MP1763 and MP1764

High-Speed Pattern Loading on the 12.5 Gigabit Bit Error Rate Test Systems

Application Note

Introduction

The MP1763 Pulse Pattern Generator and the MP1764 Error Detector allow bit patterns to be sent through the GPIB bus using the efficient Direct Memory Access (DMA) method. This Application Note covers the basics of sending data patterns to these instruments. The procedure for sending a pattern is identical for both the MP1763 and the MP1764.

Instrument Setup

Most test applications use positive logic; i.e., a "1" in the instrument will be sent as a "1" in the pattern. To use positive logic, send "LGC 0" followed by a newline (0x0A). Set the pattern mode to "programmable" by sending "PTS 1" and a newline. To set the pattern length, send "DLN" followed by a space, the number of bits in the data pattern and a newline.

Bit Order

The MP176x divides patterns into 16-bit pages, which it displays one page at a time. Within each page, the pattern bits are numbered 1 through 16 on the instrument's front panel, as in the following diagram:

During a measurement, the MP176x tests bit 1 first, then bit 2, etc. During setup, the bits within each page are transmitted from the computer to the instrument over GPIB in the opposite order from the display; i.e., bit 16 is sent first, followed by bit 15 and so forth. The overall sequence of pages is unchanged; in other words, page 0 is sent before page 1.

Here is a sample test pattern beginning with the bits in the diagram above, along with the corresponding data that would be sent via GPIB:

Order of Bits in Test Pattern		Order of Bits to be Sent Over GPIB	
Binary	*Hexadecimal*	*Binary*	*Hexadecimal*
0110 1010 0001 0000	0x6A10	0000 1000 0101 0110	0x0856
1101 1100 0100 1101	0xDC4D	1011 0010 0011 1011	0xB23B
0110 1010 1001 1001	0x6A99	1001 1001 0101 0110	0x9956
1010 0111 0101 0001	0xA751	1000 1010 1110 0101	0x8AE5

Putting the Command Together

The entire command is sent to the instrument as one command:

```
WRT <bytes>,<page><newline><binary data><newline>
```

The only space is the one immediately following the `WRT` header. For the example pattern, the PC would send:

```
WRT 8,0<newline><binary data>: 08 56 B2 3B 99 56 8A E5><newline>
```

The following C code illustrates how this pattern might be sent to the instrument:

```c
int page = 0;
int numBytes = 8;
char data[8] = {0x08, 0x56, 0xB2, 0x3B, 0x99, 0x56, 0x8A, 0xE5};
char *sendBuf = malloc (numBytes + 20);
int len, bytesSent;

sprintf (sendBuf, "WRT %d,%d\n", numBytes, page);
len = strlen (sendBuf);
memcpy (sendBuf+len, data, numBytes);
sendBuf[ len+numBytes] = '\n';

ibwrt(gpibDevice, "LGC 0\n", 6, &bytesSent);
ibwrt(gpibDevice, "PTS 1\n", 6, &bytesSent);
ibwrt(gpibDevice, "DLN 64\n", 7, &bytesSent);
ibwrt(gpibDevice, sendBuf, numBytes+len+1, &bytesSent);

free(sendBuf);
```

Further Topics

The instruments offer a number of other pattern-related commands. For example, the `RED` command retrieves the pattern from the instrument in the same format discussed above. The MP1764 Block Window commands (`MWT` and `MRD`) allow entire 16-bit pages to be set to the same value. For more information, see the GPIB Programming manuals for the two instruments.