

Interfacing the LTC1091 to the HD64180

Guy Hoover
William Rempfer

Introduction

This application note describes an interface between the LTC1091 10-bit data acquisition system and the Hitachi 64180 microprocessor. The simple four wire interface is capable of completing a 10-bit conversion and shifting the data to the 64180 in 91 μ s. Configuration of the LTC1091 and the 64180 will be discussed as it applies to this interface. Schematics, code, and timing diagrams will be shown. Finally, a summary of the key points of this interface will be given including data throughput rates.

Interface Details

The LTC1091 clock line controls the A/D conversion rate and the data shift rate. Data is transferred in a synchronous half duplex format over D_{IN} and D_{OUT}.

The 64180 has a clocked serial I/O port (CSIO) that allows the user to construct a simple communication path to the LTC1091. The serial port provides clock, transmit and receive lines that are compatible with the LTC1091. The only additional line required is one programmable output pin (RTSO) to control \overline{CS} on the LTC1091. The schematic of Figure 1 shows how the two devices are connected.

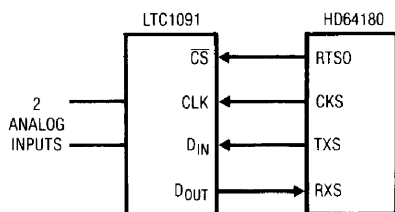
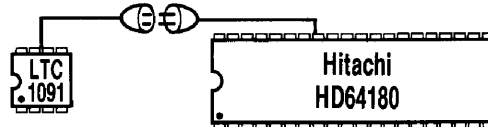


Figure 1. LTC1091 Transmits Data to HD64180 Using 4 Wires



Hardware Description

The timing diagram of Figure 2 was obtained using an HP1631A logic analyzer. The 64180 crystal frequency was 4MHz. This produced a transfer time of 455 μ s. A version of the 64180 can be run at 20MHz crystal frequency so the times shown can be reduced by a factor of five yielding a total transfer time of 91 μ s.

The analog section of the schematic of Figure 1 is omitted for clarity. For a complete discussion of the analog considerations involved in using the LTC1091 please see the data sheet.

Software Description

The software configures and controls the CSIO of the 64180. Additionally, the software manipulates RTSO (\overline{CS} of the LTC1091).

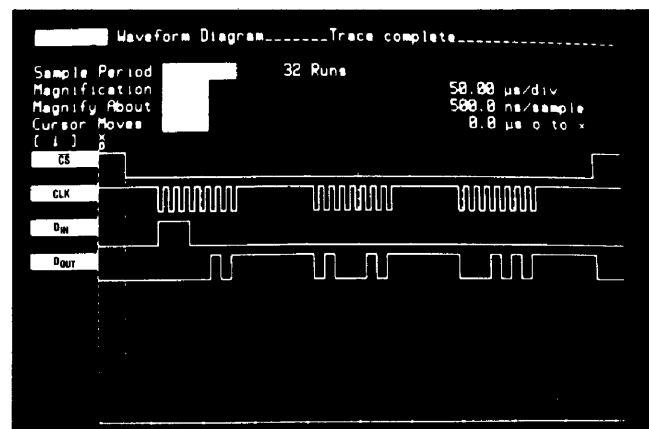


Figure 2. Timing Diagram. Throughput Times as Short as 91 μ s are Possible.

