



- Universal AC input / Full range
- 3 pole AC inlet IEC320-C14
- Built-in active PFC function, PF>0.91
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Fully enclosed plastic case
- Approvals: UL / CUL / TUV / BSMI / CCC / CB / FCC / CE
- Class I power (with earth pin)
- Pass LPS
- LED indicator for power on
- No load power consumption<0.5W
- ENERGY STAR level V compliant
- Meet EISA 2007(Energy Independence and Security Act)
- 2 years warranty



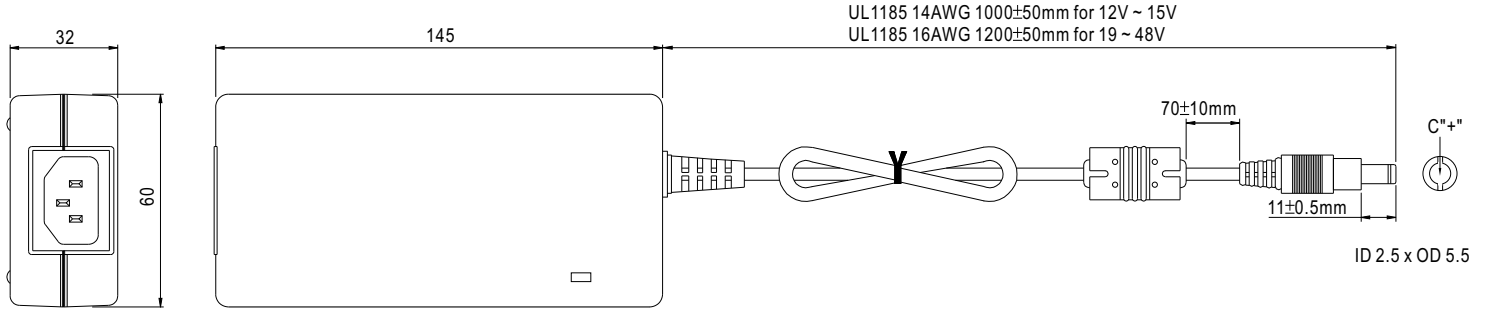
SPECIFICATION

ORDER NO.		GS90A12-P1M	GS90A15-P1M	GS90A19-P1M	GS90A24-P1M	GS90A48-P1M
OUTPUT	SAFETY MODEL NO.	GS90A12	GS90A15	GS90A19	GS90A24	GS90A48
	DC VOLTAGE Note.2	12V	15V	19V	24V	48V
	RATED CURRENT	6.67A	6A	4.74A	3.75A	1.87A
	CURRENT RANGE	0 ~ 6.67A	0 ~ 6A	0 ~ 4.74A	0 ~ 3.75A	0 ~ 1.87A
	RATED POWER (max.)	80W	90W	90W	90W	90W
	RIPPLE & NOISE (max.) Note.3	80mVp-p	100mVp-p	150mVp-p	180mVp-p	240mVp-p
	VOLTAGE TOLERANCE Note.4	±5.0%	±5.0%	±4.0%	±3.0%	±2.0%
	LINE REGULATION Note.5	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%
	LOAD REGULATION Note.6	±5.0%	±5.0%	±4.0%	±3.0%	±2.0%
	SETUP, RISE TIME Note.8	1000ms, 20ms / 230VAC 1000ms, 20ms / 115VAC at full load				
	HOLD UP TIME (Typ.)	20ms / 230VAC 20ms / 115VAC at full load				
INPUT	VOLTAGE RANGE Note.9	90 ~ 264VAC 127 ~ 370VDC				
	FREQUENCY RANGE	47 ~ 63Hz				
	POWER FACTOR (Typ.)	PF>0.91 / 230VAC PF>0.95 / 115VAC at full load				
	EFFICIENCY (Typ.)	88%	89%	89%	89.5%	91%
	AC CURRENT	2A / 115VAC 1A / 230VAC				
	INRUSH CURRENT (max.)	70A / 230VAC				
PROTECTION	OVERLOAD	110 ~ 150% rated output power Protection type : Hiccup mode, recovers automatically after fault condition is removed				
	OVER VOLTAGE	105 ~ 135% rated output voltage Protection type : Shut down o/p voltage, re-power on to recover				
	OVER TEMPERATURE	RTH30 > 100℃ Protection type : Shut down o/p voltage, re-power on to recover				
	WORKING TEMP.	0 ~ +50℃ (Refer to output load derating curve)				
ENVIRONMENT	WORKING HUMIDITY	20% ~ 90% RH non-condensing				
	STORAGE TEMP., HUMIDITY	-20 ~ +85℃, 10 ~ 95% RH				
	TEMP. COEFFICIENT	±0.03% / °C (0~50℃)				
	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes				
SAFETY & EMC (Note. 7)	SAFETY STANDARDS	UL60950-1, TUV EN60950-1, BSMI CNS14336, CCC GB4943 approved				
	WITHSTAND VOLTAGE	I/P-O/P: 3KVAC I/P-FG:1.5KVAC O/P-FG:0.5KVAC				
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃ / 70% RH				
	EMI CONDUCTION & RADIATION	Compliance to EN55022 class B, FCC PART 15 / CISPR22 class B, CNS13438 class B, GB9254 class B				
	HARMONIC CURRENT	Compliance to EN61000-3-2,3, GB17625.1				
	EMS IMMUNITY	Compliance to EN61000-4-2,3,4,5,6,8,11, light industry level, criteria A				
OTHERS	MTBF	348.7Khrs min. MIL-HDBK-217F(25℃)				
	DIMENSION	145*60*32mm (L*W*H)				
	PACKING	0.45Kg; 30pcs/14.05Kg/1CUFT				
CONNECTOR	PLUG	Standard type P1M: 2.5φ * 5.5φ * 11mm, tuning fork type, center positive for stock ; Other type available by customer requested				
	CABLE	See page 2 ; Other type available by customer requested				

NOTE	1. All parameters are specified at 230VAC input, rated load, 25℃ 70% RH ambient. 2. DC voltage: The output voltage set at point measure by plug terminal & 50% load. 3. Ripple & noise are measured at 20MHz by using a 12" twisted pair terminated with a 0.1uf & 47uf capacitor. 4. Tolerance: includes set up tolerance, line regulation, load regulation. 5. Line regulation is measured from low line to high line at rated load. 6. Load regulation is measured from 10% to 100% rated load 7. The power supply is considered as an independent unit, but the final equipment still need to re-confirm that the whole system complies with the EMC directives. 8. Length of set up time is measured at first cold start. Turning ON/OFF the power supply may lead to increase of the set up time. 9. Derating may be needed under low input voltages. Please check the derating curve for more details.
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Mechanical Specification

Case No. 978A Unit:mm

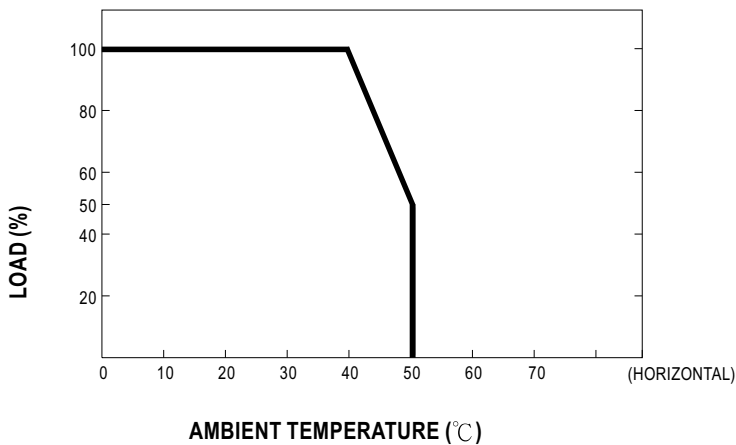


Plug Assignment

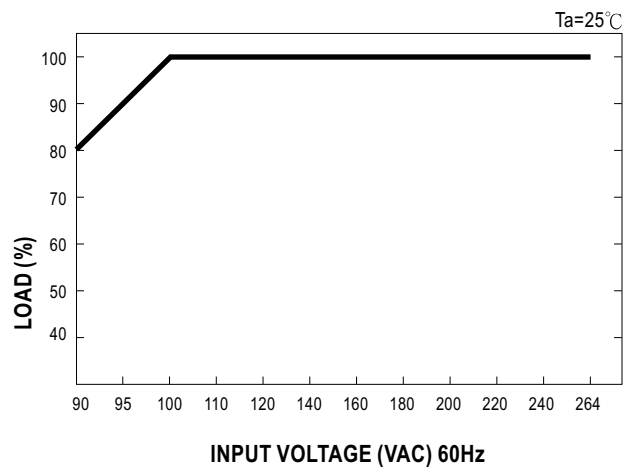
Standard plug: P1M (option)

P1M	
P/N	OUTPUT
CENTER	+

Derating Curve



Static Characteristics



MODEL : GS90A19-P1J

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1:150 mVp-p (Max)	I/P: 230VAC O/P:FULL LOAD Ta:25°C	V1: 86 mVp-p (Max)	P
2	OUTPUT VOLTAGE TOLERANCE	V1:4%~ -4% (Max)	I/P: 100 VAC / 264 VAC O/P:FULL/ MIN LOAD Ta:25°C	V1: 1 %~ -1 %	P
3	LINE REGULATION	V1: 1 %~ -1 % (Max)	I/P: 100 VAC ~ 264 VAC O/P:FULL LOAD Ta:25°C	V1: 0.04 %~ -0.04 %	P
4	LOAD REGULATION	V1: 4 %~ -4% (Max)	I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: 1 %~ -1 %	P
5	SET UP TIME	230VAC: 1000 ms (Max) 115 VAC: 1000 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 517 ms 115VAC/ 517 ms	P
6	RISE TIME	230VAC: 20 ms (Max) 115VAC: 20 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 6 ms 115VAC/ 7 ms	P
7	HOLD UP TIME	230VAC: 20 ms (TYP) 115VAC: 20 ms (TYP)	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	230VAC/ 71 ms 115VAC/ 28 ms	P
8	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	TEST: <5 %	P
9	DYNAMIC LOAD	V1: 1900 mVp-p	I/P: 230 VAC O/P:FULL /Min LOAD 90%DUTY/1KHZ Ta:25°C	442 mVp-p	P

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90VAC~264 VAC	I/P: TESTING O/P: FULL LOAD Ta: 25°C	66 V~264V	P
			I/P: LOW-LINE-3V= 87 V HIGH-LINE+15%=300 V O/P: FULL/MIN LOAD ON: 30 Sec . OFF: 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE)	TEST: OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P: 100 VAC ~ 264 VAC O/P: FULL~MIN LOAD Ta: 25°C	TEST: OK	P
3	POWER FACTOR	0.91 / 230 VAC(TYP) 0.95 / 115 VAC(TYP)	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	PF= 0.9261 / 230VAC PF= 0.9861 / 115VAC	P
4	EFFICIENCY	88 % (TYP)	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	89.8%	P
5	INPUT CURRENT	230V/ 1 A (TYP) 115V/ 2 A (TYP)	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	I = 0.44 A/ 230 VAC I = 0.84 A/ 115 VAC	P
6	INRUSH CURRENT	230V/ 70 A (TYP) COLD START	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I = 54 A/ 230 VAC	P
7	LEAKAGE CURRENT	< 1 mA / 240 VAC	I/P: 264 VAC O/P: Min LOAD Ta: 25°C	L-FG: 0.26 mA N-FG: 0.26 mA	P
8	NO LOAD CONSUMPTION	< 0.5 W/240VAC	I/P: 240 VAC O/P: NO LOAD Ta: 25°C	0.3 W	P

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	110%~ 150 %	I/P: 230 VAC I/P: 115 VAC O/P: TESTING Ta: 25°C	129 %/ 230 VAC 124 %/ 115 VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1: 19.95 V~ 25.65 V	I/P: 230 VAC I/P: 115 VAC O/P: MIN LOAD Ta: 25°C	23.29 V/ 230 VAC 23.29 V/ 115 VAC Shunt down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC: RTH30>100°C O.T.P. NO DAMAGE	I/P: 230 VAC O/P: FULL LOAD	O.T.P. Active Shunt down Re-power ON	P
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264 VAC O/P: FULL LOAD Ta: 25°C	NO DAMAGE Hiccup Mode	P

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																																																										
1	TEMPERATURE RISE TEST	MODEL : GS90A24-P1J 1. ROOM AMBIENT BURN-IN : 2 HRS I/P: 230VAC O/P: FULL LOAD Ta=33℃ 2. HIGH AMBIENT BURN-IN : 13HRS I/P: 230VAC O/P: FULL LOAD Ta=46.9℃ <table><tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT Ta=33 ℃</th><th>HIGH AMBIENT Ta=46.9℃</th></tr><tr><td>1</td><td>U2</td><td>TEA1751</td><td>80.7℃</td><td>94.8℃</td></tr><tr><td>2</td><td>LF2</td><td>TR781</td><td>69.0℃</td><td>83.2℃</td></tr><tr><td>3</td><td>BD1</td><td>4A/800V US4KB80R-7000</td><td>76.1℃</td><td>90.1℃</td></tr><tr><td>4</td><td>L2</td><td>TF1814</td><td>81.2℃</td><td>95.8℃</td></tr><tr><td>5</td><td>Q31</td><td>2SK3683-01MR 19A/500V</td><td>83.2℃</td><td>97.4℃</td></tr><tr><td>6</td><td>D30</td><td>2A/800V GP20K</td><td>108.8℃</td><td>122.7℃</td></tr><tr><td>7</td><td>Q32</td><td>SPA07N60C3 7.3A/600V</td><td>85.8℃</td><td>100.2℃</td></tr><tr><td>8</td><td>C5</td><td>100U/400V 105℃ KMG</td><td>79.4℃</td><td>94.1℃</td></tr><tr><td>9</td><td>C11</td><td>474/450V 10% P=10 MMX</td><td>79.1℃</td><td>93.5℃</td></tr><tr><td>10</td><td>T1 COIL</td><td>TF1842</td><td>79.3℃</td><td>93.6℃</td></tr><tr><td>11</td><td>C52</td><td>47u/50V UL10Kh YXM</td><td>79.5℃</td><td>93.8℃</td></tr><tr><td>12</td><td>Q101</td><td>IRF3415 43A/150V</td><td>81.5℃</td><td>96.2℃</td></tr><tr><td>13</td><td>C102</td><td>470U/35V 105℃ KY</td><td>73.7℃</td><td>88.0℃</td></tr><tr><td>14</td><td>D1</td><td>MUR460 4A/600V</td><td>88.4℃</td><td>103.3℃</td></tr><tr><td>15</td><td>CASE</td><td>Lower CASE</td><td>67.2℃</td><td>81.1℃</td></tr><tr><td>16</td><td>RTH30</td><td>100K 1%</td><td>79.5℃</td><td>94.1℃</td></tr><tr><td>17</td><td>TA</td><td></td><td>33.0℃</td><td>46.9℃</td></tr></table>			NO	Position	P/N	ROOM AMBIENT Ta=33 ℃	HIGH AMBIENT Ta=46.9℃	1	U2	TEA1751	80.7℃	94.8℃	2	LF2	TR781	69.0℃	83.2℃	3	BD1	4A/800V US4KB80R-7000	76.1℃	90.1℃	4	L2	TF1814	81.2℃	95.8℃	5	Q31	2SK3683-01MR 19A/500V	83.2℃	97.4℃	6	D30	2A/800V GP20K	108.8℃	122.7℃	7	Q32	SPA07N60C3 7.3A/600V	85.8℃	100.2℃	8	C5	100U/400V 105℃ KMG	79.4℃	94.1℃	9	C11	474/450V 10% P=10 MMX	79.1℃	93.5℃	10	T1 COIL	TF1842	79.3℃	93.6℃	11	C52	47u/50V UL10Kh YXM	79.5℃	93.8℃	12	Q101	IRF3415 43A/150V	81.5℃	96.2℃	13	C102	470U/35V 105℃ KY	73.7℃	88.0℃	14	D1	MUR460 4A/600V	88.4℃	103.3℃	15	CASE	Lower CASE	67.2℃	81.1℃	16	RTH30	100K 1%	79.5℃	94.1℃	17	TA		33.0℃	46.9℃	P
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P: 230 VAC O/P:128 % LOAD Ta:25℃	TEST : OK	P																																																																																										
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 230 VAC O/P:100% LOAD Ta=-5℃	TEST : OK	P																																																																																										
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL ℃ NO DAMAGE	I/P: 272 VAC O/P:FULL LOAD Ta= 40 ℃ HUMIDITY= 95 %R.H	TEST : OK	P																																																																																										
5	TEMPERATURE COEFFICIENT	±0.03 %(0-50℃)	I/P: 230 VAC O/P:FULL LOAD	± 0.006 %(0-50℃)	P																																																																																										
6	VIBRATION TEST	1 Carton & 1 Set (1) Waveform: Sine Wave (2) Frequency:10~500Hz (3) Sweep Time:10min/sweep cycle (4) Acceleration:2G (5) Test Time:1 hour in each axis (X.Y.Z) (6) Ta:25℃		TEST : OK	P																																																																																										

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P: 3 KVAC/min I/P-FG: 1.5 KVAC/min O/P-FG: 0.5 KVAC/min	I/P-O/P: 3.6 KVAC/min I/P-FG: 1.8 KVAC/min O/P-FG: 0.6 KVAC/min Ta:25°C	I/P-O/P: 2.836 mA I/P-FG: 2.007 mA O/P-FG: 0.496 mA NO DAMAGE	P
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ I/P-FG: 500VDC>100MΩ O/P-FG:500VDC>100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25°C / 70%RH	I/P-O/P: 25.5 GΩ I/P-FG: 1.56 GΩ O/P-FG: 30 GΩ NO DAMAGE	P
3	APPROVAL	TUV: Certificate NO : S50132045 UL: File NO : E183223			P

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A CLASS D	I/P: 220VAC/230VAC/240VAC/ 50HZ O/P:100%/75%/50%LOAD Ta:25°C	PASS	P
2	CONDUCTION	EN55022 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL/50% LOAD Ta:25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL LOAD Ta:25°C	PASS Test by certified Lab	P
4	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR:8KV / Contact:4KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 LIGHT INDUSTRY L-N :1KV L,N-PE:2KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				

M.T.B.F & LIFE CYCLE CALCULATION

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	CAPACITOR LIFE CYCLE	GS90A24-PJ1 : SUPPOSE C102 I/P: 230VAC O/P:FULL LOAD Ta=25 °C LIFE TIME=156362 HRS I/P: 230VAC O/P:FULL LOAD Ta=40 °C LIFE TIME=53762 HRS	IS THE MOST CRITICAL COMPONENT		P
2	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE: 348.7K HRS			P

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q 32Rated SPA07N60C3 7.3A/600V	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2) Output Short Ta:25°C	(1) 580 V (2) 504 V	P
2	Diode Peak Voltage	Q 101 Rated STP80NF12 80A/120V	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on (2)Output Short Ta:25°C	(1) 103 V (2) 81 V	P
3	Clamp Diode Peak Voltage	D 30 Rated GP20K : 800 V 2 A	I/P:High-Line +3V = 267 V O/P: (1) Dynamic Load 90%Duty/1KHz Ta:25°C	(1) 536 V	P
4	Input Capacitor Voltage	C 5 Rated 120u/400V 105°C KMG	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta:25°C	(1) 396 V (2) 394 V (3) 396 V	P
5	Control IC Voltage Test	U 2Rated TEA1751T : 38 V	I/P:High-Line +3V = 267 V O/P: (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta:25°C	(1) 24.52 V (2) 17.54 V (3) 24.52 V	P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2008/5/16	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG
2008/8/7	PRODUCT SAMPLE W0806B60	PASS	SANFORD SU	VINCENT TSENG

2003/12/12 A50-F023