

3. 2次年度機材据付け，試運転及び教育指導要請（案）



2 次年度 SETUP 試運転及び教育指導専門家招請計画

順番	學科	専門分野	人員	期間	担当者	備考
1	金型科	o NC Wire Cutting M/C	1 名	3 週間	趙維植, 朴源奎	稼採到着後 2ヶ月以内 (新設金型設置予定)
		o CNC Milling M/C	1 名	3 週間	趙維植, 金源鎭	
		o Injection Molding M/C	1 名	6 週間	金源鎭, 孫尚煥	
		o CNC Latho	1 名	3 週間	趙維植, 朴源奎	
		o Universal Tool Grinding M/C	1 名	1 週間	孫尚煥, 朴源奎	
		o Microprocessor Development System	1 名	7 週間	李 滙, 金春基	
2	振電應用科	o Educational Robot System	1 名	2 週間	李 滙, 金榮重	稼採到着後 2ヶ月以内 (ハードウェア設置済)
		o マイクロコンピュータ制御システム	1 名	2 週間	-----	
3	素材加工科	o 熱処理 分野 - 浸炭加, 真空焼, Salt-Bath 焼	1 名	5 週間	車永喆, 鄭傑采	稼採到着後 1ヶ月以内
		o 材料試験 分野 o 9ヶ月間の材料試験- 10ヶ月間の材料試験 予- 9分研	1 名	2 週間	車永喆, 鄭傑采	
		o 表面処理 分野 Weather-O-Meter	1 名	1 週間	-----	
		o Plating Plant System	1 名	5 週間	朴英瑞, 朴源奎, 朴英瑞	

順番	學科	專 門 分 野	人 員	期 間	擔 當 者	備 考
1	工機設計科	<ul style="list-style-type: none"> <li>○ 温度, 壓力, 流量, Level 制御</li> <li>装置 (Model Plant)</li> </ul>	1 名	2 週間	堀澤哲, 徐徳雄	試験教及び教育指導
2	機械設計科	<ul style="list-style-type: none"> <li>○ 油壓Servo 制御 応用技術分野</li> <li>○ 空壓応用 自動化装置 設計 分野</li> </ul>	1 名	3 週間	木聖吉	裝備導入 1 個月後 教育指導のみ
	計		1 名	4 4 週間		

#### 4. 第3次機材要請(案)



## List of Machinery and Equipment

1. Precision Measuring Laboratory ( 196 )
2. Pneumatic and Hydraulic Laboratory ( 198 )
3. Machining Shop ( 199 )
4. Industrial Instruments Laboratory ( 200 )
5. Electronic Instruments Laboratory ( 201 )
6. Machinery Design Room ( 216 )
7. Material Testing Laboratory ( 217 )
8. Die and Mold Machine Shop ( 218 )
9. Air Conditioning Laboratory ( 220 )
10. Mechatronics Application Laboratory ( 222 )
11. Heat Treatment Laboratory ( 224 )
12. Surface Treatment Laboratory ( 225 )

1. PRECISION MEASURING LABORATORY

No.	Name	Description	Q' ty	others
1	Roundness Tester	.Measuring Object: Roundness, concentricity straightness, cylindricity parallism .Accuracy of Rotation : Less than $0.05 \mu\text{m} + 0.0005 \mu\text{m} \times \text{H}$ .Measurable Size : Dia more than 150mm Height more than 200mm .Table Size : More than $\phi 170\text{mm}$ .Speed of rotation : about 4-5rpm .Magnification : 100-10,000x .Auto Centering Method : Least square center method .Power Source : 100V, 60HZ .Chart Paper : 150mm	1	
2	Surface Roughness Tester	.Major Parameter : Rmax, Rz, Ra, Rrms .Measuring range : Rmax : 0.001-600 $\mu\text{m}$ Ra, Rrms, Wca, Waa: 0.001-100 $\mu\text{m}$ .Recording Magnification : Vertical: 100-100,000 Horizontal : 500x .Measuring Length : 0.25-100mm .Cut of Value : 0.08, 0.25, 0.8, 2.5, 8, 25mm .Straigthness Measuring Accuracy : Less than $0.3 \mu\text{m} / 100\text{mm}$ .Data Display : LED character display .Data Printing : Profile recording paper .Auxiliary function : Auto levelling function Recording paper interlocking function Idle drive length auto selection function	1	
3	三次元 測定器 附属品	.Interchangeable stylus for TP-1 $\phi 1.0, 1.5, 2.0, 4.0, 6.0, 8.0$ .Ball probe ( $\phi 2, 3, 5, 6, 10$ ) .Taper probe ( $\phi 2-\phi 20, \phi 14-\phi 32, \phi 26-44$ $\phi 38-56$ )	1set 1set 1set	MITUTOYO F-604



No.	Name	Description	Q'ty	others
		.Other probe point, chuck, punch, scriber disk A $\phi$ 20, disk B d=30,t =10 Rotary semi cylindrical Rotary 1/4 cylindrical Extension bar $\phi$ 14 Universal probe $\phi$ 10 .Centering microscope 20x .Master ball .Geopak 210 training kit .Scantek 210 training kit. .Optoeye M1 (detector)	1set     1set 1set 1set 1set	
4	Electronic Level	Size : 200x150x50 Digital display Resolution : 0.01mm/H	4set	
5	Height Micrometer	Range : 5-310 Type : Digital display (Built-in rotary encoder) Resolution : 0.001mm Head stroke : 20mm	4set	
6	Linear Height Micromete	Resolution : 0.001mm Accuracy : $4\mu$ m Straightness : $3\mu$ m Squareness : $6\mu$ m Metric type	2set	
7	Square Gauge Block 112pcs/set		2set	
8	Universal Height Micrometer	Range : 5-610 Digital display Resolution : 0.01mm	2set	
9	Square Gauge Block Accessory	25pcs/set	2set	
10	Long Gauge Block	125mm, 150mm, 175mm, 200mm, 250mm, 300mm, 400mm, 500mm	1set	

2. PNEUMATIC AND HYDRAULIC LABORATORY

No.	Name	Description	Q' ty	Others
1	<del>REMOVED</del> Air Cooler		1	

### 3. MACHINING SHOP

No.	Name	Description	Q' ty	Others
1	Engine Lathe	Swing over bed            470mm Swing over carriage      240mm Distance between center 800mm Hole through spindle      54mm Spindle speed            50-1,500rpm  <u>Optional accessories</u> 1) Steady rest                    (1) 2) Follower rest                (1) 3) Coolant system               (2) 4) Live center MT4              (2) 5) Work light                    (2) 6) Face plate                    425mm                    (2) 7) 4-jaw chuck                 12"                        (2) 8) Chip guard                    (2)	2	
2	Gear Hobbing Machine	Gear dia                    660mm Gear pitch                 H 6 Table dia                   530mm Max.Hob dia                120mm Hob speed                  68-220rpm  <u>Optional accessories</u> 1) Tangential feed att.            (1)	1	
3	Vertical Milling Machine	Travel Longi.               750mm Gross                    270mm Vertical                   400mm Table size                 1,350 x 270mm Spindle taper              NTS 50 Spindle speed            68-1, 7600rpm  <u>Optional accessories</u> 1) Machine vise                150mm                    (2) 2) Milling chuck set              (2) 3) Rotary table                300mm                    (1) 4) Index head                 250mm                    (1) 5) Work light                    (2) 6) Digital read out               (2) 7) Oil pan                        (2)	2	
4	Drill Grinder	Max 30mm Drill dia	1	

#### 4. INDUSTRIAL INSTRUMENTS LABORATORY

No.	Name	Description	Q' ty	Others
1	Programable Indicating Controller	SLPC-250E /SPR Fluorescent bar graph Programming chip 5191-501 for SLPC/SPR	3	
2	Programmer	SPRG-000-E for Power source 100V	1	
3	Indicating Controller	SLDC-250-E Fluorescent bar graph	3	
4	Operator Station (Operator's Console)	Uops-151-B/EKE/UPRT/HL English support with Engineer Key board Printer & HL Bus Terminator	1	
5	Loop Display Unit	ULDUU-220-E Fluorescent bar graph	1	
6	Field Control Unit	LCS-1 VM1, LCJ-1 VM-2 MAC2-1 PHI PAC-1 STZ PB5	1	
7	Signal Conditioning Nest & Cards	CNH-A, CNU-A Card : CH1-A, CH5, CT5, CA1, CR5 CA5, CS1, CP1, CH2, CC0, CH2 CA0, CH0, CX1	1	
8	Cables and Other	Accessories for the above Item No. 17-1 to 17-7 Software; Pack software UBPD-101-A (English)X1 UIND-101-A (English)X1 UIND-200-A (English)X1 UBHD-101-A (English)X1 UBHD-201-A (English)X1 Application Software	1	
9	<del>Standard</del> DC Voltage/Current Standard	2553 Type	2	
10	Digital Multimeter	DC Voltage:100nV-1000V Amps : 10uA-2A Ohms : 10m -20K CNU X1		
11	Current to Pneumatic Converter	Model : 5502-21 : 4-20 mA : 0.2-1.0 Kg/cm <sup>2</sup>	2	
12	Test Switch & Lamp (16 Point UFCH CARD 用)		2	
13	Pneumatic Indicating Controller (Panel 用)		1	
14	Pneumatic Recorder	2 Pen 用	1	

5. ELECTRONIC INSTRUMENTS LABORATORY

No.	Name	Description	Q'ty	Others
1	Audio Metric Test Room	.Size:900(W) x 890(H) x 830(D)mm .Full range type dynamic speaker .Built-in standard microphone .Effect to brake external sound pressure	1	
2	Stereo Amplifier Test System	.Frequency Range : 10Hz to 100KHz .Level Controller & Output Multiplexer .Distortion Measurement .Program Step 99Max or 198Max(2Ch)	1	
3	Dual Tracking DC power Supply	. Output Voltage : 0 <sup>+</sup> +35V, 0 <sup>-</sup> -35V .Ripple 0.5mVrms .Line, Load Effect : 0.005%±1 .Output Current : 3A	20	
4	Regulated DC Power Supply	.Output Range : 0-8V . 0-10A 0-16V . 0-5A 0-35V . 0-2.5A 0-80V . 0-1A .Ripple Noise :300 μVrms(5Hz-1MHz) 2mArms( " )	4	
5	FH/AH Standard Signal Generator	.Frequency Range : 100KHz-110KHz .Reso-lution : 100Hz, 1KHz .Modulation : FH,FM stereo, AM .FH : 0-60% .Memory : 100 points .Accuracy : ±5 x 10 <sup>-4</sup>	1	
6	Precision Wheatstone Bridge	.Measuring Range : 0.10000 - 111.110KΩ (9Range) .Accuracy : 0.01% of setting .Galvanometer(built in); Bridge Power Source(built in)	1	
7	DC Meter	<u>Portable DC Ammeter(Standard)</u> .Principle : Moving coil type (taut band) .Rated Accuracy : ±0.5% of full scale .Scale Length : Approx 135mm .Measuring Range : 10/30/100/300 μA	10 (5)	
		<u>Portable DC Volt-Ammeter(STD)</u> .Principle : Moving coil type (taut band) .Rated accuracy:± 0.5% of full scale .Scale Length : Approx 135mm .Voltage Range : 3/10/30/100/300/1,000V .Current Range:1/3/10/30/100/300mA 1/3/10/30A, 50mA	(5)	

No.	Name	Description	Q'ty	Others
8	AC Meter	<u>Portable AC Ammeter (STD)</u> .Principle : Moving coil type (taut band) .Rated Accuracy : $\pm 0.5\%$ of full scale .Scale Length : Approx 135mm .Measuring Range: 10/20/50/100A	27 (5)	
		<u>Portable AC Ammeter (STD)</u> .Principle : Moving coil type (taut band) .Rated Accuracy : $\pm 0.5\%$ of full scale .Scale Length : Approx 135mm .Measuring Range: 20/50/100/200mA	(5)	
		<u>Portable AC Ammeter (STD)</u> .Principle : Moving coil type (taut band) .Rated Accuracy : $\pm 0.5\%$ of full scale .Scale Length : Approx 135mm .Measuring Range: 0.5/1/2/5A	(5)	
		<u>Portable AC Volt-Ammeter (STD)</u> .Principle : Moving coil type (taut band) .Rated accuracy: $\pm 0.5\%$ of full scale .Scale Length : Approx 135mm .Voltage Range : 30/75/150/300/ 750V .Current Range: 0.15/0.3/0.75/ 1.5/3/7.5/15/30A	(5)	
		<u>Portable AC Voltmeter (STD)</u> .Principle : Moving coil type (taut band) .Rated Accuracy : $\pm 0.5\%$ of full scale .Scale Length : Approx 135mm .Measuring Range: 15/30V	(5)	
		<u>Portable AC Ammeter (STD)</u> .Principle : Moving coil type (taut band) .Rated Accuracy : $\pm 0.5\%$ of full scale .Scale Length : Approx 135mm .Measuring Range: 0.5/1/2/5A	(1)	

No.	Name	Description	Q' ty	Others
		<u>Portable AC Ammeter (STD)</u> .Principle : Moving coil type (taut band) .Rated Accuracy : $\pm 0.5\%$ of full scale .Scale Length : Approx 135mm .Measuring Range: 2/5/10/20A	(1)	
9	Insulation Tester	.Rating : 250V/500 K $\Omega$ 500V/1000 K $\Omega$ 2,000V/2,000 K $\Omega$ .Accuracy : $\pm 5\%$ .Full standard Accessories	1	
10	AC Level Meter	.Measuring Range: 100 $\mu$ V - 700V (7 Ranges) .Accuracy : 1-0.2% .Resolution : 1 $\mu$ V (1 $\mu$ V Range), 1dB(dB Range) .Frequency Range: 10Hz-1MHz .GP-IB Interface .Option : VP-283020, 30, 40, 50	1	
11	Power Supply	.Output Voltage : 0-35V .Output Current : 0.2-5A .Ripple : 0.5mVrms .Line, Load effect : 0.005% + 1	20	
12	RF Power Meter	.Frequency Range : 10KHz-140GHz .Level Range : -60dBm - -20dBm .GP-IB Interface .Sensors : MA4701A, 02A, 03A, 05A, MA4601A, MA4603A .Optional : MA4002A, 2B, HP47A, J0384, J0385 .Accessories	1	
13	Electronic Voltmeter	.Frequency : 100KHz to 1000MHz .Voltage Measuring : 300 $\mu$ V to 3V (8 Ranges)Range .Accuracy : 3% - 15% .Full optional accessories	20	
14	Tracking Generator	.Frequency Range : 100KHz to 2 GHz .Output level Range : -10dBm to 0dBm (continuously variable)	2	

No.	Name	Description	Q'ty	Others
15	Audio Linear Amplifier	<p><u>AMP Section</u></p> <p>.Frequency Range : DC to 300KHz            .Power : 200W + 200W (80hrs)            .Distortion : 0.001%            .PHONO 1,2 KC, CD, TUNER,                              TAPE 1,2,3</p> <p>.HUM and Noise :              PHONO (KC,HIGH KC) 90dB              TAPE, TUNER, LINE, CD 110dB</p> <p><u>Tuner Section</u></p> <p>.FM,AM : 88-108MHz, 535-1605KHz            .S/N : 85dB            .Sensitivity : 10.8dBf (FM),                              35dB (AM)            .Quartz-PLL synthesizer type            .Preset up to 8FM,8AM</p>	2	
16	Shield Room	<p>.Shield effect :</p> <p>  0.5MHz-250MHz   110dB        250MHz-500MHz   100dB        500MHz-1,000MHz 80dB</p> <p>.Size:3,120(D)x3060(W)x2160(H)mm</p> <p>.Line Filter : 20A(ALF perfect SW)</p>	1	
17	Oscilloscope Calibrator	<p>.Output Voltage:0.12mV to 60V                              (18steps)</p> <p>.Output Waveform : square wave            .Rise Time : 5μs or less            .Output Frequency :                              0.5Hz-1MHz (20steps)</p>	1	
18	Synthesizer Function Generator	<p>.Frequency Range:0.001Hz-20MHz            .Accuracy : 2% or less            .Internal Memory : 100 Steps            .Output : Sine,Triangel,Square,                      Pulse,C.Pulse            .Built-in GP-IB Interface</p>	1	
19	<del>XXXXXXXXXXXX</del> Plug In Unit	For Precision Genescope MSW-745B HEGURO	15	
20	GP-IB Interface	Digital Storage Oscilloscope DS-6121 IWATSU	1	
21	GP-IB Interface	For Spectrum Analyzer MS-610B AMRITSU	2	



No.	Name	Description	Q'ty	Others
22	Pre Amplifier	For Spectrum Analyzer NS-610B ANRITSU	2	
23	High Impedance Probe	"	2	
24	Artificial Power Line Network	" (NM 23B) 2.0Ω	6	
		" (NM 24B) 2.0Ω		
		" (NM 25D) 2.0Ω		
25	Cable Assy	For Programmable Pulse Generator 8161A YHP	1	
26	GP-IB Interface	For Precision Multimeter SC-7405 IWATSU	2	
27	High voltage Probe	"	2	
28	Temperature Probe	"	2	
29	Cable Assy	For Programmable Signal Source 8165A YHP	2	
30	Hard Copy	Logic Analyzer SL-4601 IWATSU	1	
31	Dummy ANTS & Terminations	For FM/AM SSG HSG 2580 HEGURO	54	
32	Adapter	For FM/AM SSG HSG-2580 HEGURO	4	
33	Band Splitting Filter	"	1	
34	GP-IB Interface	For Universal Counter SC-7202 IWATSU	2	
35	DC Precision Supply	For Precision DC Potentiometer 272200VEW	1	
36	Voltage Ratio Box	"	1	
37	Standard Shut	For Precision DC Potentiometer 272200VEW	6	
38	Precision Standard Resistor	"	1	
39	Test Cable	For Digital LCR Meter 426ZYHP	6	
	Test Fixture for Radial Coaxial Lead Devices	"	3	

No.	Name	Description	Q' ty	Others
41	Digital Comparator	"	1	
42	HP-IB Interface	"	1	
43	100Hz Ffrequency	"	1	
44	Current Adapter	For X-Y Recorder VP-6424A	1	
45	1/20 ATT.	"	1	
46	3P Input Cable	"	1	
47	Band Splitting	For AM/FM Radio/TV Sound Digimarscope	2	
48	455KHz CW, Narrow	For AM/SSB Transceiver TS-940S KENWOOD	4	
49	8.83 CW, AM Filter	"	2	
50	SWR Meter	"	1	
51	Temperature Compensated Crystal Oscillator	AM/SSB Transceiver TS-940S KENWOOD	1	
52	Personal Computer Interface	"	2	
53	DC Power Supply & DC Cable	For FM Transceiver TK-2550A KENWOOD	2	
54	SWR/Power Meter	"	1	
55	2m ANT Tuning Unit	"	1	
56	Voice Synthesizer Unit	"	1	
57	MODEM Unit for DCL	"	1	
58	38 Tone CTSS Encoder	"	1	
59	Tripod & Tripod Adapter	For Color TV Camera	1	
60	Termination.	For Electronic Voltmeter KL-69A Anritsu	2	
61	GP-IB Interface	For Digital Memoryscope DMS-6440	1	

No.	Name	Description	Q' ty	Others
62	DC Power Supply	For Measuring Receiver (Field Strength Meter) ML-521B Anritsu	1	
63	Logperiodic ANT	"	1	
64	Loop ANT	"	1	
65	Tripod	"	2	
66	AC-Power Pack	"	1	
67	Battery Pack	"	1	
68	DC Power Supply	For Communication Receiver R-5000 KENWOOD	1	
69	VHF Converter	"	1	
70	8.83 MHz Filter	"	1	
71	SSB Narrow Filter	"	1	
72	CW, Narrow Filter	For Communication Receiver R-5000 KENWOOD	2	
73	GP-IB Interface	For TV System Analyzer MEV-5 Series	1	
74	Reference Oscillator	For Synthesized Signal Generator MG655A Anritsu	3	
75	Additional INT Modulation Frequency	"	2	
76	GP-IB Cable	"	2	
77	3 Port Junction Pad	"	1	
78	4 Port Junction Pad	"	1	
79	Conversion Pad	"	2	
80	Impedance Transformer	"	1	
81	Fixed Attenuator	"	1	

No.	Name	Description	Q'ty	Others
82	Microphone	For AM/SSB Transceiver TS-940 KENWOOD	1	
83	"	For FM Transceiver TM-2550A KENWOOD	1	
84	Personal Technical Controller	<p><u>It Consist of</u></p> <ul style="list-style-type: none"> <li>.Controller main unit:MC 1202A</li> <li>.Color display monitor MC-3602A</li> <li>.ASC II key board MC 3302A</li> <li>.Mouse Controller MC0304A</li> <li>.Mouse MC3304A</li> <li>.GP-IB Interface MC0175A</li> <li>.General Purpose I/O Interface</li> <li>.A/D converter MC0131A</li> <li>.D/A converter MC0132A</li> <li>.Hard disk Interface MC0178A</li> <li>.Printer DPR-7713A</li> <li>.1M-byte RAM. MC0110A</li> <li>.Expansion box Interface MC0101A</li> <li>.Hard disk drive MC2201A</li> <li>.Printer Interface MC0174A</li> </ul>	1	MC0170A
85	Radio Communication Analyzer	<ul style="list-style-type: none"> <li>.Frequency Range : 25MHz to 1GHz</li> <li>.Measurement Items: <ul style="list-style-type: none"> <li>-Transmitter power</li> <li>-VSWR of antenna</li> <li>-Transmitting frequency</li> <li>-FM deviation</li> <li>-Microphone input sensitivity</li> <li>-Frequency response of modulation</li> <li>-Modulation distortion</li> <li>-Tone frequency</li> <li>-Receiver sensitivity (NOS, SINAD)</li> <li>-Selectivity</li> <li>-Audio frequency output power</li> <li>-Frequency response of demodulation</li> <li>-Demodulation distortion</li> <li>-Demodulation S/N</li> <li>-Squelch sensitivity</li> <li>-DC supply voltage measurement</li> <li>-Modulation S/N</li> </ul> </li> <li>.Automatic Measurement Functions</li> <li>.DC Operation</li> <li>.Measurement Data Printing Function</li> </ul>	1	

No.	Name	Description	Q' ty	Others
86	Logic Analyzer	<u>Optional Accessories</u> .OPT-01, 02, 03. .Tone generator MH082A .Personal tester MH083A .Directional Coupler KA424A, KA514A, KA515A, UA516A .GP-IB cable 2a .Low Power Adaptor MH5112A .Impedance Transformer KA12A .CK coupler MP-520D .Divider MP-640A .Three-signal pad MP-659A .Standard Crystal Oscillator MI4100A  .Frequency Range : 200MHz .95 Input Channel (MAX) .3 Independent Time Axes .3ns glitch Detection .Set-up Condition Store/recall .Hard Copy Function .5ns Resolution (200MHz)	1	
87	Electronic Trainer Kit	<u>Optional Accessories</u> .Sync analyzer SL-0220 .GP-IB card SL-0228 .Personality probe adapter SL-0223 .8-bit personality card SL-0227 .Probe SL-0010, SL-0011, SL-0012, SL-0013, SL-0024, SL-0025 .PODS SL-0010, SL-0011, SL-0012, SL-0013, SL-0024, SL-0025  <u>It Consist of</u> .Electronic Circuit Trainer Kit ITF-01 with ITF-015 .Oscilloscope Circuit Trainer Kit ITF-04 .Semiconductor Trainer Kit ITF-05 .Electronic Counter Circuit Trainer Kit ITF-06 .Arithmetic Calculator Circuit Trainer Kit ITF-07 .Logic Circuit Trainer Kit ITF-02 .Pulse Circuit Trainer Kit ITF-03 .6-inch Rectangular CRT	2set	

No.	Name	Description	Q' ty	others
88	CRT Read Out Oscilloscope	.Frequency Range : DC-100MHz .4 Channel Input and Cursor Measurement .Jitterless Circuit for Stable Triggering .20 kv High Acceleration Voltage .Comment Display:MAX 80 characters .Delay Time Range : 0.20-10.20div	1set	
89	Sampling Scope	.Frequency range:DC-12.4 GHz.-3dB .Sensitivity:2mv/div-200mv/div .Sweep time:20ps/div-50us/div 1-2-5 sequence .Sampling frequency:MAX.70KHz .Wave form memory:3.5inch FDD  <u>Option</u> .3.5inch FDD SE-3101 .Dummy case .HF sync probe .Input probe SFP-3A, HZ-501A, 502A .Full options, SMA, BNC, N type	1set	
90	Network/Spectrum Analyzer	.Frequency range:100KHz to 2 GHz .0.1Hz resolution frequency synthesizer .Wide level-measurement range:-110 to + 20dBm .Wide measurement range Magnitude : $\pm 100$ dB Phase : + 180° Delay : 0 to 400ns Level : -110 to + 20dBm Spectrum: 60dB Synthesizer output: -70 to + 10dBm .Frequency measurement : 1Hz resolution .Impedance analysis Smith charts (6thpes), polar charts and rectangular coordinates .High-speed parameter conversion and display Reflection coefficient, return loss, VSWR Z=R + jX,  Z , Rs, Ls, Cs, Q, D Y=G + jB,  Y  Rp, Lp, Cp	1set	

No.	Name	Description	Q'ty	others
91	Network Analyzer	<p>.Flexible measuring-point setting for faster measurements            .Electrical length compensation : 0 to <math>\pm 999\mu</math>            .Simultaneous transmission and reflection measurements</p> <p><u>Option</u>            .SWR bridge set MR63J,K,A,B            .Reflection bridge set NA412A            .Impedance probe NA413A            .75 Ohm set NA610A            .128KB bubble memory cassette FBX-C128GP            .Video Printer VP-95S            .PTA2 option opt. 01            .2m GP-IB cable J0008</p> <p>.Frequency range:10Hz to 30 MHz            .Measuring item:Magnitude,phase, delay time.                magnitude/phase.                magnitude/delay time            .Frequency resolution:0.01Hz            .Memory function:using PHC,save and recall of 10 function and data            .Auto Setting:Sweep time,RBW,VBW, delay range scale            .Sweep method : LIN start/stop, center/span,log,start/stop            .GP-IB interface available</p> <p><u>Option</u>            .PTA3 option with key board            .UA-455A video plotter            .Full reflection bridge            .NA2203A impedance probe            .NA414A impedance measuring kit            .NA45A active probe            .BS128CI-A-30 memory card</p>	1 set	
92	Portable Audio-Frequency voltmeter	<p>.Principle :Moving coil type with rectifier            .Rated Accuracy:<math>\pm 0.5\%</math> of full scale value at 45Hz to 10KHz            .Range : 30/75/150/300V            .Scale Length : Approx 135mm            .Scale Division : 150            .Deflection angle : 85</p>	2	

No.	Name	Description	Q' ty	others
93	Portable AC 400Hz Voltmeter	.Principle : Moving iron type .Rated Accuracy: $\pm 0.5\%$ of full scale .Frequency influence : with in 0.2% .Range : 75/150V, 150/300V	2	
94	Audio Sweep Oscillator MAS-413A- HEGURO	.Frequency Range: 20Hz-200KHz (2band) 20Hz-20 KHz (x1) 200Hz-200KHz (x10) Accuracy: $\pm (5\% \pm 2Hz)$ .Sweep range: 20Hz-20KHz (x1) 0.5% 200Hz-200KHz (x10) 1% .Sweep mode: SINGLE, CONTINUOUS, EXIT, MANUAL .Sweep time: 1-3s, 3-10s, 10-30s .Output waveform: SINE, TRIANGLE, SQUARE .Output Level : -50 - 11dBm (SINE) 0 - 15Vp-p (TRIANGLE, SQUARE) .Output Impedance: unbalanced 600ohms	1	
95	Portable high-frequency Ammeter	<u>Portable High-Frequency A meter</u>  .Principle: Moving coil type taut-band suspension system with self-contained vacuum couple. .Rated Accuracy: $\pm 1.0\%$ of full scale .Freq. Influence: Max. 1.0% .Scale Length : Approx 135mm .Range : 5/10/20/50mA  <u>Portable High-Frequency A meter</u>  .Principle: Moving coil type taut-band suspension system with self-contained vacuum couple. .Rated Accuracy: $\pm 1.0\%$ of full scale .Freq. Influence: Max. 1.0% .Scale Length : Approx 135mm .Range : 20/50/100/200mA	4 (1)       (1)	



No.	Name	Description	Q' ty	others
96	Portable Wattmeter	<u>Portable High-Frequency Ammeter</u> .Principle: Moving coil type taut-band suspension system with self-contained vacuum couple. .Rated Accuracy: $\pm 1.0\%$ of full scale .Freq. Influence: Max. 1.0% .Scale Length : Approx 135mm .Range : 100/200/500/1,000mA	(1)	
		<u>Portable High-Frequency Voltmeter</u> .Principle : Moving coil type taut-band suspension system with self-contained vacuum couple. .Rated Accuracy: $\pm 0.5\%$ of full scale .Freq. Influence : Max. 1.0% .Max. Input Current: 150% of the rated value .Scale Length : Approx. 135mm .Range : 15/30/75/150V	(1)	
		<u>Portable Wattmeter</u> .Principle : Electrodynamometer type .Rated Accuracy: $\pm 0.5\%$ of full scale .Scale Division : 120mm .Frequency Range: DC 25 to 1,000Hz .Power Factor : 1.0 .Range : Current ... 0.2/1A, 1/5A, 5/25A Voltage ... 120/240V	8 (3)	
		<u>Portable Wattmeter</u> .Principle : Electrodynamometer type .Rated Accuracy: $\pm 0.5\%$ of full scale .Scale Division : 120mm .Frequency Range: DC 25 to 1,000Hz .Power Factor : 1.0 .Range : Current ... 0.2/1A, 1/5A 5/25A, 0.2/1A, 1/5A Voltage ... 120/240V, 30/60V	(5)	

No.	Name	Description	Q'ty	others
97	TV/IF Chroma Sweep Generator(plug-in)	<p>.High output level 120dB (for SIF &amp; VIF)</p> <p>.Built in crystal-controlled oscillator for sharp, accurate pulse markers</p> <p>.Main frame</p> <p>1.ATT:1dB x 10 (Rotary Switch) 10dB x 4,20dB x 1</p> <p>2.Gate signal input, output</p> <p>.SIF section(Plug-in)</p> <p>1.Sweep width:4.5MHz ± 350KHz or more</p> <p>2.Marker frequency : 4.41, 4.5, 4.59MHz</p> <p>3.Output level : 120dB into 750ohms load</p> <p>.VIF Section(plug-in)</p> <p>1.Sweep width : 9MHz or more</p> <p>2.Marker frequency: 39.75-47.25MHz(8points)</p> <p>3.Flatness:within 1dB over the sweep width</p> <p>.Chroma Section(plug-in)</p> <p>1.Sweep width : 4MHz or more</p> <p>2.Marker frequency:3.08, 3.58, 4.08, 4.5MHz</p> <p>3.Output level : 114dB into 750ohms load</p>	1 Sys.	
98	Attenuator	<p>.Type : Balanced, unbalanced</p> <p>.Frequency range:0-150KHz</p> <p>.Variable range:0-121dB, 0.1dB step,</p>	10	
99	Color TV Trainer	<p>.NTSC type</p> <p>.Receiving Channel:U.S. VHF,UHF</p> <p>.ANT Impedance:</p> <p>VHF 75ohms unbalanced 300ohms balanced</p> <p>UHF 300ohms balanced</p> <p>.RF circuit Exp.</p> <p>.VIF Amp circuit Exp.</p> <p>.Video Amp circuit Exp.</p> <p>.AGC circuit Exp.</p> <p>.Sound circuit Exp.</p> <p>.V.II sync circuit Exp.</p> <p>.Color process circuit Exp.</p> <p>.Color output circuit Exp.</p> <p>.Brawn circuit Exp.</p> <p>.Power supply circuit Exp.</p>	1	

No.	Name	Description	Q' ty	others
100	AC Automatic Voltage Regulator	.Thyristor phase control type .Output voltage: 1 $\phi$ , 100V $\pm$ 2% 2KVA .Frequency distortion: 60Hz 3% .Response speed: 200ms .Built-in protection circuit .Input voltage: AC100V $\pm$ 15%	2	
101	RF Interference Suppression line Filters	.Rejection frequency range: 611Hz-400MHz .Power: 110V 10A, 110V-20A, 110V 50Hz(100V-115V) (variable) .Attenuation factor: 120dB up(611Hz-400MHz)	5	

6. MACHINERY DESIGN ROOM

No.	Name	Description	Q'ty	Others
1	CAD/CAM System	<p>o <u>HARDWARE</u></p> <ol style="list-style-type: none"> <li>1. CPU : 32bit (5)</li> <li>2. MEMORY : 8MB (5)</li> <li>3. KEYBOARD: ASCII KEYBOARD (5)</li> <li>4. CRT : 19" COLOR (5)</li> <li>5. HARD DISK : 1G0MB (5)</li> <li>6. TABLET (5)</li> <li>7. PTP/PTR (1)</li> <li>8. PRINTER : 24X24 OR MORE THEN (2)</li> <li>9. X-Y PLOTTER : A1 (1)</li> </ol> <p>o <u>SOFTWARE</u></p> <ol style="list-style-type: none"> <li>1. OS SYSTEM</li> <li>2. FORTRAN 77</li> <li>3. NC</li> <li>4. GRAPHIC INTERFACE PACKAGE</li> <li>5. BASIC COMPIER</li> <li>6. FEH ANALYSIS SIMULATION</li> <li>7. FEH MESII GENERATOR</li> <li>8. MECHANISIM DESIGN SIMULATOR</li> <li>etc.</li> </ol>	5	

7. METEIRIAL TESTING LABORATORY

No.	Name	Descriptions	Q' ty	Others
1	Rockwell Hardness Tester	Work space:200Wx450x650h(mm) Test load:50,100,150kg Hight of test piece:0-200mm	1	
2	Brinell Hardness Tester	Capacity:3000kg Variable load : 500,750,1000 2000kg Hydraulic loading	1	
3	Micro Vicker Hardness Tester	Test load:10,25,50,100,200,300, 500,1000g Accuracy : better then $\pm 0.1\%$	1	
4	Shore Hardness Tester	Size:195x4.5x245(mm) Net weight : 16kg Gross weight : 30kg Type : Shore D type	1	
5	Vickers Hardness Tester	Test load:1.5,10,20,30,50kg Size:260W x 500 L x 750h(mm) Weight : 45kg	1	

## 8. DIE AND MOLD MACHINING SHOP

No.	Name	Description	Q'ty	Others
1	NC Copy Milling Machine	Table Max.Movement (X Y Z) 850X300X100mm Spindle speeds 40-2,000 rpm Tracer head movement Longi. 370mm Cross 100mm Verti. 250mm NC unit Fanuc 3300 D  <u>Optional accessories</u> 1) Template copying att. ( 1) 2) Mechanical mirror image ( 1) 3) Remote control pick feed ( 1) 4) Tool set ( 1) 5) Work light ( 1) 6) Master table ( 1) 7) Work off buzzer ( 1) 8) Oil pan ( 1) 9) Quill digital counter ( 1) 10) Cutter auto clamp ( 1) 11) Stylus set ( 1) 12) Up ward trace ( 1) 13) Software limit wire ( 1) 14) Milling chuck set ( 1) 15) Machine vise 200mm ( 1)	1	
2	Jig Boring Machinee (Digital type)	Table travel 600mm Spindle head travel 400mm Working surface 400x650mm Boring dia. 100mm Spindle speeds 50-2,000 rpm  <u>Optional accessories</u> 1) Circular dividing table ( 1) 2) Tilting rotary table ( 1) 3) Necessary tools C set ( 1) 4) Special function for digital read out ( 1) 5) Special equipment E set ( 1)	1	
3	Lifter	Standard type cap. 500kg. Strobe : Lowest 80mm Highest 180mm Fork length : 600mm Dimension : 2,220(H)x,050(L)x730(W) Weight : 100Kg	1	
4	FANUC PROGRESSIVE DIE CADI CAN SYSTEM	(1) 20" CRT and tablet (1) (2) FANUC PROGRAM FILE (1) (3) XY PLOTTER (1) (4) SOFT WARE FOR PROGRESSIVE DIE (1) (5) PTP/PTR (1) (6) P-G MARK II & KEY Board (1) (7) External Printer (1)	1	

No.	Name	Description	Q' ty	Others
5	Machining Center	<ul style="list-style-type: none"> <li>. Table size 900x500</li> <li>. Table Movement X.Y.Z= 700x450x450</li> <li>. Spindle Speed 10 -7,000</li> <li>. Number of Tools Storod 20</li> <li>. Standard &amp; Optional Accessories               <ul style="list-style-type: none"> <li>Tool set (1)</li> <li>Machino vise, Tool fixture (1)</li> <li>Centering Microscope (1)</li> <li>Spare Tool etc. (1)</li> </ul> </li> </ul>	1	

## 9. AIR CONDITIONING LABORATORY

No.	Name	Description	Q' ty	others
1	Boiler	Type:once-through Capacity : 100kg/h steam	1	
2	Refrigrating machine	Type:Water cooled packaged water chiller	1	
3	Cooling Tower	Type:Counter flow Material : F.R.P Capacity:40000Kcal/hr	1	
4	Heat Exchanger	Capacity : 85,000kcal/hr Heating source : steam Max. working pressure:5kg/cm <sup>2</sup>	1	
5	Steam Header	Dimensions:100 φ x 1000L Max. working pressure : 10kg/ cm <sup>2</sup>	2	
6	Hot Water Header	Dimensions : 100 φ x 1500L Max. Working Press : 5kg/ cm <sup>2</sup>	2	
7	Ditto	Dimensions : 50 φ x 700L Max working press:5kg/cm <sup>2</sup>	2	
8	Cooling Water Header	Dimensions:100 φ x 1400L Max. working press : 5kg/ cm <sup>2</sup>	2	
9	Oil Pump		2	
10	Cooling Water Pump	164L/MIN x 15M Type : Volute	2	
11	Hot Water Pump	155L/MIN x 20M	2	
12	Circulation Pump	60L/MIN x 10M Type : Line	2	
13	Air Conditioning Unit	Type : Horizontal	1	
14	Booster Coil Unit	Blower : 1000m <sup>3</sup> /Hr	1	
15	Fan Coil Unit	Type : Floor open	1	
16	Ditto	Type : Floor concealed	1	
17	Ditto	Type : Ceiling	1	
18	Ditto	Type : Ceiling concealed	1	
19	Packaged Type Air Conditioner	Type:Wall mount, Heat Pump Capacity : 2RT	1	
20	Circulation Blower	6700 m <sup>3</sup> x 45mmAq	1	



No.	Name	Description	Q' ty	others
21	Blower	7000 m <sup>3</sup> /Hrx32mmHg x 3.7KW (3 φ, 220V)	1	
22	Ditto	Ventilation Dia : φ 250	1	
23	Exhaust Blower	7000 m <sup>3</sup> /Hrx 32mmHg x 3.7KW	1	
24	Ditto	Ventilation Dia : φ 250	1	
25	Air Conditioning Control Panel		1	
26	Electric Power Source		1	
27	Central Control Panel System		1	
28	Process Feedback Control Study Unit	1.Desired value set station -Scale length : 100mm -Program cycle : 24hr type 2.Recorder & controller 1)Electronic recorder -Mounting :Panel mounting -Input signal:1to 5V D.C 2)Electronic controller -Cascade setting signal :1 to 5V D.C 3.Manipulator 1) 2-way selector -Selecting system : Manual -Input signal:4 to 20mA D.C -Output signal : Ditto 2)Control for temperature -Electric heater(3KW) 4.Controlled system -Metering water tank : φ 105 x 1150L 5.Primary means(Detector) -Temp. detector :Thermal resistor 100 Ω x 3wires -Flow rate detector :Range 500l/hr -Level detector:Level selector 6.Transmitter & converter -Flow rate, level transmittor -Pressure transmitter -Temperature transmitter 7.Water feed device 8.Measuring pick up 9.Compressor	1	

10. MECHATRONICS APPLICATION LABORATORY

No.	Name	Description	Q' ty	Others
1	Mechatronics Training Kit	1) I/O Interface 2) Position Sensing Kit-1 3) " Kit-2 4) Stopping Motor Kit 5) DC Servo-motor Kit 6) Servo Feedback Kit 7) Air-cylinder Control Kit-1 8) Air-cylinder Control Kit-2 9) Robot Arm Kit 10) Robot (3Axis) Kit 11) 自動變速機 機構 12) Hardware Manuals, Cables, Training Books of each kit	2 (10) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2)	島津理化學 SYMEC A10-1 PS-1B PS-1W SM-1 DC-1 FB-1 AH-1, AS-1 MO-1 RA-1 RZ-1 AU-1
2	磁氣回路 實習裝置	. 勵磁捲線 : 250, 500, 750, 100回卷 各 端子附 . 磁束計 : $\pm 0.02, \pm 0.1,$ $\pm 0.5 \text{ wb/ m}^2$ . Probe : Hall素子形, 從形, 橫形 各1本 . 磁心 : 純鐵, Ferrite Al-Ni-Co 各1個	1	島津 KHC-5
3	電磁力 測定 實習 裝置	. 電磁力測定器 (Solenoid 1.2 $\phi$ , 500 回卷) . 電磁石(0.8 $\phi$ , 180 回卷, Solenoid 形) . 電源部 ( 整流出力 1-4A, 安定化出力0-4A)	1	島津 KEM-5
4	Digital Dynaometer	Digital electronic measuring type, Eddy current brake Dyna- mometer, Digital counter	1	Seikosha ECH-2 STS-200
5	Computer Control Experiment Apparatuses	. 8bit parallel I/O . Contact Input . A/D converting Amplifier . D/A " " . Inverter Controller . Inverter . I/O signal Display . Counter (Serial Parallel Con- version) . 3-phase Induction Motor	1	RC-1802 RC-1807 RC-1804 RC-1803 RC-1820 RC-1821 RC-1805 RC-1806

No.	Name	Description	Q'ty	Others
6	Transistor Circuit Experimental Equipment	(The system is the purpose to study the operation of Transistor Amplifier, Oscillation, Detection and Pulse generator. )	1	富士Dynamic FT-200
7	CNC Training lathe with Accessories	<ul style="list-style-type: none"> <li>. Height of centers 65mm</li> <li>. Distance between centers 310mm</li> <li>. Swing over cross slide 60mm</li> <li>. Swing over bed 100mm</li> <li>. Travel of crass slide 50mm</li> </ul>	1	EXCO (Austria) Compact5CNC
8	CNC Training milling M/C with Accessories	<ul style="list-style-type: none"> <li>. Working range <ul style="list-style-type: none"> <li>- X (longitudinal) 200mm</li> <li>- Y (transverse) 100mm</li> <li>- Z (vertical) 200mm</li> </ul> </li> <li>. Milling head rotatable from Vertical to horizontal 90°</li> <li>. Table surface 420x125mm</li> <li>. T-slots/number 2</li> <li>. slot width/spacing 11/90mm</li> <li>. D.C Motor 440W</li> <li>. speed range, steplless 300-2000rpH</li> </ul>	1	EXCO FI-CNC
9	FFT signal Analyzer	<ul style="list-style-type: none"> <li>. Processing Mode <ul style="list-style-type: none"> <li>- Auto mode, Manual Mode, Program mode, Basic Mode</li> </ul> </li> <li>. Analytic Fuction <ul style="list-style-type: none"> <li>- cross power spectrum, Auto power spectrum, Transfer function, Linear spectrum (FFT), Co-herence function, 1/3 Octave Aanalysis, etc.</li> </ul> </li> <li>. 0.2Hz-100KHz, 72dB/oct dynamic range</li> <li>. A/D Converter resolution:12bit</li> <li>. Input : 2 channel ±0.1 V to ±200V/Full scale</li> <li>. Memory capacity : 16bit x 64K word</li> <li>. mini-floppy (256K byte double side, double density)</li> <li>. GP-IB Standard</li> <li>. Basic program with Key board</li> </ul>	1	IWATSU SH-2100A

## 11. HEAT TREATMENT LABORATORY

No.	Name	Descriptions	Q' ty	Others
1	High Frequency Induction Furnace	Output : 10-20KVA Frequency : 100-200KHz Type : Vacuum tube type	1	
2	Atomosphere Furnace	Max. Temp : 1300℃ Effective Size: 300Wx400 $\phi$ x200h(mm) Automatic temp controll & recording	1	
3	Electric Salt Bath	Temp : 150-350℃ Effective Size: 200Wx 280 $\phi$ x230h(mm) Power : 3 $\phi$ 220V 50kv Automatic temp. control & recording	1	
4	<del>SEM</del> Scanning Electron Microscope(SEM)	Power : 2-30KW Magnification: 35x ~ 200,000x *Maker: JEOL(日本電子) Model: JSM-T220	1	
5	Quenchio-meter	Temp: 0-1200℃ Automatic temperature Controller & recorder system	1	

12. SURFACE TREATMENT LABORATORY

No.	Name	Descriptions	Q'ty	Others
1	Micro Vicker's Hardness Tester	<p>Maker : Akashi                      Test Load : 10, 25, 50, 100, 200                      300, 500, 1000                      Accuracy : Better than <math>\pm 1\%</math>                      Accessories                      Standard Vice                      Setting Table(Slender)                      Slope Table                      Setting Table(Thin)                      Microscope for Measuring                      Hardness Test Piece                      Power Cord, Pilot Lamp                      Diamond Penetrator                      Knoop Penetrator</p>	1	(1) (1) (1) (1) (1) (1) (1) (1)
2	Metallurgical Microscope	<p>Maker:Olimpus                      Model:PHE                      Spec:                      Total magnification:35x -2000x                      with standard sets</p>	1	(1)
3	Electro-Magnetic Inductive Thickness Tester	<p>Maker:Kett                      Type : N10B                      Measuring Range:3Range                      0- 1,000 <math>\mu</math>m</p>	3	
4	Eddy Current Type of Thickness Tester	<p>Maker : Fisher Kett                      Spec:                      -I Range: <math>\pm 3\%</math>                      - II Range: below 10 <math>\mu</math>m <math>\pm 0.3\%</math>                      above 10 <math>\mu</math> <math>\pm 3.0\%</math>                      Minimum Measuring Surface                      -I Range : 5 x 5 mm<sup>2</sup>                      - II Range : 2.5 x 2.5 mm<sup>2</sup>.</p>	3	
5	Electrolytic Thickness Tester	<p>Maker : Fischer                      Type : S 8 d 5                      Measurement Range:0.05-100 <math>\mu</math>m                      Program Q'ty:Various 5 prog-in-unit                      100/220V 50-60Hz.</p>	3	
6	Electronic Analytical Balance	<p>Max. Capacity : 200g                      Min. Reading : 0.1mg</p>	1	
7	Wear Resistance Tester	<p>Maker:Takachiho Seiki Co.,LTD                      Model:TRI-S-500                      Spec:                      Testing Condition:Dry.Wet (oil                      Temp Max. 120°C)                      Pressing Load:20-500kg                      Measuring:Loadcell→Amp →Recorder                      Rotating Speed:350-3500(R.P.M)                      Oil Tank Capacity: 3 L</p>	1	





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