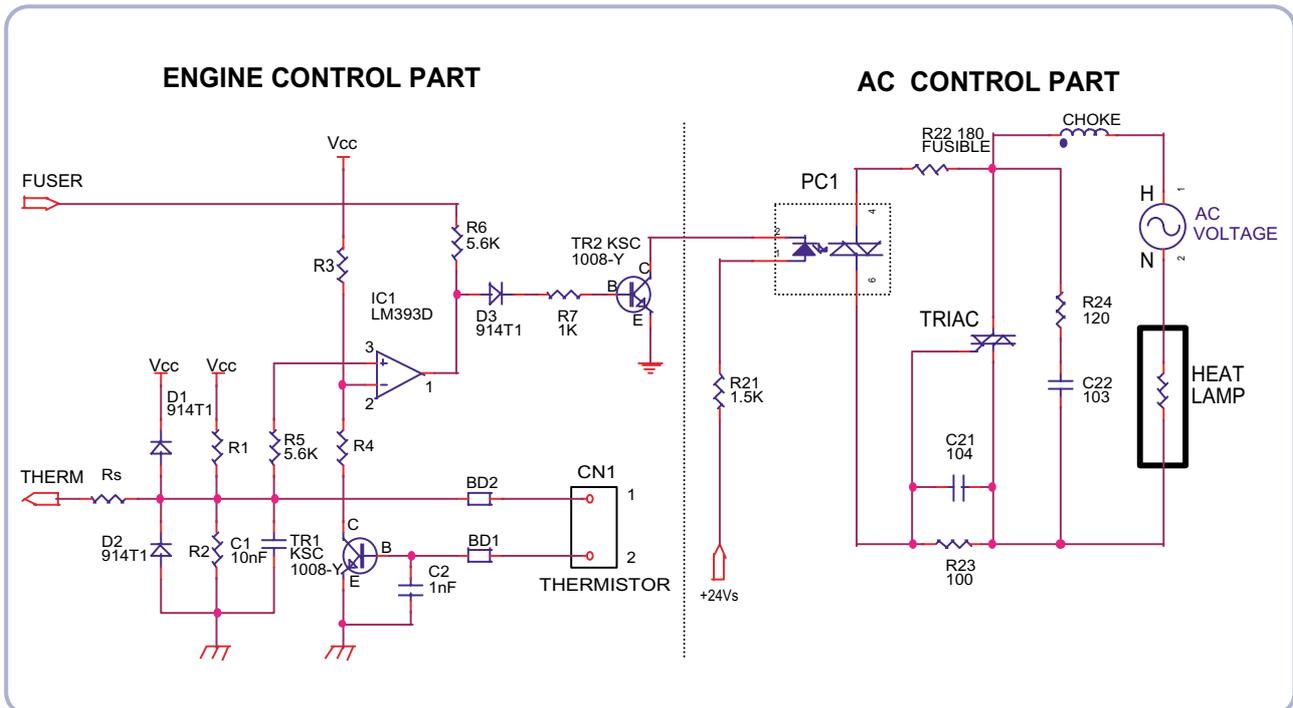


# 12. Circuit Description

## 12.1 Engine Controller

The engine controller module consists of a motor controller, a PWM controller, a LSU I/F controller, and an ADC I/F controller.

### 12.1.1 Heater Control



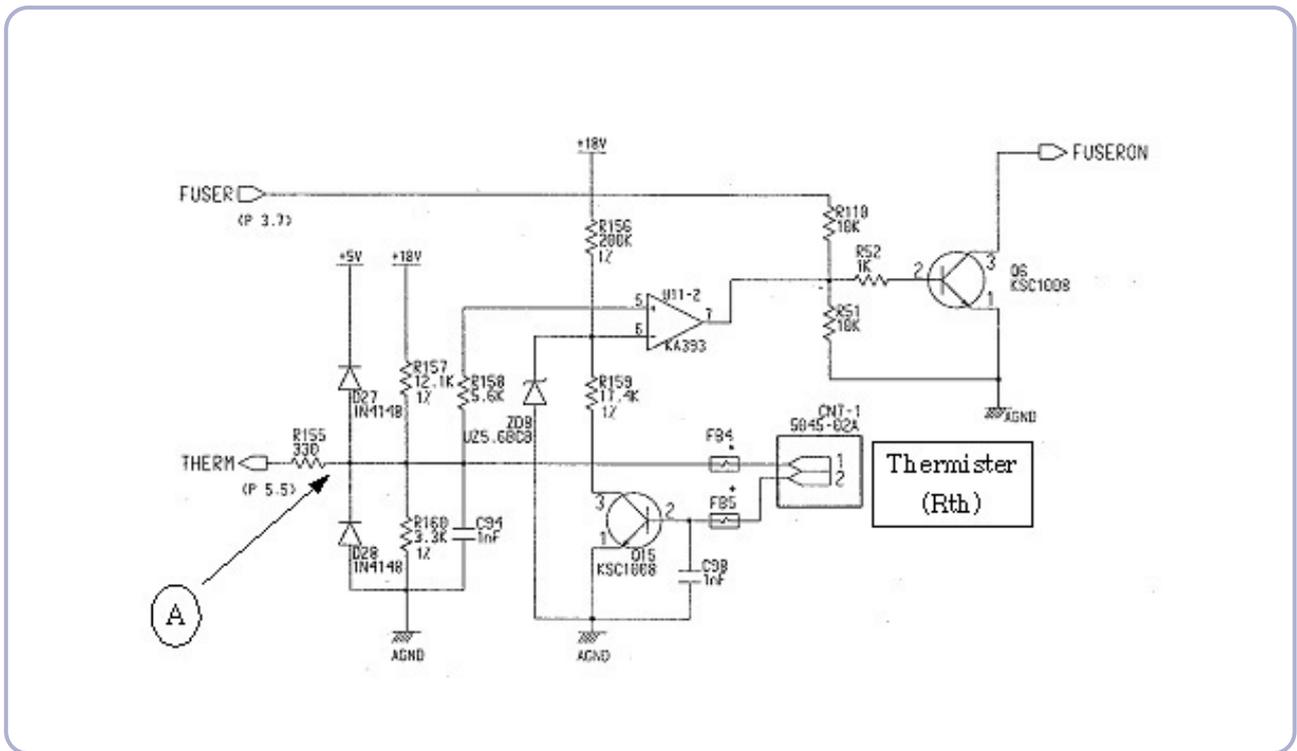
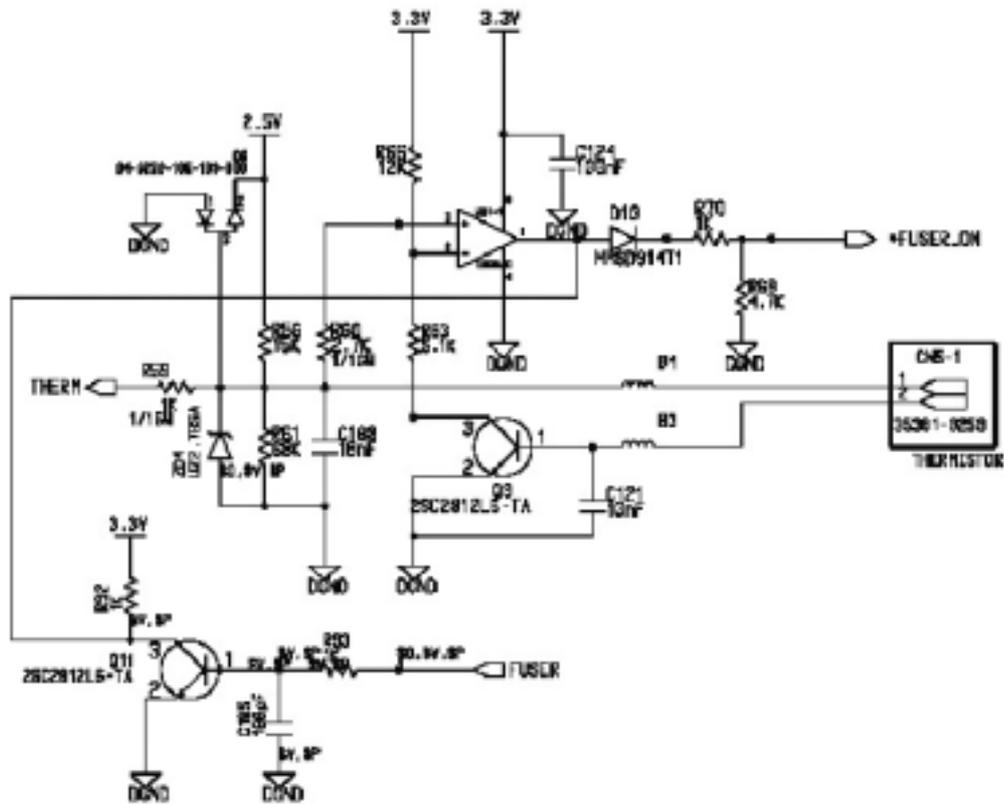
The heat lamp radiates heat by using AC power. The AC power is a TRIAC (a semiconductor switch device) which controls a switch. The 'ON/OFF' control is completed by turning on/off a gate of the TRIAC through a photo TRIAC which is insulation part.

If explaining more detail about the AC control part, it consists of passive circuit ; therefore, it turns on/off the heater by receiving the signal from the engine control part. If the heater signal is turned on at the engine, electricity flows in as the LED of the PC1 (Photo TRIAC) is connected. Then, it emits light.

By this light, the TRIAC unit, a light receiving unit, becomes on, and electricity is supplied to the gate of the TRIAC. Then, the TRIAC is turned on. As a result, AC current flows in a heat lamp, and the heat lamp radiates heat.

On the other contrary, if the signal is turned off, the PC1 becomes off, and the TRIAC is turned off due to no electricity at the gate of the TRIAC. Consequently, the heat lamp is turned off.

- Special Feature of TRIAC (THY 1): 16A, 600V SWITCHING
- Phototriac Coupler (PC3)
  - Turn On If Current: 15mA~50mA (Design: 16mA)
  - High Repeive Peak Off State Voltage: Min 600V

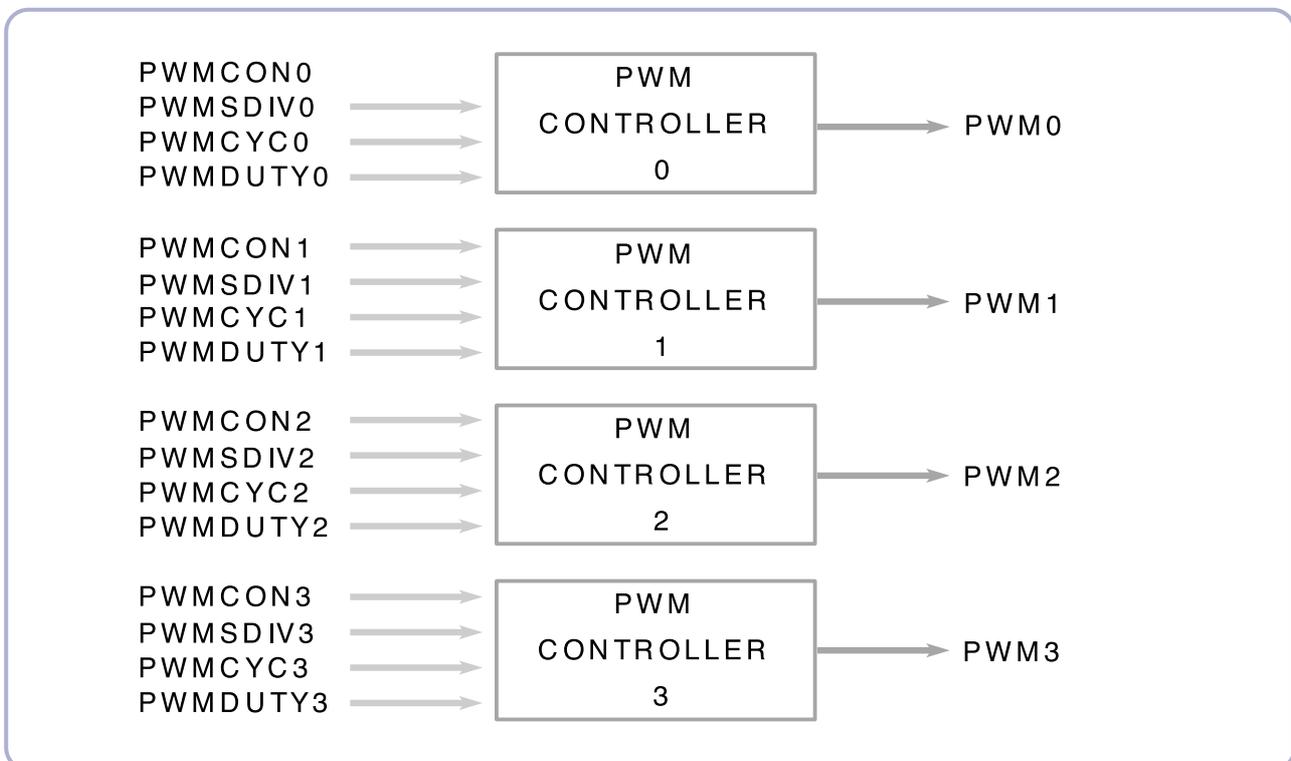


- Explanation about the condition of Normal Operation
  - If the fuser (P3.7) port becomes high, the Q6 is activated. A heat lamp starts operating by the activity. As the temperature of the heat lamp is increased, the resistance value of the thermister is decreased. Therefore, the electric potential of the circled A becomes low.
  - On/Off operation of the Q6 is only controlled by the fuser (P3.7) port because 5(+) of the U11(Comparator) is always higher than 6 (-) within the normal control temperature range.
- Functions of the Malfunction Protection:
  - If the fuser port (P3.7) is turned on regardless of controlling due to system malfunction, the temperature of the heat roller goes abnormally high. At this time, the resistance value of the thermister becomes low.
  - When the resistance value of the thermister becomes low, the electric potential of the circled A gets low, and when the temperature goes over the certain temperature, the comparator (U11) gets a low output. As a result, even though the fuser port is abnormally activated, it is disable to be over the regular temperature. For maintaining a regular temperature, a protect circuit consists in it (This protection is set up to start operating at the rage between 205°~210°)

## 12.1.2 PWM Controller

- Function Description

PWM TIMER consists of each sub block which has various functions. The sub block is divided based on this block diagram. The entire diagram of the PWMTIMER is organized as below.



PWM TIMER OPERATION is figured out if calculating PHCLK by the value selected by the register setting and the divider. PHCLK is created by count block at the PWM TIMER

### 12.1.3 Motor Driver

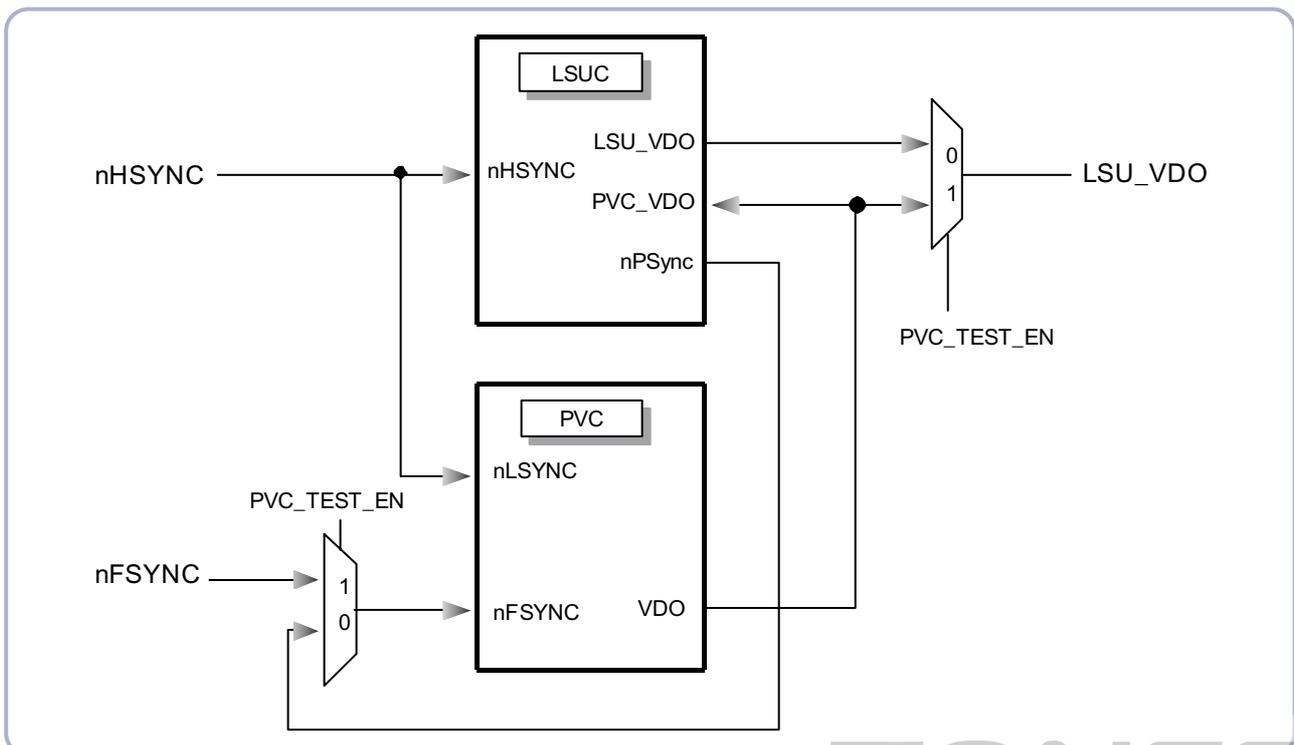
A motor drive circuit is decided when selecting a driver IC. (Supplied by vendor) ML1610 uses the motor driver IC of AN44060. However, the sensing resistance  $R_s$  value and the  $V_{reference}$  resistance value are variable according to the motor drive current value.

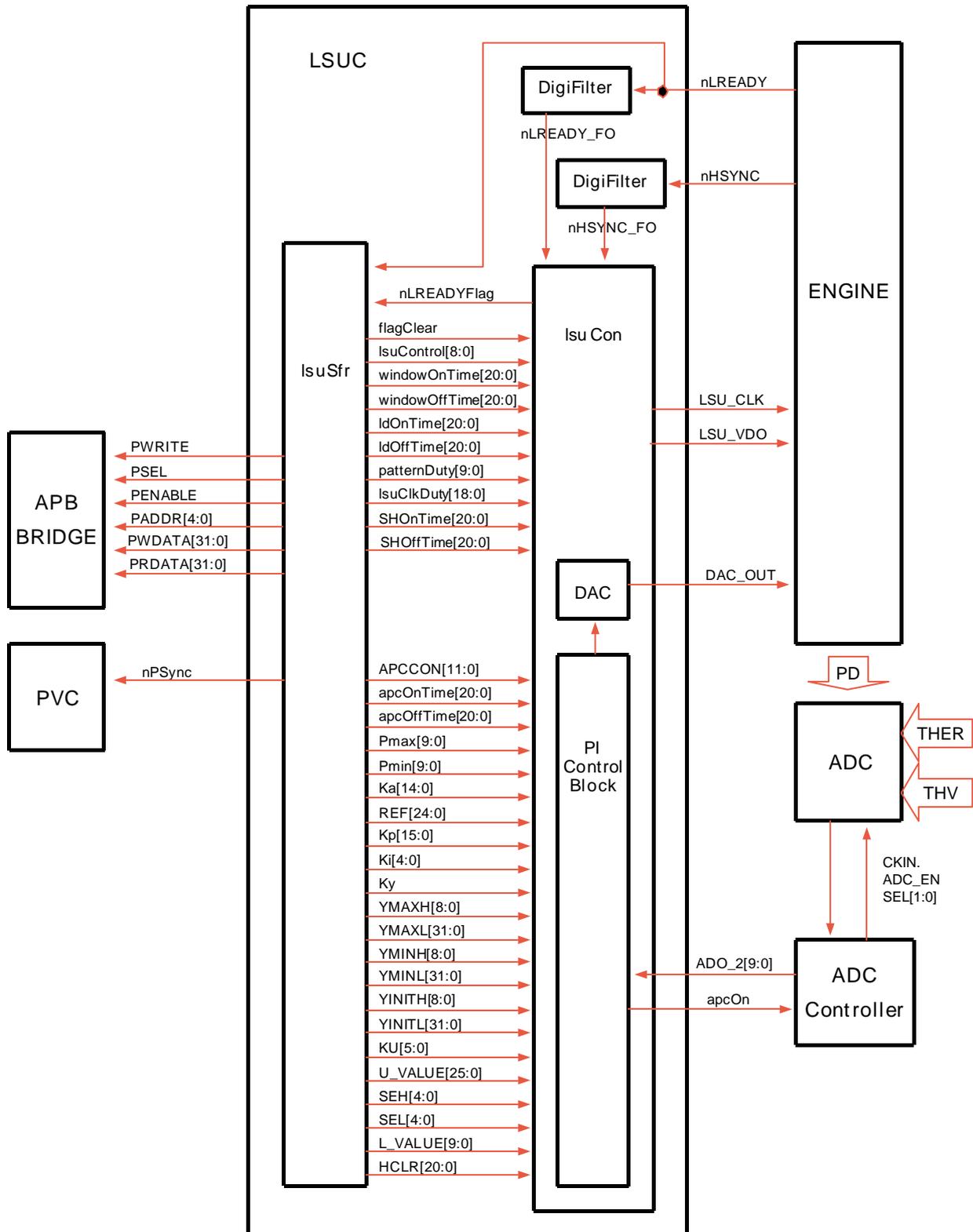
### 12.1.4 LSU Controller

The laser scanning unit controller (LSUC) of Jupiter4E is a block for interface between PVC block and LSU. LSUC sends the video data received from PVC and the laser diode turn On/Off signal created by inner 21 bit counter to the laser diode of LSU. LSU creates the horizontal sync signal (nHSYNC) by sensing the inputted diode turn on/off signal with the attached sensor. nHSYNC is inputted to PVC and LSUC as a signal that informs the beginning of one line. Also, LSU makes the activity of nLREADY signal (ready to print) low when the polygon motor becomes regularly rotating. LSU can recognize the regular rotation status of the polygon motor by reading nLREADYFlag bit in SFR. Once the polygon motor regularly rotates, it sends the page sync signal (nPSync) to PVC by writing '1' at LSUCON[5] in LSUC, and PVC starts operating for one page printing. After that, every time nHSYNC signal is created, PVC senses the signal and outputs the video data (PVC\_VDO) to LSUC. At this time, LSUC creates the video window (Printing area) and masks it on the video data sent by PVC. LSUC sends the completed video data (LSU\_VDO) to the laser diode in LSU.

Also, LSUC supplies LSU\_CLK, created by counting the system clock with the operation clock source of LSU, for the use of substitution for oscillator. The SFR is set up in IsuSfr block by receiving the bus control signal from APB bus, and the settled register values are redelivered to IsuCon block. IsuCon block creates a signal for controlling the laser diode of LSU and outputs it to a pad. The digital filter module is a digital filter to provide against the noise loaded in nHSYNC and nLREADY signal which directly get into the chip. It is three layer filter, and the delay time is  $3 \times \text{System Clock Time}$ .

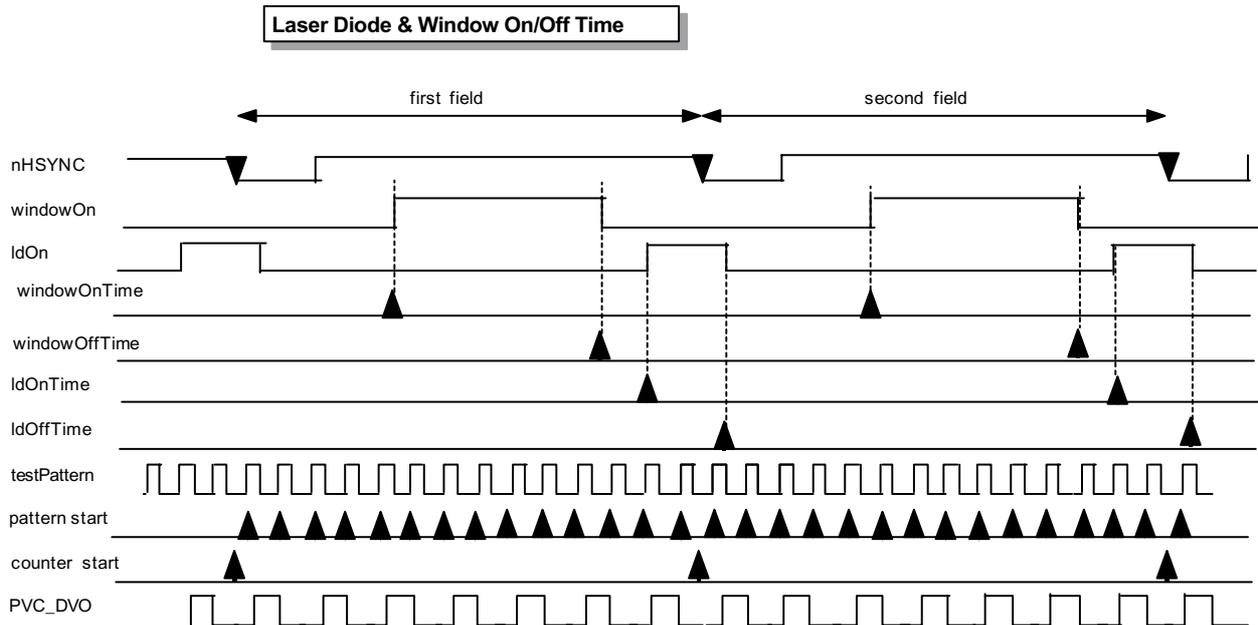
The interface between PVC and LSUC is shown in the picture.





The main signals used in LSU Controller are shown in the table.

Name	Direction	Description
PVC-VDO	I	The video data output from PVC.
nLREADY	I	Its activity becomes low as the polygon motor of LSU gets the regular speed.
nHSYNC	I	It informs the beginning of one line. It is the same as nLSYNC of PVC.
nPSync	O	It is inputted to nFSync of PVC.
LSU_VDO	O	The completed video data output by masking video window on PVC_VOD.



## 12.1.5 ADC Controller

Jupiter4E ADC Controller has 3 analog input channels.

It automatically converts the 3 channels in turns with 10 bit 500KSPS `adc1275x_pc`, and also it makes the conversion on the desired time by manually controlling STC of the register. After finishing the conversion, it makes the interruption to be pending. When AD conversion of 3rd channel ends for the PI Control of LSU, it sends the 10bit digital data converted with the latch short pulse signal to LSUC.