

TUNING PROCEDURE

RX Unit Adjustment(X55-304)

| NO | Item                         | Condition                    | Method                    | Test-equipment       | SPEC                               |
|----|------------------------------|------------------------------|---------------------------|----------------------|------------------------------------|
| 0  | Set up                       | RX P.C.B set up to jig       |                           |                      |                                    |
| 1  | Lock voltage Adj.(RX Hi1)    | CH6                          | TC2 Adj.                  | DVM                  | $4.5 \pm 0.1V$                     |
| 2  | Lock voltage check(RX Lo1)   | CH4                          | Check                     | DVM                  | 1V or more                         |
| 3  | Lock voltage Adj.(RX Hi2)    | CH3                          | TC1 Adj.                  | DVM                  | $4.5 \pm 0.1V$                     |
| 4  | Lock voltage check(RX Lo2)   | CH1                          | Check                     | DVM                  | 1V or more                         |
| 5  | Lock voltage check (Sub)     | SUB                          | Check                     | DVM                  | 1~4.5V                             |
| 6  | BPF Adj.                     | ANT Input, CN2 Output        | L3,L16 Adj.               | TG, Spectrumanarizer | Wave form Adj.(465MHz Center Adj.) |
| 7  | MCF Adj. (WIDE)              | CH4, CN3 Input, CN4 Output   | L31,L27,L38,L40,L43 Check | TG, Spectrumanarizer | Wave form Adj.                     |
| 8  | MCF Adj. (NARROW)            | CN10, CN3 Input, CN5 Output  | L32,L28,L39,L41,L44 Check | TG, Spectrumanarizer | Wave form Adj.                     |
| 9  | Discriminator Adj.(WIDE)     | CH4, 1KMOD/3kDEV, -53dBm     | L52 Adj.                  | SG, AFVM             | AF MAX                             |
| 10 | Discriminator Adj.(NARROW)   | CH10, 1KMOD/1.5kDEV, -53dBm  | L53 Adj.                  | SG, AFVM             | AF MAX                             |
| 11 | RX Sensitivity check(WIDE)   | CH4, 1KMOD/3kDEV, -113dBm    | Check                     | SG, Distortionmeter  | SINAD 12dB or more                 |
| 12 | RX Sensitivity check(NARROW) | CH10, 1KMOD/1.5kDEV, -113dBm | Check                     | SG, Distortionmeter  | SINAD 12dB or more                 |
| 13 | End                          | RX P.C.B remove from jig     |                           |                      |                                    |
|    |                              |                              |                           |                      |                                    |

*TX Unit Adjustment( X56-303)*

| <i>NO</i> | <i>Item</i>                 | <i>Condition</i>              | <i>Method</i>               | <i>Test-equipment</i>        | <i>SPEC</i>                 |
|-----------|-----------------------------|-------------------------------|-----------------------------|------------------------------|-----------------------------|
| 0         | Set up                      | TX P.C.B set up to jig.       |                             |                              |                             |
| 1         | Lock voltage Adj. (TX Hi1)  | CH3                           | TC1 Adj.                    | DVM                          | $4.5V \pm 0.1V$             |
| 2         | Lock voltage check(TX Lo1)  | CH1                           | Check                       | DVM                          | 1.0V or more                |
| 3         | Lock voltage Adj. (TX Hi2)  | CH6                           | TC2 Adj.                    | DVM                          | $4.5V \pm 0.1V$             |
| 4         | Lock voltage check (TX Lo2) | CH4                           | Check                       | DVM                          | 1.0V or more                |
| 5         | RX Ref check                | CH2                           | Check                       | freq-counter                 | 19.2MHz                     |
| 6         | EXT Ref check               | CH2, SG:10MHz/-10dBm/MOD OFF  | Make variations in SG freq. | SG, freq-counter             | Ref freq.must be variable   |
| 7         | DEV check(VCO-A)            | CH2, AG:1kHz/50mV             | Check                       | Linerdetector & Oscilloscope | Modulation wave must be out |
| 8         | DEV check(VCO-B)            | CH5, AG:1kHz/50mV             | Check                       | Linerdetector & Oscilloscope | Modulation wave must be out |
| 9         | Tone Dev. check(VCO-A)      | CH2, AG:100Hz/0.5Vpp sinewave | Check                       | Linerdetector & Oscilloscope | Modulation wave must be out |
| 10        | Tone Dev. check(VCO-B)      | CH5, AG:100Hz/0.5Vpp sinewave | Check                       | Linerdetector & Oscilloscope | Modulation wave must be out |
| 11        | End                         | TX P.C.B remove from jig.     |                             |                              |                             |
|           |                             |                               |                             |                              |                             |
|           |                             |                               |                             |                              |                             |
|           |                             |                               |                             |                              |                             |

\*\*\*\*\* SEMICONDUCTOR PARTS LIST \*\*\*\*\*

FOR MODEL : TKR-830  
 (UHF REPEATER X53-3810-10)  
 CONTROL UNIT

CIRCUIT PARTS NUMBER DESCRIPTION

SYMBOL

|      |                |                         |               |
|------|----------------|-------------------------|---------------|
| D1   | HSM88AS        | DIODE                   | DET           |
| D6   | DA204U         | DIODE                   | SURGE PROTECT |
| D7   | DA204U         | DIODE                   | SURGE PROTECT |
| D8   | DA204U         | DIODE                   | SURGE PROTECT |
| D9   | DA204U         | DIODE                   | SURGE PROTECT |
| D11  | DA204U         | DIODE                   | SURGE PROTECT |
| D13  | DA204U         | DIODE                   | SURGE PROTECT |
| D15  | DA204U         | DIODE                   | SURGE PROTECT |
| D17  | DA204U         | DIODE                   | SURGE PROTECT |
| D18  | DA204U         | DIODE                   | SURGE PROTECT |
| D20  | DA204U         | DIODE                   | SURGE PROTECT |
| D21  | DA204U         | DIODE                   | SURGE PROTECT |
| D22  | DA204U         | DIODE                   | SURGE PROTECT |
| D23  | DA204U         | DIODE                   | SURGE PROTECT |
| D24  | DA204U         | DIODE                   | SURGE PROTECT |
| D25  | DA204U         | DIODE                   | SURGE PROTECT |
| D26  | DA204U         | DIODE                   | SURGE PROTECT |
| D27  | DA204U         | DIODE                   | SURGE PROTECT |
| D28  | DA204U         | DIODE                   | SURGE PROTECT |
| D29  | DA204U         | DIODE                   | SURGE PROTECT |
| D30  | DA204U         | DIODE                   | SURGE PROTECT |
| D31  | DA204U         | DIODE                   | SURGE PROTECT |
| D32  | DA204U         | DIODE                   | SURGE PROTECT |
| D200 | MINISMDC075-02 | VARISTORCURRENT PROTECT |               |

|       |              |                |                 |
|-------|--------------|----------------|-----------------|
| D201  | B30-2197-05  | LED            | TX LED          |
| D202  | B30-2198-05  | LED            | RX LED          |
| D203  | B30-2198-05  | LED            | POWER LED       |
| D207  | DA204U       | DIODE          | SURGE PROTECT   |
| D208  | DA204U       | DIODE          | SURGE PROTECT   |
| D209  | DA204U       | DIODE          | SURGE PROTECT   |
| D210  | B30-0864-05  | LED            | REFERENCE LED   |
| D212  | LA301DB      | LED ASS'Y      | 7SEG            |
| D213  | LA301DB      | LED ASS'Y      | 7SEG            |
| D214  | DA204U       | DIODE          | SURGE PROTECT   |
| IC1   | NJM78L08UA   | IC             | 8V AVR          |
| IC2   | NJM4558EIC   |                | NOISE AMP       |
| IC3   | NJM4558EIC   |                | RX AUDIO FILTER |
| IC4   | NJM4558EIC   |                | SPLUTTER FILTER |
| IC5   | NJM4558EIC   |                | NOTCH FILTER    |
| IC6   | NJM78L05UA   | IC             | 5V AVR          |
| IC7   | BU4053BCF    | IC             | AUDIO SW        |
| IC9   | BU4094BCFV   | IC             | SHIFT REGISTER  |
| IC10  | MC8800PJUTAK | IC             | u-COM           |
| IC11  | NJM4558EIC   | LPF            |                 |
| IC12  | RH5VL42CIC   | RESET IC       |                 |
| IC13  | NJM4558EIC   | "AGC,LIMITTER" |                 |
| IC14  | ADM232LAR    | IC             | RS-232C DRIVER  |
| IC15  | NJM4558EIC   |                | RX AUDIO FILTER |
| IC101 | TC7S08FUIC   | AND GATE       |                 |
| IC102 | TC7S32FUIC   | OR GATE        |                 |
| IC103 | TC7S02FUIC   | NOR GATE       |                 |
| IC104 | M62364FPIC   |                | ELECTRIC VOLUME |
| IC105 | NJM4558EIC   | BUFFER         |                 |
| IC106 | NJM4558EIC   | BUFFER         |                 |
| IC107 | BU4053BCF    | IC             | ANALOG SW       |
| IC108 | BU4053BCF    | IC             | ANALOG SW       |
| IC109 | TC7S00FUIC   | NAND GATE      |                 |
| IC200 | NJM78L05UA   | IC             | 5V AVR          |
| IC201 | NJM78L05UA   | IC             | 5V AVR          |
| IC202 | NJM78L05UA   | IC             | 5V AVR          |

|       |                    |                                     |
|-------|--------------------|-------------------------------------|
| IC204 | BU2114F IC         | SHIFT REGISTER(TX/BUSY)             |
| IC205 | BU2114F IC         | SHIFT REGISTER(7SEG)                |
| IC206 | BU2114F IC         | SHIFT REGISTER(7SEG)                |
| Q1    | DTC144EUA          | TRANSISTOR DIGITAL SQUALCH          |
| Q2    | DTC363EKTRANSISTOR | AUDIO MUTE                          |
| Q3    | 2SC4081(R)         | TRANSISTOR DET BUFFER               |
| Q4    | 2SC2712(Y)         | TRANSISTOR BUFFER                   |
| Q5    | DTC144EUA          | TRANSISTOR SQUALCH CONTROL          |
| Q6    | DTC114EUA          | TRANSISTOR SQUALCH CONTROL          |
| Q7    | 2SD1757KTRANSISTOR | AGC                                 |
| Q8    | DTC114EUA          | TRANSISTOR HOOK                     |
| Q9    | 2SC4215(Y)         | TRANSISTOR CLOCK SHIFT              |
| Q10   | DTA144EUA          | TRANSISTOR HOOK                     |
| Q200  | DTC144EUA          | TRANSISTOR REFERENCE LED SELECT     |
| Q201  | DTC144EUA          | TRANSISTOR REFERENCE LED SELECT     |
| Q202  | DTA114EUA          | TRANSISTOR REFERENCE LED SELECT     |
| Q203  | DTC144EUA          | TRANSISTOR REFERENCE LED SELECT     |
| Q204  | DTA114EUA          | TRANSISTOR REFERENCE LED SELECT     |
| Q211  | DTC144EUA          | TRANSISTOR REFERENCE MONITER SELECT |

\*\*\*\*\* SEMICONDUCTOR PARTS LIST \*\*\*\*\*

FOR MODEL : TKR-830  
(UHF REPEATER UNIT X55-3040-10)  
RX UNIT

| CURCUIT<br>SYMBOL | PARTS NUMBER   | DESCRIPTION                               |
|-------------------|----------------|-------------------------------------------|
| D1                | 1SS355         | DIODE, LOCK DETECT                        |
| D2                | 1SV283         | VARIABLE CAPACITANCE DIODE, FREQUENCY CON |
| D3                | 1SV283         | VARIABLE CAPACITANCE DIODE, FREQUENCY CON |
| D4                | 1SV283         | VARIABLE CAPACITANCE DIODE, FREQUENCY CON |
| D6                | 1SV283         | VARIABLE CAPACITANCE DIODE, FREQUENCY CON |
| D9                | 1SV283         | VARIABLE CAPACITANCE DIODE, FREQUENCY CON |
| D10               | DAN235K        | DIODE, IF SWITCH (WIDE/NARROW)            |
| D11               | DAN202U        | DIODE, DC SWITCH                          |
| IC1               | SA7025DK       | IC, PLL (1ST LOCAL)                       |
| IC2               | NJM78L05UA     | IC, AVR                                   |
| IC3               | BU4094BCFV     | IC, LATCH                                 |
| IC4               | TA7808S        | IC, AVR                                   |
| IC5               | NJM2904E       | IC, DC AMP                                |
| IC6               | BU4053BCF      | IC, AUDIO SWITCH                          |
| IC7               | TA31137FN      | IC, IF IC                                 |
| IC8               | TA31137FN      | IC, IF IC                                 |
| IC9               | M62364FP       | IC, ELECTRONIC VOLUME                     |
| IC10              | AT2408N10S12.5 | IC, EEPROM                                |
| IC11              | NJM4558E       | IC, AUDIO AMP                             |
| IC12              | NJM4558E       | IC, AUDIO AMP                             |
| IC13              | NJM78L08UA     | IC, AVR                                   |
| IC14              | NJM2904E       | IC, DC AMP                                |
| IC15              | LMX1511TMX     | IC, PLL (2ND LOCAL)                       |
| IC16              | NJM78L05UA     | IC, AVR                                   |
| IC17              | NJM78L08UA     | IC, AVR                                   |
| IC18              | TC4S81F        | IC, AND GATE (LOCK DETECT)                |

|      |               |                                |
|------|---------------|--------------------------------|
| IC19 | TC74HC14AF    | IC, NOT GATE                   |
| Q1   | 2SC3357       | TRANSISTOR, 1ST LOCAL AMP      |
| Q3   | 2SC3356       | TRANSISTOR, 1ST LOCAL AMP      |
| Q5   | 2SC3357       | TRANSISTOR, 1ST LOCAL AMP      |
| Q6   | 2SC4226(R24)  | TRANSISTOR, 1ST LOCAL AMP      |
| Q7   | 2SC3357       | TRANSISTOR, FIRST AMPLIFIER    |
| Q8   | 2SK508NV(K53) | FET, VCO(1ST LOCAL)            |
| Q9   | 2SK508NV(K53) | FET, VCO(1ST LOCAL)            |
| Q10  | 2SC3722K(S)   | TRANSISTOR, VCO SWITCH         |
| Q12  | 2SC3722K(S)   | TRANSISTOR, VCO SWITCH         |
| Q13  | DTC114EUA     | TRANSISTOR, VCO SWITCH         |
| Q14  | 2SC4226(R24)  | TRANSISTOR, 1ST LOCAL AMP      |
| Q15  | 2SC4215(Y)    | TRANSISTOR, 2ND LOCAL AMP      |
| Q16  | 2SB1386(R)    | TRANSISTOR, DC SWITCH (NARROW) |
| Q17  | 2SC3722K(S)   | TRANSISTOR, RIPPLE FILTER      |
| Q18  | DTC114EUA     | TRANSISTOR, DC SWITCH (NARROW) |
| Q19  | DTC114EUA     | TRANSISTOR, DC SWITCH (NARROW) |
| Q20  | 2SB1386(R)    | TRANSISTOR, DC SWITCH (WIDE)   |
| Q21  | 2SK508NV(K52) | FET, VCO (2ND)                 |
| Q22  | DTC114EUA     | TRANSISTOR, DC SWITCH (WIDE)   |
| Q23  | 2SC4215(Y)    | TRANSISTOR, 2ND LOCAL AMP      |
| Q24  | 2SC3357       | TRANSISTOR, IF AMP             |
| Q25  | 2SC3357       | TRANSISTOR, IF AMP             |
| Q26  | 2SC4081(R)    | TRANSISTOR, AF AMP             |
| Q27  | 2SC4215(Y)    | TRANSISTOR, 2ND LOCAL AMP      |
| Q28  | 2SC4081(R)    | TRANSISTOR, SQ SWITCH          |
| Q29  | DTC114EUA     | TRANSISTOR, SQ SWITCH          |
| Q30  | 2SC4215(Y)    | TRANSISTOR, 2ND LOCAL AMP      |
| Q31  | 2SC3357       | TRANSISTOR, IF AMP             |
| Q32  | 2SC3357       | TRANSISTOR, IF AMP             |
| Q33  | 2SC4215(Y)    | TRANSISTOR, 2ND LOCAL AMP      |
| Q34  | 2SJ106(GR)    | FET, SQ SWITCH                 |
| Q35  | 2SJ106(GR)    | FET, SQ SWITCH                 |
| Q36  | DTC114EUA     | TRANSISTOR, OR GATE (SQ CONT)  |
| Q37  | DTC114EUA     | TRANSISTOR, OR GATE (SQ CONT)  |
| Q38  | DTC114EUA     | TRANSISTOR, NOT GATE (SQ CONT) |

\*\*\*\*\* SEMICONDUCTOR PARTS LIST \*\*\*\*\*

FOR MODEL : TKR-830  
 (REPRTER UNIT X56-3030-10)  
 TX UNIT

| CURCUIT<br>SYMBOL | PARTS NUMBER   | DESCRIPTION                               |
|-------------------|----------------|-------------------------------------------|
| D1                | 1SV283         | VARIABLE CAPACITANCE DIODE, FREQUENCY CON |
| D2                | 1SV283         | VARIABLE CAPACITANCE DIODE, FREQUENCY CON |
| D3                | 1SV283         | VARIABLE CAPACITANCE DIODE, FREQUENCY CON |
| D4                | 1SV283         | VARIABLE CAPACITANCE DIODE, FREQUENCY CON |
| D5                | 1SV283         | VARIABLE CAPACITANCE DIODE, MODULATION    |
| D6                | 1SV283         | VARIABLE CAPACITANCE DIODE, MODULATION    |
| D7                | 1SV128         | DIODE, RF SWITCH                          |
| D8                | DA204U         | DIODE, CURRENT CONTROL                    |
| D10               | 1SV128         | DIODE, RF SWITCH                          |
| D11               | 1SS355         | DIODE, CUEERNT STEERING                   |
| D12               | 1SS355         | DIODE, CUEERNT STEERING                   |
| D101              | 1SV128         | DIODE, RF SWITCH                          |
| D103              | 1SV128         | DIODE, RF SWITCH                          |
| D201              | 1SV283         | VARIABLE CAPACITANCE DIODE, FREQUENCY CON |
| D202              | 1SV283         | VARIABLE CAPACITANCE DIODE, FREQUENCY CON |
| D203              | 1SV283         | VARIABLE CAPACITANCE DIODE, MODULATION    |
| D205              | HSM88AS        | DIODE, DET                                |
| D206              | MINISMDC075-02 | VARISTOR, CURRENT PROTECT                 |
| D207              | MINISMDC075-02 | VARISTOR, CURRENT PROTECT                 |
| D240              | 1SV283         | VARIABLE CAPACITANCE DIODE, FREQUENCY CON |
| D301              | UDZ4.7(B)      | ZENER DIODE, VOLTAGE CONTROL              |
| D302              | 1SS355         | DIODE, CURRENT STEERING                   |
| D303              | ERZ-M14DK220M  | SURGE ABSORBER, SURGE PROTECTOR           |
| D304              | 1SS355         | DIODE, CURRENT STEERING                   |
| D305              | DSM3MA1        | DIODE, REVERCE CONECT PROTECTOR           |
| D306              | HSM88AS        | DIODE, DET                                |
| D308              | HSM88AS        | DIODE, DET                                |

|       |                |                            |
|-------|----------------|----------------------------|
| D310  | MINISMDC075-02 | VARIATOR,CURRENT PROTECTOR |
| D311  | MINISMDC075-02 | VARIATOR,CURRENT PROTECTOR |
| IC1   | TA7808S        | IC,AVR                     |
| IC2   | NJM78L08UA     | IC,AVR                     |
| IC3   | M62364FP       | IC,ELECTRIC VOLUME         |
| IC4   | BU4094BCFV     | IC,SHIFT REGISTER          |
| IC100 | TA75S01F       | IC,AVR                     |
| IC101 | LMX1511TMX     | IC,PLL                     |
| IC103 | NJM78L05UA     | IC,AVR                     |
| IC105 | NJM4558F       | IC,SUMMING AMP             |
| IC106 | AT2408N10S12.5 | IC,EEPROM                  |
| IC108 | NJM78L08UA     | IC,AVR                     |
| IC109 | NJM2904E       | IC,BUFFER                  |
| IC110 | NJM78L05UA     | IC,AVR                     |
| IC201 | SA7025DK       | IC,PLL                     |
| IC203 | NJM2904E       | IC,DC AMP                  |
| IC204 | NJM2903        | MIC,COMPARATOR             |
| IC205 | TC4S81F        | IC,BUFFER                  |
| IC301 | SA7025DK       | IC,PLL                     |
| IC302 | NJM2904E       | IC,COMPARATOR              |
| IC303 | NJM2904E       | IC,DC AMP                  |
| Q1    | 2SK508NV(K52)  | FET,OSC                    |
| Q2    | 2SK508NV(K52)  | FET,OSC                    |
| Q3    | 2SC3722K(S)    | TRANSISTOR,DCSWITCH        |
| Q4    | 2SC3722K(S)    | TRANSISTOR,DC SWITCH       |
| Q5    | 2SK1824        | FET,DC SWITCH              |
| Q6    | 2SC4226(R24)   | TRANSISTOR,BUFF AMP        |
| Q7    | 2SC3722K(S)    | TRANSISTOR,PIPPLE FILTER   |
| Q8    | DTC114EUA      | TRANSISTOR,DC SWITCH       |
| Q9    | 2SC4226(R24)   | TRANSISTOR,DC SWITCH       |
| Q10   | DTC144EUA      | TRANSISTOR,RF AMP          |
| Q11   | 2SB1386(R)     | TRANSISTOR,DC SWITCH       |
| Q12   | DTC114EUA      | TRANSISTOR,DC SWITCH       |
| Q13   | 2SC4093(R27)   | TRANSISTOR,DC SWITCH       |
| Q14   | 2SC3357        | TRANSISTOR,RF AMP          |
| Q15   | 2SK302(Y)      | FET,BUFF AMP               |

|      |                |                       |
|------|----------------|-----------------------|
| Q16  | DTA114EUA      | TRANSISTOR, DC SWITCH |
| Q17  | 2SA1586(Y, GR) | TRANSISTOR, DC AMP    |
| Q18  | DTC143EUA      | TRANSISTOR, DC SWITCH |
| Q102 | 2SC4215(Y)     | TRANSISTOR, BUFF AMP  |
| Q106 | 2SC4215(Y)     | TRANSISTOR, DUBLER    |
| Q107 | 2SC4226(R24)   | TRANSISTOR, RF AMP    |
| Q110 | DTA114EUA      | TRANSISTOR, DC SWITCH |
| Q111 | DTC114EUA      | TRANSISTOR, DC SWITCH |
| Q112 | 2SK1824        | FET, DC SWITCH        |
| Q113 | 2SK1824        | FET, DC SWITCH        |
| Q114 | DTA114EUA      | TRANSISTOR, DC SWITCH |
| Q115 | 2SC4215(Y)     | TRANSISTOR, BUFF AMP  |
| Q201 | 2SC4215(Y)     | TRANSISTOR, OSC       |
| Q202 | 2SC4215(Y)     | TRANSISTOR, BUFF AMP  |
| Q203 | DTC114EUA      | TRANSISTOR, DC SWITCH |
| Q205 | 2SC4226(R24)   | TRANSISTOR, RF AMP    |
| Q206 | 2SK1824        | FET, DC SWITCH        |
| Q240 | 2SC4215(Y)     | TRANSISTOR, OSC       |
| Q241 | 2SC4215(Y)     | TRANSISTOR, BUFF AMP  |
| Q301 | 2SC4081(R)     | TRANSISTOR, DC AMP    |
| Q302 | DTC144EUA      | TRANSISTOR, DC SWITCH |
| Q304 | DTC144EUA      | TRANSISTOR, DC SWITCH |
| Q305 | DTC144EUA      | TRANSISTOR, DC SWITCH |