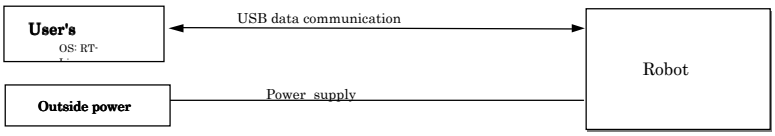
1. System Configuration



System Configuration

2. Communication method between the Robot and the User's computer

USB 1.0 12Mbps

3. Real-time controller

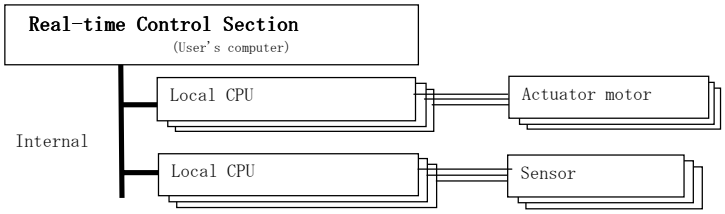
User's computuer

4. OS

User's computuer : RedHatLinux7.1
RT-linux3.1pre3
linux kernel 2.4.4

5. Control method of robot

Actuator control : Controled by the local CPU in each actuator.
Sensor processing : the local CPU.
Total control : The distributed control by internal data communication Bus between the real-time controller and each local CPU.



6. Internal bus method of Robot

USB 1.0 12Mbps

7. Control cycle

1ms (max.)
*Data Cycle between Real-time control Unit and all of the Local CPU.
*Depends on System Condition

8. Safety measures

Out of control Local CPU : System RESET by watch dog timer.
Others : The condition judgement Firmware in the local CPU.
Emergency switch on the Robot

9. Outside power supply

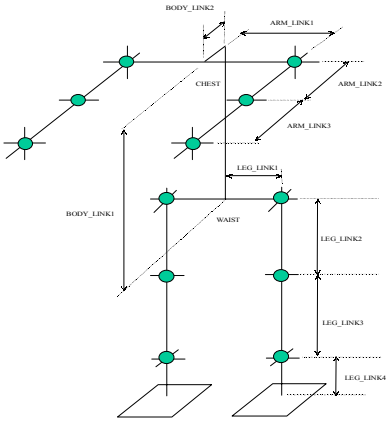
DC24V 6.3A

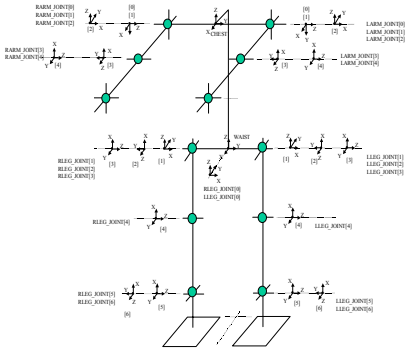
10.Simulation function

Attached for free exception to a subject of guarantee and any inquiry.

11. Actuated degree of freedom

total: 20DOF (Leg : 6DOF×2, Arm : 4DOF×2)
See below a figure (Actuated degree of freedom and Structure with Dh parameter)





12. Accelerometer

Crossed 3-axis(X,Y,Z) (In the body)
Measure range ±2G
Resolution 0.005G (=0.049m/s^2) below
Bandwidth DC～50Hz

13. Gyrometer

Crossed 3-axis(X,Y,Z) (In the body)
Measure range ±60deg/s
Resolution 0.1deg/s below
Bandwidth DC～7Hz

14. Sole sensor

The dispersion load is detected by resister fluctuation of 4 foot sensors at each sole.
And this data is changed to the robot load and ZMP data.

15. Motor control board

This board is able to controled all brush-less DC motors(Type－1, 2, 3) with PWM .
A number of drive 1motor ／board

16. Sensor processing board

Built-in 3／Robot

item		
	Posture sensor (Accelerometer ＋Gyrometer)	: 1
	Right Sole Sensor	: 1
	Left Sole Sensor	: 1

17. HUB Board

Built-in 5／Robot

18. Motor specification

Specification		Type-1	Type-2	Type-3
Geared motor	Size	φ22×53.4mm	φ35＊52.5mm	φ35＊56.5mm
	Weight	60g (Include gear 14g)	140g (Include gear 40g)	150g (Include gear
	deceleration ratio	1/144 (3 planetary gears)	1/171	←
	Output	0.37W	4.5W	6W
	Rated torque	1kgf-cm (=0.0981Nm)	15kgf-cm (=1.47Nm)	20kgf-cm (=1.96Nm)
	Rated rotation speed	0.6rps (=216deg/s)	0.5rps (=180deg/s)	←
	Rated current	500mA below	1A below	←
	Maximum torque	4kgf-cm (=0.39Nm)	30kgf-cm (=2.9Nm)	45kgf-cm (=4.4Nm)
	Rotation speed at maximum torque	0.35rps (=126deg/s)	0.1rps (=36deg/s)	←
	Current at maximum torque	800mA below	2A below	←
	Motor control board distribution I/F	Motor drive(3) / hole(3)/ Encoder(2) / Sensor power(2)	←	←
Motor	Motor form	Brush-less DC motor	←	←
	Voltage	24V	←	←
	Nothing load rotation times	350rps	187rps	150rps
	Starting torque	140gf-cm	550gf-cm	830gf-cm
	Starting electrical current	1.3A	2.7A	3.2A
	A number of Rotor magnet pole	2 (U,V,W)	←	←
	A number of Coil phase	3 (SU,SV,SW)	←	←
	hole sensor	3 (60° Pitch arrenge)	←	←
Encoder	Encoder type	Incremental Photo encoder	←	←
	Power Voltage	DC5.9V～6.5V	←	←
	Output wave	Open collector rectangle wave	←	←
	A number of channel	2 (A,B phase)	←	←
	Output pulse	Basic pulse : 110P/R (Used what this pulse is quadrupled)	←	←
	Max response frequency	15kHz (basic pulse)	←	←