capacity for the addition of new controls in the future. Furthermore, this architecture greatly increases control precision. We illustrate this by two examples.

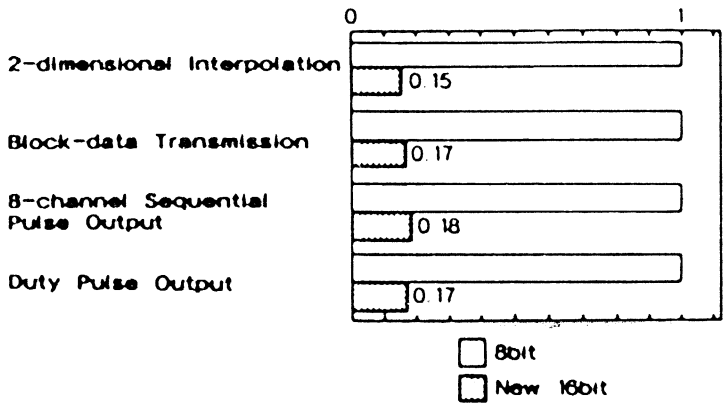

Fig. 12 Comparison of Processing Time

The first concerns fuel injection control. The new 16-bit microcomputer can perform more frequent calculations of the amount of fuel to be injected and thus achieve a higher degree of precision. Fig.13 shows a time chart for an engine speed of 6,000 rpm. The ECU using the 8-bit microcomputer calculated fuel injection quantities at intervals of approximately 10 msec, for it must maintain a balance with other controls. This resulted in injection to three cylinders on the basis of the same calculation. On the other hand, an ECU using the new 16-bit microcomputer can calculate fuel injection quantities at intervals of approximately 3 msec, hence, even at an engine speed of 6,000rpm, the amount of fuel appropriate for instanteous·engine conditions can be injected into each cylinder, which best brings out the advantage of sequential injection.

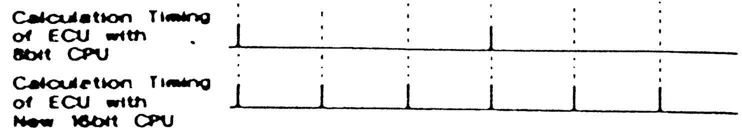

Fig. 13 Comparison of Calculation Timing between 2CPUs

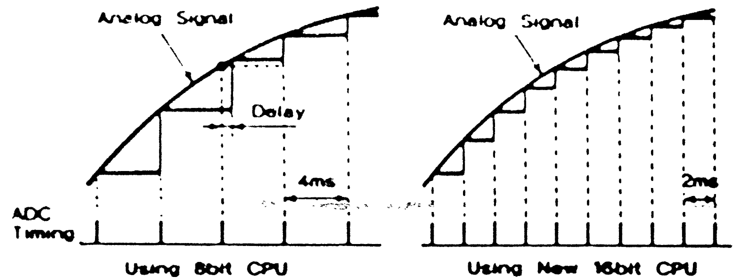

Fig. 14 Comparison of ADC Timing between 2CPUs

Next, A/D conversion is performed more frequently. and this has increased the responsiveness to changes of analog data. Fig.14 shows A/D conversion when intake manifold pressure is in a state of transition. An ECU using the 8-bit microcomputer performs A/D conversion on a 4 msec timer interrupt processing basis in order to maintain a balance with other controls, but this can create a 1.1 msec lag at worst during periods of overlapping interrupts. On the other hand, an ECU using the 16-bit microcomputer can perform A/D conversion every 2 msec, which reduces the lag to a mere 0.3 msec at worst. This increases the responsiveness to changes of analog data concerning intake manifold pressure, thus increasing the quantitative precision of fuel injection amount and spark timing calculated by the control unit.