The DPS ShuttleBus system

Table of contents

Introduction

The MDMs

The SCU

The SCU is the controlling system of the MDM. It reacts to commands from the GPCs/PCMMUs and contains a 512 words Programmable Read-Only Memory (PROM), which permits automatic execution of I/O. The first sixteen words of the PROM are special and encode the types of installed hardware in the MDM.

The MDM I/O cards

Type 1: Discrete input, low voltage

This input card reads digital signals in the range of 0 to 5V, 5V meaning high or true, 0V meaning low or false. It has 3 channels, each 16 bit channel being equal to 16 output lines.

Type 5: TACAN/Radar altimeter

This is a special kind of card, that combines serial I/O with analog I/O functions.

MDMs

Flight forward (FF) MDMs

All four flight forward MDMs can be interchanged and thus, use equal I/O hardware and equal PROM images.

Bus control element numbers

MDM	BCE Number
FF1	10
FF2	11
FF3	12
FF4	13

PROM Programs

FCINPUT1 – read 20 words (CW: 01011 0 0010 000010000 10011)

Call: ExecutePROM(bce, 16, 20, data);

Program:

```
FCINPUT1 EQU *
      #READ 14,6,1
      #READ 14,7,1
      #READ 14,1,1
      #READ 1,6,1
      #READ 1,7,1
      #READ 1,1,1
      #READ 14,5,1
      #READ 1,5,1
      #READ 14,3,1
      #READ 1,3,1
      #READ 7,1,1
      #READ 4,0,1
      #READ 4,1,1
      #READ 4,2,1
      #READ 12,0,1
      #READ 12,1,1
      #READ 6,0,1
      #READ 15,0,1
      #READ 14,0,1
      #READ 14,2,1
```

FCINPUT2 – multiple read operations

CW:
Call:

```
      ExecutePROM(bce, 27, 7, data);           //01011 0 0010 000011011 00110
      ExecutePROM(bce, 42, 8, data);           //01011 0 0010 000101010 00111
      ExecutePROM(bce, 50, 1, data);           //01011 0 0010 000110010 00000
      ExecutePROM(bce, 52, 1, data);           //01011 0 0010 000110100 00000
      ExecutePROM(bce, 51, 1, data);           //01011 0 0010 000110011 00000
```

Program (remarks for FF1):

```
FCINPUT21 EQU *
      #READ 4,0,1
      #READ 4,1,1
      #READ 4,2,1
      #READ 12,0,1
      #READ 12,1,1
      #READ 6,0,1
      #READ 15,0,1

FCINPUT22 EQU *
      #READ 7,0,1             Fwd Attach Pt Cap Volts A
      #READ 0,0,1             TACAN 1 Bearing Word A
      #READ 0,1,1             TACAN 1 Bearing Word B
      #READ 0,2,1             TACAN 1 Range Word A
      #READ 0,3,1             TACAN 1 Range Word B
      #READ 0,4,1             RADAR Alt 1 Parent Word
      #READ 0,5,1             MDM FF1 Discrete in
      #READ 0,6,1             MDM FF1 Discrete in
FCINPUT23 EQU *
      #READ 11,1,6            ADTA 1
FCINPUT25 EQU *
      #READ 11,0,14           IMU 1
FCINPUT24 EQU *
      #READ 3,0,3             MSBLS 1
```

I/O cards

Module address	Card type
0	TACAN/RALT
1	Analog input, differential
2	Discrete output
3	Serial I/O
4	Discrete input
5	Discrete output
6	Discrete input
7	Analog input

Module address	Card type
8	Analog output
10	Discrete output
11	Serial I/O
13	Discrete output
14	Analog input, differential
15	Discrete input

Card 1 – Analog input

Channel address	Subsystem	Quantity
0		
1	LH RHC	LH RHC CMD (A, B, C, D) Yaw
2		
3	LH RPTA	LH RPTA CMD (A, B, C, D)
4		
5	LH SBTC	LH SBTC CMD (A, B, C, D)
6	LH RHC	LH RHC CMD (A,B, C, D) Roll
7	RH RHC	RH RHC CMD (A, B, C, D) Pitch

Card 3 – Serial I/O

Channel address	Subsystem	Quantity
0		
1	MTU	Serial I/O
2		

Card 11 – Serial I/O

Channel Address	Subsystem	Quantity
0	IMU	Serial I/O
1	ADTA	Serial I/O
2		

Card 14 – Analog input

Channel Address	Subsystem	Quantity
0	AA	Norm Acc 1 signal
1	RH RHC	RH RHC CMD (A, B, C, D) Yaw
2	AA	Lat Acc 1 signal
3	RH RPTA	RH RPTA CMD (A, B, C, D)
4		
5	RH SBTC	RH SBTC CMD (A, B, C, D)
6	RH RHC	RH RHC CMD (A, B, C, D) Roll
7	RH RHC	RH RHC CMD (A, B, C, D) Pitch

MMU

BCE 18/19

Opcode 1 = Write with checksum

Opcode 2 = Write without checksum

Opcode 3 = Read with checksum

Opcode 4 =Read without checksum

Opcode 5 = MM Utility write