



FIGURE 5.28 The complete datapath for the multicycle implementation together with the necessary control lines. The control lines of Figure 5.27 are attached to the control unit, and the control and datapath elements needed to effect changes to the PC are included. The major additions from Figure 5.27 include the multiplexer used to select the source of a new PC value; gates used to combine the PC write signals; and the control signals PCSource, PCWrite, and PCWriteCond. The PCWriteCond signal is used to decide whether a conditional branch should be taken. Support for jumps is included.

and multiple readers of the value. Just as we reduced the number of functional units for the datapath, we can reduce the number of buses interconnecting these units by sharing the buses. For example, there are six sources coming to the ALU; however, only two of them are needed at any one time. Thus, a pair of buses can be used to hold values that are being sent to the ALU. Rather than placing a large multiplexer in front of the