

A MICRO PLC FOR PROCESS CONTROL (500 Words) :

A PLC or a Programmable Logic Controller in any process control, e.g. a petroleum refinery, an automobile manufacturing unit or a building complex is designed to carry out operations and annunciations in the working of the plant that could be the monitoring of pressure, temperature, Motor and Valve status, etc., and controlling of electrical and mechanical machines within a sequence of values of time, pressure, temperature, level etc. In reality PLC's could be quite complex and is usually built around 486 and Pentium based processors with plenty of Analog and Digital I/O's to control an entire series of operations. However, at times an application may desire the use of a PLC with very limited functions but the costing doesn't suit the budget. Thus arises the need of having a flexible and programmable MicroPLC within a very restricted budget.

The PSoC based controller is used to control/operate a remote butterfly valve pack in a pipeline installation and working as a slave controller in connectivity with a MASTER PLC LAN . The Micro PLC uses the RS232 to receive control and status interrogation commands over the RS232 and also updates a remotely placed MASTER PLC of the valve status. The system is based on the PSoC CY8C26443 with logic/communication control to avoid or disallow illegal function call/operation. A MAX232A serves as the RS232 Line Driver and Receiver.

A. SIGNALLING & PROTOCOL

Physical Layer	:	RS 232 signals over a CAT5 twisted pair cable
Protocol	:	Command and Status update (CSU)
Encoding	:	Control/Status Functions – ASCII character set
Format	:	8 bit ASCII/Binary, 1 Start & 1 Stop Bit, Even parity
Bit Rate	:	9600
Flow Control	:	XON / XOFF Handshaking (^S & ^Q)

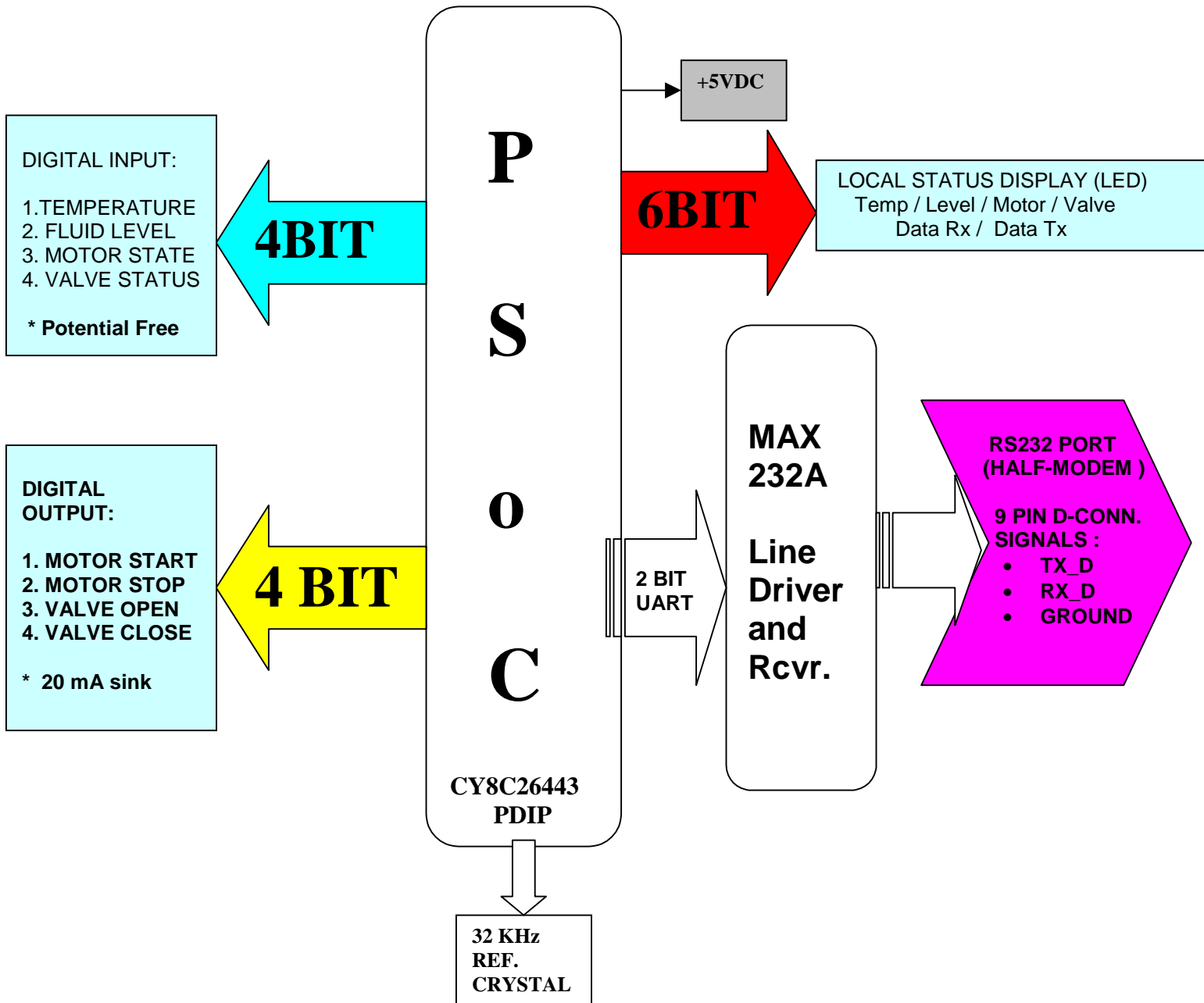
B. PRINCIPLE OF OPERATION

The encoded signal from the Command Control(CC) is received at the MicroPLC unit where it is decoded over a specified format and appropriate function / operation is activated by the microcontroller based system through the potential free relay interface. Subsequently the PSoC controller sends backs status updation / annunciation signals back to the Command Control for annunciation and display locally at the the Command Centre.The system has the adaptability to operate over a three wire line using CAT5 LAN cable to distances of 10 to 20 metres at 9600 baud and being a point to point link over a CAT5, it is sufficiently immuned to band noise and other industrial interferences prevalent in plants.

C. ADVANTAGES OF THIS SYSTEM

The technology is a system integration of external analog electrical/logic circuit and the PSoC microcontroller and the signalling format/protocol easily interfaces as a slave controller to the commonly available industrial PLC's in the world market. The system would readily replace the practice of installing dedicated control/logic panels using multicore control cables all of which are expensive with high maintenance costs. The PLC will also interface to Packet Radio engines.

SYSTEM BLOCK DIAGRAM :



4. MICRO PLC CIRCUIT SCHEMATIC DIAGRAM :

PROJECT NUMBER : 250

