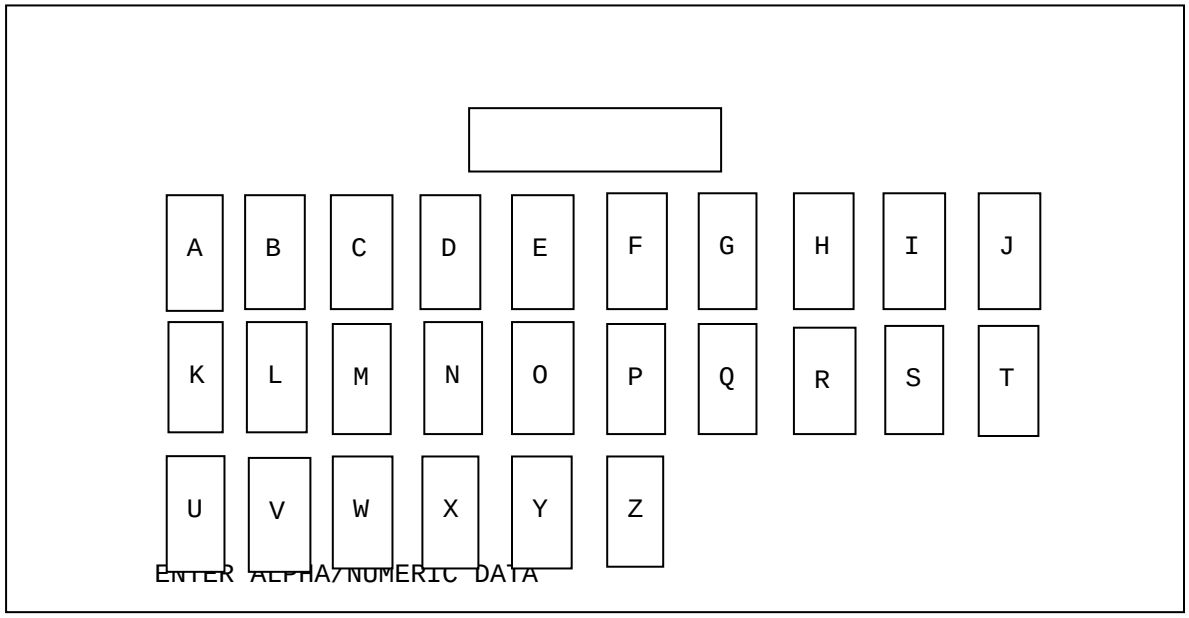


Figure 51 CITY PAIRS ALPHANUMERIC EDIT SCREEN

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

CITY PAIRS cont.

Three words are used for this information. Their structure is as follows:

```
1st Word :        Bits  1-8         : Label 040
                  Bits  9-15        : Character 1 FROM
                  Bits 16-22        : Character 2 FROM
                  Bits 23-29        : Character 3 FROM
                  Bits 30-31        : SSM
                  Bit  32           : Parity

2nd Word :        Bits  1-8         : Label 041
                  Bits  9-15        : Character 4 FROM
                  Bits 16-22        : Space
                  Bits 23-29        : Character 1 TO
                  Bits 30-31        : SSM
                  Bit  32           : Parity

3rd Word :        Bits  1-8         : Label 042
                  Bits  9-15        : Character 2 TO
                  Bits 16-22        : Character 3 TO
                  Bits 23-29        : Character 4 TO
                  Bits 30-31        : SSM
                  Bit  32           : Parity
```

The refresh rate is 3000 ms.

AIRCRAFT ID

When editing the AIRCRAFT ID word (labels 301, 302, 303, 304), the alphanumeric screen shown in Figure 52 will appear. Use a combination of the letters on the screen and the numbers on the keypad to enter the desired data for the AIRCRAFT TAIL NUMBER. After the tail number entry is completed, press the ENTER key on the keypad. The screen will then prompt you to enter the AIRCRAFT TYPE CODE. Once entered, press the ENTER key again and the screen will prompt you to enter the FLEET IDENT. Once entered, press the ENTER key again and the screen will prompt you to enter the RECORD VERSION. Once entered, press the ENTER key again and the screen will revert back to Figure 49. Any new data entered by the operator for the AIRCRAFT ID will be displayed.

NOTE Press only the ENTER key on the keypad if no change to the data is required.

Four words are used for this information. Their structure is as follows:

```
1st Word :        Bits  1-8         : Label 300
                  Bits  9-10        : SDI
                  Bits 11-17        : 1st A/C Tail No. Character
                  Bits 18-24        : 2nd A/C Tail No. Character
                  Bits 25-31        : 3rd A/C Tail No. Character
                  Bit  32           : Parity
```

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

continued from previous page

```
2nd Word :        Bits  1-8          : Label 301
                  Bits  9-10         : SDI
                  Bits 11-17         : 4th A/C Tail No. Character
                  Bits 18-24         : 5th A/C Tail No. Character
                  Bits 25-31         : 6th A/C Tail No. Character
                  Bit  32            : Parity

3rd Word :        Bits  1-8          : Label 302
                  Bits  9-10         : SDI
                  Bits 11-17         : 7th A/C Tail No. Character
                  Bits 18-24         : Space
                  Bits 25-31         : Space
                  Bit  32            : Parity

4th Word :        Bits  1-8          : Label 303
                  Bits  9-10         : SDI
                  Bits 11-16         : A/C Type Code
                  Bit  17            : Spare (zero)
                  Bits 18-21         : Fleet Ident
                  Bits 22            : Spare (zero)
                  Bits 23-24         : Record Version
                  Bits 25-31         : Space
                  Bit  32            : Parity
```

The refresh rate is 4000 ms.

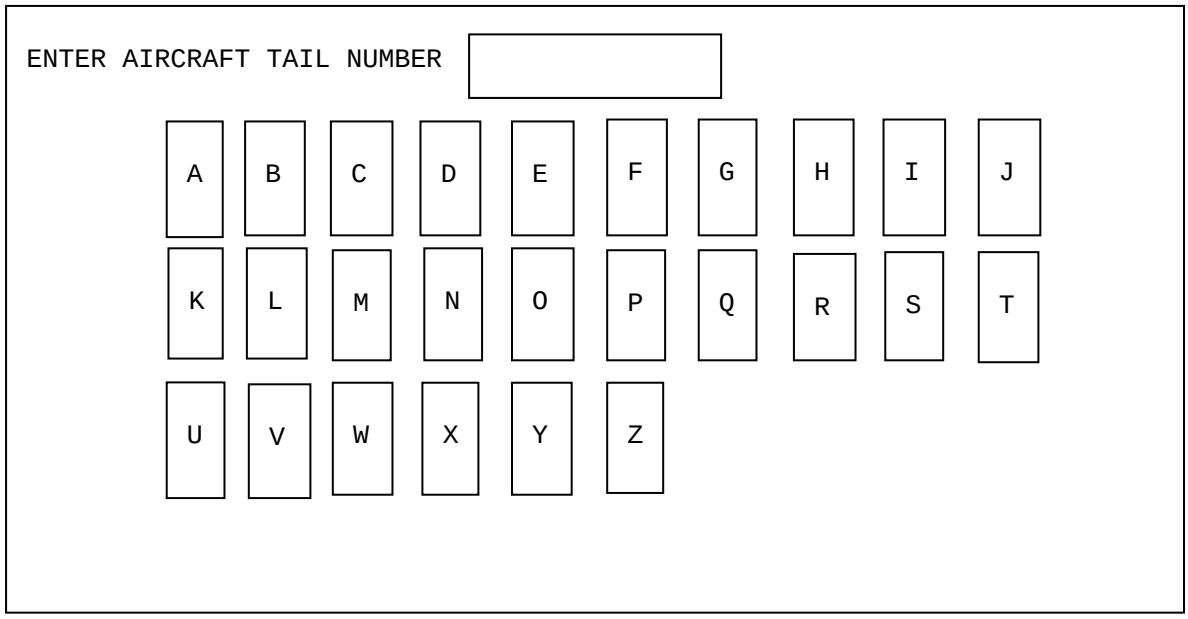


Figure 52 AIRCRAFT ID WORD ALPHANUMERIC EDIT SCREEN

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

AIRCRAFT CONFIGURATION WORD

The AIRCRAFT CONFIGURATION WORD (label 155) options (shown on the lower portion of Figure 49) are edited by pressing the appropriate word on the screen and toggling it either ON or OFF as desired. This data is encoded into bits 11 through 27 of label 155. The structure of the word is as follows:

```
Bits 1-8          : Label 155
Bits 9-10         : SDI 00
Bit 11            : Printer
Bit 12            : Data Link
Bit 13            : Aids
Bit 14            : RMP 3
Bit 15            : VHF 3
Bit 16            : HF 1
Bit 17            : HF 2
Bit 18            : ADF 2
Bit 19            : MLS 1
Bit 20            : MLS 2
Bit 21            : WBS 1
Bit 22            : Radar 2
Bit 23            : TPIS
Bit 24            : AFT Cargo Heat
Bit 25            : FWD Cargo Heat
Bit 26            : Cargo Smoke
Bit 27            : WBS 2
Bit 28-29         : Spare
Bit 30-31         : SSM
Bit 32            : Parity
```

The refresh rate is 1000 ms.

The bits are coded: 0 if system not installed
1 if system installed
T1200B default condition = 0.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

CONFIGURE CHANNELS A, B, C, D

At this time press the PRIOR PAGE key on the keypad to return to the CFDS MODE SELECT screen as shown in Figure 48. Press the CONFIGURE CHANNELS A, B, C, D selection to advance to the configuration screen as shown in Figure 53.

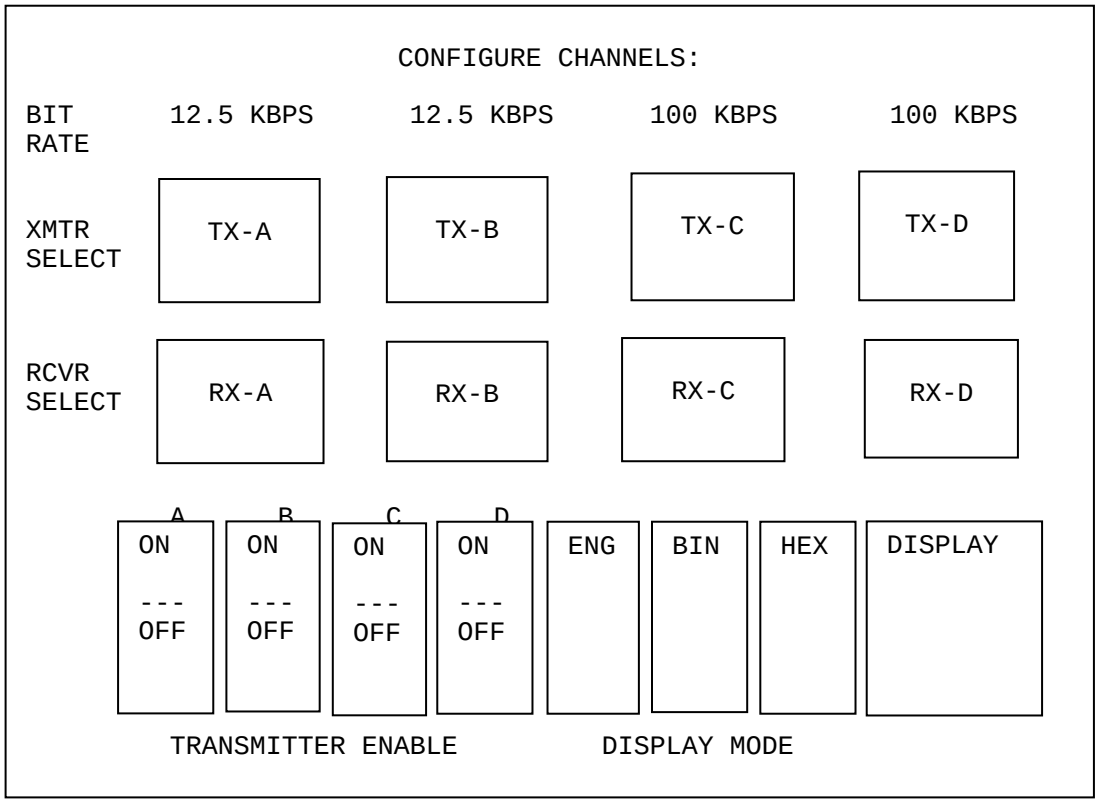


Figure 53 CONFIGURE CHANNELS A, B, C,D SCREEN

Press the BIN (Binary) Display Mode selection in the lower center portion of the screen and then press the DISPLAY selection in the lower right hand portion of the screen to advance to the TX/RX EDIT screen as shown in Figure 54.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

CONFIGURE CHANNELS A, B, C, D cont.

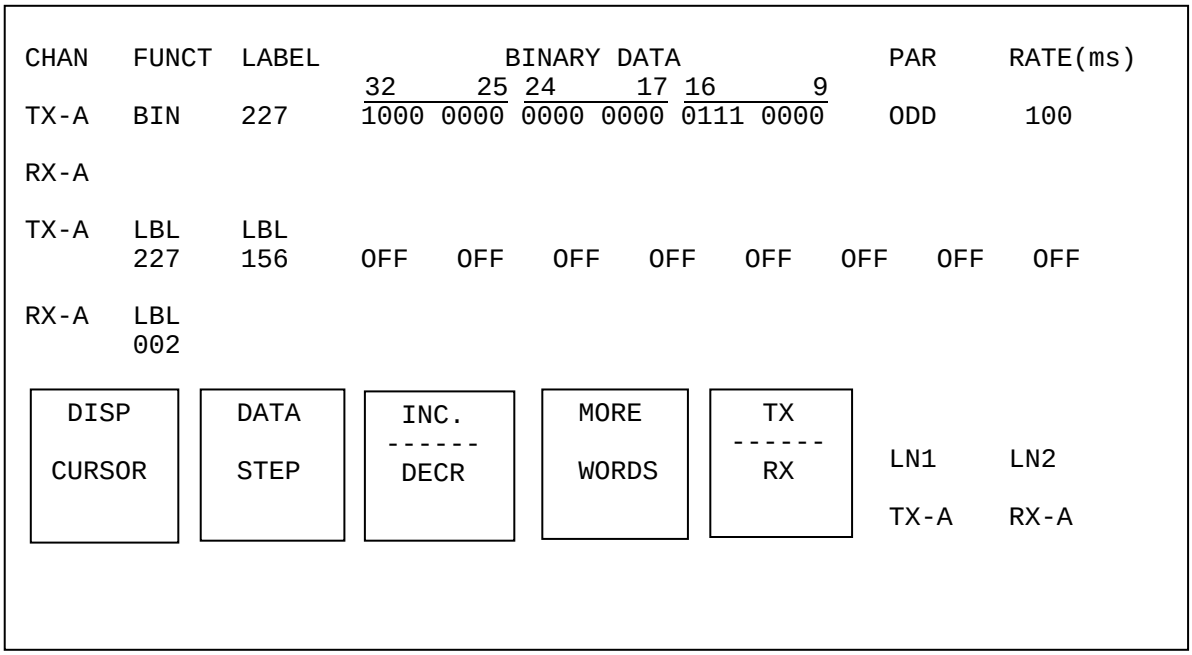


Figure 54 TX/RX EDIT SCREEN

The TX/RX EDIT screen can be used to edit the SDI of the BITE COMMAND (label 227), to add any other desired labels to be transmitted, to modify AIRCRAFT TYPE (label 156) or to observe the data being received by the T1200B. The Hexadecimal Equipment Code can be edited from this screen but is normally edited from the LRU SELECTION screen (Figure 47). Editing the Hexadecimal Equipment Code from this screen will cause the LRU EQUIPMENT CODE number on the CFDS MODE SELECT screen (Figure 48) to be changed to the edited value.

The structures of the BITE COMMAND word and the AIRCRAFT TYPE are as follows:

```
Bits  1-8          : Label 227
Bits  9-10         : SDI
Bit  11            : Spare or used to indicate Ready in CTS word
Bit  12            : Spare
                                                  + 13-16 (LSD)
Bits 13-24         : Hexadecimal Equipment Code   1 17-20
                                                  . 21-24 (MSD)
Bits 25-31         : Command Code
Bit  32            : Parity
```

The refresh rate is 100 ms.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

CONFIGURE CHANNELS A, B, C, D cont.

```
Bits  1-8          : Label 156
Bits  9-10         : SDI
Bit  11-22         : Spare
Bits 23-24         : AIRBUS AIRCRAFT TYPE Code (00 - A320,
                   :   01 - Not Used, 10 - A340, 11 - A330)
Bits 25-31         : SPARE
Bit  32            : Parity
```

The refresh rate is 1000 ms.

NOTE Even though the other 15 labels are being transmitted from the T1200B, they do not appear on this screen, as they can only be edited from the EDIT CFDS TX DATA screen (Figure 49).

Press the PRIOR PAGE key on the keypad twice to return to the CFDS MODE SELECT screen (Figure 48). Press the CFDS OPERATION MODE selection to advance to the ENTER DATE AND SHOP CODE screen as shown in Figure 55. The DATE and/or SHOP CODE can be edited from this screen by pressing the data field on the screen to the right of each line and entering the desired numeric data from the keypad.

Note that editing the Date and/or Shop Code from this screen has a similar effect as editing the Date and/or Aircraft ID from the CFDS TX EDIT screen (Figure 49). The only difference being that editing the Shop Code results in the editing of only the first three labels (labels 301, 302 & 303) of the Aircraft ID and only numeric data can be entered. The Shop Code is a special feature incorporated for testing Collins LRUs.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

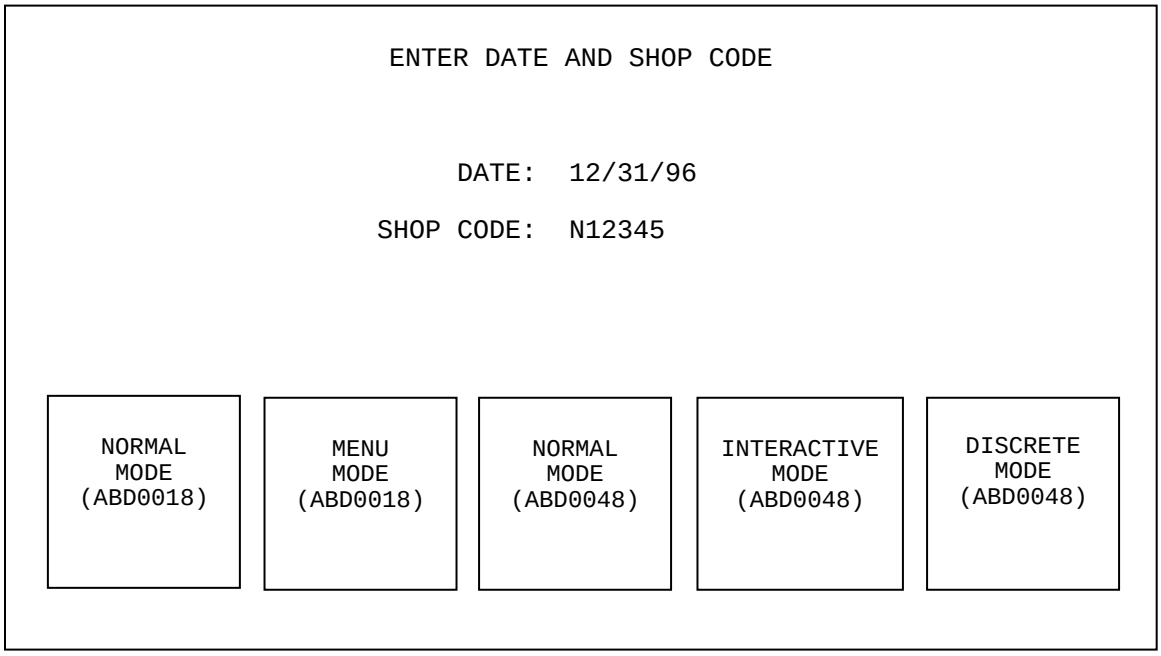


Figure 55 ENTER DATE AND SHOP CODE SCREEN

NORMAL MODE (ABD0018)

Press the NORMAL MODE (ABD0018) selection on the ENTER DATE AND SHOP CODE screen to advance to the NORMAL MODE screen as shown in Figure 56. This screen is used to display any messages transmitted from the LRU to the T1200B on label 356. If label 356 (any data) has not been received within three s or if the detected label 356 word rate is greater than three s after advancing to this screen, the message NO MAINTENANCE DATA RECEIVED will be illuminated at the bottom of the screen as indicated in Figure 57.

Located at the bottom left of the screen is a selection that allows the operator to select the FLIGHT PHASE to either GROUND or AIR. This data is encoded as part of the COMMAND CODE into bits 25-31 of label 227 (BITE Command Word) being transmitted from the T1200B. When GROUND is selected (default mode), a code of 00 (hex) is transmitted. When AIR is selected, a code of 12 (hex) is transmitted for 100 ms, then changed to 11 (hex) for the remainder of the time that AIR is selected.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

NORMAL MODE (ABD0018) cont.

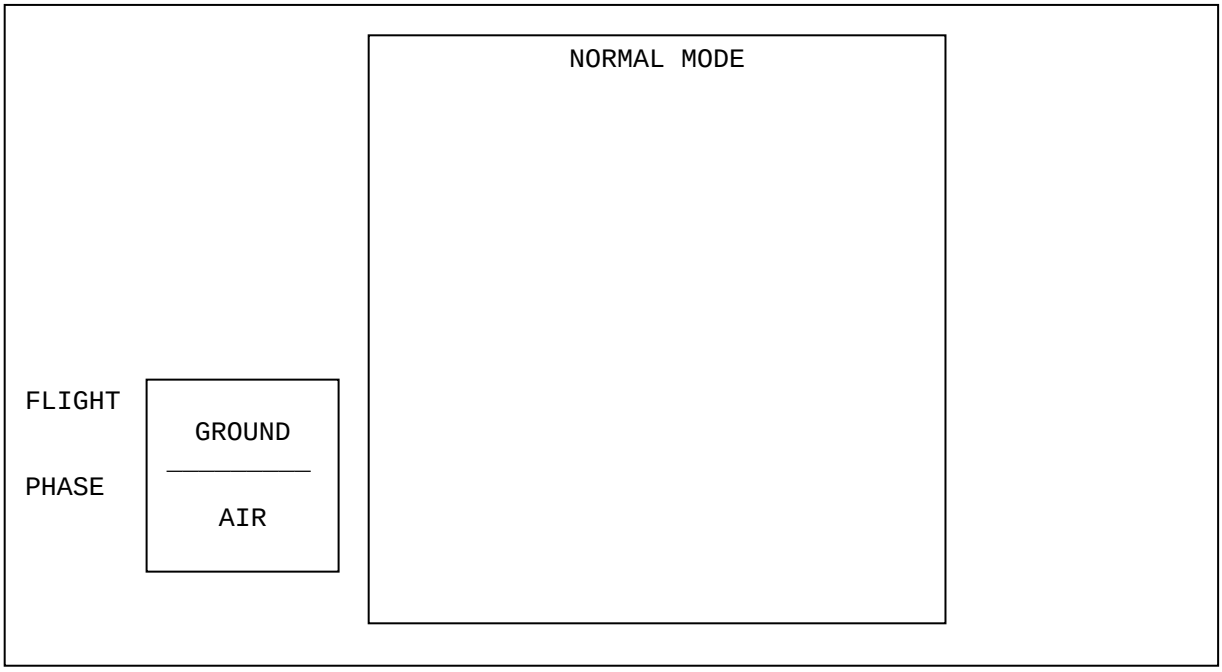


Figure 56 NORMAL MODE SCREEN

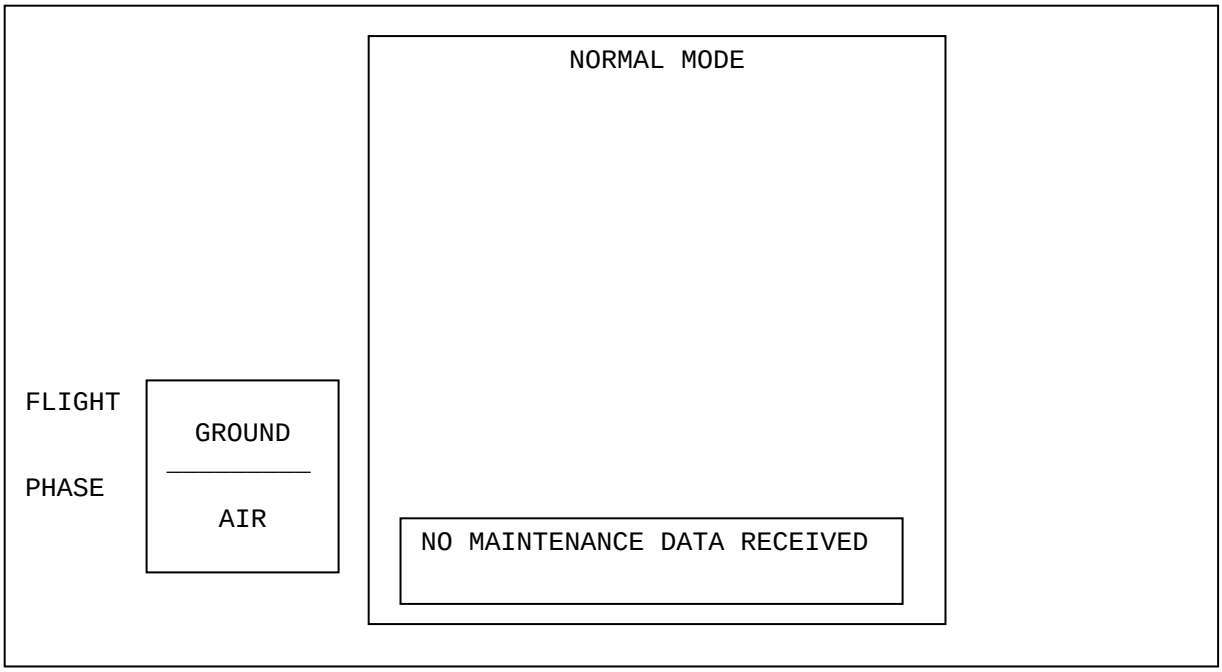


Figure 57 NORMAL MODE SCREEN (NO MAINT. DATA RCV'D MESSAGE)

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

NORMAL MODE (ABD0018) cont.

The following check can be performed if you wish to simulate sending a Failure Message to be displayed by the T1200B. Using an Aeroflex Model 429E (or equivalent) ARINC 429 Transmitter/Receiver to transmit to RX-A of the T1200B, the following example will result in the message JcAIR - CFDS TEST to be displayed on the NORMAL MODE screen as shown in Figure 58. Each word and data pattern must be entered into the 429E exactly as described for correct results. Be sure to press the ENTER key on the 429E to synchronize the order of the transmit slots after entering all the data.

Slot No.	Label	Data (Hex)	
10	356	02720A	(STX)
9	356	202020	(DATA)
8	356	202020	"
7	356	41634A	"
6	356	205249	"
5	356	C3202D	"
4	356	534446	"
3	356	455420	"
2	356	A05453	"
1	356	040000	(EOT)

Once the correct message is being displayed, you can cause the T1200B to display the message BLOCK WORD COUNT ERR at the bottom of the screen by changing the data of the 429E TX Slot No. 10 to 027209. This tells the T1200B that there should be 9 "words" in the message block instead of the actual 10, resulting in the error.

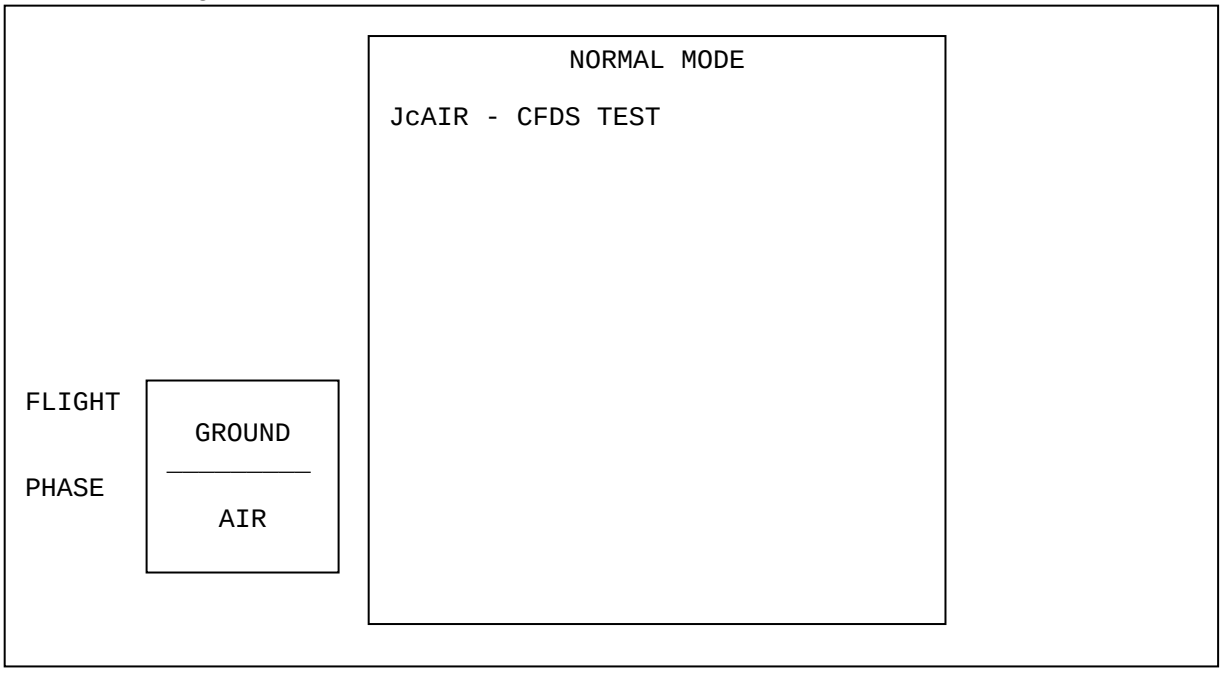


Figure 58 NORMAL MODE SCREEN (JcAIR - CFDS TEST MESSAGE)

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

MENU MODE (ABD0018)

Press the PRIOR PAGE key on the keypad to return to the ENTER DATA AND SHOP CODE screen. Then press the MENU MODE (ABD0018) selection to advance to the MENU MODE screen as shown in Figure 59.

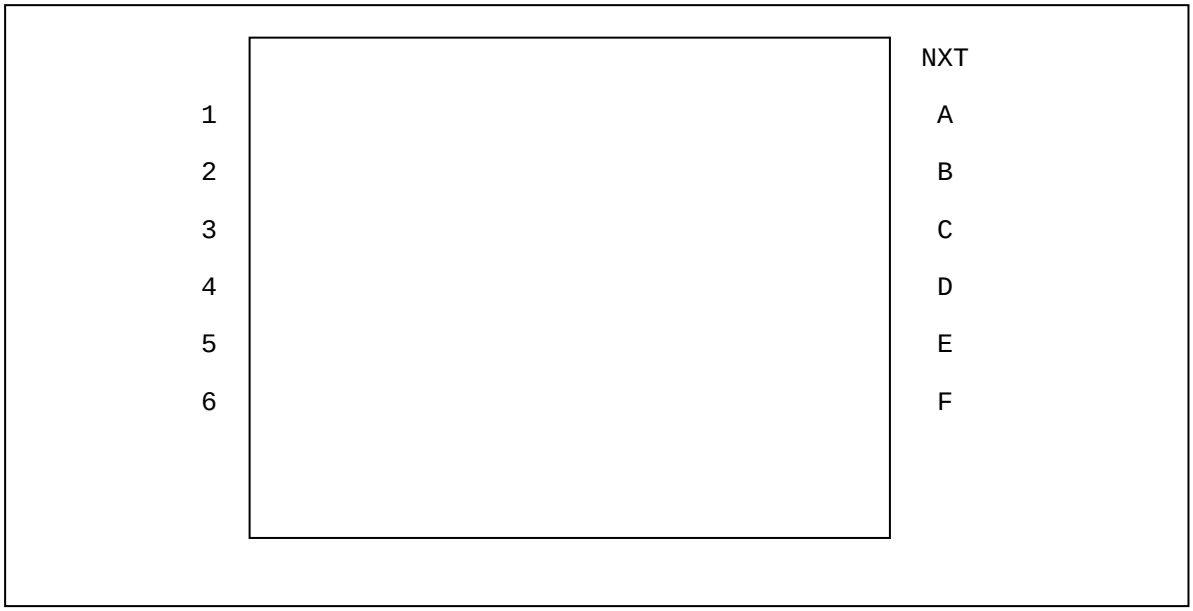


Figure 59 MENU MODE SCREEN

If an appropriate LRU were correctly connected to the T1200B, a menu would appear within the boxed-in area of the screen shown in Figure 46. To display the different menus available for the particular LRU, the operator must press the corresponding number (1-6) or letter (A-F) on the display or the keypad. Pressing any of these commands will cause the appropriate menu request to be transmitted to the LRU. This Menu Item Data Request is encoded as part of the COMMAND CODE into bits 25-31 of label 227 (BITE Command Word) being transmitted from the T1200B. The menu request commands are structured as follows:

T1200B Menu Command	Bits 25-31 Data (Hex)
1	70
2	71
3	72
4	73
5	74
6	75
A	78
B	79
C	7A

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

MENU MODE (ABD0018) cont.

D	**7B**
E	**7C**
F	**7D**

Some menus will have more than one page, which will require the operator to press the PAGE key on the keypad.

NOTE On some T1200B's that have been modified for CFDS/CMC operation, this key may be blank and not identified with the word PAGE. The key is located directly below the "F" key. If blank, mark the key with the word PAGE using a felt tip marker or contact Aeroflex and we can provide you with a decal to stick on the key.

Pressing this key will cause the word NXT in the upper right corner of the display to appear in reverse video and a new menu page will appear on the screen.

T1200B Menu Command	Bits 25-31 Data (Hex)
PAGE	**77**

Without an LRU transmitting menu data to the T1200B, the message NO RESPONSE (LRU EXCEEDED 3 SECS) will be displayed at the bottom of the screen approximately 3 s after selecting this screen as shown in Figure 60.

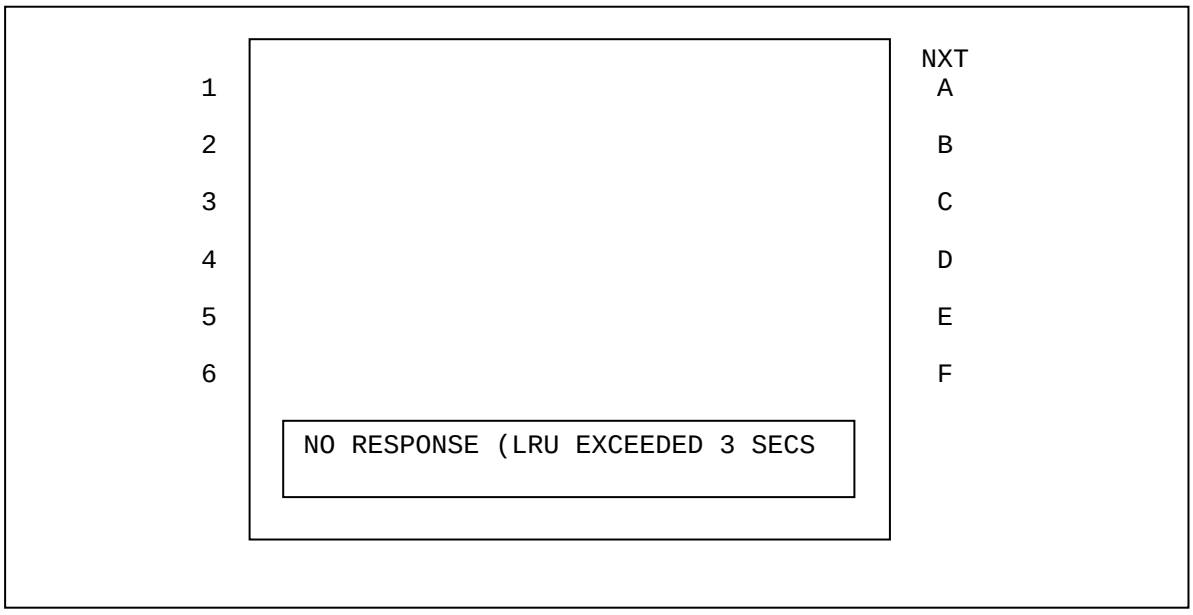


Figure 60 MENU MODE SCREEN (NO RESPONSE MESSAGE)

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

MENU MODE (ABD0018) cont.

Failure to receive data after approximately 30 s will result in the message LRU ERROR - HIT <PRIOR PAGE> OR ANOTHER KEY as shown in Figure 61.

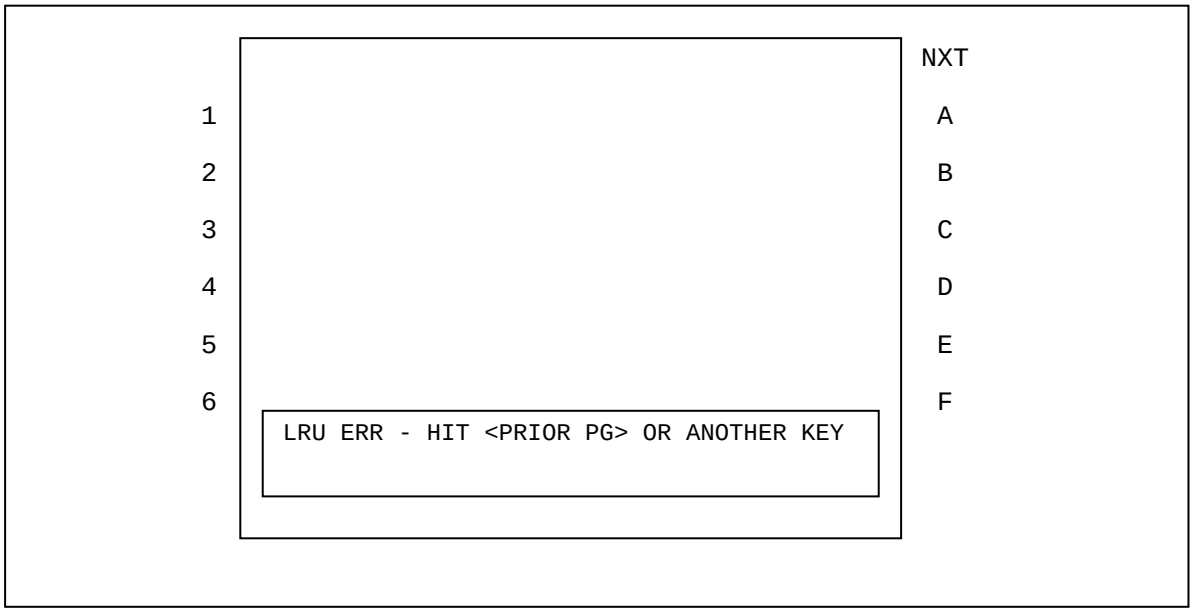


Figure 61 MENU MODE SCREEN (LRU ERROR MESSAGE)

NORMAL MODE (ABD0048) FUNCTIONS EXACTLY THE SAME AS NORMAL MODE (ABD0018). REFER TO CHAPTER 1-4, CFDS MODE, NORMAL MODE (ABD0018).

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

INTERACTIVE MODE (ABD0048)

Press the PRIOR PAGE key on the keypad to return to the ENTER DATA AND SHOP CODE screen. Then press the INTERACTIVE MODE (ABD0048) selection to advance to the INTERACTIVE MODE screen as shown in Figure 62.

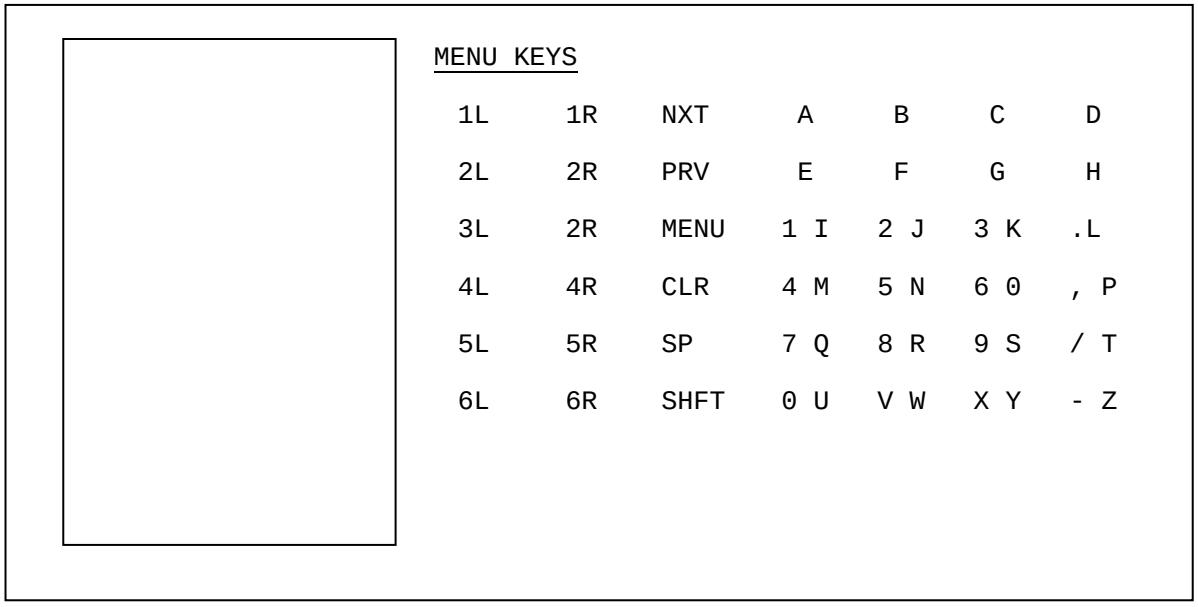


Figure 62 INTERACTIVE MODE SCREEN

If an appropriate LRU were correctly connected to the T1200B, a menu would appear within the boxed-in area of the screen shown in Figure 62. To display the different menus available for the particular LRU, the operator must press the corresponding field (1L-6L) for left menu selections or (1R-6R) for the right menu selections. Pressing any of these commands will cause the appropriate menu request to be transmitted to the LRU. This Menu Item Data Request is encoded as part of the COMMAND CODE into bits 25-31 of label 227 (BITE Command Word) being transmitted from the T1200B. The menu request commands are structured as follows:

T1200B Menu Command	Bits 25-31 Data (Hex)
1L	70
2L	71
3L	72
4L	73
5L	74
6L	75
1R	78
2R	79
3R	7A
4R	7B

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

INTERACTIVE MODE (ABD0048) cont.

5R	**7C**
6R	**7D**

Some menus will have more than one page, which will require the operator to use the NXT or PRV fields. Pressing the NXT field will cause a new menu page to appear on the screen. Pressing the PRV field will cause the previous menu to reappear on the screen.

T1200B Menu Command	**Bits 25-31 Data (Hex)**
PRV	**76**
NXT	**77**

Without an LRU transmitting menu data to the T1200B, the message NO RESPONSE (LRU EXCEEDED 3 SECS) will be displayed at the bottom of the screen approximately 3 s after selecting this screen as shown in Figure 63.

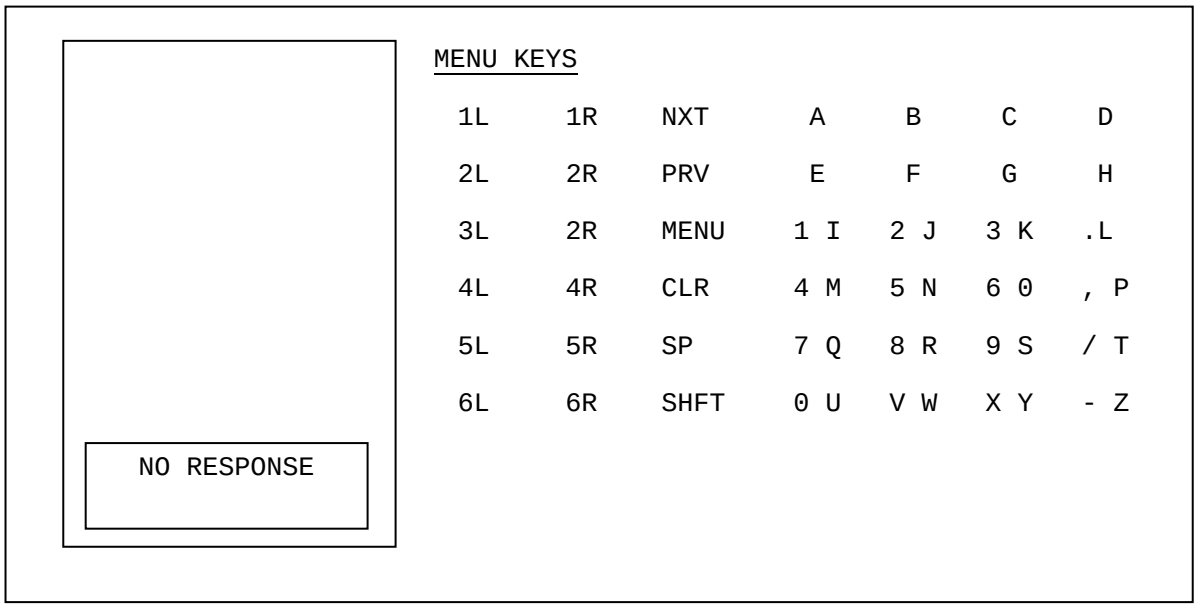


Figure 63 INTERACTIVE MODE SCREEN (NO RESPONSE MESSAGE)

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

INTERACTIVE MODE (ABD0048) cont.

Failure to receive data after approximately 30 s will result in the message LRU ERROR - HIT <PRIOR PAGE> OR ANOTHER KEY as shown in Figure 64.

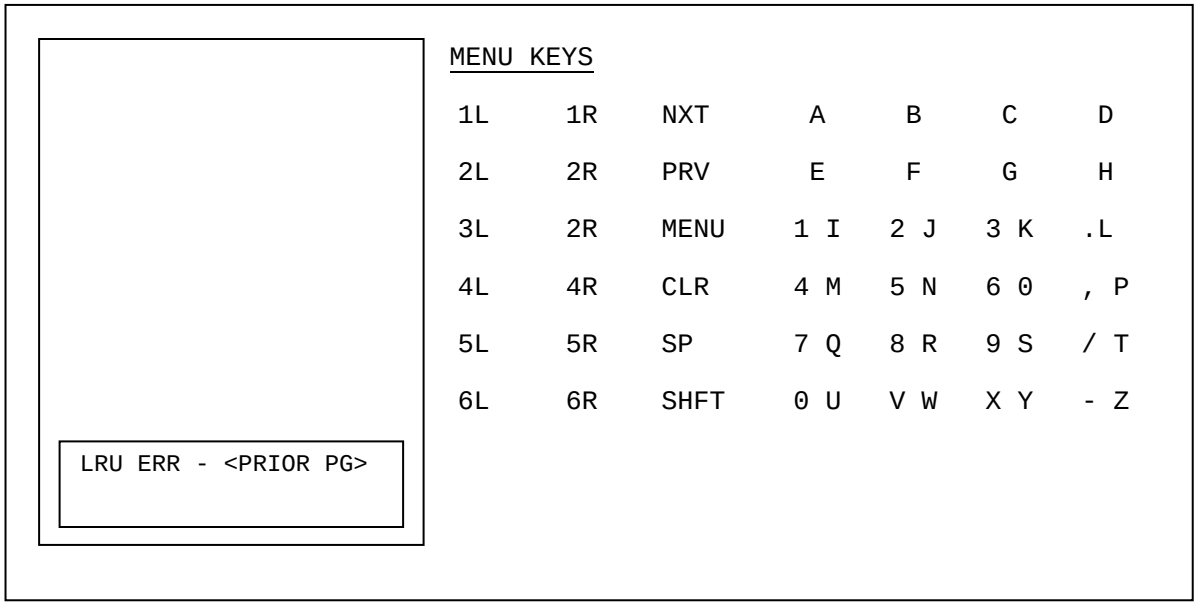


Figure 64 INTERACTIVE MODE SCREEN (LRU ERROR MESSAGE)

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

INTERACTIVE MODE (ABD0048) cont.

Some LRUs will require the operator to input data before the LRU can perform a test. When a LRU requires alphanumeric data, the menu page it transmits will look similar to the one in Figure 65.

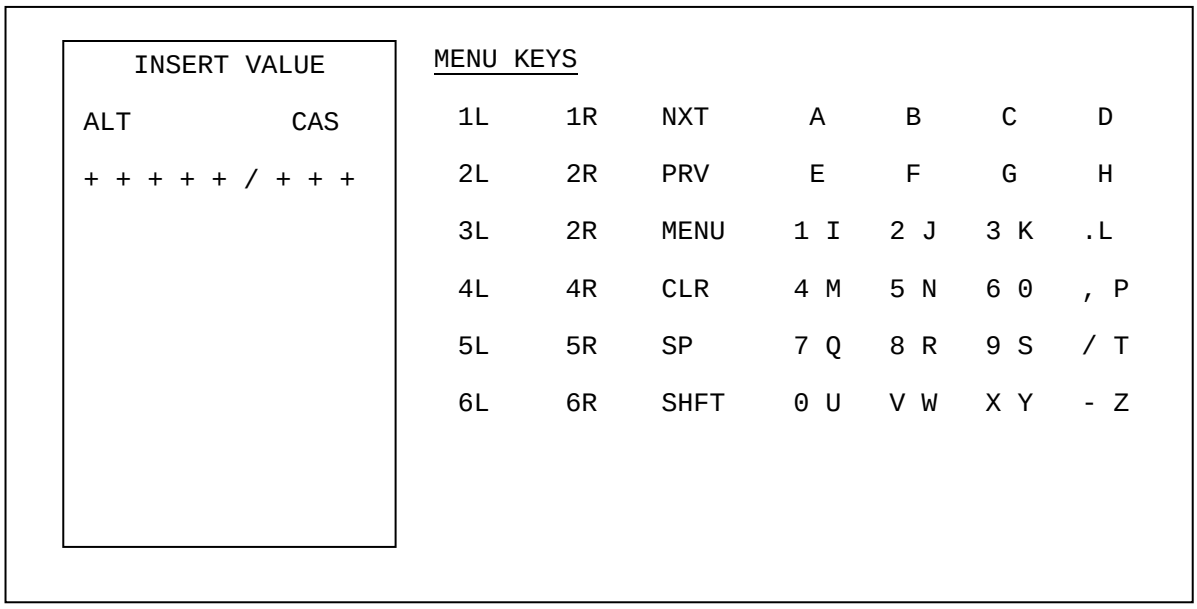


Figure 65 INTERACTIVE MODE SCREEN (REQUEST FOR INPUT)

To enter alphanumeric data, use the touch screen fields, or where appropriate, use the keypad. The selected character will be displayed on the screen as shown in Figure 66. The T1200B will insert the character into bits 25 - 31 of label 227.

There is a SP touch screen field for a " " character, and a SHFT touch screen field to gain access to characters that share a touch screen field (e.g. "I").

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F CFDS MODE cont.

INTERACTIVE MODE (ABD0048) cont.

NOTE DUE TO THE NUMBER OF TOUCH SCREEN FIELDS ON THE INTERACTIVE MODE SCREEN, THE FIELDS ARE NOT CENTERED DIRECTLY ABOVE THE HARDWARE TOUCH SCREEN SWITCHES. THEREFORE, TO ENSURE THAT THE DESIRED CHARACTER IS SELECTED, PRESS ON THE LEFT SIDE OF THE TOUCH SCREEN FIELD.

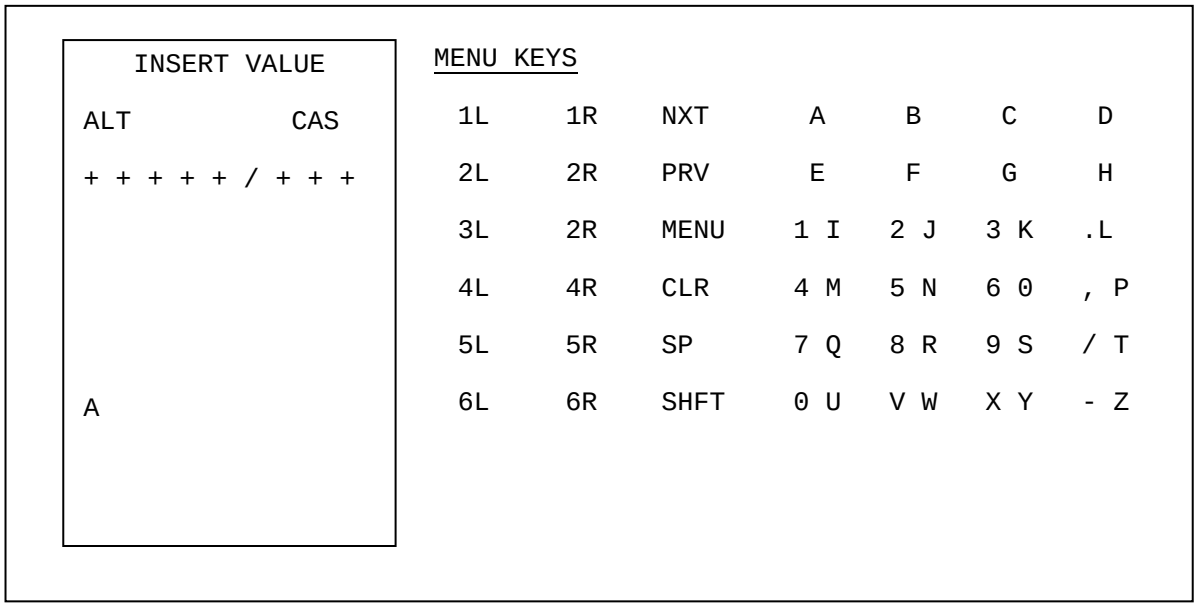


Figure 66 INTERACTIVE MODE SCREEN (OPERATOR INPUT 'A')

The T1200B will continue to transmit the character until it receives either an 'ACK', or a 'NAK', from the LRU. If an 'ACK' is received, the T1200B will stop transmitting the character and increment the character entry position for the next character. If 'NAK' is received, the T1200B will display the message shown in Figure 67 and attempt the transmission of the character 2 more times. If the T1200B receives 3 non-acknowledgments (NAKs), it will display the message shown in Figure 68 and stop transmission of the character.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

INTERACTIVE MODE (ABD0048) cont.

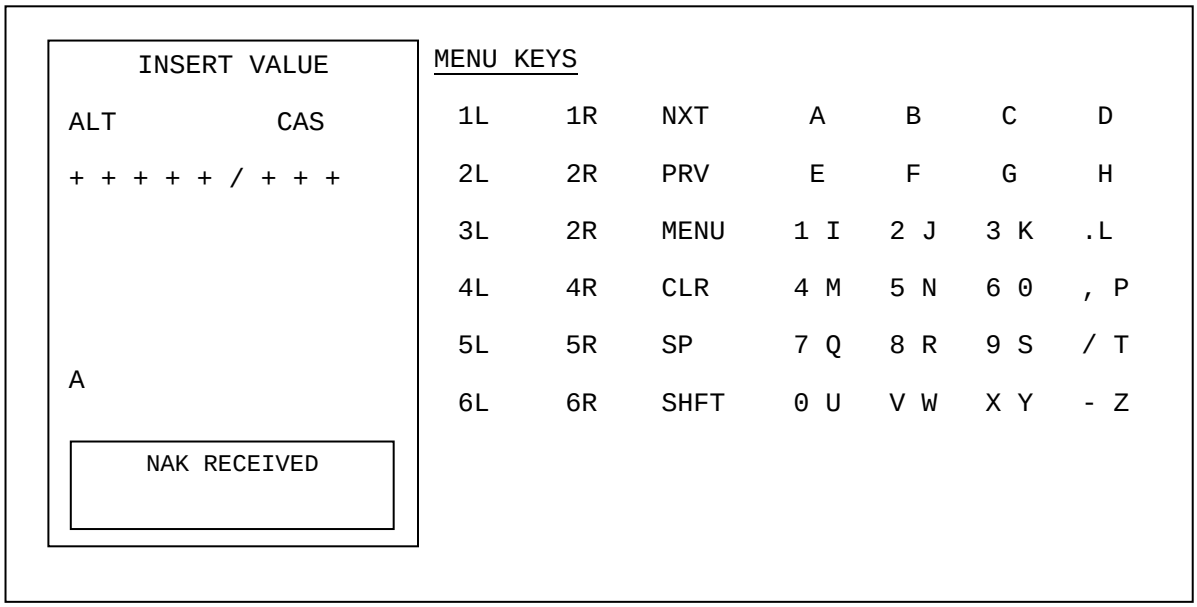


Figure 67 INTERACTIVE MODE SCREEN (NAK MESSAGE)

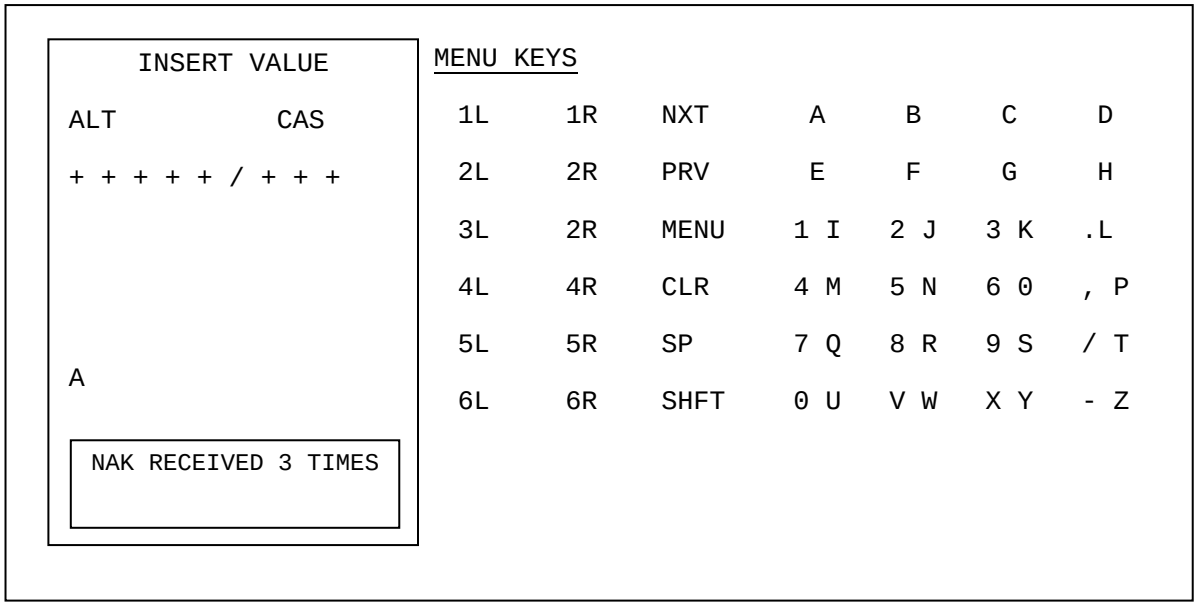


Figure 68 INTERACTIVE MODE SCREEN (3 NAK MESSAGE)

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

INTERACTIVE MODE (ABD0048) cont.

If the T1200B does not detect an 'ACK' or 'NAK' within 3 s after starting the transmission of the character, it will display the error message shown in Figure 69. If after 30 s the LRU still has not responded, the T1200B will display the error message shown in Figure 70.

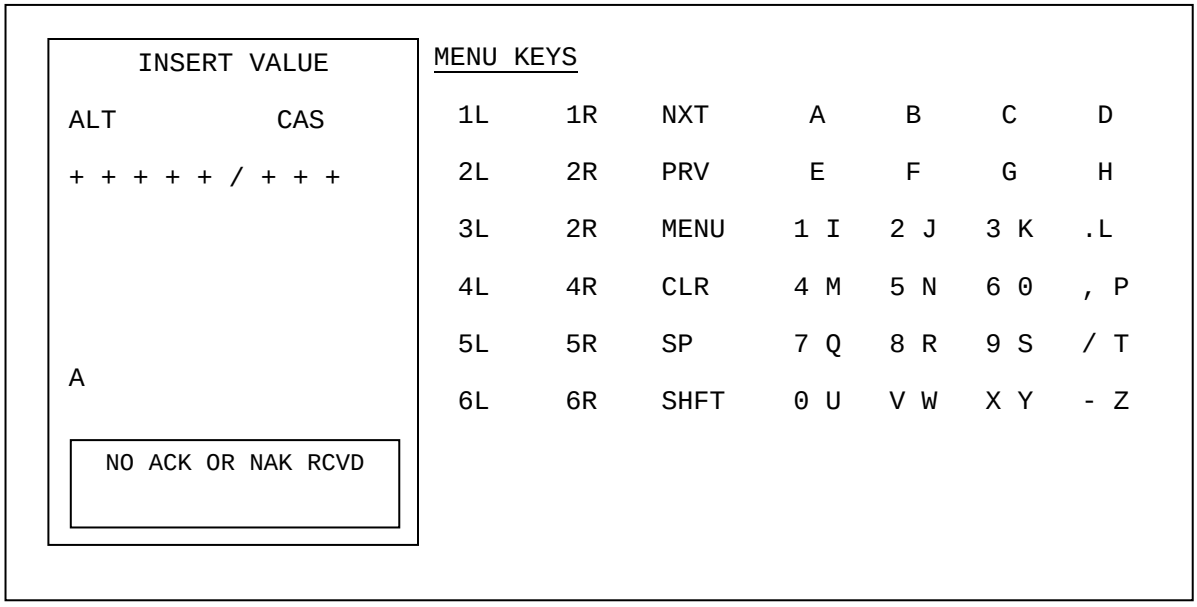


Figure 69 INTERACTIVE MODE SCREEN (NO ACK OR NAK MESSAGE)

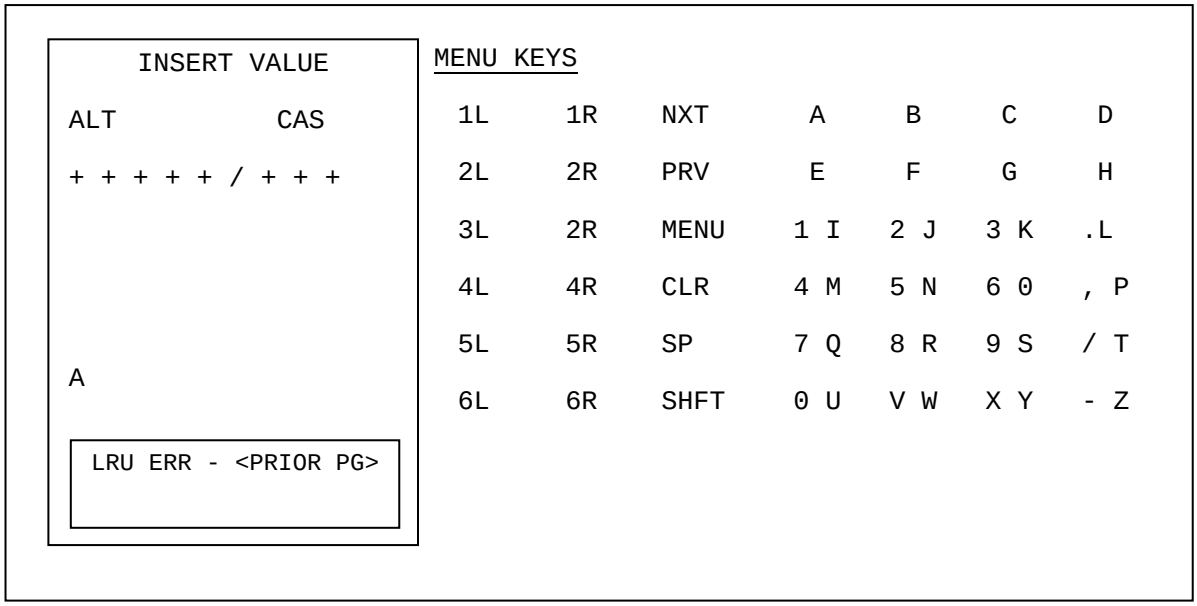


Figure 70 INTERACTIVE MODE SCREEN (LRU ERR MESSAGE)

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

INTERACTIVE MODE (ABD0048) cont.

To erase a character press the 'CLR' touch screen field. To erase an entire line press the 'SHFT' touch screen field (the 'SHFT' field's text should change to inverse high intensity), then press the 'CLR' field. When the T1200B detects either of the 'CLR' commands it will erase the proper number of characters and then change bits 31 - 25 of label 227 to 08 hex. If it is the 'CLR' command the T1200B will clear bit 12 of the label 227 word. If it is the 'SHFT' 'CLR' the T1200B will set bit 12.

NOTE THE CLEAR CHARACTER (COMMAND) MUST BE ACKNOWLEDGED (ACK) BY THE LRU JUST LIKE ANY OTHER CHARACTER.

DISCRETE MODE (ABD0048)

Press the PRIOR PAGE key on the keypad to return to the ENTER DATA AND SHOP CODE screen. Then press the DISCRETE MODE (ABD0048) selection to advance to the DISCRETE MODE screen as shown in Figure 71.

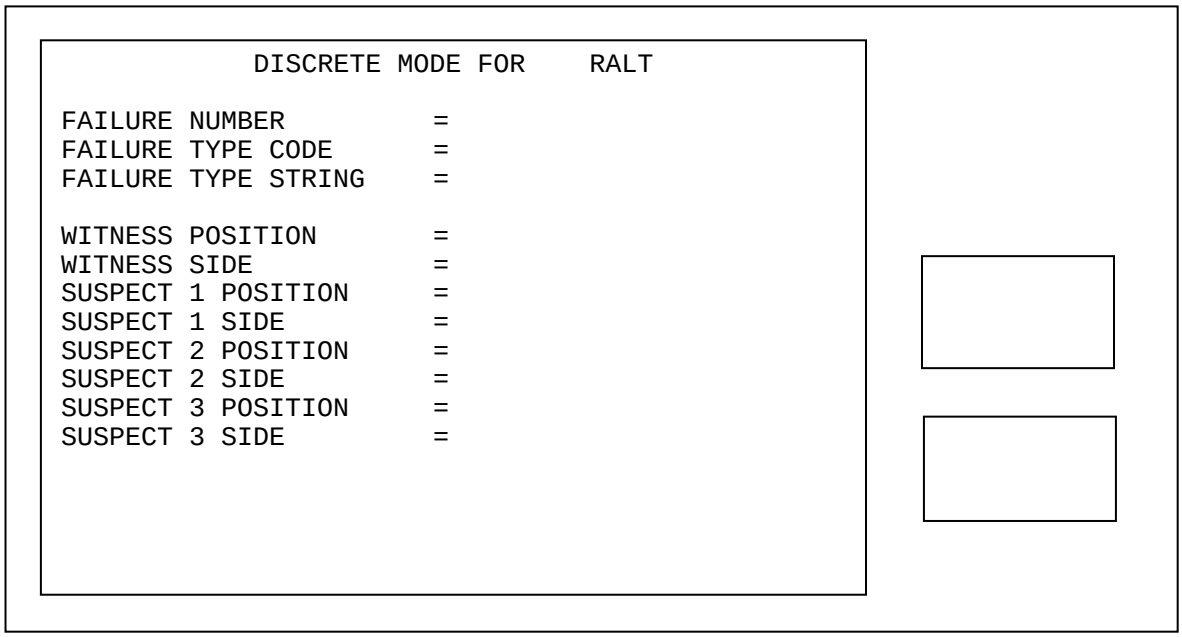


Figure 71 DISCRETE MODE SCREEN

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

DISCRETE MODE (ABD0048) cont.

If the T1200B does not detect any label 355 words from the LRU in 1 s, it will display the error message shown in Figure 72.

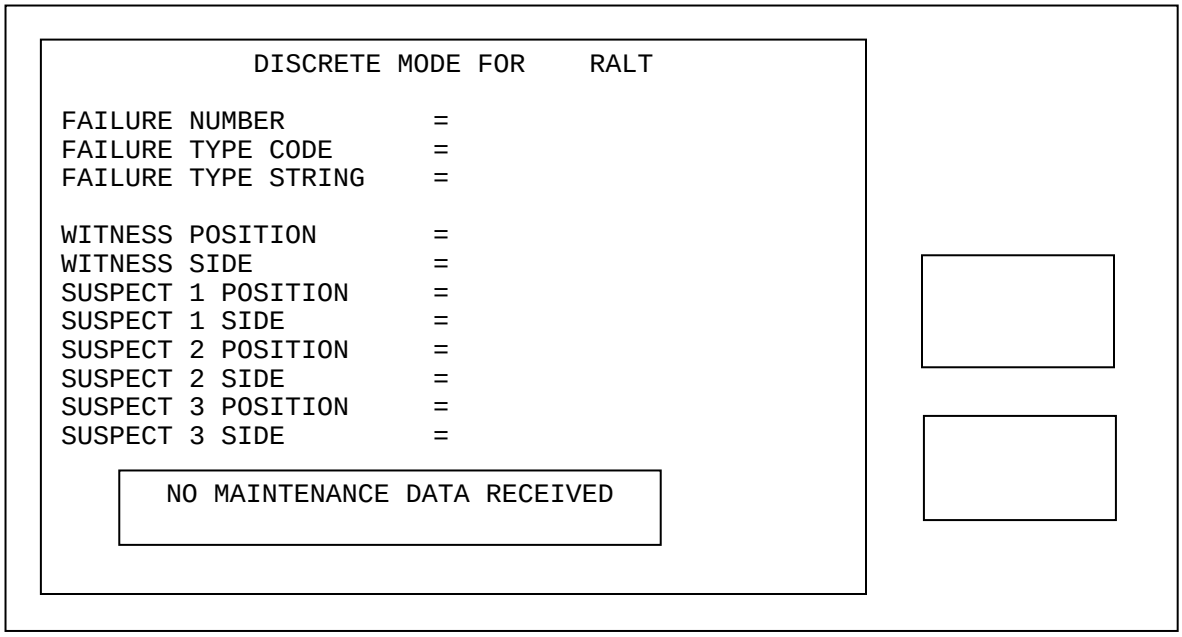


Figure 72 DISCRETE MODE SCREEN (NO DATA RECEIVED MESSAGE)

If the T1200B detects a failure message from a LRU, it will display the failure on the screen. An example failure message display is shown in Figure 73. If the T1200B detects several failure messages from a LRU, the PREV FAILURE and NEXT FAILURE fields will become active as shown in Figure 74. These fields allow the operator to view all the failures received from the LRU.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

DISCRETE MODE (ABD0048) cont.

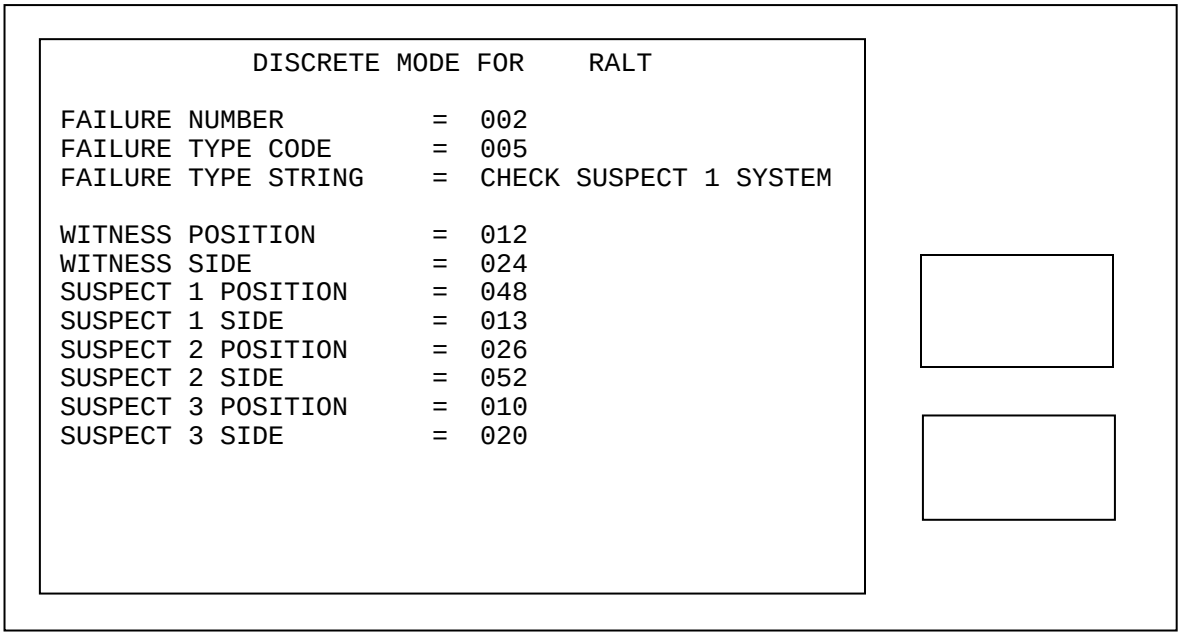


Figure 73 DISCRETE MODE SCREEN (SINGLE FAILURE MESSAGE)

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

DISCRETE MODE (ABD0048) cont.

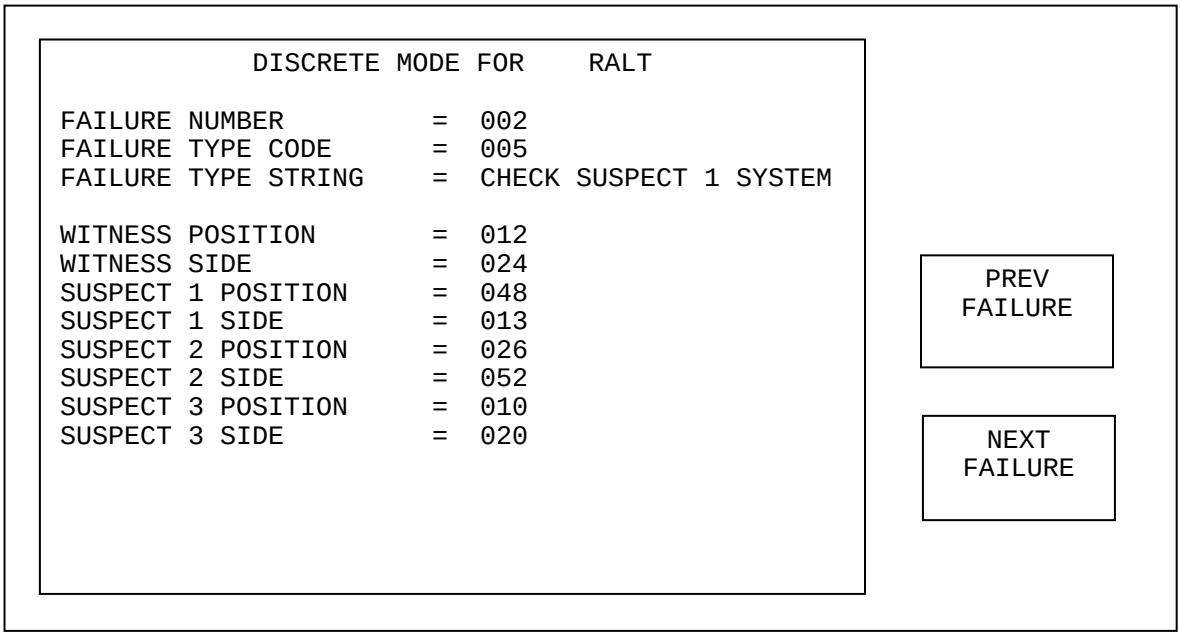


Figure 74 DISCRETE MODE SCREEN (MULTIPLE FAILURE MESSAGES)

ERROR MESSAGE	EXPLANATION
NO MAINTENANCE DATA RECEIVED	T1200B has not received any label 356 words in NORMAL, MENU, or INTERACTIVE MODES, or label 355 words in DISCREET MODE.
NO RESPONSE (LRU EXCEEDED 3 S)	LRU did not respond to T1200B ENQ within 4.2 s (ABD0048C - says LRU should respond in 3 s).
LRU ERR - HIT <PRIOR PG> OR ANOTHER KEY	T1200B did not detect any response from the LRU in 30 s.
RECORD WORD CNT ERR	The record word count in the STX word did not equal the number of words between STX and ETX (or EOT) inclusive
BLOCK WORD CNT ERR	The word count in the DC2 word did not equal the number of words received for the page. STX to EOT inclusive.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CFDS MODE cont.

DISCRETE MODE (ABD0048) cont.

ERROR MESSAGE	EXPLANATION
RECORD SEQUENCE ERR	The records sequence number in the STX word does not match the sequence number the T1200B was expecting.
NO EOT RCVD	The T1200B did receive an EOT at the end of a menu page, or more than 4 s elapsed between STX and EOT. Each menu page should be transmitted in less than 3 s.
CURSOR CONTROL ERROR	The record extended past the 24th position on the screen.
NO ACK OR NAK RCVD	The T1200B tried to send a character to the LRU, and the LRU did not re-s with ACK or NAK within 3 s.
NAK RECEIVED	T1200B tried to send a character to a LRU, but the LRU refused it.
NAK RECEIVED 3 TIMES	LRU refused it 3 times.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE

The operation of the CMC mode is consistent with the other portions of the T1200B in that the screens and menus are easily and logically accessible to the operator via the touch screen display. The following discussion provides a description of each screen displayed by the CMC mode of operation. When performing tests to an actual unit, the test procedures found in the CMM (Component Maintenance Manual) for the particular LRU (Line Replaceable Unit) should be followed. Do NOT connect the T1200B to other test sets or LRUs while performing this procedure unless instructed to do so.

After power up, the operator then has the option of pressing the highlighted areas of the screen to select either the STANDARD MODE, CFDS MODE, or the CMC MODE from the Power Up & Self-Test Screen (Figure 5).

LRU SELECTION SCREEN

Press the CMC MODE portion of the screen to advance to the LRU SELECTION screen as shown in Figure 75.

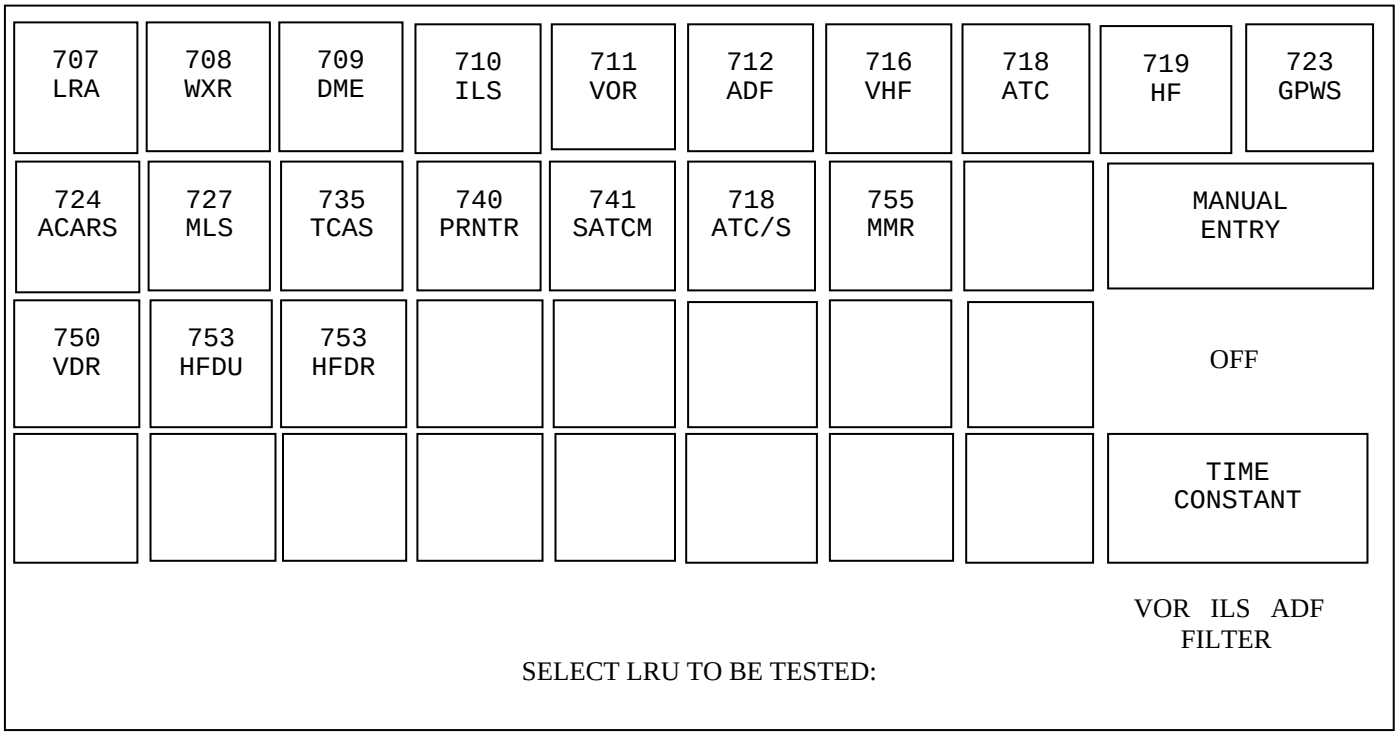


Figure 75 LRU SELECTION SCREEN

The purpose of this screen is to allow the operator to select the type of LRU being tested. Whichever selection is pressed will cause the T1200B to encode the appropriate Equipment Code into bits 13 (LSB) through 24 (MSB) of label 227, which is transmitted to the LRU under test. Commands are addressed to the receiving equipment by combinations of Equipment Code and SDI. Should you be testing an LRU that is not among those listed on the screen, you can press the MANUAL ENTRY selection and manually enter any three digit code from 000 - FFF (Hex) via the keypad.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

BOEING CMC/SENSOR BITE SCREEN

For purposes of this discussion, press the 707 LRA selection at the top left corner of the screen to proceed to the BOEING CMC/SENSOR BITE screen as shown in Figure 76.

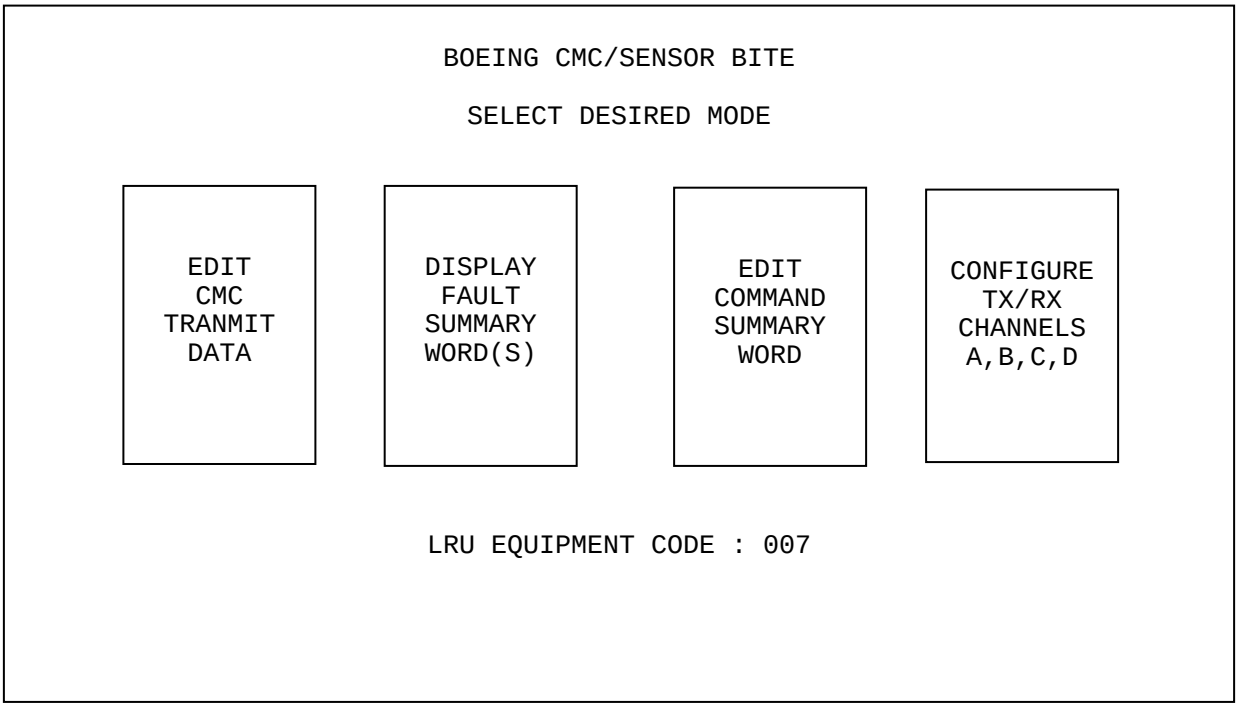


Figure 76 BOEING CMC/SENSOR BITE SCREEN

This screen allows the operator to proceed directly to the DISPLAY FAULT SUMMARY WORD(S) screen or to perform changes to the default settings of the data being transmitted to the LRU by selecting either EDIT CMC TRANSMIT DATA, EDIT COMMAND SUMMARY WORD or CONFIGURE CHANNELS A, B, C, D.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

EDIT CMC TRANSMIT DATA

At this time, press the EDIT CMC TRANSMIT DATA selection to proceed to the screen as shown in Figure 77.

This screen allows the operator to edit the data of any of the 16 labels that are being transmitted to the LRU from the T1200B (except for label 227, which is edited from other screens). While the T1200B software is designed to eliminate the need for the operator to know which label performs what function, for information purposes only, the 16 labels are as follows:

LABEL	DESCRIPTION	REFRESH RATE
040	CITY PAIRS (Word #1)	3000 ms
041	CITY PAIRS (Word #2)	3000 ms
042	CITY PAIRS (Word #3)	3000 ms
125	TIME (GMT)	1000 ms
126	FLIGHT PHASE	1000 ms
155	AIRCRAFT CONFIGURATION WORD	1000 ms
227	BITE COMMAND	100 ms
233	FLIGHT NUMBER (Word #1)	4000 ms
234	FLIGHT NUMBER (Word #2)	4000 ms
235	FLIGHT NUMBER (Word #3)	4000 ms
236	FLIGHT NUMBER (Word #4)	4000 ms
260	DATE	1000 ms
301	AIRCRAFT ID (Word #1)	4000 ms
302	AIRCRAFT ID (Word #2)	4000 ms
303	AIRCRAFT ID (Word #3)	4000 ms
304	AIRCRAFT ID (Word #4)	4000 ms

NOTE ALTHOUGH LABEL 304 IS TRANSMITTED, THE AIRCRAFT ID IS ONLY ENCODED IN LABELS 301, 302, and 303, PER BOEING DOCUMENT D243W201-1.

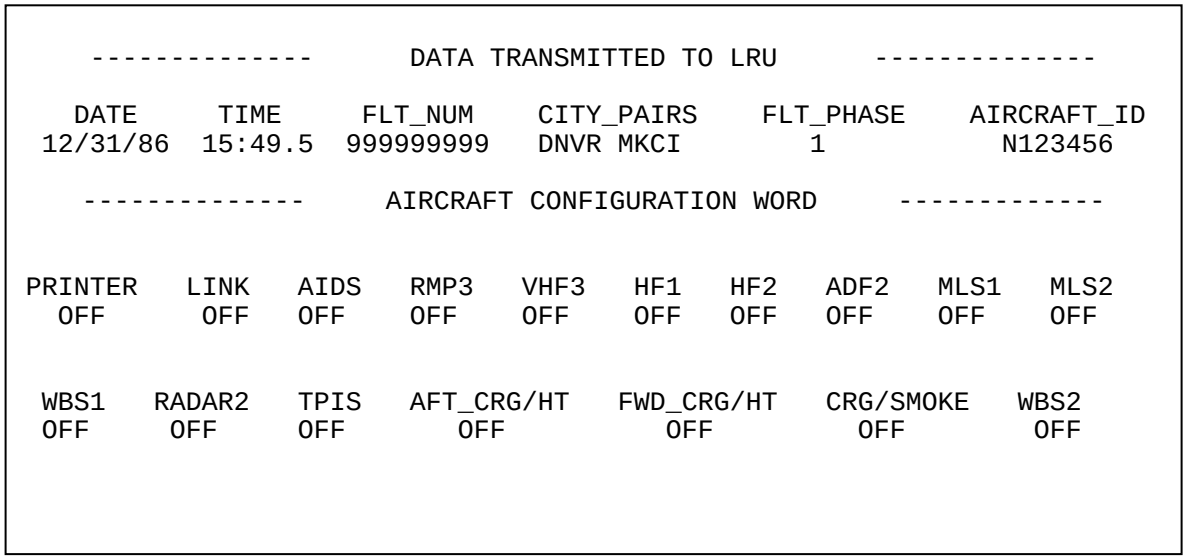


Figure 77 EDIT CMC TRANSMIT DATA SCREEN

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

F. CMC MODE cont.

EDIT CMC TRANSMIT DATA cont.

The transmitted CMC information, can easily be edited by the operator without interrupting transmission. This is accomplished by touching the desired CMC information word, i.e. DATE, TIME, FLT NUM, CITY PAIRS, FLT PHASE or AIRCRAFT ID, and then entering the new data via the keypad.

DATE

The DATE (label 260) is edited by pressing the word DATE on the upper row of the screen. Once pressed, a reverse video box will appear below it prompting you to enter the new date. The data should be entered as MONTH/DAY/YEAR. The structure of the data word is as follows:

```
Bits  1-8         : Label 260
Bits  9-10        : Source Destination Identifier (SDI)
Bits 11-14        : The units of the year       BCD   e.g.  6
Bits 15-18        : The tens of the year        BCD   e.g.  8
Bits 19-22        : The units of the month      BCD   e.g.  2
Bit  23           : The tens of the month       BCD   e.g.  1
Bits 24-27        : The units of the day        BCD   e.g.  1
Bits 28-29        : The tens of the day         BCD   e.g.  3
Bits 30-31        : Sign/Status Matrix (SSM)
Bit  32           : Parity
```

The example given is 31 December 1986. The refresh rate is 1000 ms.

TIME (GMT)

The TIME (label 125) is edited by pressing the word TIME on the upper row of the screen. Once pressed, a reverse video box will appear below it prompting you to enter the new time. The data should be entered as HOURS/MINUTES using 24 hour military time. The structure of the data word is as follows:

```
Bits  1-8         : Label 125
Bits  9-10        : SDI
Bits 11-14        : Tenths of minutes           BCD   e.g.  0.5
Bits 15-18        : The units of the minutes    BCD   e.g.  9
Bits 19-22        : The tens of the minutes     BCD   e.g.  4
Bit  23-26        : The units of the hours      BCD   e.g.  5
Bits 27-29        : The tens of the hours       BCD   e.g.  1
Bits 30-31        : SSM
Bit  32           : Parity
```

The example given is 15:49.5. The refresh rate is 1000 ms.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

FLIGHT NUMBER

When editing FLIGHT NUMBER (labels 233, 234, 235, 236), the alphanumeric screen shown in Figure 78 will appear. This will allow any necessary letters (A-Z) to be entered that are not available on the keypad. Enter the eight-digit identifier, i.e. 1A2B3C4D, for the desired FLIGHT NUMBER. The scratch pad on the screen above the letters will show entered data. If a mistake is made, press the CLEAR button on the keypad and start over. When the data entry is complete, press the ENTER key on the keypad and the screen will revert back to Figure 77. Any new data entered by the operator for the FLIGHT NUMBER will be displayed.

```
1st Word :        Bits  1-8          : Label 233
                  Bits  9-10         : Spare (zeros)
                  Bits 11-17         : 1st Character ISO
                  Bit  18            : 0 (Constant value)
                  Bits 19-25         : 2nd Character ISO
                  Bit  26            : 0 (Constant value)
                  Bits 27-29         : spare (zeros)
                  Bits 30-31         : SSM
                  Bit  32            : Parity

2nd Word :        Bits  1-8          : Label 234
                  Bits  9-10         : Spare (zeros)
                  Bits 11-17         : 3rd Character ISO
                  Bit  18            : 0 (Constant value)
                  Bits 19-25         : 4th Character ISO
                  Bit  26            : 0 (Constant value)
                  Bits 27-29         : spare (zeros)
                  Bits 30-31         : SSM
                  Bit  32            : Parity

3rd Word :        Bits  1-8          : Label 235
                  Bits  9-10         : Spare (zeros)
                  Bits 11-17         : 5th Character ISO
                  Bit  18            : 0 (Constant value)
                  Bits 19-25         : 6th Character ISO
                  Bit  26            : 0 (Constant value)
                  Bits 27-29         : spare (zeros)
                  Bits 30-31         : SSM
                  Bit  32            : Parity

4th Word :        Bits  1-8          : Label 236
                  Bits  9-10         : Spare (zeros)
                  Bits 11-17         : 7th Character ISO
                  Bit  18            : 0 (Constant value)
                  Bits 19-25         : 8th Character ISO
                  Bit  26            : 0 (Constant value)
                  Bits 27-29         : spare (zeros)
                  Bits 30-31         : SSM
                  Bit  32            : Parity
```

The refresh rate is 4000 ms.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G.CMC MODE cont.

FLIGHT NUMBER cont.

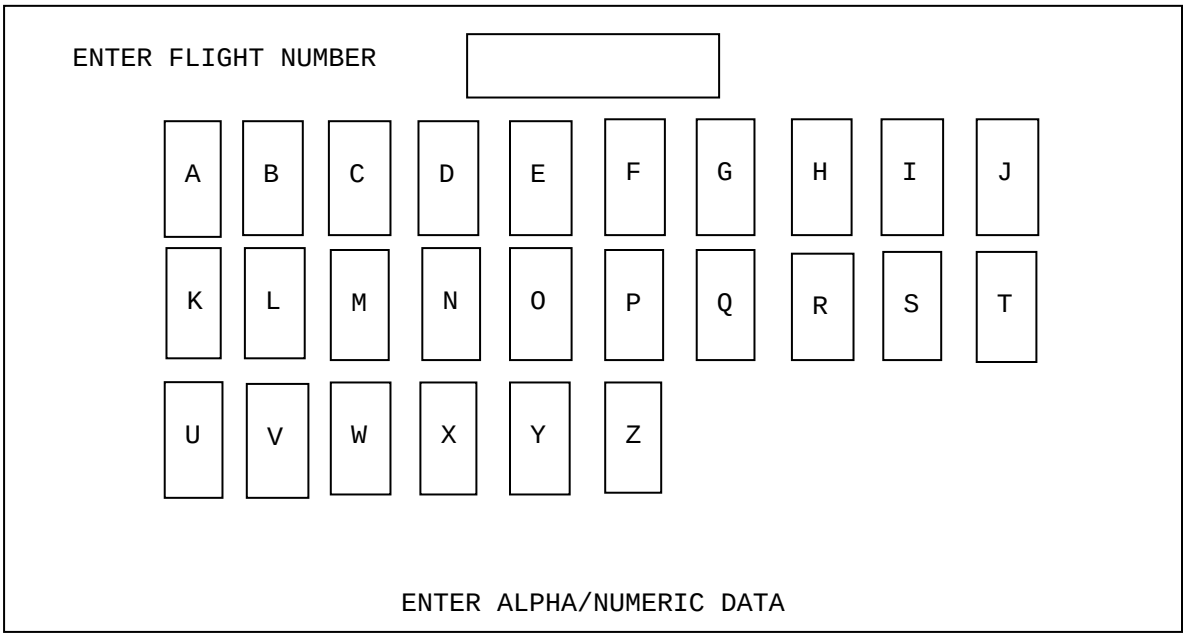


Figure 78 FLIGHT NUMBER ALPHANUMERIC EDIT SCREEN

FLIGHT PHASE

The FLIGHT PHASE (label 126) is edited by pressing the word FLIGHT PHASE on the upper row of the screen. Once pressed, a reverse video box will appear below it prompting you to enter the new flight phase. The data should be entered in up to two consecutive numeric characters (1-10). The structure of the data word is as follows:

```
Bits  1-8              : Label 126
Bits  9-10             : SDI
Bits 11-14             : Flight Phase Count    BNR
                           (LSB=11, MSB=14)
Bits 15-29             : Spare (zeros)
Bits 30-31             : SSM
Bit  32                : Parity
```

The refresh rate is 1000 ms.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

CITY PAIRS & AIRCRAFT ID

In the case where alphanumeric data is required, i.e. CITY PAIRS or AIRCRAFT ID, one of two slightly different alphanumeric screens will appear.

CITY PAIRS

When editing CITY PAIRS (labels 040, 041, 042), the alphanumeric screen shown in Figure 79 will appear. This will allow any necessary letters (A-Z) to be entered that are not available on the keypad. Enter the two 4-digit identifiers, i.e. DNVR MKCI, for the desired CITY PAIRS. The scratch pad on the screen above the letters will show entered data. Note that a space will automatically be inserted between the two 4-digit identifiers. If a mistake is made, press the CLEAR button on the keypad and start over. When the data entry is complete, press the ENTER key on the keypad and the screen will revert back to Figure 77. Any new data entered by the operator for the CITY PAIRS will be displayed.

Three words are used for this information. Their structure is as follows:

```
1st Word :        Bits  1-8         : Label 040
                  Bits  9-15        : Character 1 FROM
                  Bits 16-22        : Character 2 FROM
                  Bits 23-29        : Character 3 FROM
                  Bits 30-31        : SSM
                  Bit  32           : Parity

2nd Word :        Bits  1-8         : Label 041
                  Bits  9-15        : Character 4 FROM
                  Bits 16-22        : Space
                  Bits 23-29        : Character 1 TO
                  Bits 30-31        : SSM
                  Bit  32           : Parity

3rd Word :        Bits  1-8         : Label 042
                  Bits  9-15        : Character 2 TO
                  Bits 16-22        : Character 3 TO
                  Bits 23-29        : Character 4 TO
                  Bits 30-31        : SSM
                  Bit  32           : Parity
```

The refresh rate is 3000 ms.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

CITY PAIRS cont.

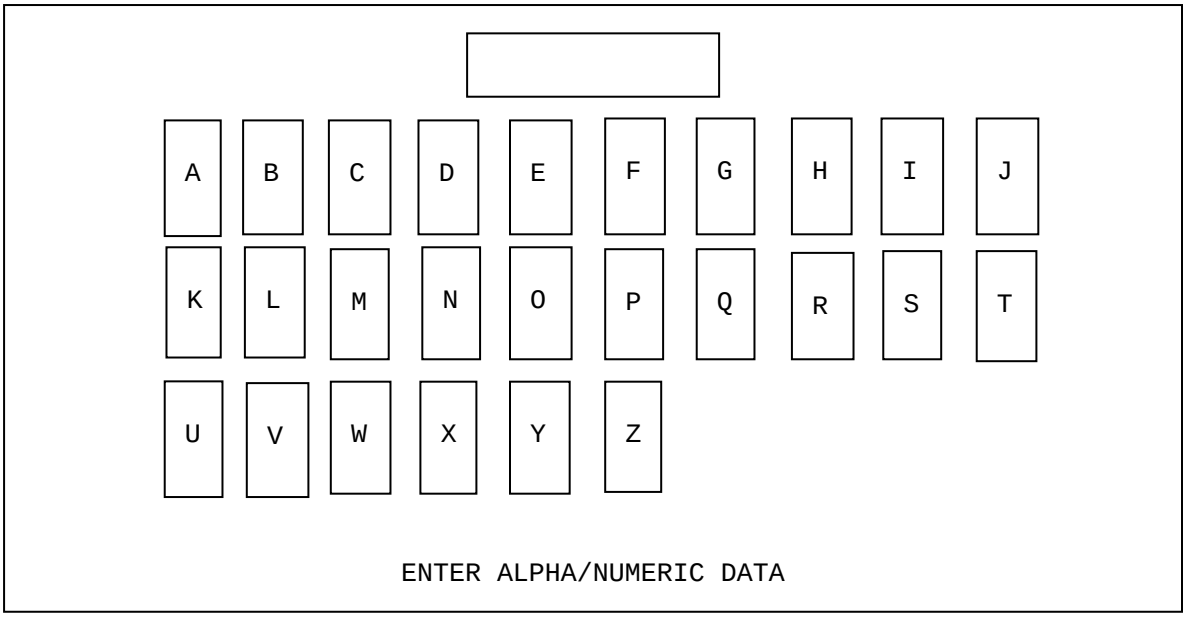


Figure 79 CITY PAIRS ALPHANUMERIC EDIT SCREEN

AIRCRAFT ID

When editing the AIRCRAFT ID word (labels 301, 302, 303), the alphanumeric screen shown in Figure 80 will appear. Use a combination of the letters on the screen and the numbers on the keypad to enter the desired data for the AIRCRAFT TAIL NUMBER. After the tail number entry is completed, press the ENTER key on the keypad. The screen will revert back to Figure 77. Any new data entered by the operator for the AIRCRAFT ID will be displayed.

NOTE Press only the ENTER key on the keypad if no change to the data is required. Three words are used for this information. Their structure is as follows:

```
1st Word :        Bits  1-8         : Label 300
                  Bits  9-10        : SDI
                  Bits 11-17        : 1st A/C Tail No. Character
                  Bits 18-24        : 2nd A/C Tail No. Character
                  Bits 25-31        : 3rd A/C Tail No. Character
                  Bit  32           : Parity
```

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

AIRCRAFT ID cont.

```
2nd Word :        Bits  1-8          : Label 301
                  Bits  9-10         : SDI
                  Bits 11-17         : 4th A/C Tail No. Character
                  Bits 18-24         : 5th A/C Tail No. Character
                  Bits 25-31         : 6th A/C Tail No. Character
                  Bit  32            : Parity

3rd Word :        Bits  1-8          : Label 302
                  Bits  9-10         : SDI
                  Bits 11-17         : 7th A/C Tail No. Character
                  Bits 18-24         : Space
                  Bits 25-31         : Space
                  Bit  32            : Parity
```

The refresh rate is 4000 ms.

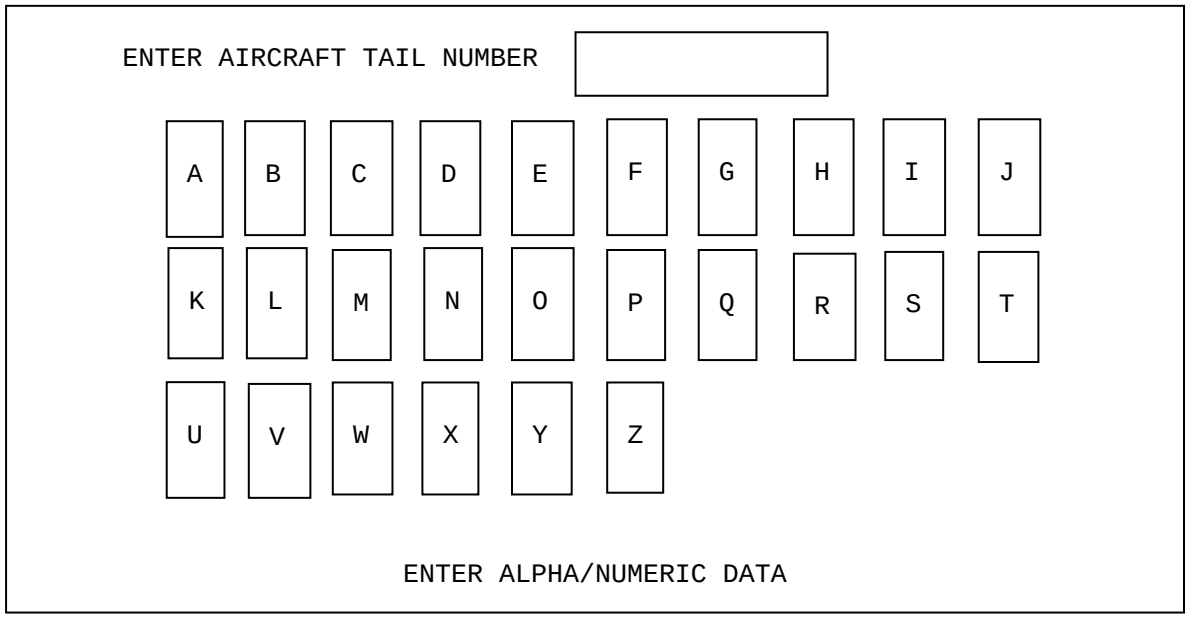


Figure 80 AIRCRAFT ID WORD ALPHANUMERIC EDIT SCREEN

AIRCRAFT CONFIGURATION WORD

The AIRCRAFT CONFIGURATION WORD (label 155) options (shown on the lower portion of Figure 77) are edited by pressing the appropriate word on the screen and toggling it either ON or OFF as desired. This data is encoded into bits 11 through 27 of label 155. The structure of the word is as follows:

```
Bits 1-8          : Label 155
Bits 9-10         : SDI 00
Bit 11            : Printer
```

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

AIRCRAFT ID cont.

```
Bit 12          : Data Link
Bit 13          : Aids
Bit 14          : RMP 3
Bit 15          : VHF 3
Bit 16          : HF 1
Bit 17          : HF 2
Bit 18          : ADF 2
Bit 19          : MLS 1
Bit 20          : MLS 2
Bit 21          : WBS 1
Bit 22          : Radar 2
Bit 23          : TPIS
Bit 24          : AFT Cargo Heat
Bit 25          : FWD Cargo Heat
Bit 26          : Cargo Smoke
Bit 27          : WBS 2
Bit 28-29       : Spare
Bit 30-31       : SSM
Bit 32          : Parity
```

The bits are coded: 0 if system not installed
1 if system installed

The T1200B default condition = 0. The refresh rate is 1000 ms.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

AIRCRAFT ID cont.

DISPLAY FAULT SUMMARY WORD(S)

Press the PRIOR PAGE key on the keypad to return to the BOEING CMC/SENSOR BITE screen (Figure 76). Press the DISPLAY FAULT SUMMARY WORD(S) selection to advance to the screen shown in Figure 81.

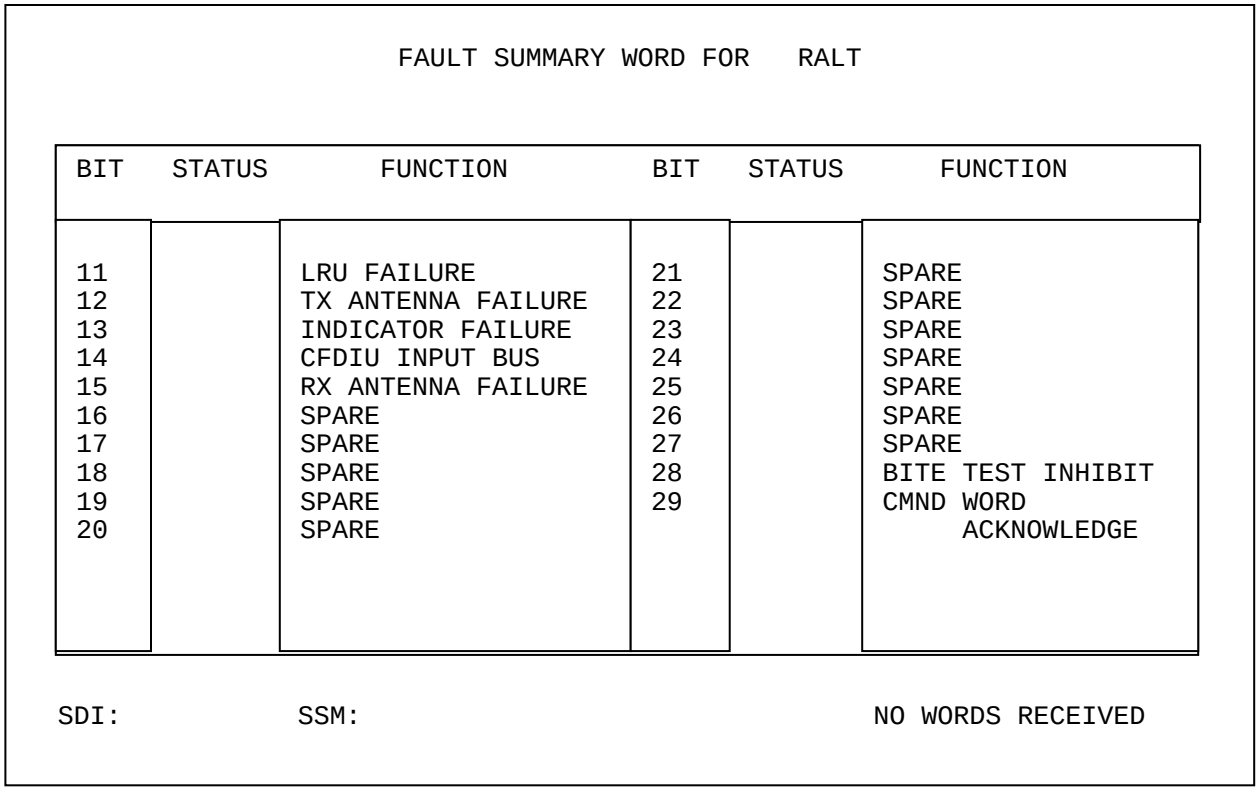


Figure 81 FAULT SUMMARY WORD SCREEN - RALT

This screen will provide the operator with an easy to understand display of the FAULT SUMMARY WORD data being transmitted from the LRU. With no LRU connected to the T1200B, the STATUS fields of all the bits in the data field are empty and the NO WORDS RECEIVED message at the bottom right corner of the screen indicate that no information is being received. Note that the top line of the screen indicates that the information present is the FAULT SUMMARY WORD FOR **RALT**. This is a result of the previous LRU selection of "707 RALT". If a different type of LRU is selected, the type of LRU selected will appear on the top line and an appropriately different FUNCTION for each bit of the FAULT SUMMARY WORD will be displayed.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

DISPLAY FAULT SUMMARY WORD(S) cont.

If an Equipment Code for an LRU is selected that is not in the T1200B's memory, XXX will appear in the top line as the FAULT SUMMARY WORD SELECTED and the word SPARE will appear in all BIT FUNCTIONS except for bits 28 and 29 which have the same function on all LRUs.

The Fault Summary Word is transmitted to the T1200B from the LRU on label 350. If a second Fault Summary Word is required, it will be transmitted on label 351 and will be displayed on a second page. To indicate this, the T1200B will display a message (Press PAGE for Word #2) in the lower right hand corner of the display to indicate to the operator to press the PAGE key on the keypad (to observe the second word).

NOTE On some T1200B's that have been field converted for CFDS/CMC operation, this key may be blank and not identified with the word PAGE. The key is located directly below the "F" key. If blank, mark the key with the word PAGE using a felt tip marker or contact Aeroflex and we can provide you with a decal to stick on the key.

Once on the second page, the message (Press PAGE for Word #1) tells the operator that pressing the PAGE key will return the screen to the first word.

The structure of the FAULT SUMMARY words are as follows:

```
Bits  1-8          : Label 350 (Word #1) and 351 (Word #2)
Bits  9-10         : SDI                    00 = All
                                            01 = Left
                                            10 = Right
                                            11 = Center
Bit   11-27        : Fault Data
Bit   28           : BITE Test Inhibit      0 = Enable
                                            1 = Inhibit
Bit   29           : CMD Word Acknowledge   0 = NAK
                                            1 = ACK
Bits 30-31         : SSM                    00 = Verified
                                            01 = No Computed Data
                                            10 = Functional Test
                                            11 = Not Defined
Bit   32           : Parity
```

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

DISPLAY FAULT SUMMARY WORD(S) cont.

The following check can be performed if you wish to simulate sending a Fault Summary Word to be displayed by the T1200B.

Using an Aeroflex Model 429E ARINC 429 Transmitter/Receiver to transmit to RX-A of the T1200B, the following example will result in the FAULT SUMMARY WORD screen to appear as in Figure 82.

429E TX

Slot No.	Label	Data (Hex)
1	350	800000

Once the correct message is being displayed, you can cause the T1200B to change the status of bits 11 through 29 or the SDI or SSM by editing the data being transmitted from the 429E. For example, changing the data from the 429E to transmit 000004 (setting bit 11 to a "1") will cause bit 11 status to change from OK to FAILURE.

FAULT SUMMARY WORD FOR RALT

BIT	STATUS	FUNCTION	BIT	STATUS	FUNCTION
11	OK	LRU FAILURE	21	OFF	SPARE
12	OK	TX ANTENNA FAILURE	22	OFF	SPARE
13	OK	INDICATOR FAILURE	23	OFF	SPARE
14	OK	CFDIU INPUT BUS	24	OFF	SPARE
15	OK	RX ANTENNA FAILURE	25	OFF	SPARE
16	OFF	SPARE	26	OFF	SPARE
17	OFF	SPARE	27	OFF	SPARE
18	OFF	SPARE	28	ENABLE	BITE TEST INHIBIT
19	OFF	SPARE	29	NAK	CMND WORD ACKNOWLEDGE
20	OFF	SPARE			

SDI: ALL SSM: VERIFIED Fault Summary Word #1

Figure 82 FAULT SUMMARY WORD SCREEN - RALT (ACTIVE)

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

EDIT COMMAND SUMMARY WORD

Press the PRIOR PAGE key on the keypad to return to the BOEING CMC/SENSOR BITE screen (Figure 76). Press the EDIT COMMAND SUMMARY WORD selection to proceed to the screen as shown in Figure 83.

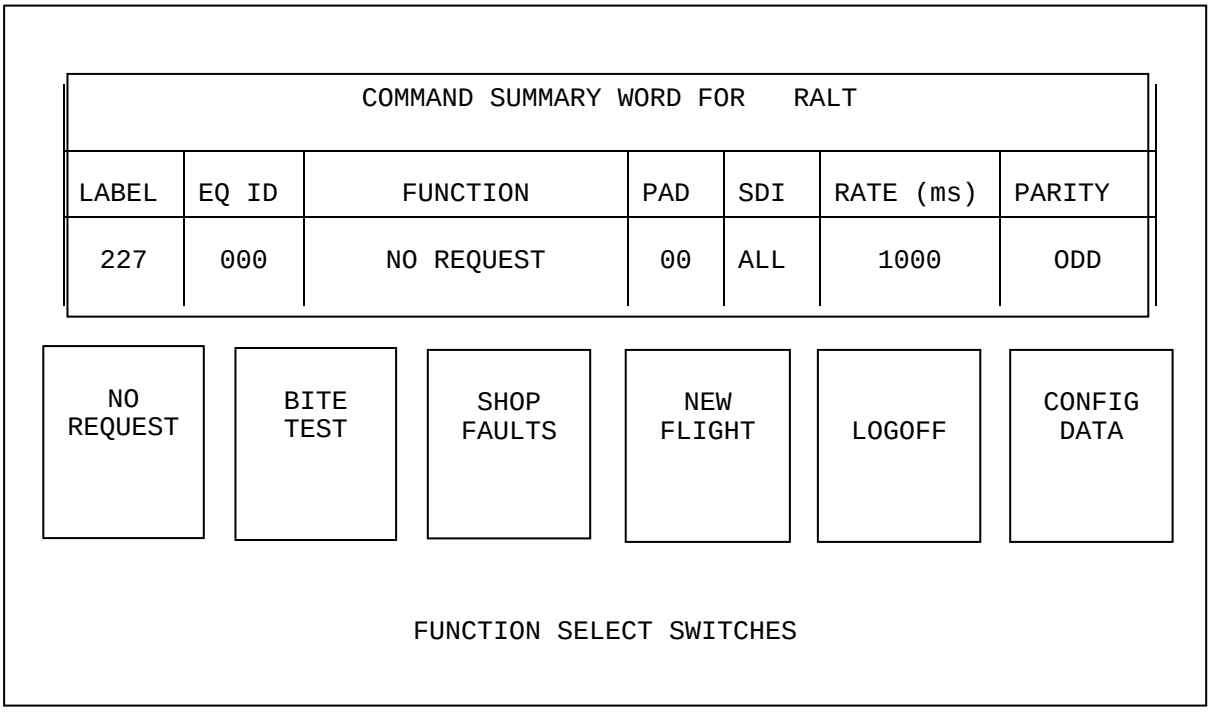


Figure 83 EDIT COMMAND SUMMARY WORD SCREEN

This screen allows the operator to edit the parameters of the Command Summary Word (label 227) that is being transmitted to the LRU from the T1200B. The parameters of the Command Summary Word are clearly defined for operator editing capability.

EQ ID (Equipment ID), PAD bits and RATE (ms) is edited by pressing the screen at the data fields associated with these parameters. The data field will appear highlighted and the new data can be entered via the keypad. Once the new data is entered, press the ENTER key on the keypad to complete the entry.

SDI and PARITY is edited by pressing the data field as above. However, the data will toggle between all possibilities of change as the data field is repetitively pressed rather than having to enter data from the keypad.

The FUNCTION field (Command Code) is edited by pressing the reverse video areas towards the lower portion of the screen above the heading FUNCTION SELECT SWITCHES. The default function of NO REQUEST is momentarily replaced by either BITE TEST, SHOP FAULTS, NEW FLIGHT or LOGOFF as each switch is pressed. This momentary replacement of NO REQUEST lasts until the LRU acknowledges the command (via bit 29 of label 350 or 351) or the T1200B times out after approximately five seconds.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

EDIT COMMAND SUMMARY WORD cont.

The structure of the COMMAND SUMMARY word is as follows:

```
Bits  1-8          : Label 227
Bits  9-10         : SDI
Bits 11-12         : Pad bits
                                                  + 13-16 (LSD)
Bits 13-24         : Hexadecimal Equipment Code   1 17-20
                                                  . 21-24 (MSD)
Bits 25-31         : Command Code
Bit  32            : Parity

Command Code       : NO REQUEST       00 (hex)
                     BITE TEST        01 (hex)
                     SHOP FAULTS      03 (hex)
                     NEW FLIGHT       12 (hex)
                     LOGOFF           7F (hex)
```

If the T1200B does not receive a valid Fault Summary Word (label 350), the message NO MAINTENANCE DATA RECEIVED will be displayed on the lower portion of the screen approximately 5 s after selecting this screen as shown in Figure 84.

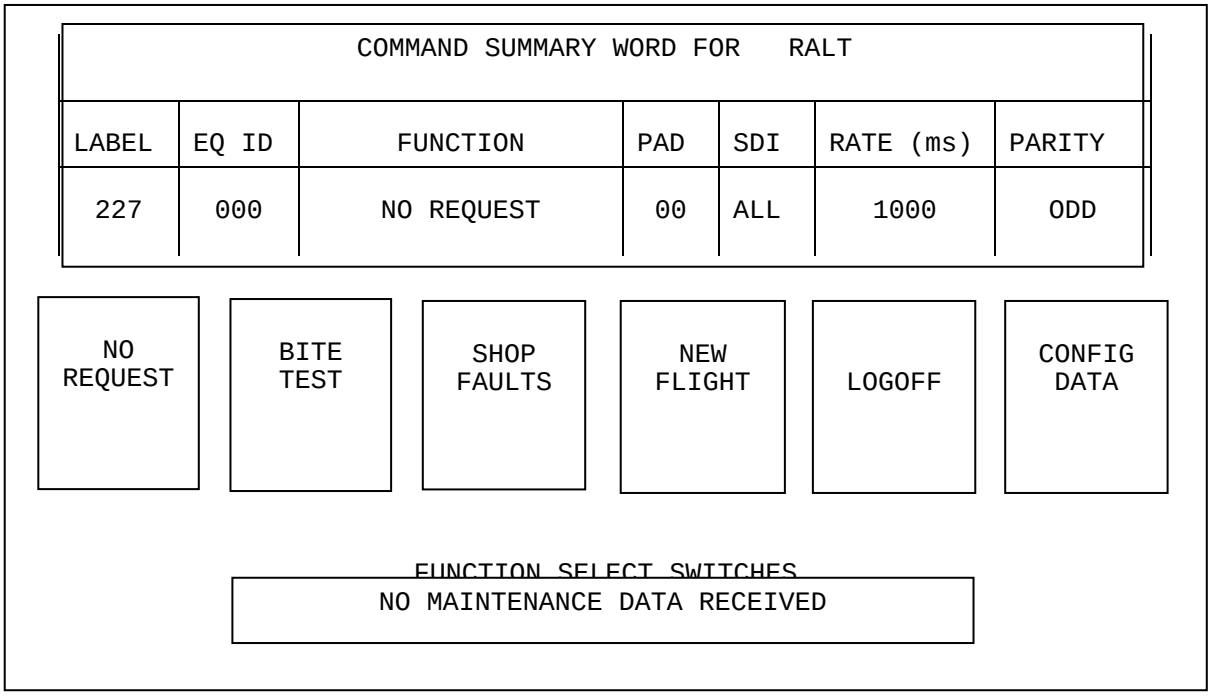


Figure 84 EDIT COMMAND SUMMARY WORD SCREEN (NO MAINT. DATA RCV'D MESSAGE)

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

EDIT COMMAND SUMMARY WORD cont.

If the T1200B does not receive a HI on the Command Word ACK (bit 29) of the Fault Summary Word (label 350) in response to a Command Word being sent to the LRU, the message WARNING: NO CMND WORD ACK RCVD will be displayed on the lower portion of the screen approximately 3 s after sending the command as shown in Figure 85.

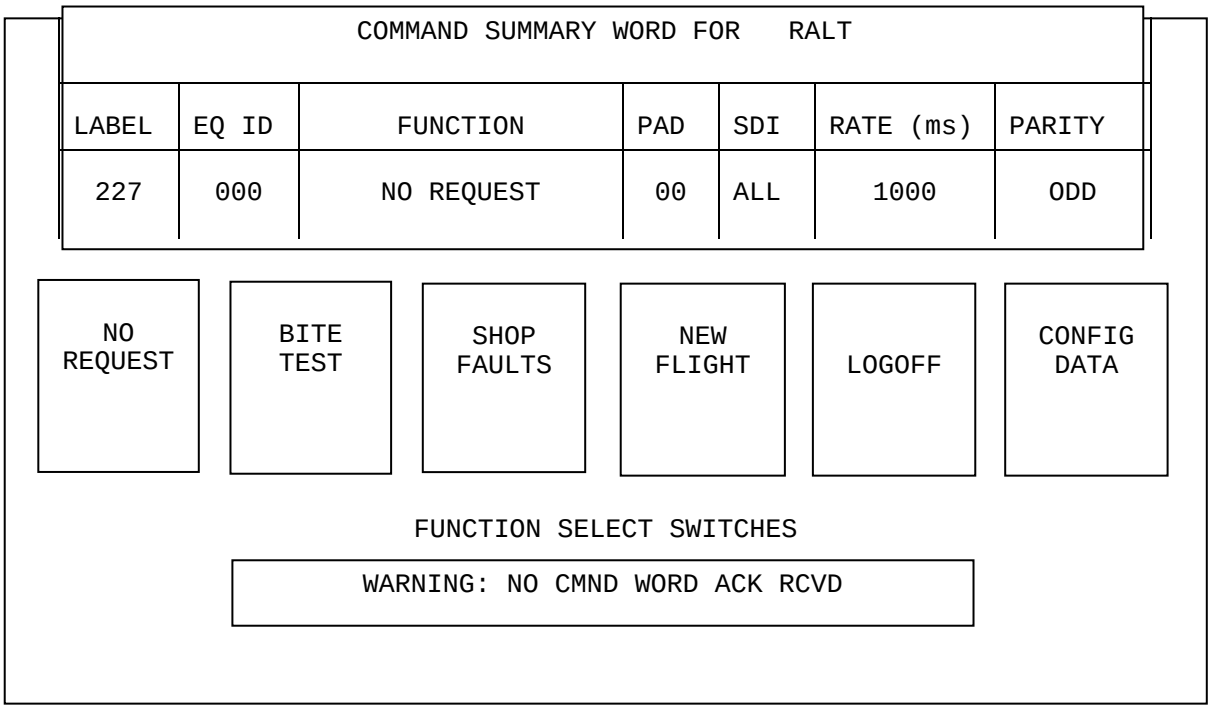


Figure 85 EDIT COMMAND SUMMARY WORD SCREEN (NO CMND WORD ACK RCVD MESSAGE)

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

SHOP FAULTS COMMAND

In addition to sending the proper COMMAND CODE to the LRU on label 227, pressing of the SHOP FAULTS command window causes the T1200B to advance to the SHOP FAULTS screen as shown in Figure 86.

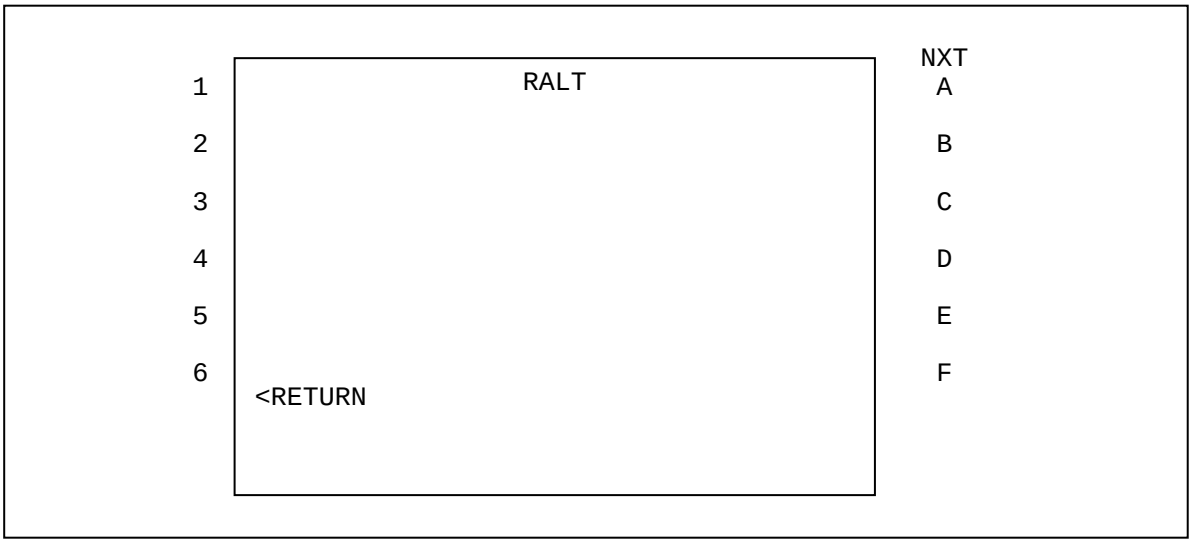


Figure 86 SHOP FAULTS SCREEN

If the T1200B does not receive a HI on the Command Word ACK (bit 29) of the Fault Summary Word (label 350) in response to the SHOP FAULTS Command Word being sent to the LRU, the message WARNING: NO CMND WORD ACK RCVD will be displayed on the lower portion of the screen approximately 3 s after sending the command as shown in Figure 87.

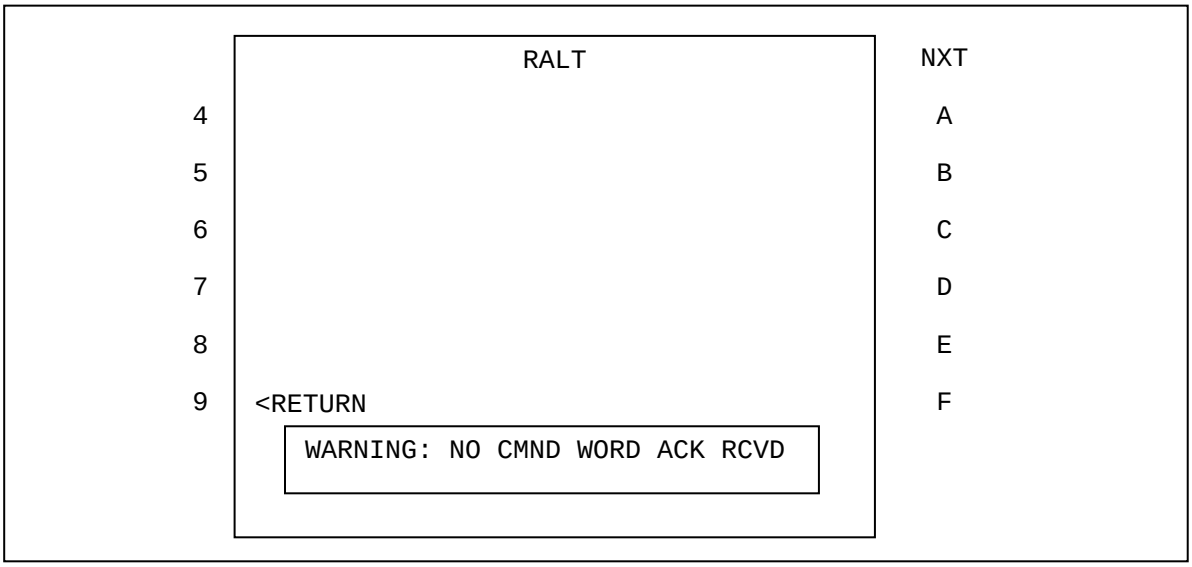


Figure 87 SHOP FAULTS SCREEN
(NO CMND WORD ACK RCVD MESSAGE)

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

SHOP FAULTS COMMAND cont.

Following the NO CMND WORD ACK RCVD message, if the T1200B does not receive a valid Fault Summary Word (label 350), the message NO MAINTENANCE DATA RECEIVED will be displayed on the lower portion of the screen as shown in Figure 88.

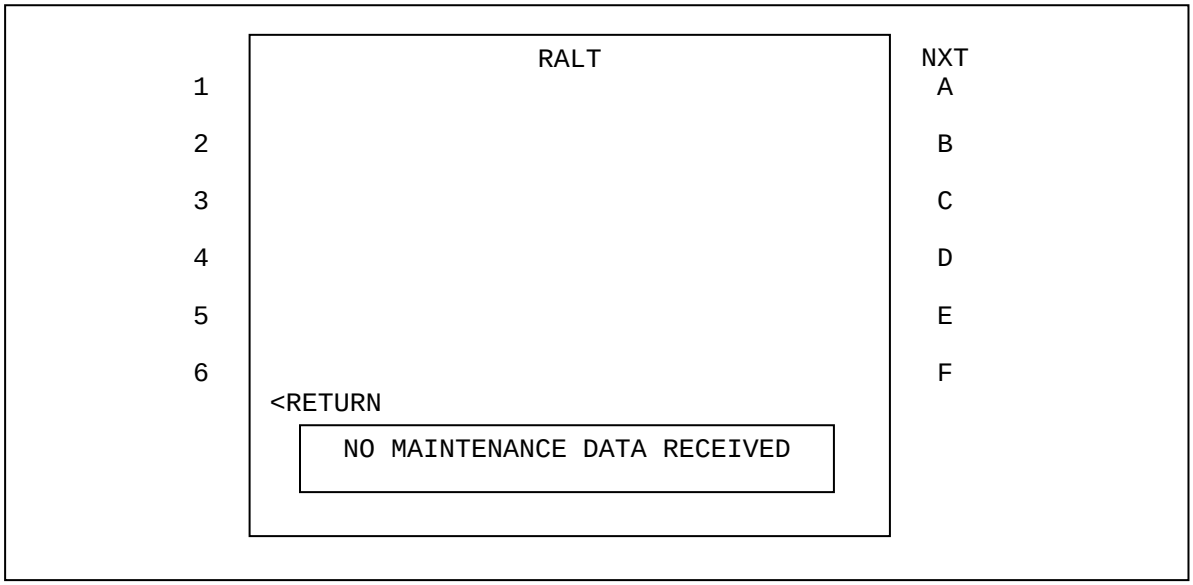


Figure 88 SHOP FAULTS SCREEN
(NO MAINTENANCE DATA RECEIVED MESSAGE)

Following the NO MAINTENANCE DATA RECEIVED message, if the T1200B does not receive a valid Shop Fault message (label 356 data), the message NO LRU RESPONSE IN 12 SECS will be displayed on the lower portion of the screen as shown in Figure 89.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

SHOP FAULTS COMMAND cont.

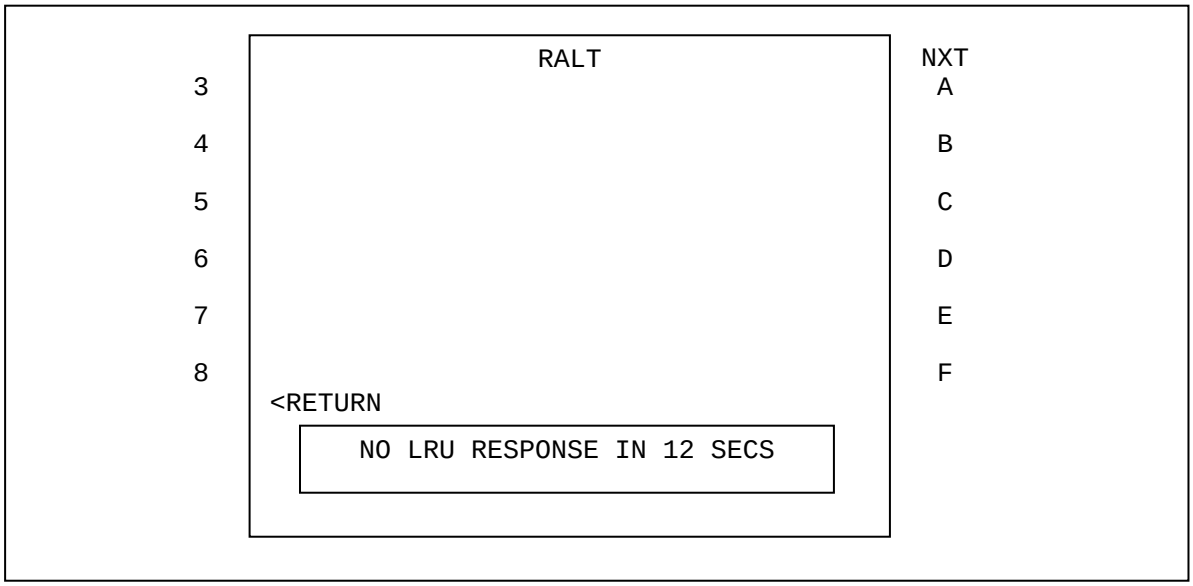


Figure 89 SHOP FAULTS SCREEN
(NO LRU RESPONSE IN 12 SECS MESSAGE)

The following check can be performed if you wish to simulate sending a valid Shop Fault message to be displayed by the T1200B.

Using an Aeroflex Model 429E (or equivalent) ARINC 429 Transmitter/Receiver to transmit to RX-A of the T1200B, the following example will result in the message JcAIR - CMC TEST to be displayed on the SHOP FAULTS screen as shown in Figure 90. Each word and data pattern must be entered into the 429E exactly as described for correct results. Be sure to press the ENTER key on the 429E to synchronize the order of the transmit slots after entering all the data.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

SHOP FAULTS COMMAND cont.

429E TX

Slot No.	Label	Data (Hex)	
*10	350	100000	(MAINT DATA)
9	356	027209	(STX)
8	356	202020	(DATA)
7	356	41634A	"
6	356	205249	"
5	356	C3202D	"
4	356	A0434D	"
3	356	D34554	"
2	356	202054	"
1	356	040000	(EOT)

*Label 350 (Fault Summary Word) is also being sent (with bit 29 Hi) to prevent the NO COMMAND WORD ACK RCVD message from being displayed.

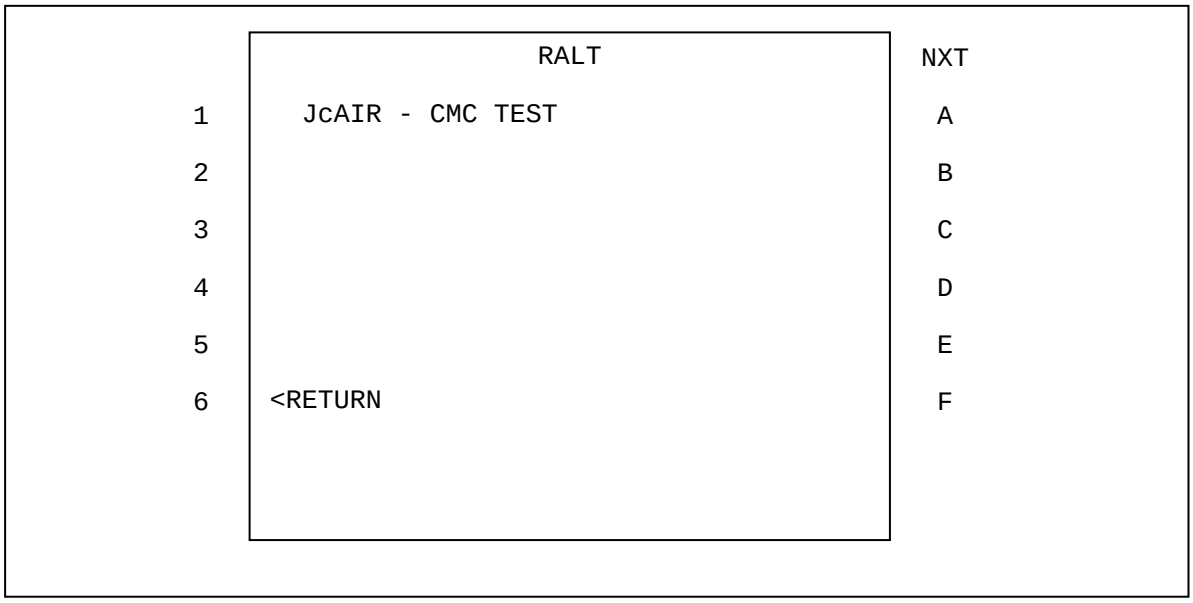


Figure 90 SHOP FAULTS SCREEN (JcAIR - CMC TEST MESSAGE)

Once the correct message is being displayed, you can cause the T1200B to display the message BLOCK WORD COUNT ERR at the bottom of the screen by changing the data of the 429E TX Slot No. 9 to 827208. This tells the T1200B that there should be 8 "words" in the message block instead of the actual 9, resulting in the error.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

CONFIG DATA COMMAND

In addition to sending the proper COMMAND CODE to the LRU on label 227, pressing of the CONFIG DATA command window causes the T1200B to advance to the CONFIG DATA screen as shown in Figure 91.

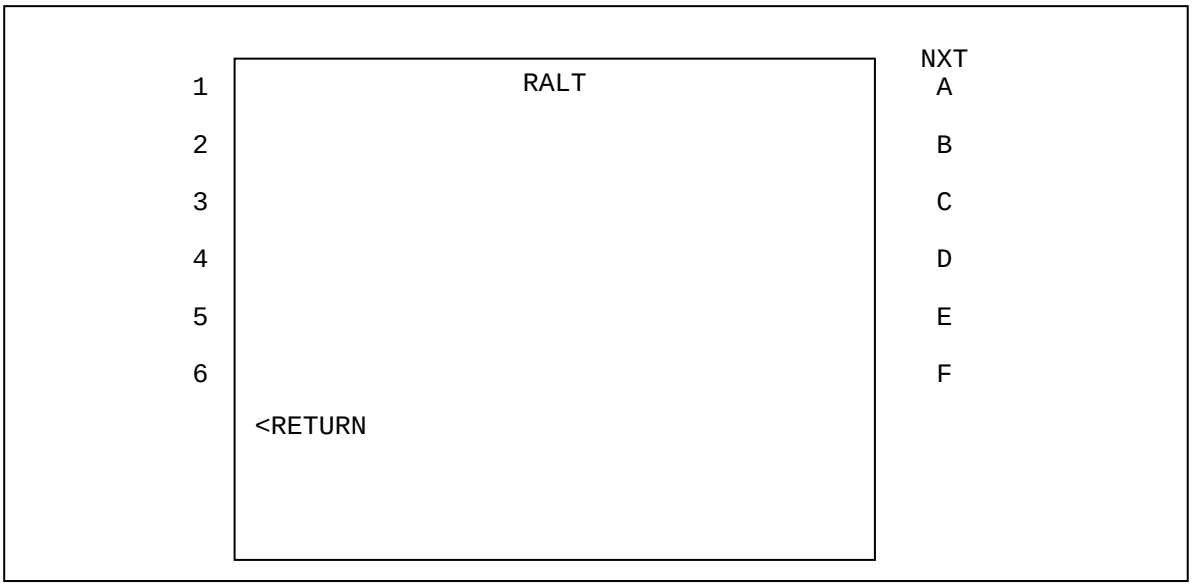


Figure 91 CONFIG DATA SCREEN

If the T1200B does not receive a HI on the Command Word ACK (bit 29) of the Fault Summary Word (label 350) in response to the CONFIG DATA Command Word being sent to the LRU, the message WARNING: NO CMND WORD ACK RCVD will be displayed on the lower portion of the screen approximately 3 s after sending the command as shown in Figure 92.

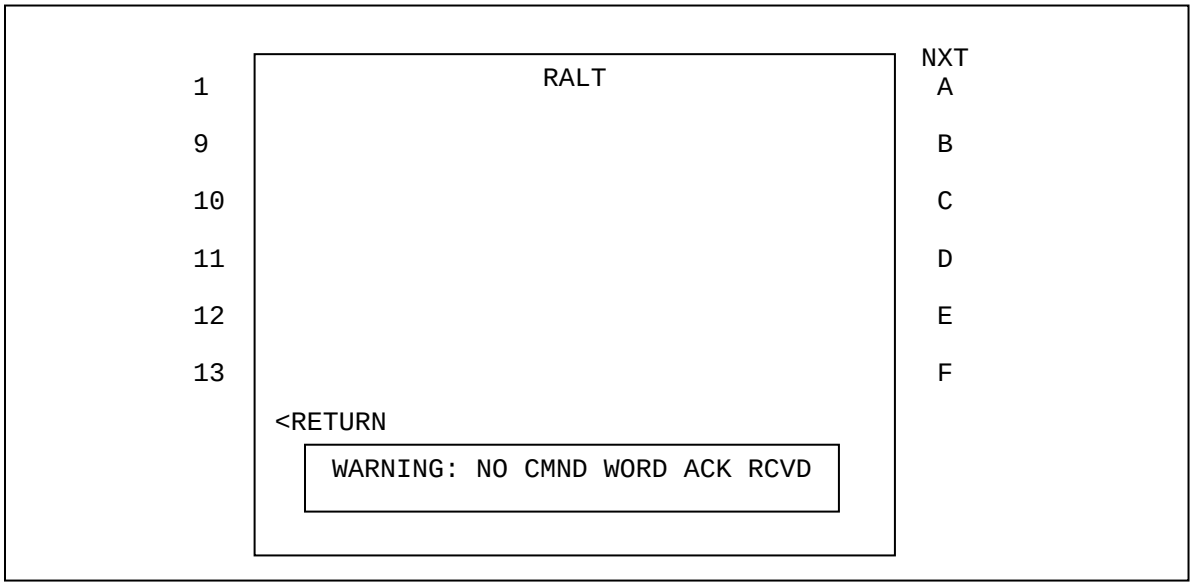


Figure 92 CONFIG DATA SCREEN
(NO CMND WORD ACK RCVD MESSAGE)

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

CONFIG DATA COMMAND cont.

Following the NO CMND WORD ACK RCVD message, if the T1200B does not receive a valid Fault Summary Word (label 350), the message NO MAINTENANCE DATA RECEIVED will be displayed on the lower portion of the screen as shown in Figure 93.

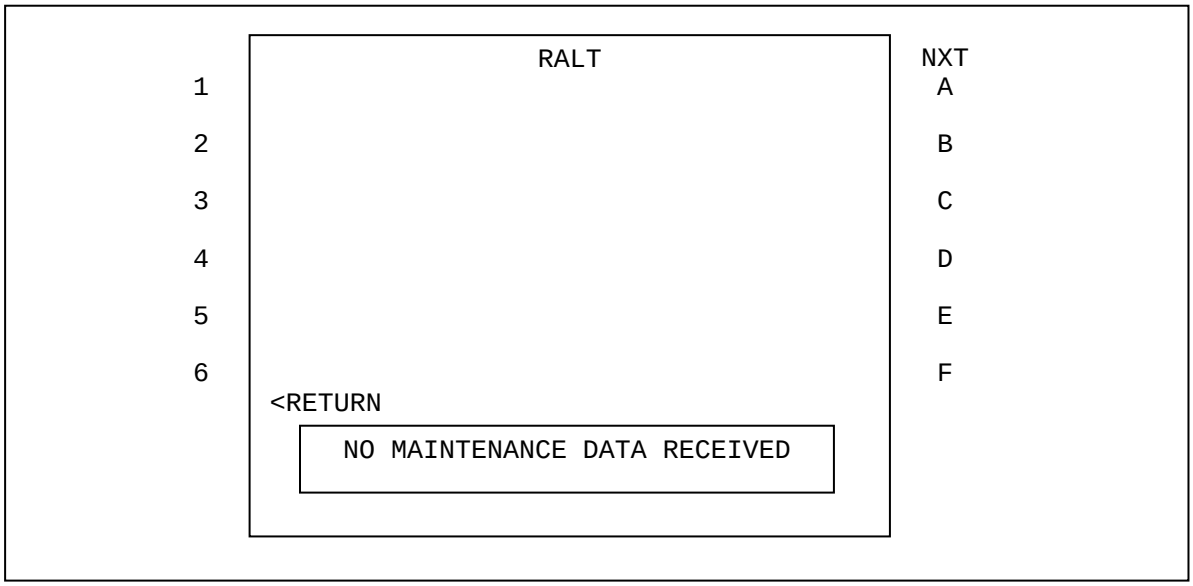


Figure 93 CONFIG DATA SCREEN
(NO MAINTENANCE DATA RECEIVED MESSAGE)

Following the NO MAINTENANCE DATA RECEIVED message, if the T1200B does not receive a valid Config Data message (label 356 data), the message NO LRU RESPONSE IN 12 SECS will be displayed on the lower portion of the screen as shown in Figure 94.

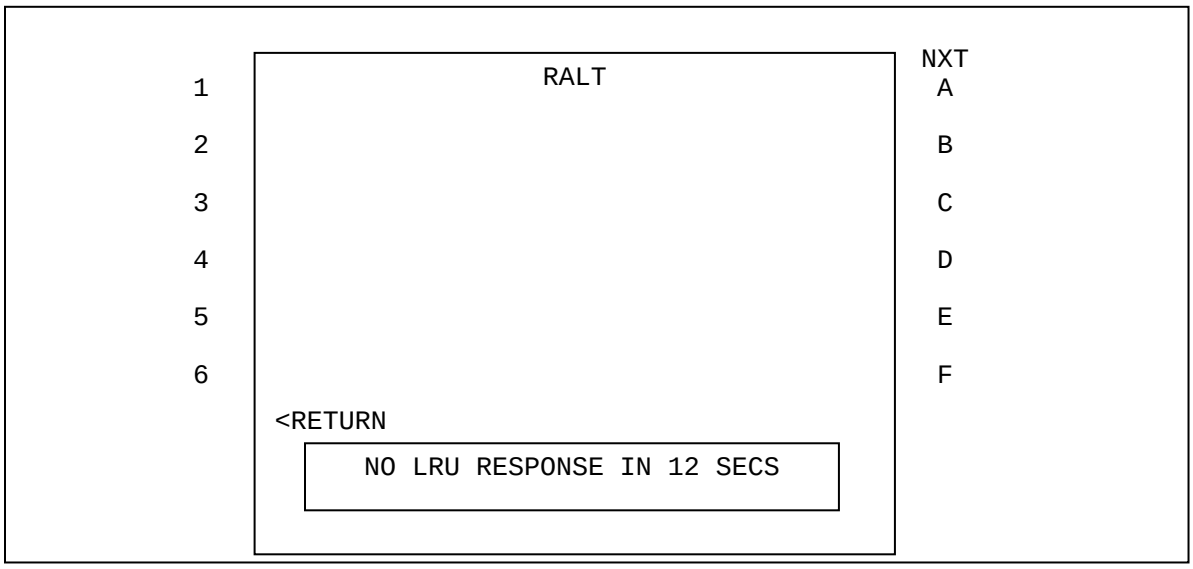


Figure 94 CONFIG DATA SCREEN
(NO LRU RESPONSE IN 12 SECS MESSAGE)

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

CONFIGURE CHANNELS A, B, C, D

At this time press the PRIOR PAGE key on the keypad twice to return to the BOEING CMC/SENSOR BITE screen as shown in Figure 76. Press the CONFIGURE CHANNELS A, B, C, D selection to advance to the configuration screen as shown in Figure 95.

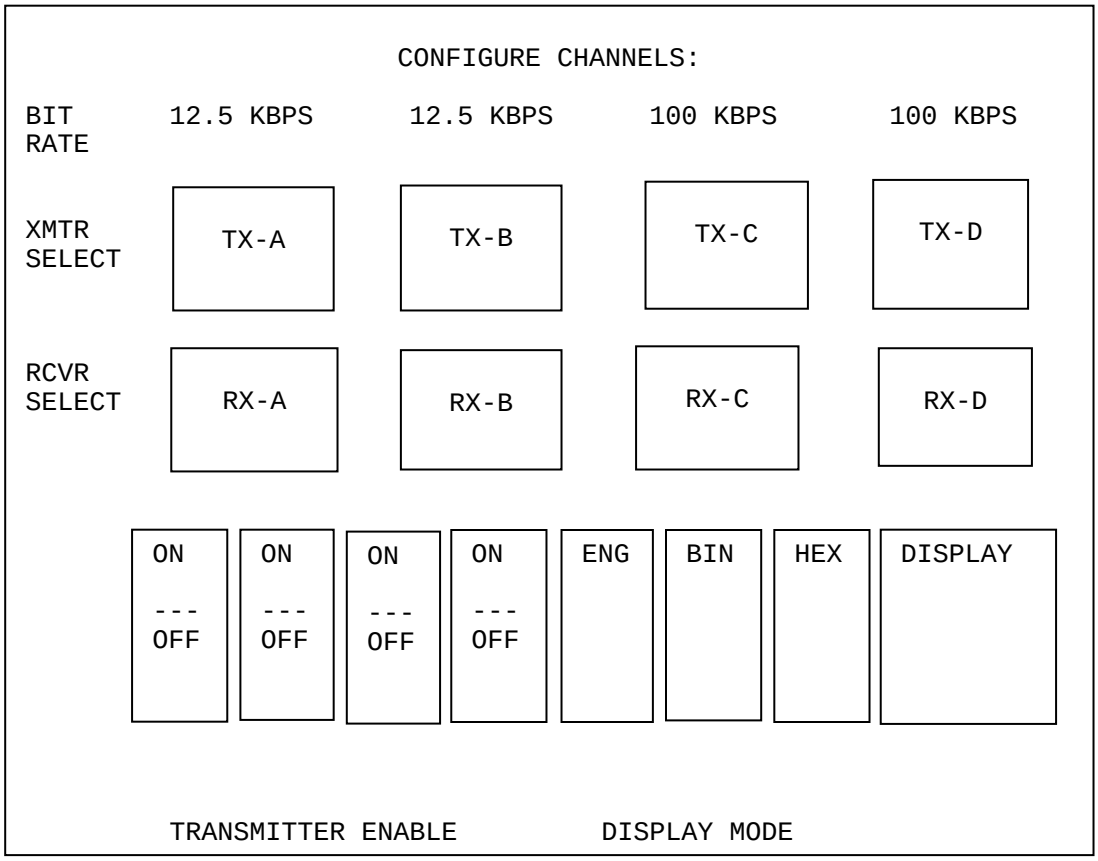


Figure 95 CONFIGURE CHANNELS A, B, C, D SCREEN

Press the BIN (Binary) Display Mode selection in the lower center portion of the screen and then press the DISPLAY selection in the lower right hand portion of the screen to advance to the TX/RX EDIT screen as shown in Figure 96.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

G. CMC MODE cont.

CONFIGURE CHANNELS A, B, C, D cont.

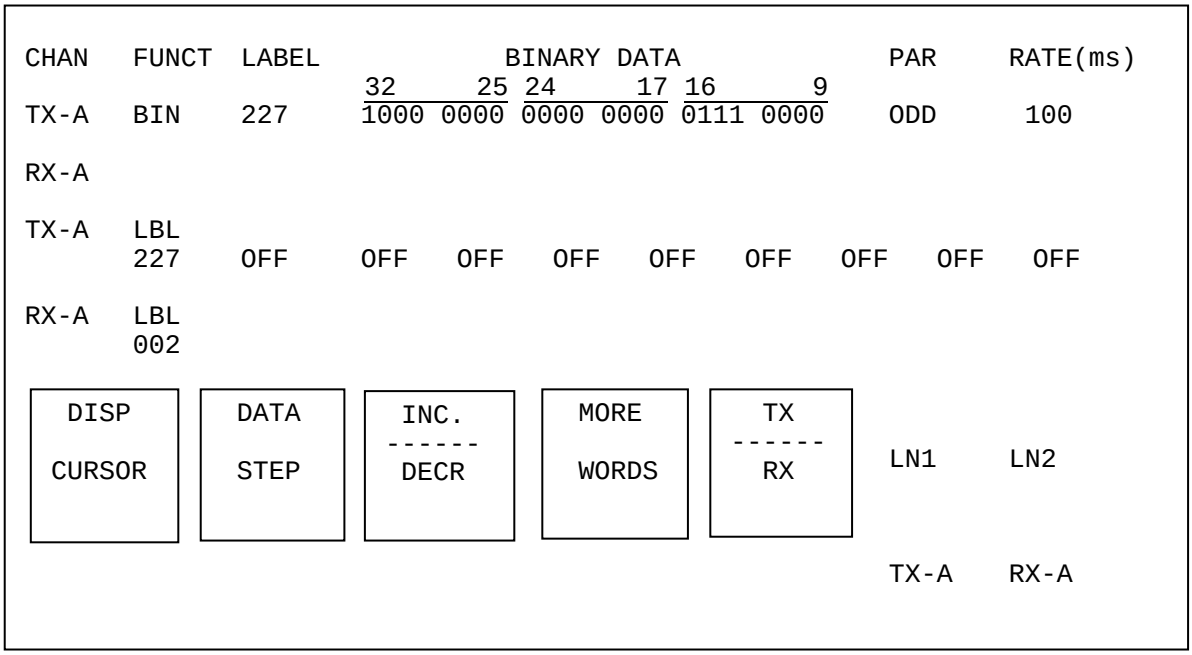


Figure 96 TX/RX EDIT SCREEN

The TX/RX EDIT screen can be used to edit the COMMAND SUMMARY WORD (label 227), to add any other desired labels to be transmitted, or to observe the data being received by the T1200B. While editing of the COMMAND SUMMARY WORD is possible from this screen, you will find that it is more easily accomplished on the EDIT COMMAND SUMMARY WORD screen (Figure 83).

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

H. DEFINED LABELS AND DEFAULT DATA

LABEL	NAME	DEFAULT DATA	UNITS	SDI	PADS	SSM	RATE
001	DIST TOGO	0.0	MN	00	-	PLS	150
002	TIME TOGO	0.0	MIN	00	0000	PLS	150
003	XTRK DIST	0.0	MN	00	0000	PLS	150
010	PRES LAT	000E 00.0'	DG	--	-	N.	375
011	PRES LONG	000E 00.0'	DG	--	-	E.	375
012	GND SPD	0	KTS	00	0000	PLS	375
013	TRUE TRK	0.0	DEG	00	0000	PLS	375
014	MAG HDG	0.0	DEG	00	0000	PLS	375
015	WIND SPD	0	KTS	00	00000000	PLS	375
016	WIND DIR	0	DEG	00	00000000	PLS	375
017	RHDG BCD	0.0	DEG	00	0000	PLS	200
020	SEL VSPD	0	FT/M	00	0000	PLS	150
022	SEL MACH	0.000	MACH	00	0000	PLS	150
023	SEL HDG	0	DEG	00	00000000	PLS	150
024	CRS1 BCD	0	DEG	00	00000000	PLS	200
027	CRS2 BCD	0	DEG	00	00000000	PLS	200
030	VHF COMM	118.000	MHZ	00	-	NML	150
031	ATC RPLY	1234	SQWK	00	00000001	NML	150
032	ADF FREQ	577.0	KHZ	00	000	NML	150
033	ILS FREQ	110.30	MHZ	00	0000	NML	200
034	VOR FREQ	108.00	MHZ	00	0000	NML	200
035	DME FREQ	108.00	MHZ	00	0000	NML	150
037	HF FREQ	10.000	MHZ	--	000	NML	150
041	SET LAT	000E 00.0'	DG	--	-	N.	375
042	SET LONG	000E 00.0'	DG	--	-	E.	375
043	MAG HDG	0	DEG	00	00000000	PLS	375
044	TRUE HDG	0.0	DEG	00	0000	PLS	375
047	VHF 8.33	117.992	MHZ	00	-	NML	150
053	MAG HDG	0	DEG	00	00000000	PLS	375
065	GRS WGT	1000	CLBS	00	-	PLS	150
100	CRS1 BNR	0.00	DEG	00	000000	NML	200
101	SEL HDG	0.00	DEG	00	000000	NML	50
102	SEL ALT	0	FT	00	00	NML	150
103	SEL ASPD	0.00	KTS	00	0000000	NML	150
104	SEL VSPD	0	FT/M	00	0000	NML	150
105	RHDG BNR	0.00	DEG	00	0000000	NML	200
106	SEL MACH	800	mMAC	00	000000	NML	50
110	CRS2 BNR	0.00	DEG	00	000000	NML	200
114	DSRD TRK	0.00	DEG	00	000000	NML	50
115	WYPT BRG	0.00	DEG	00	000000	NML	50
116	XTRK DIST	0.000	NM	00	000	NML	50

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

H. DEFINED LABELS AND DEFAULT DATA cont.

LABEL	NAME	DEFAULT DATA	UNITS	SDI	PADS	SSM	RATE
123	THR CMD	0.000	D/S	00	-	NML	75
134	PWR ANGL	0.00	DEG	00	000000	NML	150
137	FLAP ANGL	0.00	DEG	00	000000	NML	150
162	ADF BRG	0.00	DEG	00	000000	NML	50
164	RALT BNR	125.000	FT	00	00	NML	37
165	RALT BCD	1000.0	FT	00	-	PLS	100
173	LOC DEV	0.0000	DDM	00	000000	NML	50
174	GLS DEV	0.0000	DDM	00	000000	NML	50
200	DRFT ANGL	0.0	DEG	00	0000	PLS	150
201	DIST BCD	0.00	NM	00	-	PLS	125
202	DIST BNR	0.00	NM	00	00	NML	125
203	PRES ALT	0	FT	00	0	NML	50
204	BARO ALT1	0	FT	00	0	NML	50
205	MACH	0.000000	M	00	00	NML	100
206	CMPD ASPD	0.000	KT	00	0000	NML	100
207	MAX ASPD	0.00	KT	00	000000	NML	100
210	TAS BNR	0.000	KT	00	000	NML	100
211	TOT TEMP	0.00	DEGC	00	0000000	NML	375
212	ALT RATE	0	FT/M	00	0000000	NML	50
213	STAT TEMP	0.00	DEGC	00	0000000	NML	375
215	IMPC PRES	0.000	mb	00	0000	NML	100
217	STAT PRES	0.000	inHG	00	00	NML	100
220	BARO ALT2	0	FT	00	0	NML	50
221	AVG AOA	0.00	DEG	00	000000	NML	50
222	VOR BRG	0.00	DEG	00	000000	NML	75
230	TAS BCD	0	KTS	00	000000	PLS	375
231	TAT BCD	0	DEGC	00	00000000	PLS	375
232	ALT RATE	0	FT/M	00	0000	PLS	50
233	SAT BCD	0	DEGC	00	00000000	PLS	375
234	BARO COR1	745.0	mb	00	-	PLS	100
235	BARO COR1	22.000	inHG	00	-	PLS	100
236	BARO COR2	745.0	mb	00	-	PLS	100
237	BARO COR2	22.000	inHG	00	-	PLS	100
241	CORR AOA	0.00	DEG	00	000000	NML	50
242	VOR ID#1	VO		11	-	UND	50
243	VOR ID#2	R1		11	-	UND	50
246	DME ID#1	DM		11	-	UND	50
247	VOR ID#2	E1		11	-	UND	50

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 4. OPERATING INSTRUCTIONS

H. DEFINED LABELS AND DEFAULT DATA cont.

LABEL	NAME	DEFAULT DATA	UNITS	SDI	PADS	SSM	RATE
251	BARO COR3	0	FT	00	0	PLS	50
254	ADF ID#1	AD		11	-	UND	50
255	ADF ID#2	F1		11	-	UND	50
263	ILS ID#1	IL		11	-	UND	50
264	ILS ID#2	S1		11	-	UND	50
270	DSCR DAT1	0		00	-	-	100
277	TEST WORD	0		00	-	-	100
310	PRES LAT	0.0000	DG	00	-	NML	150
311	PRES LONG	0.0000	DG	00	-	NML	150
312	GND SPD	0.000	KT	00	000	NML	37
313	TRUE TRK	0.0000	DG	00	000	NML	37
314	TRUE HDG	0.0000	DG	00	000	NML	37
315	WIND SPD	0	KTS	00	0000000000	NML	75
316	WIND ANGL	0.0	DEG	00	0000000000	NML	75
317	MAG TRK	0.0000	DG	00	000	NML	37
320	MAG HDG	0.0000	DG	00	000	NML	37
321	DRFT ANGL	0.00	DEG	00	000000	NML	37
322	FLT PATH	0.00	DEG	00	000000	NML	37
323	FPTH ACC	0.000	g	00	000000	NML	15
324	PTCH ANGL	0.000	DG	00	0000	NML	15
325	ROLL ANGL	0.000	DG	00	0000	NML	15
326	PTCH RATE	0.000	D/S	00	00000	NML	15
327	ROLL RATE	0.000	D/S	00	00000	NML	15
330	YAW RATE	0.000	D/S	00	00000	NML	15
331	LONG ACC	0.000	g	00	000000	NML	15
332	LAT ACC	0.000	g	00	000000	NML	15
333	NORM ACC	0.000	g	00	000000	NML	15
334	PLAT HDG	0.00	DEG	00	0000000	NML	30
335	TRK RATE	0.000	D/S	00	0000000	NML	15
336	INER PTCH	0.000	D/S	00	00000	NML	15
337	INER ROLL	0.000	D/S	00	00000	NML	15
340	EPR	0.000		00	000000	NML	150
341	N1 CMD	0.000	RPM	00	0000	NML	150
347	FUEL FLOW	0	LB/H	00	0000000	NML	75
350	MAIN DAT1	0		00	-	-	100
351	MAIN DAT2	0		00	-	-	100
357	ISO ALPH	KQE	--	-		INT	100
360	PNTL VSPD	0	FT/M	00	000	NML	15
361	INER ALT	0.0	FT	--	-	NML	30
362	ALNG TRK	0.000	g	00	000000	NML	15
363	XTRK ACC	0.000	g	00	000000	NML	15
364	VERT ACC	0.000	g	00	000000	NML	15
365	INER VVEL	0	FT/M	00	000	NML	30
366	N-S VEL	0.000	KT	00	000	NML	75
367	E-W VEL	0.000	KT	00	000	NML	75

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS cont.

SECTION 5. THEORY OF OPERATION

A. GENERAL INFORMATION

This section contains the Theory of Operation for the T1200B CDU and is broken down into subsections discussing its various blocks.

Figure 84 shows the Block Diagram of the T1200B. Many of the blocks shown in the block diagram are contained on a single printed circuit board which is installed in a backplane. The backplane provides power, signal routing, and a communications bus to each board.

Power is supplied to the backplane from a triple output power supply (+5 V, +12 V, and –12 V) mounted in the T1200B chassis.

B. CPU BOARD

The CPU BOARD is the controller for the T1200B and is based on the Motorola 68B09E MPU (Micro Processing Unit). The board is installed in the backplane of the T1200B which facilitates communication with the other boards installed in the backplane. The CPU Board contains all of the RAM and programmed EPROM necessary for operation. The touch screen display, keyboard, and DFIU control are also controlled by the CPU Board and have edge connections for access.

Figure 85 shows the CPU BOARD Block Diagram. In the CMM (Component Maintenance Manual), the Assembly drawing JPN: 25-6103-00 and Schematic drawing JPN: 02-6103-00 are included for reference.

The CPU Board and the rest of the T1200B are reset on power up or by pressing the S1 switch located at the top of the CPU board. On power up, a timer chip provides a reset pulse of approximately 520 ms. This reset pulse resets the 68B09E MPU, 68B21 PIA, and the 68B40 PTM on the CPU Board. The reset pulse is buffered and sent out on the backplane to reset the other boards installed in the backplane. For maintenance purposes, a reset button also provides a reset pulse when pressed. The reset button and the power on reset pulse are logically NORed together to drive the same reset line.

68B09E MPU

The CPU Board utilizes the Motorola 68B09E MPU for controlling the T1200B. The 68B09E is an eight bit MPU with 16 address lines and 8 bi-directional data lines. All of the address lines are buffered for use on the CPU Board and the backplane bus. The bi-directional data lines are isolated from the backplane bus by a bus transceiver.

An 8 MHz crystal, a D flip-flop, and a J-K flip-flop provide the E and Q signals for the 68B09E MPU. The E signal is a 2 MHz bus clock, which is used throughout the T1200B system.

The T1200B Receiver boards use the MRDY (Memory ReaDY) pin of the 68B09E to extend the data access time when reading a received ARINC 429 word. This allows the data from the Receiver boards to stabilize on the backplane bus. When the MRDY pin is rescinded (logic 0), the current bus cycle is extended until the MRDY pin is reasserted (logic 1).

The 68B09E has three interrupt lines: NMI(not), IRQ(not), and FIRQ(not).

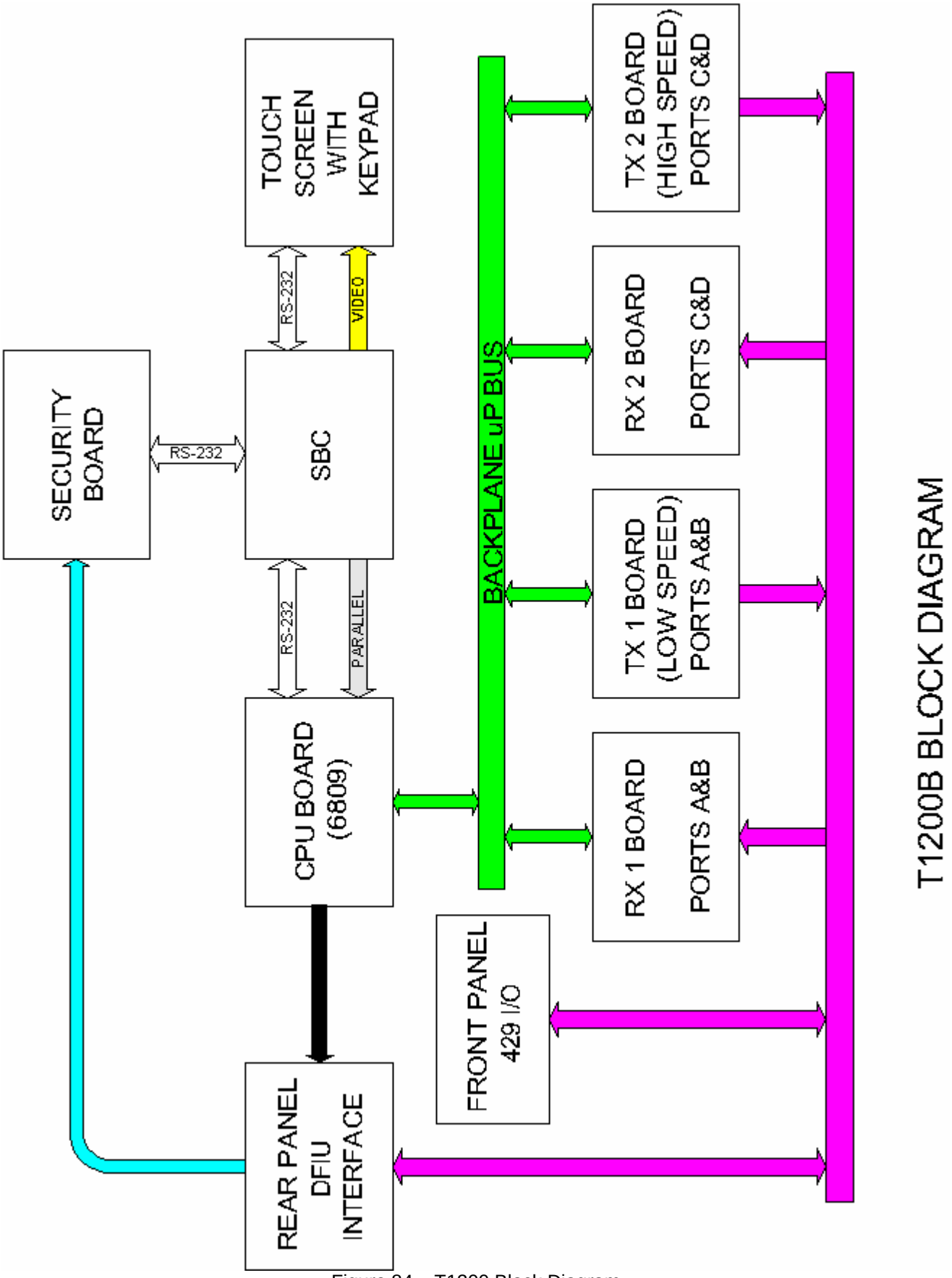


Figure 84 – T1200 Block Diagram

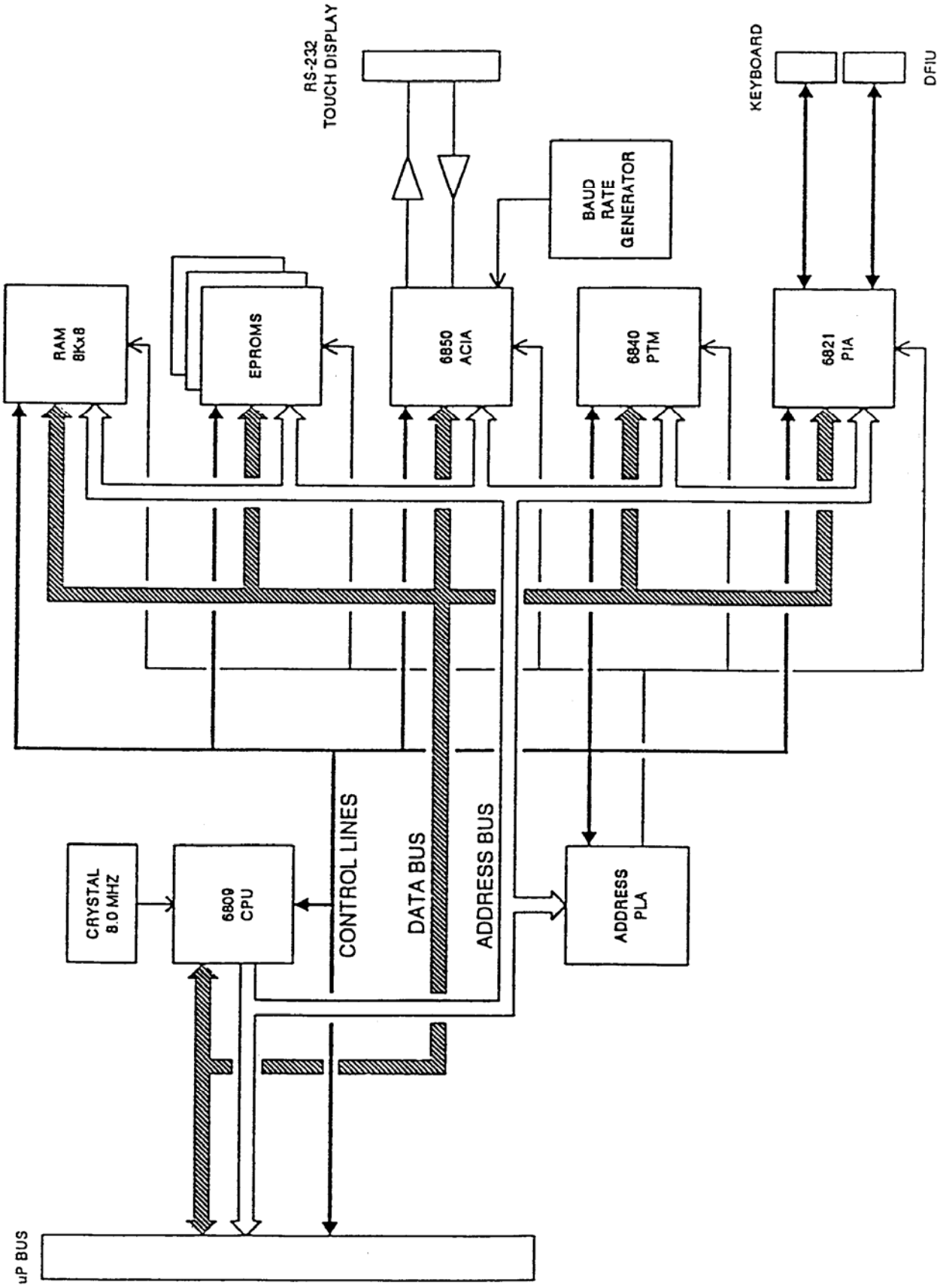


Figure 85 - CPU BOARD Block Diagram

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 5. THEORY OF OPERATION

B. CPU BOARD cont.

The NMI(not) (Non-Maskable Interrupt) is not used on the CPU Board, but is available for the other boards installed in the backplane. The FIRQ(not) (Fast Interrupt ReQuest) is used by the 68B40 PTM, 68B21 PIA, 68B50 ACIA, and is also available for the other boards installed in the backplane. The IRQ(not) signal is used as an interrupt for receiving 429 data.

ADDRESS PLD

The address decoding and page-select logic for the chips on the CPU Board is handled by a PLD (Programmable Logic Device). This device is programmed to provide a logic 0 to the chip enables of the memory and peripheral chips on the board. The chip enable asserted is based on the address, E and Q lines from the 68B09E MPU.

The following list shows the address decoding provided by the PLD (in hexadecimal):

ADDRESS RANGE	DEVICE
0000 - 0FFF	RAM
1000 - 2FFF	EXTERNAL
3000 - BFFF	BASE EPROM
C000 - DFFF	PAGED EPROM
E000 - E7FF	RAM
EC00 - E0FF	I/O
EE00 - EFFF	EXTERNAL
F000 - FFFF	BASE EPROM

RAM

The CPU Board uses a 32k x 8 static RAM.

EPROMS

The CPU uses two EPROMs for program and read only data memory. The base ROM is located at addresses 3000-$BFFF_{16}$ and F000-$FFFF_{16}$, while the paged ROM is located at addresses C000-$DFFF_{16}$. There are 64 8 k pages of ROM available.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 5. THEORY OF OPERATION

B. CPU BOARD cont.

68B50 ACIA

The CPU Board communicates with the touch screen display using a full duplex RS-232C 9600 baud link. 68B50 ACIA (Asynchronous Communications Interface Adapter) controls the transmitting and receiving of the RS-232C data. The 4702 baud rate generator chip is used to generate a 153.6 kHz clock from a 2.4576 MHz crystal. The 153.6 kHz clock is used by the 68B50 to produce the 9600 baud clock for receiving and transmitting data. The RS-232C transmitter and receiver chips convert the voltage levels to/from RS-232C levels, since they are not compatible with the TTL levels used by the 68B50.

The microprocessor interfaces to the 68B50 through control lines and an eight-bit data bus. The chip is enabled by the address PLD and address lines A4 and A7. Internal registers are accessed using the RS (Register Select) line and the R/W(not) line. The E input provides synchronization with the MPU bus. When RS-232C data is received or sent, the MPU is interrupted when the 68B50 asserts its IRQ(not) pin. The MPU's FIRQ(not) is asserted, and it reads the received byte or gets ready to send the next byte.

68B40 PTM

The 68B40 PTM (Programmable Timer Module) provides three independent general purpose timers. The 68B09E uses the first timer to divide the E clock (2 MHz) by 2000 to provide an FIRQ interrupt every 1 ms. The MPU uses this interrupt to generate transmit word timing.

The second timer also divides the E clock by 2000, however the output of this timer (1 kHz) is used as an external clock input to the third timer. The third timer is used by the 68B09E MPU for general purposes such as timing delays and to measure received word rates.

The microprocessor interfaces to the 68B40 through control lines and an eight-bit data bus. The chip is enabled by the address PLD and address line A4. Internal registers are accessed using the RS0-RS2 (Register Select) lines and the R/W(not) line. The E input provides synchronization with the MPU bus and a reference clock. When a timer times out, the MPU is interrupted when the 68B40 asserts its IRQ(not) pin. The MPU's FIRQ(not) is asserted and it responds to the interrupt.

68B21 PIA

The 68B21 PIA (Peripheral Interface Adapter) provides two independent general purpose eight bit I/O ports (PA and PB) and associated handshaking lines (CA1, CA2, CB1, and CB2). The 68B09E uses Port A to provide an interface to read the keyboard. When a key is pressed, the keyboard circuit provides a logic 1 to the CA1 handshake line. This forces the IRQ(not) line to assert and causes a FIRQ interrupt which tells the MPU that a key has been pressed. The MPU then reads bits PA0 - PA5 from Port A. These bits contain the code for the key pressed. In addition, the read causes CA2, on the next E high to low transition, to go to a logic 0 for one clock cycle. This clears the keyboard circuitry and CA1 rescinds.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 5. THEORY OF OPERATION

B. CPU BOARD cont.

68B21 PIA cont.

Port B is used to output an eight-bit word to control an external DFIU (Discrete Function Interface Unit). At the present time, this port is not used.

The microprocessor interfaces to the 68B21 through control lines and an eight-bit data bus. The chip is enabled by the PLD and address lines A4 and A7. Internal registers are accessed using the RS0 and RS1 (Register Select) lines and the R/W(not) line. The E input provides synchronization with the MPU bus.

C. TRANSMITTER BOARD

The TX1 BOARD is a low speed ARINC 429 transmitter board. The board is installed in the backplane of the T1200B. This allows the MPU to program the TX1 board. The board contains all the circuitry to provide two low speed ARINC 429 transmitter outputs.

The high speed ARINC 429 transmitter TX2 BOARD is nearly identical to the TX1 Board, except for some passive component values and dip switch settings. Therefore, only the TX1 Board will be discussed in detail. Any differences will be addressed in the discussion. Also, since there are two transmitter channels on the board, only channel 1 will be discussed, as both are functionally identical.

Figure 86 shows the Block Diagram for the TX1/TX2 board. In the CMM (Component Maintenance Manual), the Assembly drawing JPN: 25-6103-00/01 and Schematic drawing JPN: 02-6103-00/01 are included for reference.

The following subsections discuss the TX1/TX2 Board Block Diagram in detail:

ADDRESS DECODING

The address decoding for the TX boards is handled by U37, U38, and U34. U38, S1-1, and S1-2 are used to setup and decode the board address. S1-1 and S1-2 are both open for the low speed TX1 board and both closed for the high speed TX2 board. NAND gate U37 provides an enable to 1 of 8 decoder U34 when all inputs are logic 1. Thus, the address range for TX1 is EF80 to EF8F and TX2 is EFB0 to EFBF.

U34 decodes 3 address lines and provides a logic 0 on 1 of the 8 outputs. It is enabled when the output of U37 and the address bit A3 are both logic 0. The following list describes the functions performed by the addresses provided to U34:

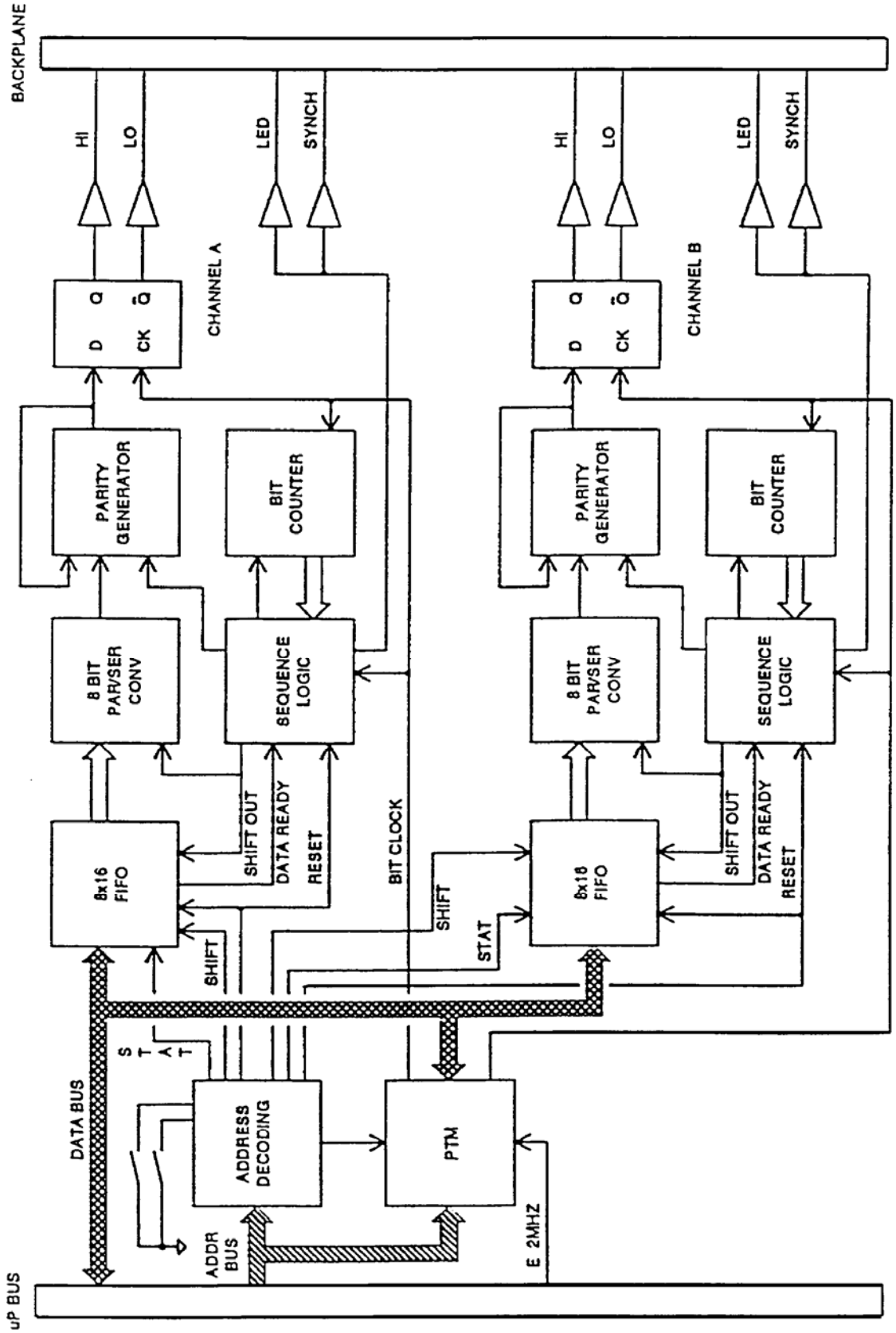


Figure 86 TX/TX2 board Block Diagram

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 5. THEORY OF OPERATION

C. TRANSMITTER BOARD cont.

ADDRESS DECODING cont.

0 - Reads Channel 1 FIFO status bit (0 = Full).
1 - Shifts in a byte to Channel 1 FIFO.
2 - Resets Channel 1.
3 - Undefined.
4 - Reads Channel 2 FIFO status bit (0 = Full).
5 - Shifts in a byte to Channel 2 FIFO.
6 - Resets Channel 2.
7 - Undefined.

When the board is enabled by U37 and the address bit A3 is a logic 1, the 68B40 PTM is selected. The registers of the PTM are accessed using the address bits A0 - A3 which are connected to the RS0 - RS2 Register Select inputs.

PTM

The 68B40 PTM (Programmable Timer Module) U30 provides three independent general purpose timers. The first two timers are used to develop the bit clocks for each ARINC 429 transmitter channel on the board. The MPU programs the bit clock into timers and the output is a clock that controls the timing of each bit during transmission.

The third timer has a clock input developed from U12 and U13. They are counters configured to divide the E clock by 1000. At the present time, however this timer is not used.

The microprocessor interfaces to the 68B40 through control lines and an eight-bit data bus. The chip is enabled by the address PLA and address line A4. Internal registers are accessed using the RS0-RS2 (Register Select) lines and the R/W(not) line. The E input provides synchronization with the MPU bus and serves as a reference clock.

8 x 16 FIFOs

Each of the two transmitter channels on the TX Board utilize two 4 bit by 16 location FIFOs (First In First Out). The two FIFOs are configured to provide an 8 bit by 16 byte FIFO. This allows up to four ARINC 429 words to be stored and waiting to be transmitted.

The MPU writes four bytes of data into the FIFO for every 32 bit ARINC 429 word to be sent. The MPU is allowed to write into the FIFO only when the FIFO DIR (Data Input Ready) pin is asserted. The DIR pin from both 4 bit FIFOs are NANDed together to make a single DIR(not) line. When the FIFO is full the DIR(not) line is a logic 1, the MPU will not be able to write a byte to the FIFO because the output of OR gate U33A (SHIFT IN) is held at a logic 1. However, when the FIFO is not full, the DIR(not) line is a logic 0 and the output of OR gate U33A (SHIFT IN) will follow the TX WRT(not) line. Both of these lines go to a logic 0 when the MPU writes a byte into the FIFO.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 5. THEORY OF OPERATION cont.

C. TRANSMITTER BOARD cont.

8 x 16 FIFOs cont.

The DIR(not) line can also be read by the MPU to determine if the FIFO is full. The DIR(not) line is an input to a tristate buffer U35B. When the MPU reads the status on the FIFO, U35B is enabled by the logic 0 from the 0(not) pin of U34 and allows DIR(not) to be present on the internal data bus. From there, the DIR(not) line is buffered through the bus transceiver U36 to D7 of the MPU data bus.

The outputs of the FIFO are provided to the parallel inputs of a parallel to serial converter U18. The bytes are shifted out of the FIFO by a SHIFT OUT(not) pulse from the Sequence Logic, discussed later in this chapter

A DOR (Data Output Ready) line from each 4 bit FIFO are ANDed together by U32A and provided to the Sequence Logic. This tells the Sequence Logic that the FIFOs are empty and no more data can be transmitted.

The FIFO may be reset in one of two ways. First, the MPU may reset the FIFO by writing to a reset address. This provides a reset pulse through NAND gate U29A to the FIFO and to several other chips in the transmitter section. The second way the FIFO can be reset, is by a reset pulse from the backplane (Reset Button). This pulse also goes through NAND gate U29A.

8 BIT PARALLEL TO SERIAL CONVERSION

The 8 bit Parallel to Serial Converter chip U18 provides the means to convert the 4 bytes (32 bits) stored in the FIFO into 32 bit serial ARINC 429 words. The bytes are brought into the parallel side of the chip (P1- P8), then shifted out the serial output Q8. The parallel byte is written into the internal parallel latch of U18 from a strobe pulse presented at the P/S (Parallel Strobe) input. The strobe is provided by the Sequence Logic section of the transmitter. Each bit is shifted out of U18 by a pulse at the CK input. The pulse which drives the bit shifting CK pulse is provided by the Sequence Logic.

BIT COUNTER

A ripple counter U3 is used to count each bit being transmitted. The counter outputs are used by the Sequence Logic to force certain events to occur based on the bit count. The Sequence Logic also provides a reset signal to the RS input of the counter. A clock signal from U30 PTM causes the counter to count the transmitted bits when the RS input is at a logic 0. When the RS signal is a logic 1, the count outputs are at a logic 0.

SEQUENCE LOGIC

The Sequence Logic decodes and provides all the control signals required to transmit an ARINC 429 word. Figure 87 is a timing diagram for the Sequencer Logic and may be referenced during this discussion. The transmitter is designed to transmit ARINC 429 words without direct intervention of the MPU. The MPU is only required to write the words into the FIFO and the Sequencer Logic transmits the word, generates the proper parity, and waits four gap bits before transmitting another word, if one is ready.

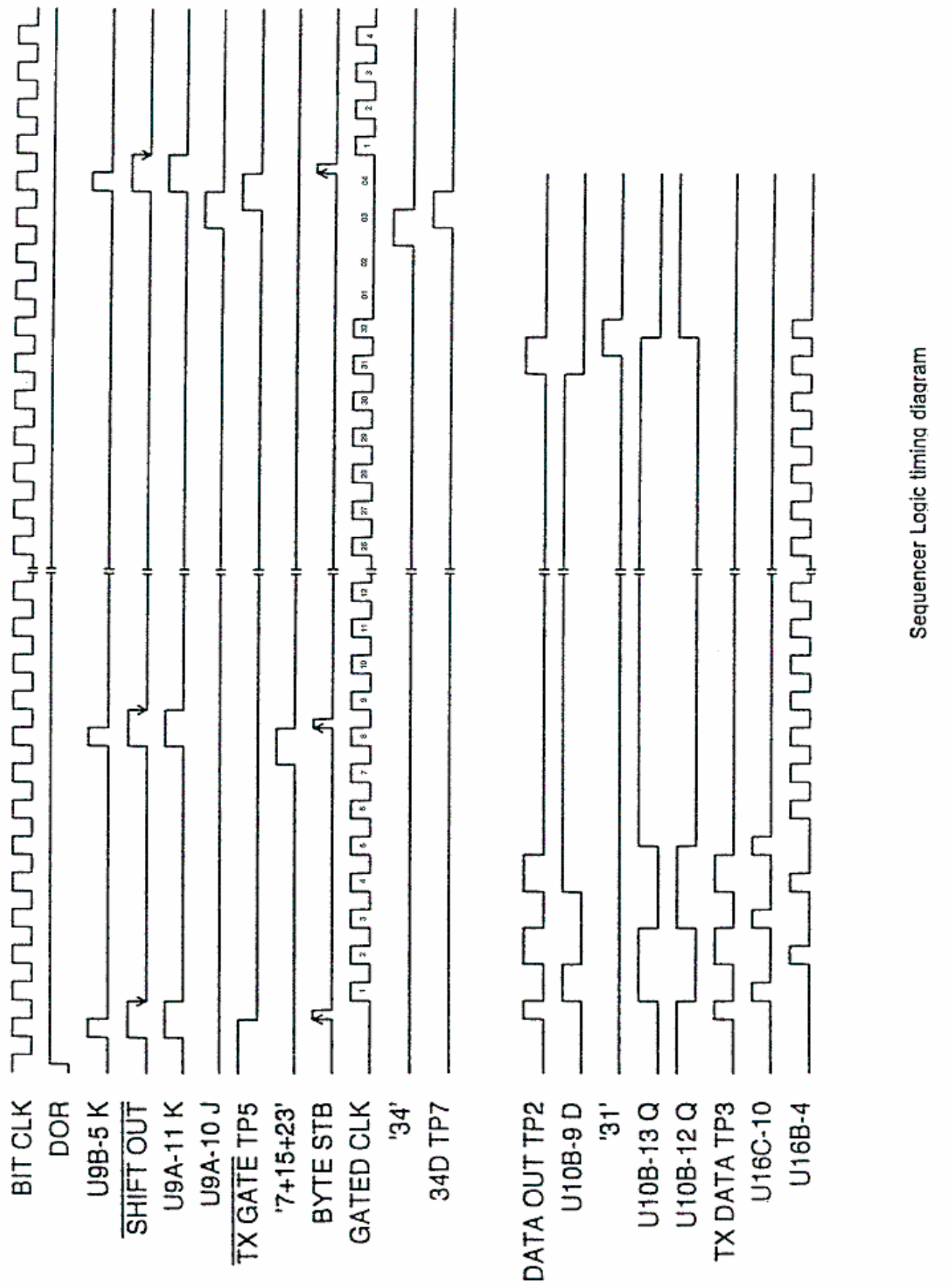


Figure 87 – Sequencer Logic Timing Diagram

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 5. THEORY OF OPERATION

C. TRANSMITTER BOARD cont.

SEQUENCE LOGIC cont.

The timing diagram assumes that the transmitter channel is reset and no bytes have been written to the FIFOs.

The BIT CLK is provided by the PTM and is shown at the top of the timing diagram. This clock is free running regardless of the state of the transmitter. The MPU programs the frequency of this clock based on the desired bit rate. The 100 kbps and 12.5 kbps rates are the standard values for high and low speed transmissions respectively.

With the transmitter reset and no words stored in the FIFO, the DOR signal is at a logic 0. When the MPU wishes to transmit an ARINC 429 word, four bytes are formatted and written into the FIFO. The bytes are formatted so that bit 1, of the 32 bit ARINC 429 word, is stored in the LSB (Least Significant Bit) of the first byte written to the FIFO. When this first byte is written into the FIFO, it is immediately available on the FIFO outputs and the DOR signal is forced to a logic 1. This signals the Sequencer Logic to begin the transmit process. Meanwhile, the MPU continues to write the remaining bytes to the FIFO.

With both the DOR and TX GATE(not) signals at a logic 1, the output of the AND gate U2B and thus the OR gate U22B are forced to a logic 1. This drives the K input of the JK flip-flop U9B. The next rising edge of the BIT CLK will force the Q(not) output (SHIFT OUT(not)) of the JK flip-flop to a logic 1.

The DOR and SHIFT OUT(not) signals are ANDed together by AND gate U23B and drive the K input of the JK flip-flop U9A to a logic 1. The J input is a logic 0 (default from reset). At the next falling edge of the BIT CLK, the Q output (TX GATE(not)) of the flip-flop is driven to a logic 0.

When the TX GATE(not) signal goes to a logic 0, several events occur simultaneously. First, the Bit Counter U3 and D type flip-flop U10B (in the Parity Generator) are enabled. Secondly, the TX GATE(not) signal is inverted by U1F which turns transistors Q3 and Q4 on. This drives both the front panel LED and rear panel SYNCH signals to indicate an ARINC 429 word is being transmitted. Thirdly, the TX GATE(not) is ANDed with the DOR signal. Since the DOR signal is at a logic 1, the TX GATE(not) signal going low forces the output to also go to a logic 0. This output is ORed with the '7+15+23' signal (logic 0) and forces the K input of U9B flip-flop to return to a logic 0. Therefore, the next rising edge of the BIT CLK will cause SHIFT OUT(not) to also return to a logic 0. This forces the FIFO to output the next byte. And finally, when TX GATE(not) goes to a logic 0, the output of OR gate U15C is also driven to a logic 0. This high to low transition causes a fast high to low pulse to be developed at the input of the inverter U1B. The capacitor C18 and pull up resistor R5 are used to setup the width of the pulse, while the diode D7 prevents the voltage from rising too high above 5 V and damaging the inverter. The resulting low to high, then back to low pulse (BYTE STB) latches the byte on the output of the FIFO into the parallel side of the parallel to serial converter.

At this point, the Sequencer Logic has prepared the circuitry and is ready to start transmitting the ARINC 429 word. With each rising edge of BIT CLK, a bit will be transmitted and with each subsequent falling edge the bit will be counted by the Bit Counter. The Sequencer Logic must load the next three bytes from the FIFO into the parallel to serial converter so that all 32 bits of the ARINC 429 word can transmitted.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 5. THEORY OF OPERATION

SEQUENCE LOGIC cont.

When the Bit Counter has reached a count of seven, the output of AND gate U4B will go to a logic 1. This, in turn, drives the outputs of AND gate U2C, OR gate U22B, and OR gate U15C ('7+15+23') and the K input of flip-flop U9B to a logic 1. Therefore, the next rising edge of BIT CLK drives the SHIFT OUT(not) signal high. On the subsequent falling edge of BIT CLK, the '7+15+23' signal returns to a logic 0 and forces the K input of flip-flop U9B low and a BYTE STB pulse which loads a byte into the parallel side of parallel to serial converter from the FIFO outputs. The next rising edge of BIT CLK forces the SHIFT OUT(not) signal to return to a logic 0 and shifts the next byte to the outputs of the FIFO. This sequence is repeated when the counter reaches the 15th and 23rd counts. If the MPU has written another ARINC 429 word into the FIFO before the 23rd count, the first byte of the next ARINC 429 word will be shifted to the output of the FIFO. Otherwise, the Sequencer Logic will reset itself after all 32 bits have been transmitted.

When the count reaches 31, the SHIFT OUT(not) signal is prevented from going high by the output of AND gate U2A (through inverter U1D) which is high from count 24 and above. At count 32, the clock which transmits each bit (GATED CLK) is inhibited by Q6 of the Bit Counter. Now the output of the ARINC 429 driver will remain in the null state until the next ARINC 429 word is transmitted.

When the count reaches 34, the output of AND gate U4C will drive the D input of the latch U11A high. On the next rising edge of BIT CLK, the output of the U4C latch (34D) will go high and force the TX GATE(not) signal to go high on the subsequent falling edge. This resets the Bit Counter and Parity Generator latch U10B. The next rising edge of BIT CLK resets the 34D signal. The whole sequence is repeated for each ARINC 429 word transmitted.

PARITY GENERATOR

The Parity Generator is made up of five gates and one latch. Basically it is a one bit binary adder. Each time a logic 1 is to be transmitted the adder is incremented by one, with no carry. After 31 bits of the 32 bit ARINC 429 word has been transmitted, the sum indicates whether an even or odd number of ones have been transmitted. The 32nd bit is used to specify transmission parity: even (logic 1) or odd (logic 0). The logic determines the logic level to be transmitted for the 32nd bit.

The adder consists of XOR gate U17A and D type latch U10B. The current count and the current bit to transmit are XORed together and latched by the GATED CLK. If the two inputs of the XOR gate are the same, the output is low, otherwise high. Before each ARINC 429 word is transmitted, the latch U10B is reset by the TX GATE(not) pulse so the Q output starts at a logic 0. If a zero is transmitted, then the output of XOR gate U17A is zero and the latch remains unchanged. The first one to be transmitted forces the output of the XOR gate U17A to go high and the Q output of latch U10B will also go high on the rising edge of BIT CLK. The second one to be transmitted forces the output of the XOR gate U17A to go low and the Q output of latch U10B will also go low on the rising edge of BIT CLK.

PARITY GENERATOR cont.

The bit to be transmitted is allowed to pass through the Parity Generator to the output latch until the 32nd bit. This is accomplished by XOR gate U17B and two AND gates U16D and U16A. The '31' signal is used to enable the Parity Generator output and is at logic 0 until the 31st count of the Bit Counter where it becomes a logic 1.

When the bit to be transmitted is a logic 0, the output of XOR gate U17B is low. The outputs of both AND gates U16A and U16D are forced low. This drives the input to the Output Latch to a logic 0.

When the bit to be transmitted is a logic 1, the output of XOR gate U17B is high and allows the sum of the counter to pass through AND gate U16D. The output of AND gate U16A depends on an inverted sum. Thus, one of the AND gate outputs will be a logic 1. This drives the input to the Output Latch to a logic 1.

The parity is transmitted when the '31' signal goes high. The 32nd bit will determine the type of parity to be transmitted. If bit 32 is a logic 0, odd parity is generated by XOR gate U17B and gate U16D. The output of XOR gate U17B is high, therefore the Q output of the D latch U10B is passed through to the Output latch.

If bit 32 is a logic 1, even parity is generated by AND gate U16A. The Q(not) output of the D latch U10B is passed through to the Output latch.

OUTPUT LATCH

The Output Latch is used to store the bit to be transmitted. The Q and Q(not) outputs drive two AND gates U16C and U16B. The AND gates allow the GATED CLK (when at logic 0) to force both outputs to a logic 0. This forces the Output Drivers to transmit a null between bits. When the bit to be transmitted is a logic 1, the Q output and the output of AND gate U16C are a logic l and output of AND gate U16B is a logic 0. When the bit to be transmitted is a logic 0, the Q(not) output and the output of AND gate U16B are a logic l and the output of AND gate U16C is a logic 0.

OUTPUT DRIVERS

The Output Drivers convert the TTL logic signals into drive signals required by the ARINC 429 specification. The ARINC 429 specification has two output terminals for the transmitter: A and B. To transmit a logic 1, the voltage at terminal A, with respect to terminal B, is +10 V. For a logic 0, the voltage is -10 V. And for a null transmission, the voltage is $\pm$ 0.5 V.

The circuit uses an OP AMP (Operational Amplifier) to bias transistors to drive each output terminal. The OP AMP U21A is configured as a differential amplifier with a gain of slightly greater than one. The difference between the voltages presented before the R2 and R3 is amplified and drives the base of transistors Q7 and Q8. The non-inverting or + input to OP AMP U21A is driven by AND gate U16C and the inverting or - input by U16B. If a logic 1 is transmitted, the output of AND gate U16C will be high and U16B will be low. The voltage difference is 5 - 0 = 5. Therefore, the output of the OP AMP will drive the base of the transistors so that the emitters are at +5 V. Thus, the base of the transmitters are driven positive and turns on NPN transistor Q8, while turning off PNP transistor Q7. The A terminal is at +5 V with respect to ground. The voltage is supplied from the +12 V power supply. The resistor R33 is used to limit current.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 5. THEORY OF OPERATION

C. TRANSMITTER BOARD cont.

OUTPUT DRIVERS cont.

The OP AMP U21B is configured the same as U21A. The non-inverting or + input is driven by AND gate U16B and the inverting or - input by U16C. If a logic 1 is transmitted, the output of AND gate U16C will be low and U16B will be high. The voltage difference is 0 - 5 = -5. Therefore, the output of the OP AMP will drive the base of transistors Q5 and Q6 so that the emitters are at -5 V. Thus, the base of the transmitters are driven negative and turns on PNP transistor Q5, while turning off NPN transistor Q6. The B terminal is at -5 V with respect to ground. The voltage is supplied from the -12 V power supply. The resistor R32 is used to limit current.

With the A terminal at +5 V, and the B terminal at -5 V (with respect to ground), the differential voltage from terminal A to B is +10 V. This represents an ARINC 429 logic 1.

The circuit performs in opposite manner when a logic 0 is transmitted. However, when a null is transmitted, both OP AMPs output 0 V and force a differential voltage of 0 V between terminals A and B.

The capacitors C11, C12, C16, and C19 are installed in parallel to the 45.3 kΩ resistors on each OP AMP circuit. This configuration slows down the rise and fall times of the pulses that drive the output transistors. This allows the output to meet ARINC 429 specifications on rise and fall times of 10 μs for low speed and 1.5 μs for high speed transmissions. The capacitor values are 100 pF for TX1 boards and 10 pF for TX2 boards.

The zener diodes CR1 - CR4 provide over voltage protection. If either of the A or B terminals voltage (with respect to ground) begin to rise above or below ± 7.5 V, the zener diodes will clamp the voltage.

D. RECEIVER BOARD

The RX1 BOARD is a low speed ARINC 429 receiver board. The board is installed in the backplane of the T1200B. This allows the MPU to read the ARINC 429 words received by the RX1 board. This board contains all circuitry to provide two ARINC 429 receivers.

The high speed ARINC 429 receiver RX2 BOARD is nearly identical to the RX1 Board except for some passive component values and DIP switch settings. Therefore, only the RX1 Board will be discussed in detail. Any differences will be addressed in the discussion. Also, since there are two receiver channels on the board, only channel 1 will be discussed, as both are functionally identical.

Figure 88 shows the Block Diagram for the RX1/RX2 board. In the CMM (Component Maintenance Manual), the Assembly drawing JPN: 25-5578-00/01 and Schematic drawing JPN: 02-5578-00/01 are included for reference.

The following subsections discuss the RX1/RX2 Board Block Diagram in detail:

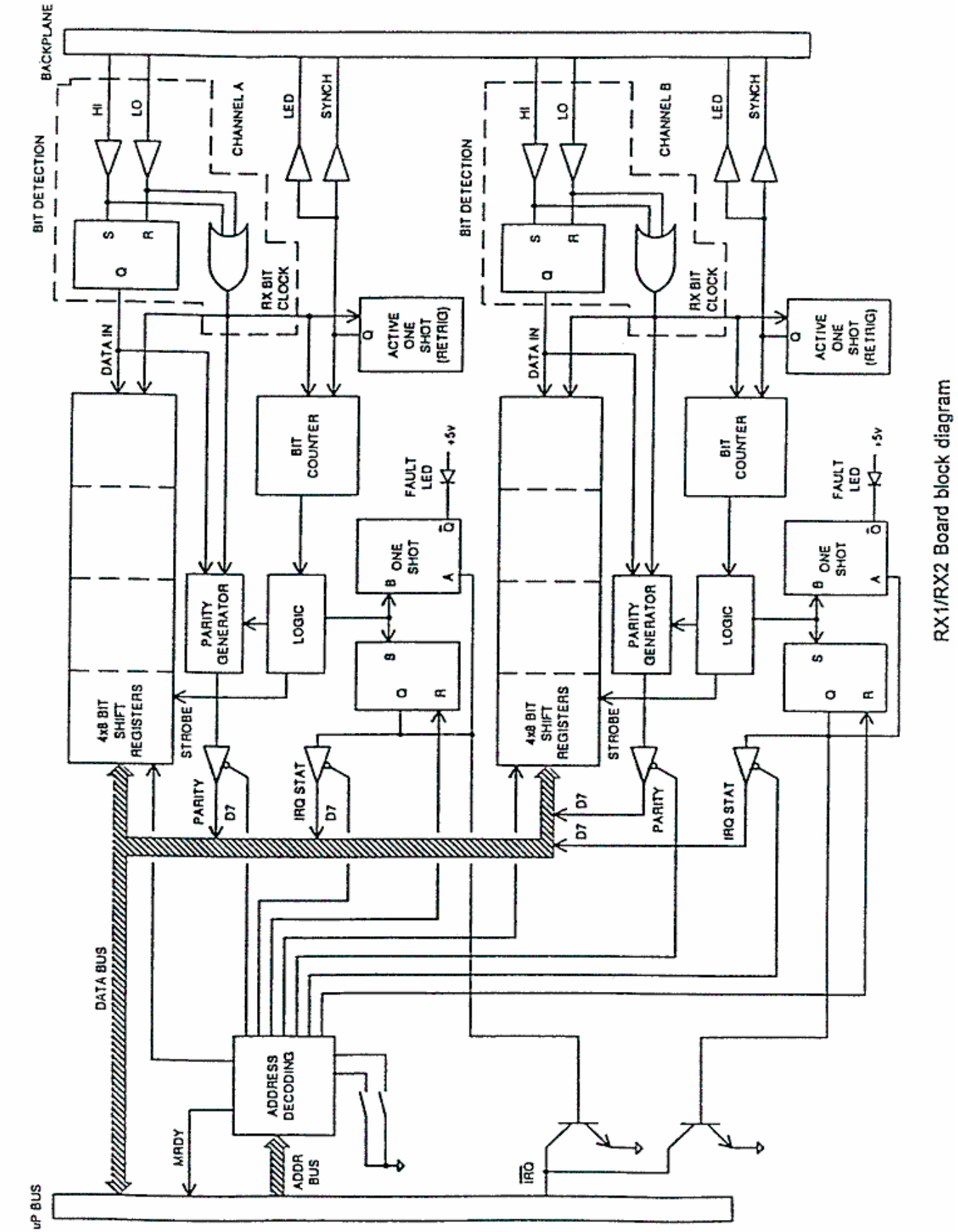


Figure 88 – RX1/RX2 Board Block Diagram

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 5. THEORY OF OPERATION

D. RECEIVER BOARD cont.

ADDRESS DECODING

The address decoding, for the RX board, is handled by U33, U32D, and U32A. U33, S1-1, and S1-2 are used to setup and decode the board address. S1-1 and S1-2 are both open for the low speed RX1 board and S1-1 is closed with S1-2 open for the high speed RX2 board. U33 NAND gate provides a logic 0 enable to U26 1 of 8 decoder when all inputs are logic 1. Thus, the address range for RX1 is EFC0 to EFCF and RX2 is EFD0 to EFDF.

U26 decodes 3 address lines and provides a logic 0 on 1 of 8 outputs. It is enabled when the output of U33 is a logic 0. In addition to U26, each channel on the board contains a 1 of 4 decoder (U13A and U13B) to perform specific operations. The following list describes the functions performed by the combination of functions selected by U26, U13A, and U13B:

A3 A2 A1 A0 (X = Don't care)

0	0	0	0	Reads Channel 1 received byte #2.
0	0	0	1	Reads Channel 1 received byte #1.
0	0	1	0	Reads Channel 1 received byte #4.
0	0	1	1	Reads Channel 1 received byte #3.
0	1	0	0	Clears and enables IRQ interrupt for Channel 1.
0	1	0	1	Disables IRQ interrupt for Channel 1.
0	1	1	X	Reads IRQ status for Channel 1.
1	0	0	0	Reads Channel 2 received byte #2.
1	0	0	1	Reads Channel 2 received byte #1.
1	0	1	0	Reads Channel 2 received byte #4.
1	0	1	1	Reads Channel 2 received byte #3.
1	1	0	0	Clears and enables IRQ interrupt for Channel 2.
1	1	0	1	Disables IRQ interrupt for Channel 2.
1	1	1	X	Reads IRQ status for Channel 2.

BIT DETECTION

The Bit Detection circuitry converts the ARINC 429 signals into TTL levels. The ARINC 429 specification has two input terminals for the receiver: A and B. When receiving a logic 1, the voltage at terminal A, with respect to terminal B, is ideally +10 V, although the range is +6.5 to +13 V. For a logic 0, the voltage is -10 V with a range of -6.5 to -13 V. And for a null transmission, the voltage is $\pm$ 0.5 V.

The ARINC 429 signal is applied to a voltage divider network consisting of resistors R51, R45, R46, and R52. Notice the divider network is connected to ground between resistors R45 and R46. This provides a reference to ground and divides the voltage equally between the two Comparator circuits. When receiving a logic 1, the voltage divided from the A terminal develops across resistor R45 to ground and is approximately 0.25 V. Likewise, the voltage divided from the B terminal develops across resistor R46 to ground and is approximately -0.25 V. When receiving a logic 0, the voltage magnitudes remain the same, however, the polarities are reversed. When receiving a null, both divided voltages are approximately 0 V.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 5. THEORY OF OPERATION

D. RECEIVER BOARD cont.

BIT DETECTION cont.

The Comparator circuits determine the logic state of the bit being received (0 or 1). The difference between the voltages presented at the + and - inputs of the Comparators are compared and are used to set or reset RS latch U24A. The non-inverting or + input of Comparator U21B is driven by the divided A terminal voltage. The inverting or - input is biased by a voltage divider made up of resistors R15 and R14. This divider biases the Comparator depending on the divided voltage of the B terminal. If a logic 1 is received, the voltage present at the inverting input of the Comparator can be determined by:

Vin = 5 - [(5 - Vb) * R15 / (R14 + R15)]
Where: Vin is the inverted input to the Comparator
Vb is the divided B terminal voltage (-0.25)
R14 1 kΩ
R15 16.2 kΩ
Vin = 5 - [(5 - -0.25) * 16.2 k / (1 k + 16.2 k)
= 5 - [(5.25) * 16.2 k / 17.2 k]
= 5 - [85.05 k / 17.2 k]
= 5 - 4.9447674
= 0.0552 V

Since the difference between the input voltages is positive (0.25 V -0.0552 V = 0.1948) the output of the Comparator U21B will begin to go positive. The circuit wraps the feedback resistor back to the non-inverting input. This creates positive feedback and adds more voltage to the non-inverting input. Thus, the output continues to climb quickly until it reaches the V+ rail at +5 V. This sets the RS latch U24A for a received logic 1.

The Comparator U21A is configured the same as U21B, except the non-inverting or + input is driven by the divided B terminal voltage. The inverting or - input is biased by a voltage divider made up of resistors R21 and R19. This divider biases the Comparator depending on the divided voltage of the A terminal. If a logic 1 is received, the voltage present at the inverting input of the Comparator can be determined by:

Vin = 5 - [(5 - Va) * R21 / (R21 + R19)]
Where: Vin is the inverted input to the Comparator
Va is the divided A terminal voltage (0.25)
R19 1 kΩ
R21 16.2 kΩ
Vin = 5 - [(5 -0.25) * 16.2 k / (1 k + 16.2 k)
= 5 - [(4.75) * 16.2 k / 17.2 k]
= 5 - [76.95 k / 17.2 k]
= 5 - 4.4738372
= 0.526 V

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 5. THEORY OF OPERATION

D. RECEIVER BOARD cont.

Since the difference between the input voltages is negative (-0.25 V -0.526 V = -0.776) the output of the Comparator U21A will begin to go negative. The circuit wraps the feedback resistor back to the non-inverting input. This creates positive feedback and adds more negative voltage to the non-inverting input. Thus, the output continues to decrease quickly until it reaches the V- rail at -12 V. The output is divided using the resistors R22 and R23 which converts the -12 V level to approximately 0 V. This inhibits the reset of the RS latch U24A. The diodes CR6 and CR7 protect the logic by clamping the voltage to around -0.7 V if the voltage goes below -0.7 V.

The circuit performs in opposite manner when a logic 0 is received and when a null is received, both Comparators output -12 V (divided up to 0 V).

4x8 BIT SHIFT REGISTERS

The four 8 bit shift registers (U6 - U9) provide the means to convert the received serial 32 bit ARINC 429 words into four 8 bit bytes the MPU can read. The 8 bit shift registers are cascaded together to form a 32 bit shift register. As the ARINC 429 word is received the NOR gate U22B creates a clock pulse. One of the inputs will go to a logic 1, this forces the output low. When the ARINC 429 signal returns to the null state, both inputs are low and the output goes high. This low to high transition strobes the bit into the shift register, the Bit Counter is incremented by one, and the one-shot U16A is triggered.

When the MPU reads the internal output latches of the shift registers, one-shot U28A is triggered. The output of the one-shot turns transistor Q5 on. This drives the MRDY of the MPU low which stretches out the current clock cycle. This allows the slower shift register enough time to output the byte onto the MPU data bus (through transceiver U30) and allow it to settle. When the one-shot times out, the MPU continues the bus cycle and reads the byte.

ACTIVE ONE SHOT

The Q output of Active One-Shot U16A drives an inverter and transistor circuit to provide +5 V to the front panel receiver active LED. The one-shot also provides a rear panel scope sync output. On the first falling edge of the bit clock created by U22B, the Active One-Shot is triggered and Q(not) goes high. This removes the reset on JK flip-flop U15A, Bit Counter U17, and one-shot U19A. The duration of the Active One-Shot is setup by the capacitor C14 and resistor R6. The RX1 low speed board uses a 20.0 kΩ resistor and provides a 0.2 ms pulse, while the RX2 high speed board uses a 2.43 kΩ resistor and provides a 24.3 μs pulse. The one-shot is retriggerable and is retriggered each clock pulse.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 5. THEORY OF OPERATION

D. RECEIVER BOARD RX1 cont.

BIT COUNTER

A ripple counter U17 is used to count each bit being received. When the 32nd bit is counted, the Q6 output goes high. This triggers one-shot U19A for 15 μs. U19A's Q (STB) output, when it returns low, strobes the data stored in the shift registers to their internal output latches and triggers one-shot U19B for 15 μs. This sets RS latch U24B and generates an IRQ(not) by turning on transistor Q1. U19A's Q(not) output is used to latch the ones count into latch U18B and to drive the B input of the Fault One-Shot U20A.

PARITY GENERATOR

The Parity Generator is made up of JK flip-flop U15A. Basically it is a one bit binary adder. Each time a logic 1 is received the adder is incremented by one, with no carry. After all bits of 32 bit ARINC 429 word have been received, the sum indicates ether an even or odd number of ones have been received. If an odd parity word has been received, an odd number of ones should have been counted.

Each one bit that is received drives the DATA IN line high. The J and K inputs are connected to the DATA IN line and thus, are also high. If both J and K inputs are high on the rising of the Bit Clock, the Q output toggles. Therefore, two (even number) ones received will toggle the flip-flop from low (default from reset) to high, then back low.

After the ARINC 429 word has been received, the ones count is stored in latch U18B. When the MPU reads byte four from shift register U9, bit 7 is substituted with the ones count via a tri-state buffer U1B.

IRQ INTERRUPT

During a T1200B reset, the latch U18A is preset. This enables the channel to generate an IRQ(not) interrupt of the MPU. The MPU may turn off or clear and turn on the interrupt using the addresses described in the Address Decoding section. After all 32 bits of the ARINC 429 word have been received and U19A is triggered, the falling edge of STB triggers one-shot U19B. The Q output of this one-shot is ANDed with the IRQ enable latch U18A. If the output of the AND gate is high, latch U24B is set and the IRQ(not) interrupt line is driven low by Q1 turning on. The MPU will check the channel to see if it caused the interrupt by reading the interrupt status via a tri-state buffer U1D.

An IRQ interrupt can be disabled by accessing address EFC5 (EFCD for channel 2, and EFD5 and EFDD for RX2 board) which will clock latch U18A and force the Q(not) output to go low. This will inhibit the IRQ SET signal and not allow any interrupts.

FAULT ONE-SHOT

A Fault One-Shot will be triggered by the Q(not) if a previous IRQ interrupt has not been cleared by the MPU. This indicates a data overrun error. The one-shot turns on transistor Q3 which turns on an LED on the board.

CHAPTER ONE - GENERAL INFORMATION AND OPERATING INSTRUCTIONS

SECTION 5. THEORY OF OPERATION

E. TOUCH SCREEN DISPLAY & SINGLE BOARD COMPUTER (SBC)

The Single Board Computer and Touch Screen are used to emulate the Fluke InfoTouch display used in the original T1200. The SBC acts as an interface between the CPU board and the touch screen.

The Touch Screen allows the operator to select menu options and enter information into the T1200B. The screen is divided into two parts, the upper section is used to display information and provide menu options and the lower section is the Keyboard or Keypad that is used to enter numeric information.

The CPU Board provides information to the SBC that is formatted and displayed on the touch screen. Touch screen inputs are received by the SBC, formatted and sent to the CPU Board. Display outputs and touch screen inputs to and from the upper portion of the display are sent and received over a full duplex RS-232C 9600 baud data link between the SBC and the CPU Board. The CPU generates the screens and menus shown on the Touch Screen by sending ASCII data to the SBC. When the operator touches the screen, the SBC sends an ASCII byte to the CPU.

The information obtained from the Keypad, lower portion of the screen, is formatted in a parallel format by the SBC and sent to the CPU using the parallel port. When a key on the keypad is pressed the SBC places a code on the parallel port and interrupts the CPU by pulling the IRQ line low. When the CPU has read the value from the parallel port, it responds by a pulse on the CA2 line that is connected to the SBC's parallel port. The SBC then clears the data from the parallel port. If the CPU does not respond to the keypad input within 200 milliseconds the data is removed from the parallel port and the input is ignored.

F. SECURITY

The Security Board is used in conjunction with the Discrete Function Interface Units (DFIU's) to verify the proper DFIU is connected for the menu selected. The security board in the T1200B communicates with a similar board in the DFIU to determine if it is the correct DFIU type for the selected menu.

CHAPTER TWO - MAINTENANCE

SECTION 1. MAINTENANCE INFORMATION

Maintenance information, along with calibration procedures, bills of materials, assembly, drawings, and schematics, is located in the T1200B Maintenance Manual (P/N 06-1200-B0 for hard copy, E6-1200-B0 for CD) available separately from Aeroflex.

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP