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Using the 'B' command on the DDS9m and 409A.
AN001

To allow full access to the on-board DDS generator integrated circuit, an AD9959, both the DDS9m and 409A implement a "byte" command. This command allows byte-by-byte control of the all the registers in the AD9959. Refer to the AD9959 data sheet from Analog Devices, Inc. for details.

The basic format is:

```
B aa[bb[cc[dd[ee[ff[gg]]]]]]
```

The AD9959 requires a different number of bytes depending upon which function or register is being programmed. However, all programming sequences begin with an "instruction byte," which selects the register to be written. While the AD9959 accepts either a read or write of registers, the DDS9m and 409A allow writes only. Following the "instruction byte" there will be a varying number of bytes written depending upon the register selected. For example, if the Channel Select Register (CSR) is chosen, only one byte need be written after the instruction byte. If Channel 1 was selected, this "B" command would look like:

```
B 0020
```

Which would program the AD9959 to accept values for Channel 1. If all subsequent values were to affect Channel 1, this sequence would not need to be sent again.

As a more detailed example, assume that a frequency of 25.0MHz was desired on Channel 2. This requires a CSR value of 0x40. The frequency of 25MHz, as 0.1Hz resolution in hexadecimal is 0x0ee6b280, which must be stored in Channel Frequency Tuning Word 0 (CTW0) at address 0x04.This would then give the "B" command:

```
B 0040040ee6b280
```

This can also be sent piece by piece to make the command operation more obvious:

```
B 0040        ;set CSR to 0x40 to select channel 2
B 040ee6b280 ;select address 0x04 (CTW0) and write frequency value
```

If combined with the "I x" command, the complete command sequence can be sent before the output is enabled.

Since this command allows all writes to any register on the AD9959, it is possible to put the chip into a non-functional state. For example, changing the serial I/O mode select in the CSR will render the on-board microprocessor incapable of communicating with the AD9959. A board reset will be required to return control.