MDB-64, MID-64

**Driver Interfaces for
the METRABUS**

Functional Description

METRABUS Driver board interfaces the METRABUS system to the PC. It allows a single PC expansion slot to control up to 32 external METRABUS I/O boards. This allows a single board to interface to 512 digital or 256 analog I/O points. Programming the METRABUS system is very simple because the interface board generates all required timing and control signals.

A 50-pin connector extends out the rear of the PC and connects to the METRABUS cable. The 50 conductor cable connects the METRABUS interface boards and power supply to the driver board. The cable carries all data, address, and control signals as well as power. Ground conductors are interleaved between all signal lines to increase system noise immunity.

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The METRABUS system has been designed to allow cable lengths up to 100 feet. Applications which require communication at distances greater than 100 feet should use the REM-64 remote driver card or INTMD64 stand-alone controller.

The MDB-64 uses 4 consecutive I/O addresses in the PC. The MID-64 uses 8 consecutive addresses. The addresses are set by a DIP switch located on the boards.

Software

Programming is very easy because the board generates its own METRABUS control signal. The MDB-64 uses 4 consecutive addresses in the computer's I/O expansion address space. Reading and writing to each of these addresses has a specific function. These are described in the table below. The MID-64 uses 8 consecutive addresses but is otherwise identical.

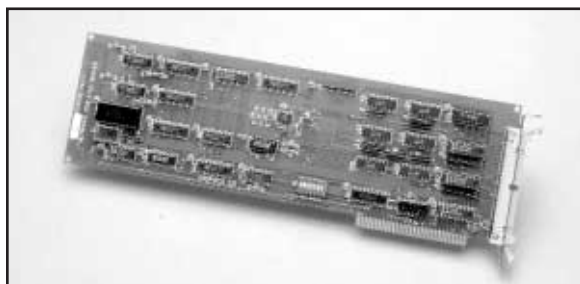| I/O ADDRESS	READ	WRITE
Base + 0	DATA IN	DATA OUT
+ 1	ADDRESS + STATUS	ADDRESS
+ 2	—	clear
+ 3	—	—

There are two steps to reading from and writing to a METRABUS I/O board. The first step selects the METRABUS address to select the desired I/O board on the system. The second step reads and writes data from/to the board. An example of a METRABUS program in interpreted Basic is shown below. Similar routines can easily be implemented in other languages.
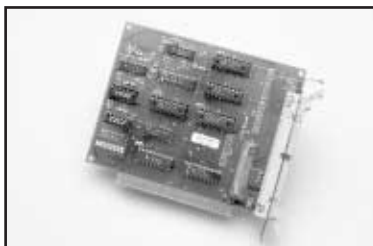
```
10  BASE ADR=768              ' set BASEADR to 768 (hex 300)
20  OUT (BASEADR + 2), 00     ' command system reset
30  OUT (BASEADR + 1), 16     ' select METRABUS address 16
40  OUT (BASEADR), 55         ' write 55 to selected device (at address 16)
50  DD=INP (BASEADR)          ' read back address 16 contents
60  IF DD < > 55 THEN PRINT "ERROR"  ' verify that 55 was received by  board
70  OUT (BASEADR + 1), 00     ' select new METRABUS address  (00)
80  XX = INP (BASEADR)        ' read from new address
90  PRINT XX                  ' print the data returned from  address 00
```
Note: The METRABUS address can be read back if desired.

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If you need to find the current address setting, it can be read:

   xx100A = inp (baseadr + 1)

Reading the address also yields 2 bits of status information as well as the address:

ADDRESS BYTE

d7	d6	d5	d4	d3	d2	d1	d0
busy	r/w	a5	a4	a3	a2	a1	a0

Normally both the BUSY and R/W status signals will be zero, so the value returned will be identical to the content of the address bus.

For a period of about 100 microseconds after a data output (write) operation on the bus, the R/W status returns low. When programming in interpreted Basic, it is not necessary to test the R/W status as the interpreter execution delays are longer than the METRABUS write time, but if an interpreted Basic program is subsequently compiled, or if you are using assembly language or any other compiled language, you should perform a test of the R/W status before proceeding with the next I/O operation.

The BUSY signal is an additional status signal for slow I/O devices e.g. A/D converters, stepper motor drivers, etc.

Power Supplies

Small systems which require only +5 volt supplies may be run directly off the PC's power supply with the MDB-64. No power from the computer is brought to the METRABUS connector of the MID-64. This requires all larger applications or applications using the MID-64 to have a METRABUS power supply or equivalent to provide system power. (Refer to MBUS-PWR on page 549.)

SPECIFICATIONS

METRABUS ADDRESS

Up to 8 consecutive addresses

DATA TRANSFER RATE: 80Kbaud (10,000 8-bit transfers/sec max)

DRIVEABLE CABLE LENGTH: 100 feet at full speed max

POWER CONSUMPTION: +5V: 250mA typ 325mA max (not including I/O modules)

±12V: Not used

ISOLATION (PC TO METRABUS): 500V (MID-64 only)

ENVIRONMENTAL

OPERATING TEMPERATURE RANGE: 0 - 50°C

STORAGE TEMPERATURE RANGE: –25 to + 88°C

ORDER	DESCRIPTION
MDB-64	METRABUS Driver Board for PC/XT/AT
MID-64	Isolated METRABUS Driver Board for PC/XT/AT (See Cable Selection Guide on page 550)