Vertex Standard

UHF Digital/Analog
Mobile Transceiver
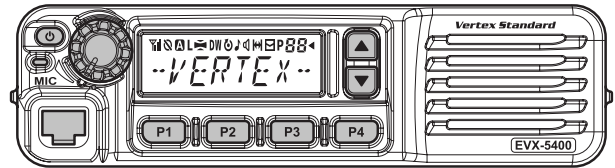
EVX-5300/-5400

Service Manual
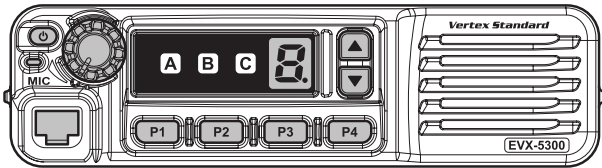
EVX-5300

EVX-5400

Introduction

This manual provides technical information necessary for servicing the **EVX-5300/-5400** UHF Digital/Analog Mobile Transceiver.

Servicing this equipment requires expertise in handling surface-mount chip components. Attempts by non-qualified persons to service this equipment may result in permanent damage not covered by the warranty, and may be illegal in some countries.

Two PCB layout diagrams are provided for each double-sided circuit board in the transceiver. Each side of is referred to by the type of the majority of components installed on that side ("leaded" or "chip-only"). In most cases one side has only chip components, and the other has either a mixture of both chip and leaded components (trimmers, coils, electrolytic capacitors, ICs, etc.), or leaded components only.

As described in the pages to follow, the advanced microprocessor design of the **EVX-5300/-5400** allows a complete alignment of this transceiver to be performed without opening the case of the radio; all adjustments can be performed from the personal computer, using with the Vertex Standard FIF-12 USB Programming Interface and CE142 Software.

While we believe the technical information in this manual to be correct, Vertex Standard assumes no liability for damage that may occur as a result of typographical or other errors that may be present. Your cooperation in pointing out any inconsistencies in the technical information would be appreciated.

Important Note

This transceiver is assembled using Pb (lead) free solder, based on the RoHS specification.
Only lead-free solder (Alloy Composition: Sn-3.0Ag-0.5Cu) should be used for repairs performed on this apparatus. The solder stated above utilizes the alloy composition required for compliance with the lead-free specification, and any solder with the above alloy composition may be used.

Contents

General

Frequency Range:	403-470 MHz (Type "G6")
	450-520 MHz (Type "G7") (USA Model: 450-512 MHz)
Channel / Group:	8 Channel / 1 Group (EVX-5300)
	512 Channel / 32 Group (EVX-5400)
Channel Spacing:	12.5 / 25 kHz (Analog) (USA Model: 12.5 kHz)
	12.5 kHz (Digital)
Emission Type:	16K0F3E / 11K0F3E (Analog)
	7K60F1E / 7K60FXE (Digital: 12.5 kHz Voice)
	7K60F1D / 7K60FXD (Digital: 12.5 kHz Data)
	7K60F1W (Digital: Combination of 12.5 kHz Voice & Data)
Power Supply Voltage (Rated):	13.6 V DC ±20 %
Current Consumption:	11 A (45 W TX)
	7 A (25 W TX)
	2.5 A (RX, AF Power Max.)
Temperature Range:	–22 °F to +140 °F (–30 °C to +60 °C)
Antenna Impedance:	50 ohm (unbalanced)
Case Size (W x H x D):	6.5" x 1.8" x 6.1" (165 x 45 x 155 mm)
Weight (Approx.):	2.8 lbs (1.25 kg)

Receiver: Measured by TIA603/603D

Circuit Type:	Double Conversion Super-heterodyne
IF	50.85 MHz / 101.7 MHz
Sensitivity:	0.25 μV (Analog, 12 dB SINAD)
	0.28 μV (Digital, 1 % BER)
Adjacent Channel Selectivity:	70 dB (25 kHz Step, TIA603)
	60 dB (12.5 kHz Step, TIA603)
Intermodulation:	70 dB (Analog)
Spurious Rejection:	65 dB (Analog)
Audio output:	4 W (internal @ 20 ohm 5% THD)
	12 W (external @ 4 ohm 5% THD)

Transmitter: Measured by TIA603/603D

Output Power:	45 / 25 / 10 W (45 W Model)
	25 / 10 / 5 W (25 W Model)
Frequency Stability:	±1.5 ppm
Modulation Type:	Sigma Delta Modulation
Maximum Deviation:	±5.0 kHz (25 kHz Step, Analog)
	±2.5 kHz (12.5 kHz Step, Analog)
	1745 Hz - 2138 Hz (12.5 kHz Step, Symbol Deviation)
FM Noise:	–45 dB (25 kHz Step)
	–40 dB (12.5 kHz Step)
Conducted Spurious Emissions:	Better then 70 dBc
Audio Distortion:	3 % @1 kHz
Microphone Impedance:	600 ohm

Specifications subject to change without notice or obligation.

General

|	
Frequency Range:	403-470 MHz
Channel / Group:	8 Channel / 1 Group (EVX-5300)
	512 Channel / 32 Group (EVX-5400)
Channel Spacing:	12.5 / 20 / 25 kHz (Analog)
	12.5 kHz (Digital)
Emission Type:	16K0F3E / 14K0F3E / 11K0F3E (Analog)
	7K60F1E / 7K60FXE (Digital: 12.5 kHz Voice)
	7K60F1D / 7K60FXD (Digital: 12.5 kHz Data)
	7K60F1W (Digital: Combination of 12.5 kHz Voice & Data)
Power Supply Voltage (Rated):	13.6 V DC ±20 %
Current Consumption:	7 A (25 W TX)
	2.5 A (RX, AF Power Max.)
Temperature Range:	–30 °C to +60 °C
Antenna Impedance:	50 ohm (unbalanced)
Case Size (W x H x D):	165 x 45 x 155 mm
Weight (Approx.):	1.25 kg

Receiver: Measured by ETS 300 086

Circuit Type:	Double Conversion Super-heterodyne
IF	50.85 MHz / 101.7 MHz
Sensitivity:	0.4 µV (Analog, 20 dB SINAD)
	0.28 µV (Digital, 1 % BER)
Adjacent Channel Selectivity:	70 dB (20 / 25 kHz Step, Analog)
	60 dB (12.5 kHz Step, Analog)
Intermodulation:	65 dB (Analog)
Spurious Rejection:	70 dB (Analog)
Audio output:	4 W (internal @ 20 ohm 5% THD)
	12 W (external @ 4 ohm 5% THD)

Transmitter: Measured by ETS 300 086

Output Power:	25 / 10 / 5 W
Frequency Stability:	±1.5 ppm
Modulation Type:	Sigma Delta Modulation
Maximum Deviation:	±5.0 kHz (25 kHz Step, Analog)
	±4.0 kHz (20 kHz Step, Analog)
	±2.5 kHz (12.5 kHz Step, Analog)
	1745 Hz - 2138 Hz (12.5 kHz Step, Symbol Deviation)
FM Noise:	–45 dB (25 kHz Step)
	–40 dB (12.5 kHz Step)
Conducted Spurious Emissions:	–36 dBm @≦ 1 GHz, –30 dBm @>1 GHz
Audio Distortion:	3 % @1 kHz
Microphone Impedance:	600 ohm

Specifications subject to change without notice or obligation.

DSUB 15-pin Accessory Connector
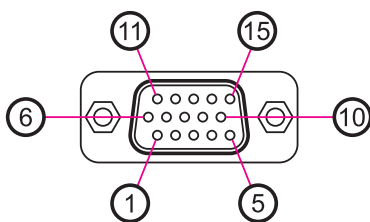
Pin 1: AF IN (Analog Input)

External Microphone Input. Nominal input level is 4 mV (or –47 dBm; programmed via the CE142 programmer) at 600-ohm.

Pin 2: AF OUT (Analog Output)

Low-level receiver output. Peak signal level is –10 dBm at 600-ohm.

Pin 3: AF GND

Ground for all logic levels and power supply return.

Pin 4: DC OUT (13.6 V DC Output)

Switched 13.6V output for supplying power to an accessory.
Maximum output current is 1 A.

Pin 5: RSSI (Analog Output)

A DC voltage proportional to the strength of the signal currently being received (Receiver Signal Strength Indicator) is provided on this pin. This low impedance output is generated by the receiver IF sub-system and buffered by an internal op-amp. Typical output voltages are 0.1 V (@ No Signal Input) through 2.0 V (@50 dBμ Signal Input).

Pin 6: EXT PTT

Shorting this port to ground causes the transceiver to be placed in the Transmit mode, while opening the connection to this port returns the transceiver to the Receive mode. Opening voltage is 5 V, closed current approx. 5 mA.

Pin 7: TRX

This port is intended for controlling an external TX/RX switching circuit. When the transceiver is placed in the Receiver mode, this port is 5 V. When the transceiver is placed in the Transmit mode, this port reduce to 0 V.
This port is open drain output which can sink approx. 50 mA when active.

Pin 8: IGN (Ignition Sense feature)

The EVX-5300/-5400 may be automatically be switched to the STND-BY mode when the vehicle's ignition key is turned on. Maximum current is 20 mA.

Pin 9-12: ACC1 - ACC4 (Accessory Port)

These port features can be programmed via the CE142 programmer. Each port is open drain output which can sink approx. 50 mA when active. Max. output 16 V.
When the input is selected, it becomes active between 2 V and 16 V.

Pin 13: ACC5 (Accessory Port)

The port 5 is available to set only for Output function, and active logic is opposite side against the Port 1 ~ 4.
Max. output 5 V, closed current approx. 1 mA (CMOS output).

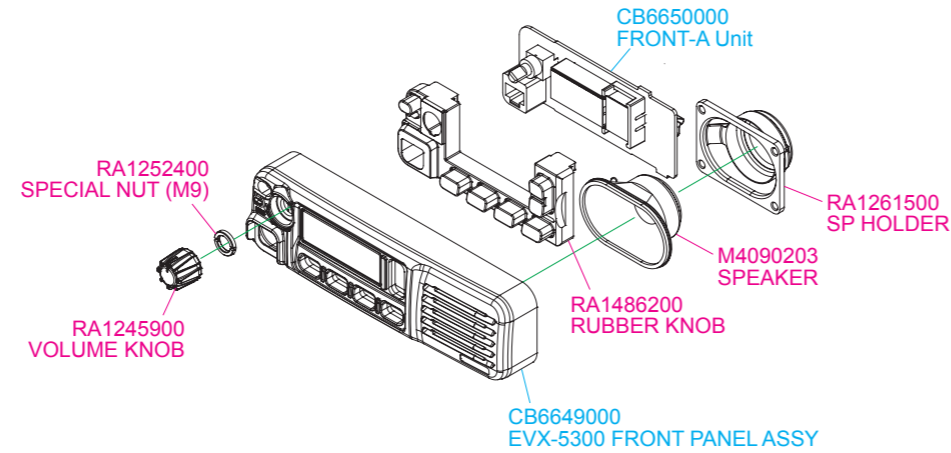## Pin 14: ACC6 (Accessory Port)

The port 6 is available to set only for Input function, and active logic is opposite side against the Port 1 ~ 4.
Max. input 5 V (CMOS input).
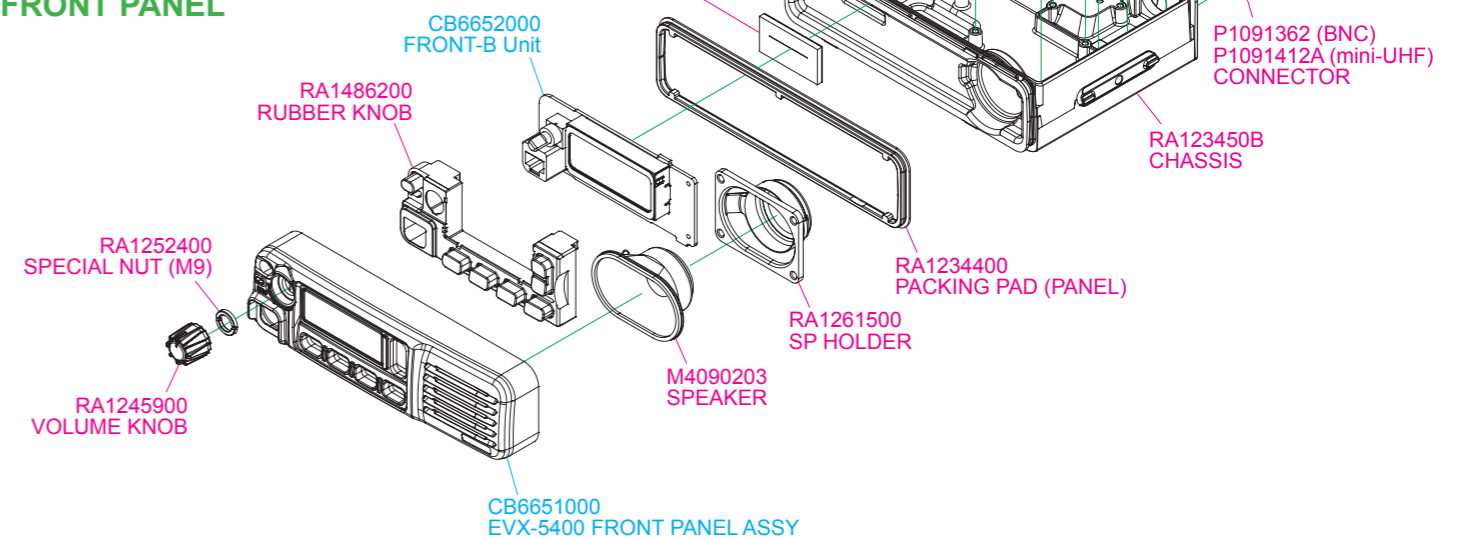
Pin 15: GND

Chassis ground

EVX-5300 FRONT PANEL

CB6650000
FRONT-A Unit

RA1252400
SPECIAL NUT (M9)

RA1261500
SP HOLDER

M4090203
SPEAKER

RA1245900
VOLUME KNOB

RA1486200
RUBBER KNOB

CB6649000
EVX-5300 FRONT PANEL ASSY

EVX-5300 FRONT PANEL ASSY (Component)
FRONT PANEL ASSY (8ch)
NAME PLATE (EVX-5300)

FRONT-A Unit (Component)
Printed Circuit Board with Components
CONNECTOR
LED
HOLDER (LED)
LIGHT GUIDE (LED) (3 pcs)
SHEET (LED)
LED FILTER (8CH)
BLIND SHEET (L10)

RA123420B
TOP COVER

RA1234300
PACKING PAD (COVER)

RA123460A
SHIELD CASE COVER (TOP)

TYPE "G6", 25W: G1095437 (RA30H3847M1A)
TYPE "G7", 25W: G1095438 (RA30H4452M1A)
TYPE "G6", 45W: G1095428 (RA60H3847M1A)
TYPE "G7", 45W: G1095429 (RA60H4452M1A)
IC (Power Module)

RA127870A
SHIELD CASE COVER (JACK)

CB6656000 (EVX-5300, TYPE "G6", 45W)
CB6657000 (EVX-5300, TYPE "G6", 25W)
CB6658000 (EVX-5400, TYPE "G6", 45W)
CB6659000 (EVX-5400, TYPE "G6", 25W)
MAIN Unit (FR026490A w/DC Power Cord)
CB6645000 (EVX-5300, TYPE "G7", 45W)
CB6646000 (EVX-5300, TYPE "G7", 25W)
CB6647000 (EVX-5400, TYPE "G7", 45W)
CB6648000 (EVX-5400, TYPE "G7", 25W)
MAIN Unit (FR024860B w/DC Power Cord)
CB6728000 (EVX-5300, TYPE "G7", 45W)
CB6729000 (EVX-5300, TYPE "G7", 25W)
CB6730000 (EVX-5400, TYPE "G7", 45W)
CB6731000 (EVX-5400, TYPE "G7", 25W)
MAIN Unit (FR026490A w/DC Power Cord)

RA0790300
SHIELD CASE (POWER)

DSUB CONNECTOR
ACCESSORY

Q9000375
SURGE ABSORBER

RA1264700
EXT CAP

RA127990A
INSULATOR (10X5)

T9207533
WIRE ASSY

RA123740A
PAD (20X20X4)

T92075281
WIRE ASSY

RA079080A
PAD (DIODE)

RA125440A
PAD (10X17)

RA129240A
SPONGE RUBBER (FW)

P1091362 (BNC)
P1091412A (mini-UHF)
CONNECTOR

RA123450B
CHASSIS

SUPPLIED ACCESSORIES

DESCRIPTION	VXSTD P/N	QTY.
DC CABLE		
45 W Mode: 02P 15A UL 2.8M	T9026415	1
25 W Mode: 02P 10A UL 2.8M	T9026510	1
BLADE FUSE		
50 W Mode: ATY-N15	Q0000175	1
25 W Mode: ATY-N10	Q0000177	1
BRACKET	RA1234700	1
KNOB SCREW	RA079060A	2
HEX HEAD BOLT (HSM5X12B)	U9900209	2
DOUBLE FACE	R7069960	1
BRACKET MOUNTING SCREWS		
PAN HEAD SCREW (M5X20)	U00520001	4
PAN HEAD TAPPING (5X20 #1)	U40520101	4
HEX NUT (N5)	U60500301	4
SPRING LOCK WASHER (SW5B)	U71005007	2
PLAIN WASHER (FW5)	U70005001	8
TOOTHED LOCK WASHER (OW5)	U72005007	4

No.	VXSTD P/N	DESCRIPTION	QTY.
①	U03308002	SEMS SCREW ASM3X8NI	2
②	Q0000175	BIND HEAD TAPTITE-B M3X8	12
③	U72005007	SPRING LOCK WASHER SW2.6	2

EVX-5400 FRONT PANEL ASSY (Component)
FRONT PANEL ASSY (512ch)
NAME PLATE (EVX-5400)

FRONT-B Unit (Component)
Printed Circuit Board with Components
CONNECTOR
LCD
LIGHT GUIDE (LCD)
LCD HOLDER
INTER CONNECTOR
REFLECTOR SHEET (093)
REFLECTOR SHEET (SUB)
SPONGE RUBBER (LCD)
BLIND SHEET (L10)

MAIN Unit / MAIN-2 Unit (Component)
Printed Circuit Board with Components
WIRE ASSY (DC Power Cord)

CHASSIS ASSY (Component)
CHASSIS
SPONGE RUBBER (FW)
PAD (10X17)
PAD (20X20X4)
PAD (DIODE)

EVX-5400 FRONT PANEL

CB6652000
FRONT-B Unit

RA1486200
RUBBER KNOB

RA1252400
SPECIAL NUT (M9)

RA1234400
PACKING PAD (PANEL)

RA1261500
SP HOLDER

M4090203
SPEAKER

RA1245900
VOLUME KNOB

CB6651000
EVX-5400 FRONT PANEL ASSY

Non-designated parts are available only as parts of a designated assembly.

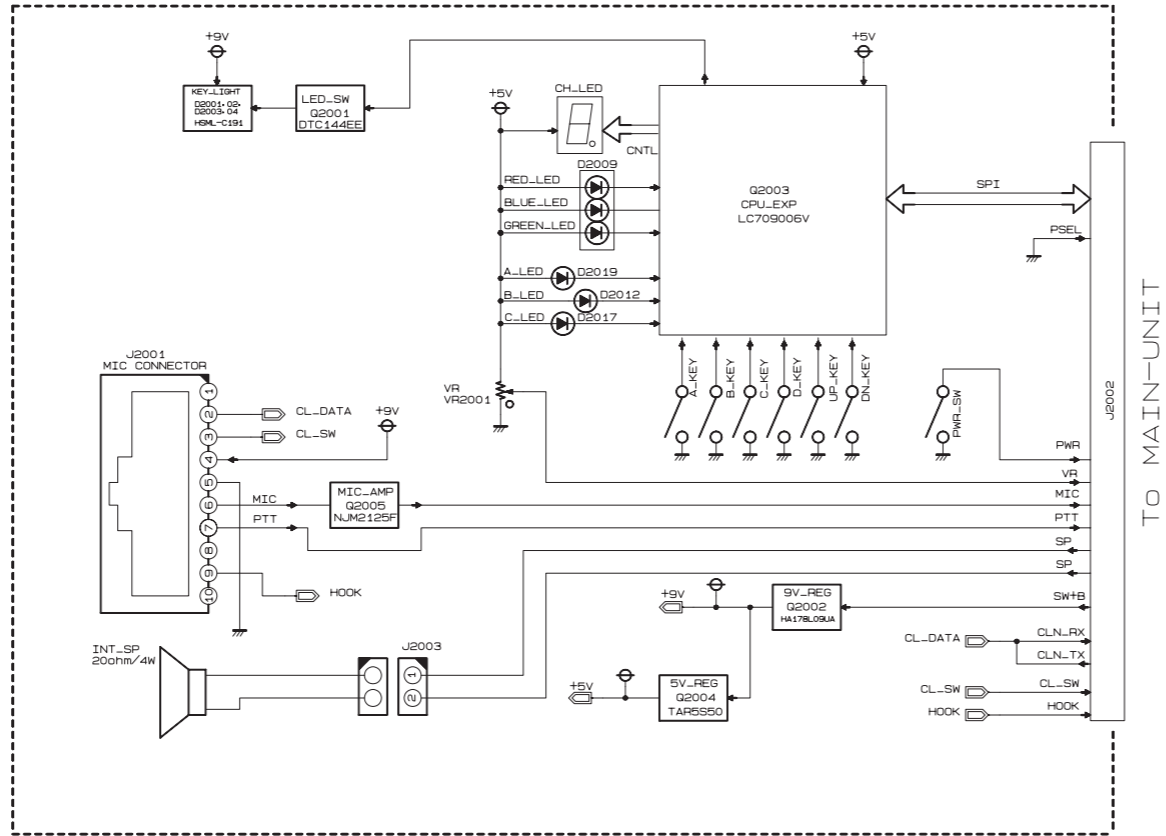| REF.	DESCRIPTION	VALUE	MFR's DESIG	VXSTD P/N
	PCB with Components			
	FRONT-A UNIT (FR024850C: EVX-5300)			CB6650000
	FRONT-B UNIT (FR025010B: EVX-5400)			CB6652000
	MAIN UNIT (FR026490A, w/DC Power Cord, w/o Q1046 PA Module) Please confirm the firmware version when replace the MAIN UNIT			CB6656000: EVX-5300, TYPE "G6", 45W CB6657000: EVX-5300, TYPE "G6", 25W CB6658000: EVX-5400, TYPE "G6", 45W CB6659000: EVX-5400, TYPE "G6", 25W
	MAIN UNIT (FR024860B, w/DC Power Cord, w/o Q1046 PA Module) Please confirm the firmware version when replace the MAIN UNIT			CB6645000: EVX-5300, TYPE "G7", 45W CB6646000: EVX-5300, TYPE "G7", 25W CB6647000: EVX-5400, TYPE "G7", 45W CB6648000: EVX-5400, TYPE "G7", 25W
	MAIN-2 UNIT (FR026490A, w/DC Power Cord, w/o Q1046 PA Module) Please confirm the firmware version when replace the MAIN-2 UNIT			CB6728000: EVX-5300, TYPE "G7", 45W CB6729000: EVX-5300, TYPE "G7", 25W CB6730000: EVX-5400, TYPE "G7", 45W CB6731000: EVX-5400, TYPE "G7", 25W
	EVX-5300 FRONT PANEL ASSY (CB6649000)			
	FRONT PANEL ASSY NAME PLATE		8ch EVX-5300	RA1492800 RA1491400
	EVX-5400 FRONT PANEL ASSY (CB6651000)			
	FRONT PANEL ASSY NAME PLATE		512ch EVX-5400	RA1492900 RA1515800
	Mechanical Parts（Chassis）			
	CHASSIS SPONGE RUBBER PAD PAD PAD		FW 10X17 20X20X4 DIODE	RA123450B RA129240A RA125440A RA123740A RA079080A
	Mechanical Parts (Miscellaneous)			
	TOP CASE PACKING PAD SHIELD CASE COVER SHIELD CASE SHIELD CASE COVER EXT CAP INSULATOR PACKING PAD SP HOLDER RUBBER KNOB VOLUME KNOB SPECIAL NUT (M9) SEMS SCREW BIND HEAD TAPTITE-B SPRING LOCK WASHER	2 pcs 12 pcs 2 pcs	COVER TOP POWER JACK 10X5 PANEL ASM3X8NI M3X8 SW2.6	RA123420B RA1234300 RA123460A RA0790300 RA127870A RA1264700 RA127990A RA1234400 RA1261500 RA1486200 RA1245900 RA1252400 U03308002 Q0000175 U72005007
	Electrical Parts			
	SPEAKER CONNECTOR CONNECTOR SURGE ABSORBER WIRE ASSY WIRE ASSY	20-ohm	5015134H02 ANT (mini-UHF) ANT (BNC) DSP201M-S00B DC Power Cord	M4090203 P1091412A P1091362 Q9000375 T92075281 T9207533

REF.	DESCRIPTION	VALUE	MFR's DESIG	VXSTD P/N
	MAIN UNIT (FR026490A & FR024860B) Electrical Parts			
F 1001	CHIP FUSE ⚠	1.25A, 36V	FCC16 132ABTP	Q0000109
F 1002	CHIP FUSE ⚠	1.25A, 36V	FCC16 132ABTP	Q0000109
F 1003	CHIP FUSE ⚠	1.25A, 36V	FCC16 132ABTP	Q0000109
J 1001	CONNECTOR		52793-2070	P1091408
J 1002	CONNECTOR		AXK6S30547YG	P0091578
J 1003	CONNECTOR		AE0195-00E	P1091177
J 1004	CONNECTOR		HSJ6062-0450	P1091168
Q 1046	IC	"G6", 25W	RA30H3847M1A-122	G1095437
Q 1046	IC	"G6", 45W	RA60H3847M1A-122	G1095428
Q 1046	IC	"G7", 25W	RA60H4452M1A-122	G1095429
Q 1046	IC	"G7", 45W	RA60H4452M1A-122	G1095429
Q 1052	FET		RD01MUST113	G3070321
X 1001	XTAL	32.768kHz	4809995L18 32.768KHZ	H0103407
X 1002	TCXO	19.2MHz	TTS27NSC-A7 19.2MHZ	H9501380
XF1001	XTAL FILTER		DSF753SDF 50.85MHZ	H1102479
	MAIN-2 UNIT (FR026490A) Electrical Parts			
F 4001	CHIP FUSE ⚠	1.25A, 36V	FCC16 132ABTP	Q0000109
F 4002	CHIP FUSE ⚠	1.25A, 36V	FCC16 132ABTP	Q0000109
F 4003	CHIP FUSE ⚠	1.25A, 36V	FCC16 132ABTP	Q0000109
J 4001	CONNECTOR		52793-2070	P1091408
J 4002	CONNECTOR		AXK6S30547YG	P0091578
J 4003	CONNECTOR		AE0195-00E	P1091177
J 4004	CONNECTOR		HSJ6062-0450	P1091168
Q 4046	IC	25W	RA30H4452M1A-122	G1095438
Q 4046	IC	45W	RA60H4452M1A-122	G1095429
Q 4052	FET		RD01MUST113	G3070321
X 4001	XTAL	32.768kHz	4809995L18 32.768KHZ	H0103407
X 4002	TCXO	19.2MHz	TTS27NSC-A7 19.2MHZ	H9501380
XF4001	XTAL FILTER		DSF753SDF 50.85MHZ	H1102479
	FRONT-A UNIT (FR024850C: EVX-5300) Electrical & Mechanical Parts			
DS2001	LED		ELS-512SURWA/S530-A3	G2090796
J 2001	CONNECTOR		43090-1505	P1091319
J 2002	CONNECTOR		52793-2070	P1091408
J 2003	CONNECTOR		53260271	P0091500
J 2004	LEAF SPRING			RA129670C
J 2005	LEAF SPRING			RA129670C
VR2001	POT.		RK09L1140C33 20KB	J60800312
	LIGHT GUIDE		LED	RA1246900
	HOLDER		LED	RA124680A
	SHEET		LED	RA1254600
	BLIND SHEET		L10	RA1301400
	LED FILTER		8CH	RA0997300
	FRONT-B UNIT (FR025010B: EVX-5400) Electrical & Mechanical Parts			
DS3001	LCD		GS-35720-TFZWU	G6090201
J 3001	CONNECTOR		43090-1505	P1091319
J 3002	CONNECTOR		52793-2070	P1091408
J 3003	CONNECTOR		53260271	P0091500
J 3004	LEAF SPRING			RA129670C
J 3005	LEAF SPRING			RA129670C
TH3001	THERMISTOR		ERTJ0EV473J	G9090120
VR3001	POT.		RK09L1140C33 20KB	J60800312
	LCD HOLDER			RA1244600
	LIGHT GUIDE		LCD	RA124470A
	INTER CONNECTOR			RA1244800
	SPONGE RUBBER		LCD	RA0786900
	REFRECTOR SHEET		093	RA1288200
	REFRECTOR SHEET		SUB	RA1292600
	BLIND SHEET		L10	RA1301400

⚠ When replace a chip fuse,
use the part of the same type and value.
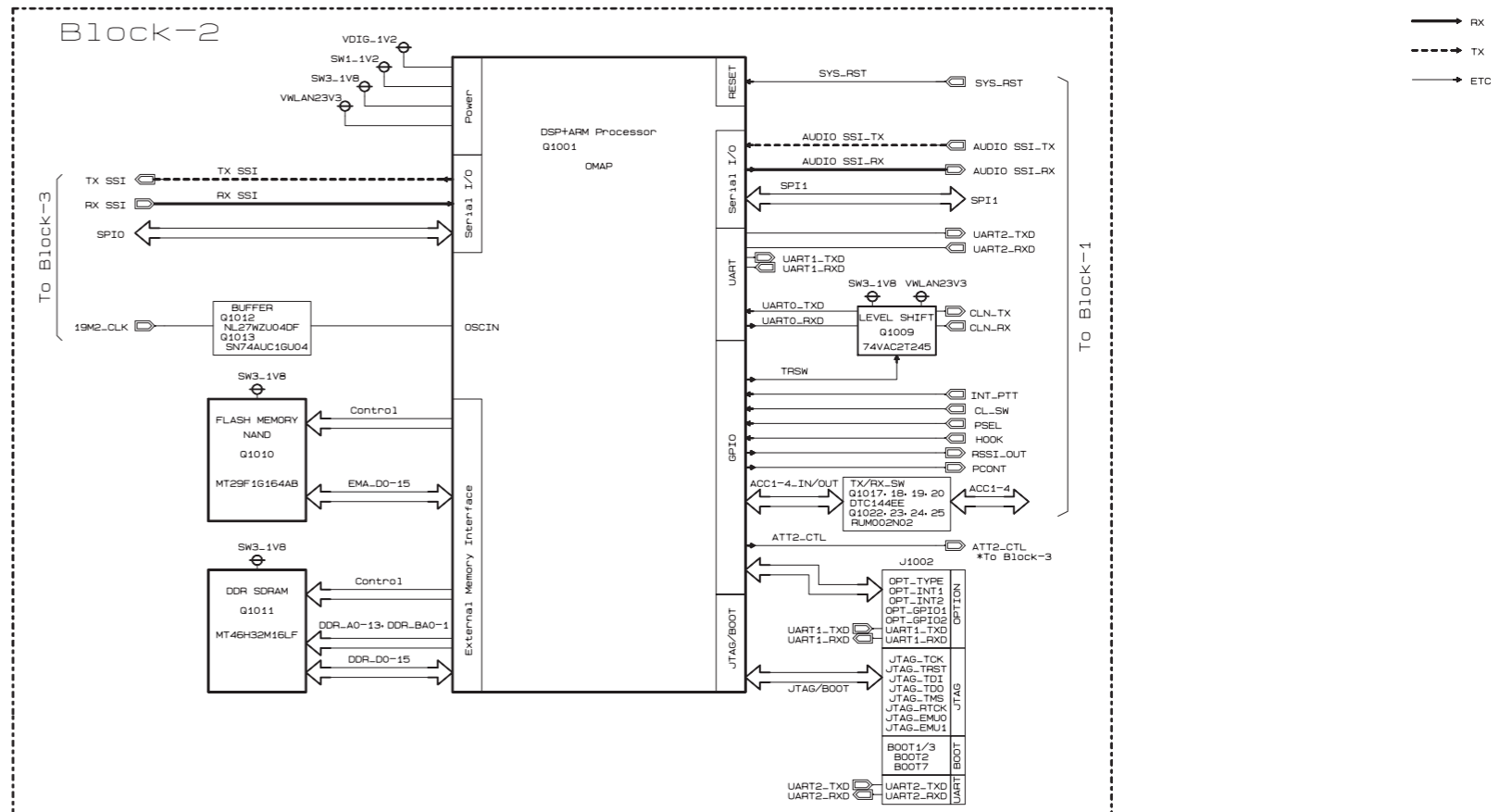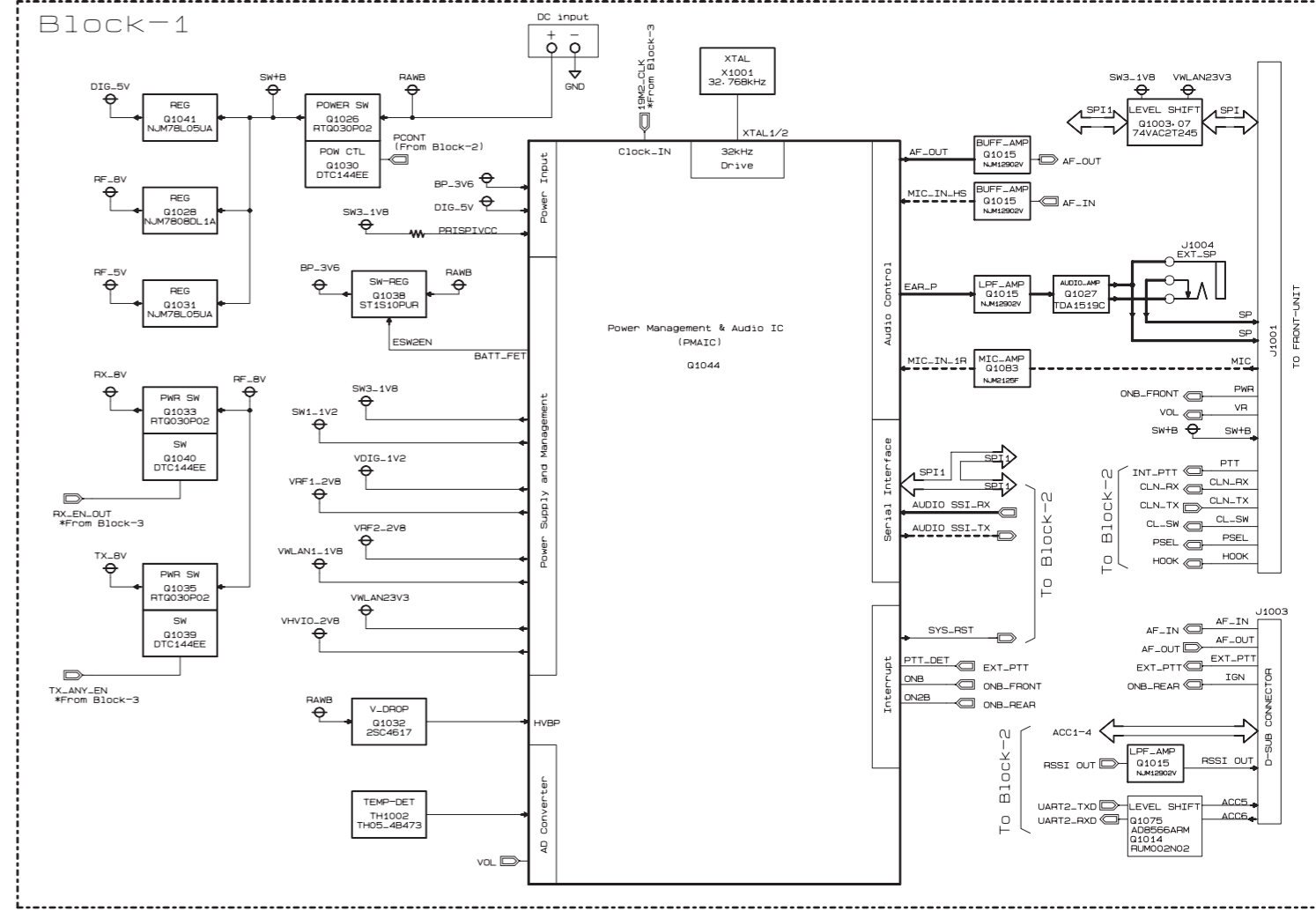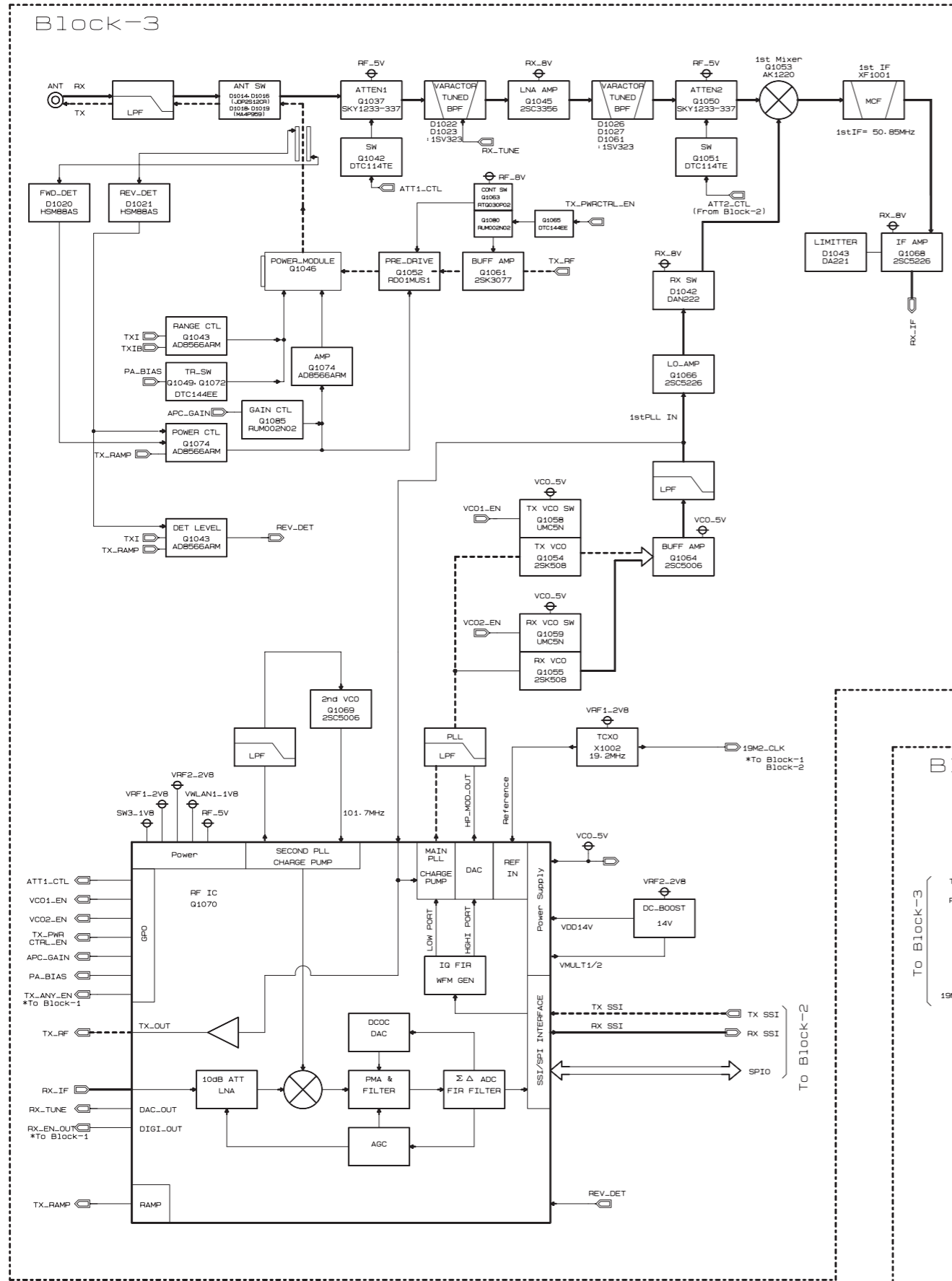
PARTS REFERENCE NUMBER

MAIN-UNIT : 1001 - 1999

MAIN-2-UNIT : 4001 - 4999

Block Diagram

FRONT-A Unit (EVX-5300)

FRONT-B Unit (EVX-5400)

FRONT-A Unit (EVX-5300)

+9V
+5V
KEY_LIGHT
D2001-D2-
D2003-D4
HSML-C191
LED_SW
Q2001
DTC144EE
+5V
CH_LED
CNTL
RED_LED
BLUE_LED
GREEN_LED
D2009
Q2003
CPU_EXP
LC709006V
SPI
PSEL
A_LED D2019
B_LED D2012
C_LED D2017
A_KEY B_KEY C_KEY D_KEY UP_KEY DN_KEY
PWR_SW
J2001
MIC CONNECTOR
CL_DATA
CL_SW
+9V
VR
VR2001
PWR
VR
MIC
MIC_AMP
Q2005
NJM2125F
MIC
PTT
SP
SP
HOOK
SW+B
INT_SP
20ohm/4W
9V_REG
Q2002
HA178L09UA
+9V
CL_DATA CLN_RX
CLN_TX
J2003
5V_REG
Q2004
TAR5S50
+5V
CL_SW CL_SW
HOOK HOOK
J2002
TO MAIN-UNIT

FRONT-B Unit (EVX-5400)

SW+B
+5V
KEY_LCD_LIGHT
D3001-D300B
HSML-C191
LED_SW
Q3001/2
2SB1132/UMH1
DS3001
LCD
COM/SEG CNTL
Q3007
CPU
LC709701F
SPI
SW+B
CONTRAST
Q3005/3006
UMH1/2SA1774
NC PSEL
+5V
RED_LED
BLUE_LED
GREEN_LED
LED_SW
Q3008/9/11
DTC144
D3014
VR
VR3001
A_KEY B_KEY C_KEY D_KEY UP_KEY DN_KEY
PWR_SW
J3001
MIC CONNECTOR
CL_DATA
CL_SW
+9V
PWR
VR
MIC
MIC_AMP
Q3010
NJM2125F
MIC
PTT
SP
SP
HOOK
SW+B
SW+B
INT_SP
20ohm/4W
J3003
+9V
9V_REG
Q3003
HA178L09UA
SW+B
CL_DATA CLN_RX
CLN_TX
+5V
5V_REG
Q3004
TAR5S50
CL_SW CL_SW
HOOK HOOK
J3002
TO MAIN-UNIT

Circuit Description

1. Receiver System

1-1. FRONT-END RF AMPLIFIER

Incoming RF signal from the antenna passes through the Low-pass filter, antenna switching diode D1014, D1016 (both JDP2S12CR), and the 1st RF attenuator Q1037 (SKY12338), and then removed undesired frequencies by the varactor tuned band-pass filter D1022 and D1023 (both 1SV323).

The filtered RF signal is amplified by Q1045 (2SC3356) and then passes through the varactor tuned band-pass filter D1026, D1027, D1061 (all 1SV323) and the 2nd RF attenuator Q1050 (SKY12338), and then applied to the 1st mixer Q1053 (AK1220).

1-2. FIRST MIXER

The RF signal is mixed with the 1st local signal between 352.15 and 419.15 MHz (Type "G6") or 399.15 and 469.15 MHz (Type "G7") in the 1st mixer Q1053 (AK1220), to produce 50.85 MHz 1st IF signal.

The 1st local signal is generated by the VCO, which consists of Q1055 (2SK508), varactor diodes D1029 (1SV279), D1032 (Type "G6": 1SV279, Type "G7": 1SV280), D1036 (1SV279), and D1037 (Type "G6": 1SV279, Type "G7": 1SV280). The 1st local signal is supplied to the 1st mixer Q1053 (AK1220) through the buffer amplifier Q1064 (2SC5006) and Q1066 (2SC5226).

1-3. IF AMPLIFIER & DEMODULATOR

The 1st IF signal is applied to the monolithic crystal filter XF1001 to strip away all but the desired signal, and then supplied to the custom IC Q1070 (RFIC) through the IF amplifier Q1068 (2SC5226). The custom IC Q1070 (RFIC) converts the 1st IF signal into the Base Band signal.

The Base Band signal from the custom IC Q1070 (RFIC) is applied to another custom IC Q1001 (OMAP), which is demodulated by the Digital Signal Processor.

1-4. AUDIO AMPLIFIER

The demodulated signal from the custom IC Q1001 (OMAP) is applied to another custom IC Q1044 (PMAIC), which convert to analog signal. The output signal from the custom IC Q1044 (PMAIC) is applied to the AF amplifier Q1015 (NJM12902) and Q1027 (TDA1519CTH). The output signal from Q1027 (TDA1519CTH) is applied to the front panel audio speaker or external speaker which is connected to the EXT SP jack (J1004).

2. Transmitter System

2-1. MIC AMPLIFIER & MODULATOR

The speech signal from the external microphone which connected to the J2001 (EVX-5300) or J3001 (EVX-5400) is supplied to the AF amplifier Q2005 (NJM2125: EVX-5300) or Q3010 (NJM2125: EVX-5400), and then applied to the custom IC Q1044 (PMAIC), which is amplified the speech signal.

The amplified speech signal from the custom IC Q1044 (PMAIC) is supplied to another custom IC Q1001 (OMAP), which process the speech signal by the Digital Signal Processor.

The processed speech signal from the custom IC Q1001 (OMAP) is supplied to the modulator section of the custom IC Q1070 (RFIC), which modulates the speech signal into the FM or digital signal.

2-2. DRIVE & FINAL AMPLIFIER STAGES

The modulated signal from the custom IC Q1070 (RFIC) is buffered by Q1061 (2SK3077) and amplified by Q1052 (RD01MUS1), and then is applied to the Power Module Q1046 (RA60H3847M1A: Type "G6", RA60H4452M1A: Type "G7"), which is amplified up to 45 watts output power.

The transmit signal then passes through the antenna switch D1018 and D1019 (both MA4P959) and is low pass filtered to suppress away harmonic spurious radiation before delivery to the antenna.

2-3. AUTOMATIC TRANSMIT POWER CONTROL

The forward power of the Power Module Q1046 (RA60H3847M1A: Type "G6", RA60H4452M1A: Type "G7") is detected by D1020 (HSM88AS), and then applied to the comparator Q1074 (ADM8566ARM).

The comparator Q1074 (ADM8566ARM) compares detected voltage of forward power and power control voltage from custom IC Q1070 (RFIC), makes output power stable by controlling the bias voltage RF amplifier Q1052 (RD01MUS1).

Additionally, output voltage of operational amp Q1043 (ADM8566ARM) is supplied to Power Module. The output level is controlled by Q1070 (RFIC) to three level (45 watt model) or two level (25 watt model).

The Reflection power from the antenna is detected by D1021 (HSM88AS), Automatic transmission power control circuit protect equipment. For example, when the antenna is not connected.

3. PLL Frequency Synthesizer

The frequency synthesizer consists of VCO, TCXO (X1002), and the custom IC Q1070 (RFIC).

The output frequency from TCXO is 19.2 MHz and the tolerance is ±1.5 ppm in the temperature range –22 °F to +140 °F (–30 °C to +60 °C).

3-1. VCO (Voltage Controlled Oscillator)

While the radio is receiving, the RX oscillator Q1055 (2SK508) generates a programmed frequency between 352.15 and 419.15 MHz (Type "G6") or 399.15 and 469.15 MHz (Type "G7") as 1st local signal.

While the radio is transmitting, the TX oscillator Q1054 (2SK508) generates a frequency between 403-470 MHz (Type "G6") or 450-520 MHz (Type "G7").

The output from oscillator is amplified by buffer amplifier Q1064 (2SC5006) and then is divided, one is fed back to the PLL Circuit in the custom IC Q1070 (RFIC). The other one is supplied to the 1st mixer Q1053 (AK1220) in case of the reception. In the transmission, the output is modulated to the FM (or digital) in the custom IC Q1070 (RFIC), and then supplied to the transmitter section described previously.

3-2. VCV (Varactor Control Voltage) Control

The tuning voltage (VCV) of the VCO establishes the lock range of VCO by controlling the cathode of varactor diode (D1029 (1SV279), D1032 (Type "G6": 1SV279, Type "G7": 1SV280), D1036 (1SV279), and D1037 (Type "G6": 1SV279, Type "G7": 1SV280) for receiving, and D1028 (1SV279), D1031 (Type "G6": 1SV279, Type "G7": 1SV280), D1034 (1SV279), & D1035 (Type "G6": 1SV279, Type "G7": 1SV280) for transmitting) from the custom IC Q1070 (RFIC).

3-3. PLL

The main constitution product of the PLL is equipped all with in the custom IC Q1070 (RFIC), so that all processing regarding the frequency control is performed in the custom IC Q1070 (RFIC).

Introduction

The **EVX-5300/-5400** has been aligned at the factory for the specified performance across the entire frequency range specified. Realignment should therefore not be necessary except in the event of a component failure. All component replacement and service should be performed only by an authorized Vertex Standard representative, or the warranty policy may be voided.

The following procedures cover the sometimes critical and tedious adjustments that are not normally required once the transceiver has left the factory. However, if damage occurs and some parts are replaced, realignment may be required. If a sudden problem occurs during normal operation, it is likely due to component failure; realignment should not be done until after the faulty component has been replaced.

We recommend that servicing be performed only by authorized Vertex Standard service technicians who are experienced with the circuitry and fully equipped for repair and alignment. Therefore, if a fault is suspected, contact the dealer from whom the transceiver was purchased for instructions regarding repair. Authorized Vertex Standard service technicians realign all circuits and make complete performance checks to ensure compliance with factory specifications after replacing any faulty components. Those who do undertake any of the following alignments are cautioned to proceed at their own risk. Problems caused by unauthorized attempts at realignment are not covered by the warranty policy. Also, Vertex Standard must reserve the right to change circuits and alignment procedures in the interest of improved performance, without notifying owners. Under no circumstances should any alignment be attempted unless the normal function and operation of the transceiver are clearly understood, the cause of the malfunction has been clearly pinpointed and any faulty components replaced, and the need for realignment determined to be absolutely necessary. The following test equipment (and thorough familiarity with its correct use) is necessary for complete realignment. Correction of problems caused by misalignment resulting from use of improper test equipment is not covered under the warranty policy. While most steps do not require all of the equipment listed, the interactions of some adjustments may require that more complex adjustments be performed afterwards. Do not attempt to perform only a single step unless it is clearly isolated electrically from all other steps. Have all test equipment ready before beginning, and follow all of the steps in a section in the order presented.

Required Test Equipment

- ☐ Radio Tester with calibrated output level at 600 MHz
- ☐ In-line Wattmeter with 5% accuracy at 600 MHz
- ☐ 50-ohm, 100 W RF Dummy Load
- ☐ Regulated DC Power Supply (standard 13.6 VDC, 15 A)
- ☐ Frequency Counter: ±0.2 ppm accuracy at 600 MHz
- ☐ AF Signal Generator
- ☐ AC Voltmeter
- ☐ DC Voltmeter
- ☐ UHF Sampling Coupler
- ☐ IBM PC/Compatible Computer with Microsoft® Windows® 2000, XP, Vista, or 7
- ☐ Vertex Standard CE142 PC Programming Software
- ☐ Vertex Standard FIF-12 USB Programming Interface and CT-104A or CT-171 PC Programming Cable
- ☐ Vertex Standard FRB-6 Tuning Interface Box and CT-159 Connection Cable

Alignment Preparation & Precautions

A 50- RF Dummy Load and in-line wattmeter must be connected to the main antenna jack in all procedures that call for transmission, except where specified otherwise. Correct alignment is not possible with an antenna.

After completing one step, read the following step to determine whether the same test equipment will be required. If not, remove the test equipment (except dummy load and wattmeter, if connected) before proceeding.

Correct alignment requires that the ambient temperature be the same as that of the transceiver and test equipment, and that this temperature be held constant between 20 °C and 30 °C. When the transceiver is brought into the shop from hot or cold air, it should be allowed time to come to room temperature before alignment.

Whenever possible, alignments should be made with oscillator shields and circuit boards firmly affixed in place. Also, the test equipment must be thoroughly warmed up before beginning.

Note: Signal levels in dB referred to in this procedure are based on 0 dBµ EMF = 1.0 µV.
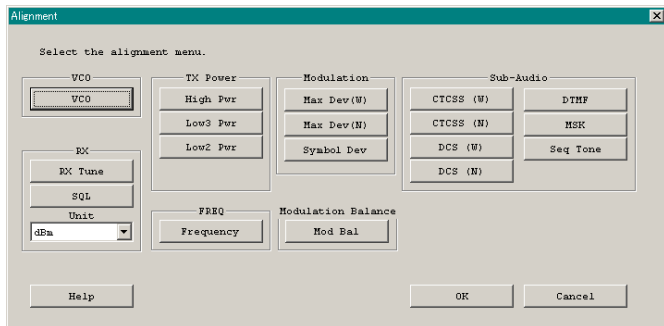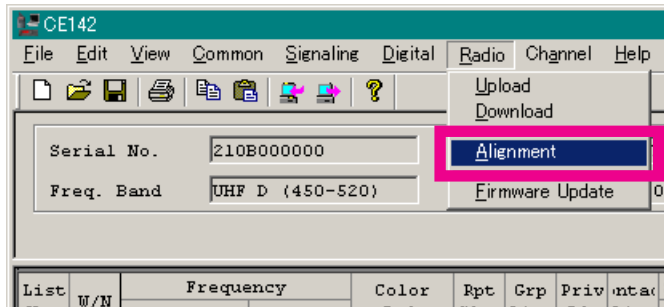
Test Setup

Setup the test equipment as shown below for transceiver alignment, then apply 13.6 V DC power to the transceiver.
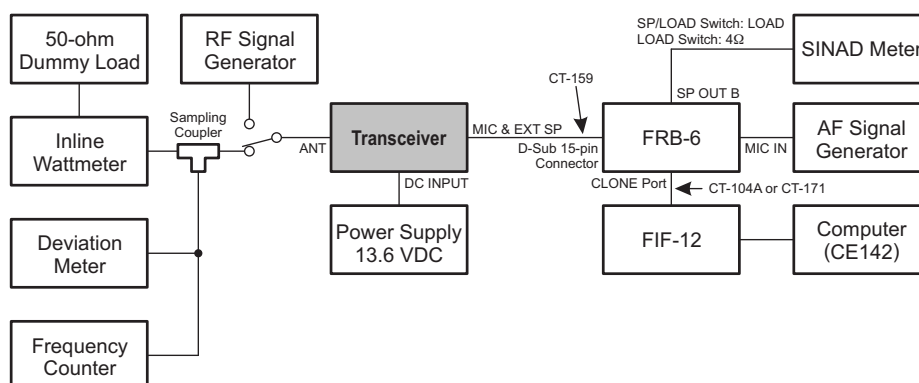
The Alignment Tool Outline

Installation the tool

❏ Install the CE142 PC Programming Software to your PC.

❏ Execute the "Alignment" function in the "Radio" menu of CE142.

Action of the switches

When the transceiver is in "Alignment Mode", the action of PTT and KEY is ignored. All of the action is remote controlled by Computer.

Alignment Mode

In the "Alignment Mode", the aligned data written in the radio will be able to re-align its alignment data. The value of each parameter can be changed to desired position by "←"/"→" arrow key for data up/down, "↑"/"↓" arrow key for channel up/down, direct number input, and drag the mouse.

Note: when all items are aligned, it is strongly recommended to align according to following order. The detail information is written in the help document of CE142 PC Programming Software.

1. VCO (confirmation only)
2. PLL Reference Frequency (Frequency)
3. RX Sensitivity (RX Tune)
4. Squelch (SQL/RSSI)
5. TX Power <High/Low3/Low2>
6. Maximum Deviation <Wide/Narrow>

Adjust the following items when needed.

❍ Symbol Deviation
❍ Modulation Balance
❍ CTCSS Deviation <Wide/Narrow>
❍ DCS Deviation <Wide/Narrow>
❍ DTMF Deviation
❍ MSK Deviation
❍ Sequential Tone Deviation

Unit

During alignment, you may select the value among dBµV, µV (EMF or PD), or dBm by the "UNIT" box.
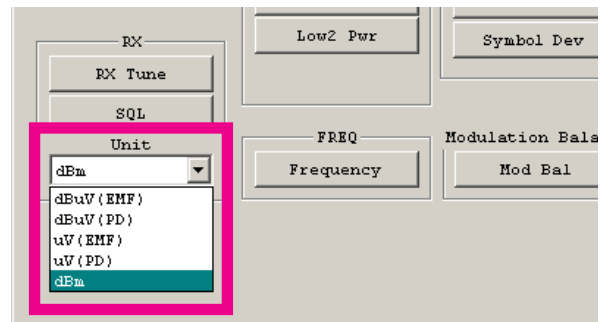
When perform the RX Tune and SQL alignment, the RF level shows this unit according to this setting.

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1. VCO (RX VCO/TX VCO) *- This parameter is for confirmation only and cannot align -*

This parameter is to confirm whether the VCO status shall be "Lock" or "Unlock".

1. Click the "VCO" button to open the "VCO" window.
2. Click the "CH" button on the desired channel. The RX VCO status ("Lock" or "Unlock") will appear in the "RX" box.
3. Click the "PTT" button. The radio starts to transmit on the selected channel, and the TX VCO status ("Lock" or "Unlock") will appear in the "TX" box.
4. Click the "PTT" button again to stop transmitting.
5. Click the "OK" button to finish the confirmation of the VCO status.
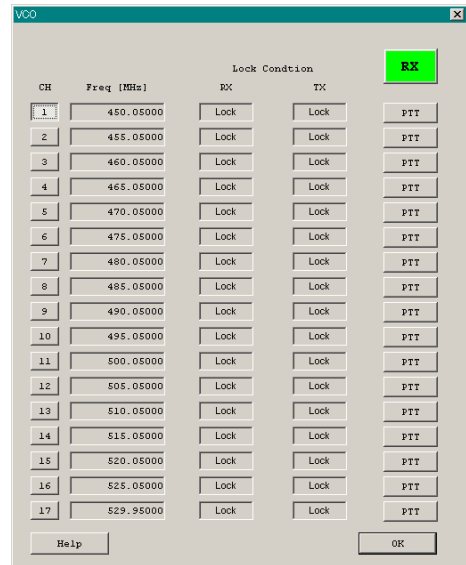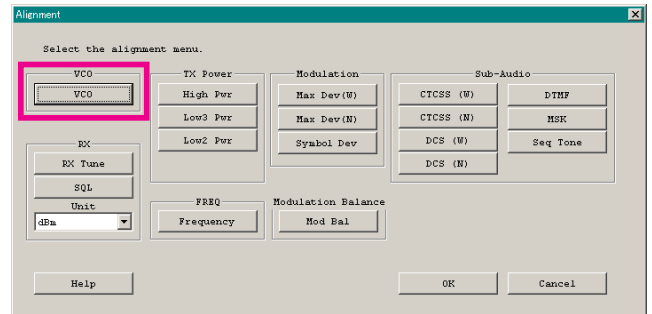
2. PLL REFERENCE FREQUENCY (FREQUENCY)

This parameter is to align the reference frequency for PLL.

1. Click the "Frequency" button to open the "Frequency Alignment" window.
2. Click the "PTT" button or press the "SPACE" bar of the computer's keyboard, the radio will start to transmit on the center frequency channel.
3. Set the value to get the desired frequency according to the following ways:
   ● Dragging the slide bar
   ● Clicking the arrow buttons
   ● Pressing the left/right arrow key of the computer's keyboard
   ● Entering the value ("0000" - "FFFF") in the "Current Data" box from the computer's keyboard
4. After getting the desired frequency, click the "PTT" button or press the "SPACE" bar to stop transmitting.
5. Click the "OK" button to finish the frequency alignment and save the data.
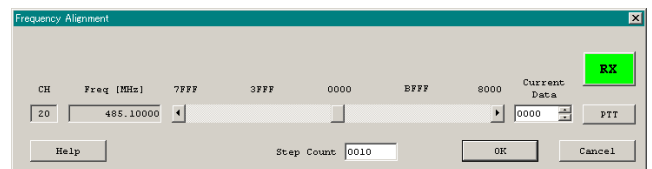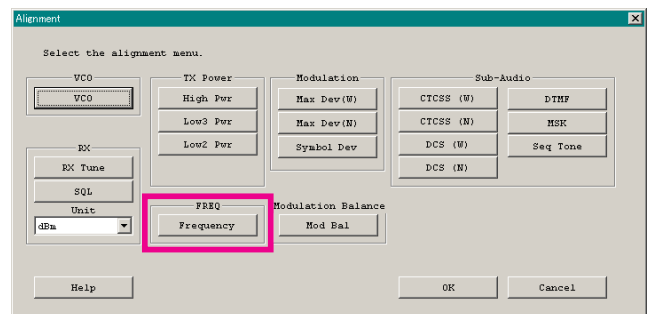
3. RX Sensitivity (RX Tune)

This parameter is to align the RX BPF (Band Pass Filter) for Receive (RX) sensitivity. The PLL Reference Frequency (Frequency) alignment must be done before this alignment is performed.

1. Click the "RX Tune" button to open the "RX Sensitivity Alignment" window.
2. Click the "Auto" button on the desired channel. The "Auto Tuning" window will appear.
3. Set the RF Signal Generator output according to the indication of the screen.
4. Click the "Start" button to start the automatic alignment to get the best RX sensitivity (Highest RSSI value).
5. Click the "OK" button to finish the RX Sensitivity alignment and save the data.

1) You may adjust the RX sensitivity manually by the following method:
   ● Dragging the slide bar
   ● Clicking the arrow buttons
   ● Pressing the left/right arrow key of the computer's keyboard
   ● Entering the value ("800"- "FFF") in the "Current Data" box from the computer's keyboard

2) You may select the alignment type from the "Radio" button (**ADJ Type**) located at the bottom of the screen, as needed.

   Basic: "Low-edge / band center / high-edge" and select the channel for alignment (Default).

   Single: Alignment value changes only on the selected channel.

   All Freq: Alignment value changes on all channels.
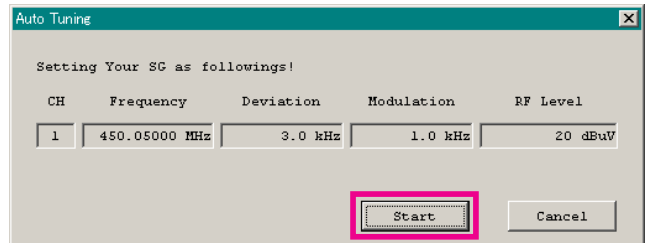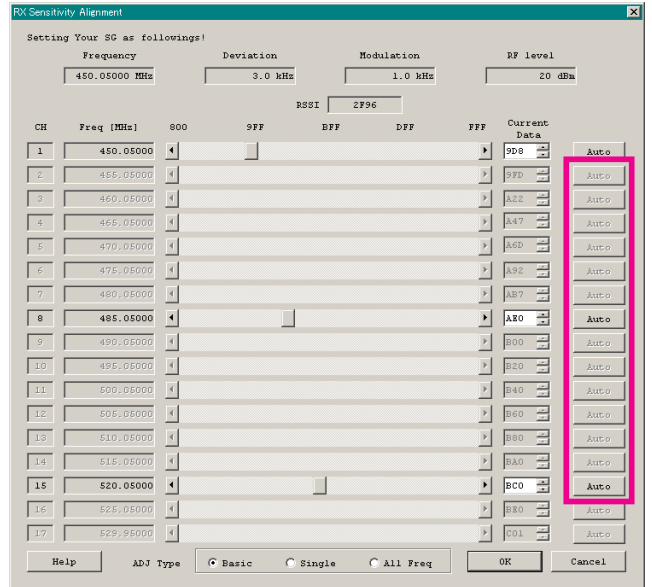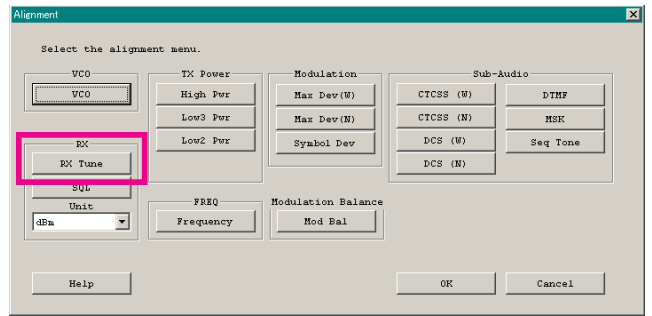
4. SQUELCH (SQL)

This parameter is to align the SQL (Squelch) Sensitivity. There are several alignment items as follows in the Squelch Sensitivity.

Threshold SQL Level (Wide/Narrow)

The alignment for the Noise SQL Threshold level at Wide (5k/4k) or Narrow (2.5k).

Normal RSSI Level (Wide/Narrow)

The alignment for the RSSI Normal level at Wide (5k/4k) or Narrow (2.5k).

Tight RSSI Level (Wide/Narrow)

The alignment for the RSSI Tight level at Wide (5k/4k) or Narrow (2.5k).

SQL Close Level (Wide/Narrow)

The alignment for the Noise SQL Close level at Wide (5k/4k) or Narrow (2.5k).

RSSI Close Level (Wide/Narrow)

The alignment for the RSSI Close level at Wide (5k/4k) or Narrow (2.5k).

The procedure for all the alignments is as follows.

1. Click the "Start" button you wish to align to open the "SQL/RSSI Alignment" window.
2. Click the "Start" button on the desired alignment item to open other window.
3. Set the RF Signal Generator according to the indication of the window, then click the "Start" button.
4. The automatic alignment will start to get the optimum level.
5. The alignment result will appear in the "New" box.
   On the following alignment items, click the "Next" button and then repeat step 2-5 several times according to the indication of the window.

   Threshold SQL Level (Wide/Narrow)
   Normal RSSI Level (Wide/Narrow)
   Tight RSSI Level (Wide/Narrow)

   Other alignment items has not extra step; only one step procedure.
6. Click the "OK" button, then the data will be saved and the alignment is finished.
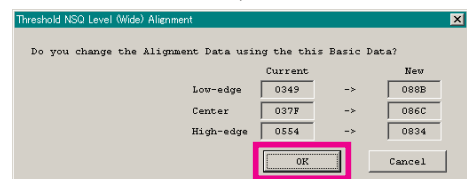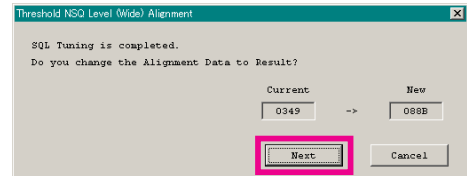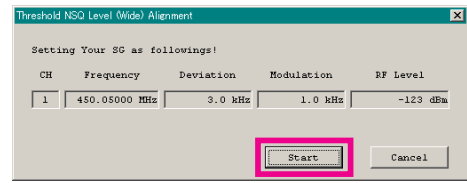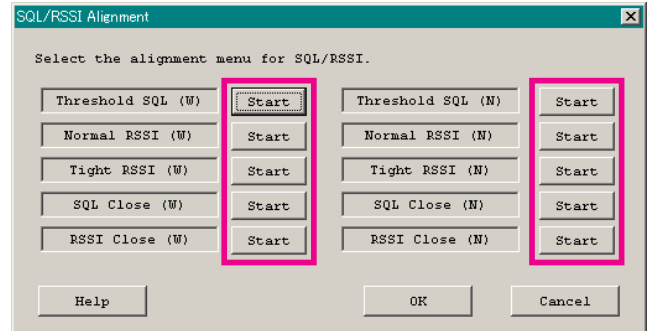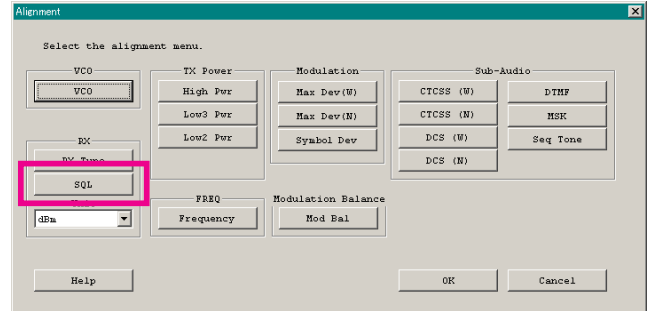
5. TX POWER

This parameter is to align the "High Power", "Low3 Power", and "Low2 Power" for the selected channel.

1. Click the "TX Power (High Pwr / Low3 Pwr / Low2 Pwr)" button to open the "TX Power Alignment" window.
2. Click the "PTT" button on the desired channel. The radio starts to transmit on the selected channel.
3. Set the value to get desired output power on the Power Meter according to the following ways:
   ● Dragging the slide bar
   ● Clicking the arrow buttons
   ● Pressing the left/right arrow key of the computer's keyboard
   ● Entering the value in the entry box from the computer's keyboard

Model	45 W	25 W
High	45 W	25 W
Low 3	25 W	10 W
Low 2	5 W	10 W

4. After getting the desired output power, click the "PTT" button or press the "SPACE" bar to stop transmitting.
5. Click the "OK" button to finish the TX Power alignment and save the data.

You may select the adjusting type from the "Radio" button (**ADJ Type**) located at the bottom of the screen, as needed.

Basic: "Low-edge / band center / high-edge" and select the channel for alignment (Default).

Single: Alignment value changes only on the selected channel.

All Freq: Alignment value changes on all channels.
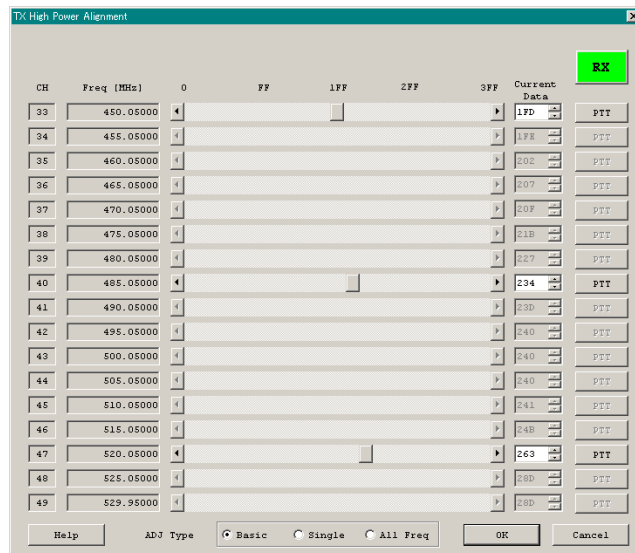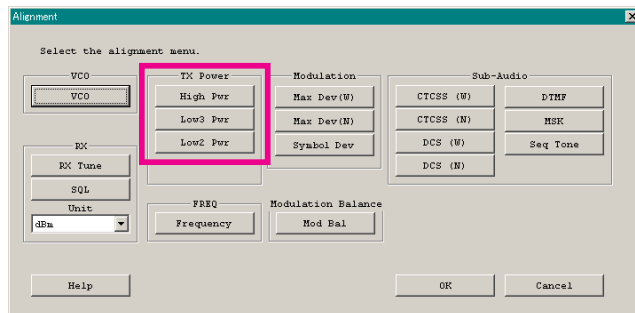
6. MAXIMUM DEVIATION <WIDE> / <NARROW>

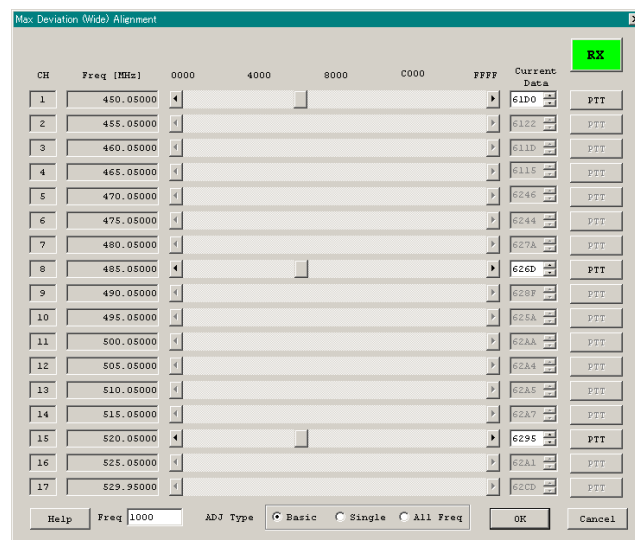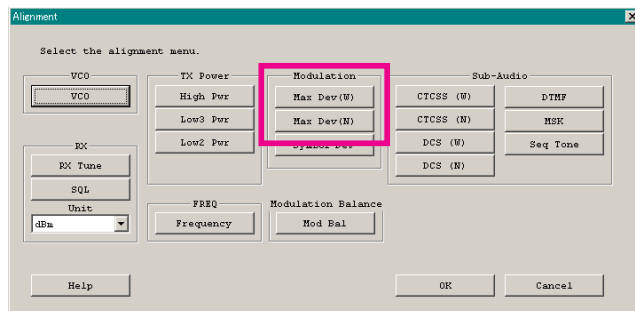This parameter is to align the "Maximum Deviation" (Wide/Narrow).

1. Press the "Max Dev (W/N)" button to open the "Max Deviation Alignment" window.
2. Click the "PTT" button on the desired channel. The radio starts to transmit on the selected channel.
3. Set the value to get desired deviation (Wide: 4.2 kHz, Narrow: 2.1 kHz) on the deviation meter according to the following ways:
   ● Dragging the slide bar
   ● Clicking the arrow buttons
   ● Pressing the up-down key of the computer's keyboard
   ● Entering the value in the entry box from the computer's keyboard
4. After getting the desired deviation, click the "PTT" button or press the "SPACE" bar to stop transmitting.
5. Click the "OK" button to finish the Max Deviation alignment and save the data.

1) You may align the deviation level by any modulation frequency by changing the value of the "Freq" box located at the bottom left of the screen, if needed.
2) You may select the alignment type from the "Radio" button (**ADJ Type**) located at the bottom of the screen, as needed.

Basic: "Low-edge / band center / high-edge" and select the channel for alignment (Default).

Single: Alignment value changes only on the selected channel.

All Freq: Alignment value changes on all channels.

Perform the following alignments as needed.

SYMBOL DEVIATION

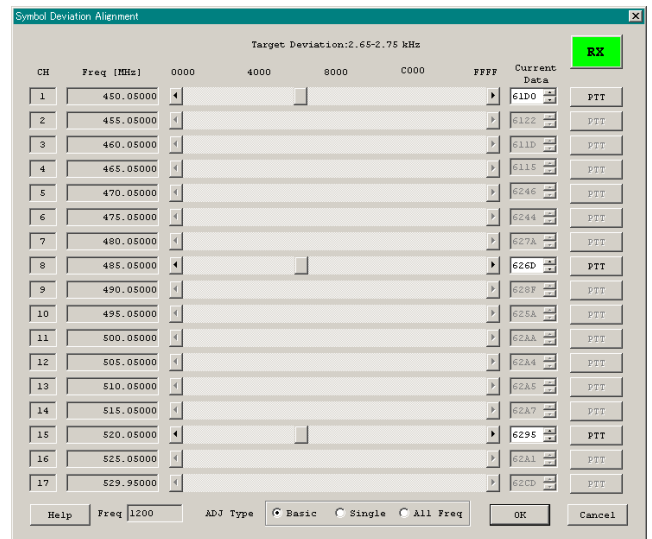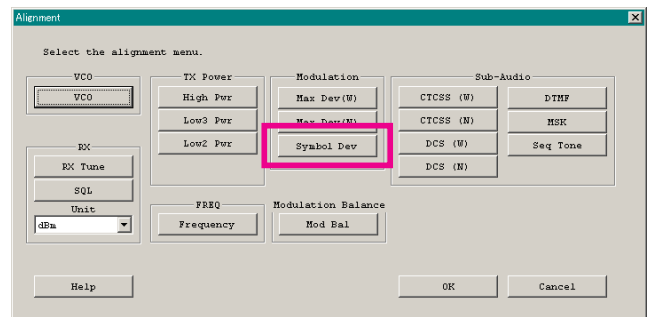This parameter is to align the deviation of the digital mode artificially.

1. Press the "Symbol Dev" button to open the "Symbol Deviation Alignment" window.
2. Click the "PTT" button on the desired channel. The radio starts to transmit on the selected channel.
3. Set the value to get Target Deviation (which is indicated on the screen) on the deviation meter according to the following ways:
   ● Dragging the slide bar
   ● Clicking the arrow buttons
   ● Pressing the up-down key of the computer's keyboard
   ● Entering the value in the entry box from the computer's keyboard
4. After getting the desired deviation, click the "PTT" button or press the "SPACE" bar to stop transmitting.
5. Click the "OK" button to finish the Symbol Deviation alignment and save the data.

You may select the alignment type from the "Radio" button (**ADJ Type**) located at the bottom of the screen, as needed.

Basic: "Low-edge / band center / high-edge" and select the channel for alignment (Default).

Single: Alignment value changes only on the selected channel.

All Freq: Alignment value changes on all channels.

MODULATION BALANCE <WIDE> / <NARROW> (THIS ALIGNMENT IS DIFFICULT.)

This parameter is to align the "Modulation Balance" (Wide/Narrow).

1. Press the "Mod Bal" button to open the "Modulation Balance Alignment" window.
2. Confirm the modulation frequency which is indicated in the "Freq" box located at the bottom left of the screen is "50 (Hz)". If not, enter the value (50) in the "Freq" box from the computer's keyboard.
3. Click the "PTT" button on the desired channel. The radio starts to transmit on the selected channel.
4. Write down a deviation level, then enter the "4000 (Hz)" of the modulation frequency to the "Freq" box.
5. Set the value to get the same deviation level that wrote down according to the following ways:
   ● Dragging the slide bar
   ● Clicking the arrow buttons
   ● Pressing the left/right arrow key of the computer's keyboard
   ● Entering the value ("0" - "3FF") in the "Current Data" box from the computer's keyboard
6. Click the "PTT" button or press the "SPACE" bar to stop transmitting.
7. Click the "OK" button to finish the Modulation Balance alignment and save the data.

1) You may align the modulation balance by any frequency pair by changing the value of the "Freq" box located at the bottom left of the screen, if needed.
2) You may select the alignment type from the "Radio" button (**ADJ Type**) located at the bottom of the screen, as needed.
   Basic: "Low-edge / band center / high-edge" and select the channel for alignment (Default).
   Single: Alignment value changes only on the selected channel.
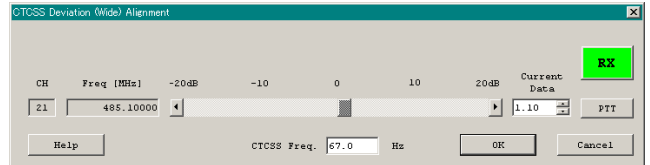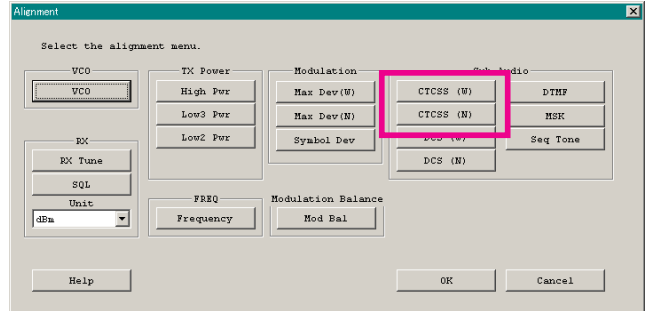   **All Freq**: Alignment value changes on all channels.
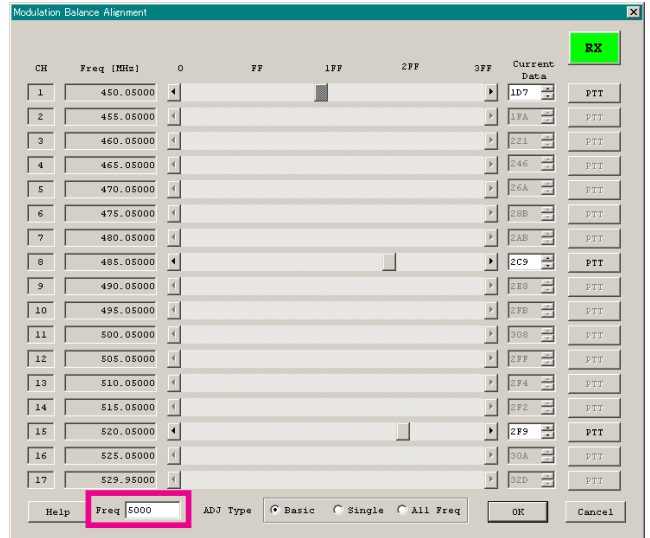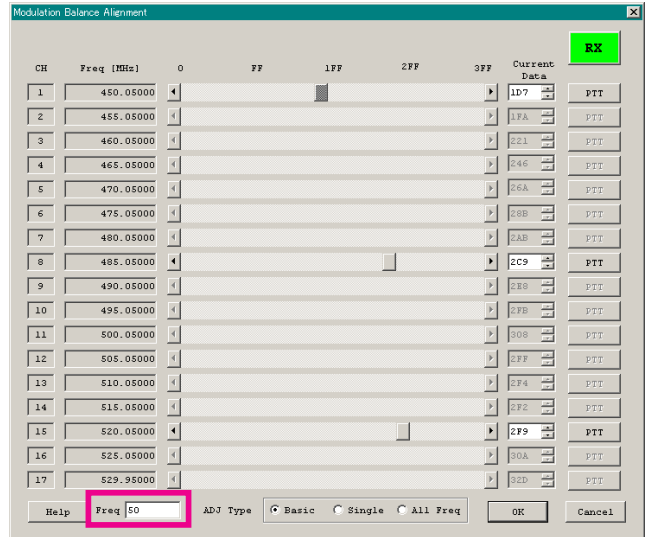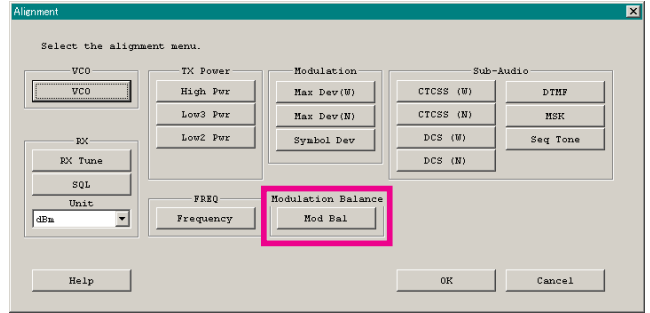
CTCSS Deviation <Wide> / <Narrow>

This parameter is to align CTCSS Deviation of the selected channel.

1. Press the "CTCSS (W/N)" button to open the "CTCSS Deviation Alignment" window.
2. Click the "PTT" button or press the "SPACE" bar of the computer's keyboard to transmit the radio.
3. Set the value to get desired deviation (Nominal: Wide: 0.6 kHz, Narrow: 0.35 kHz) on the deviation meter according to the following ways:
   - Dragging the slide bar
   - Clicking the arrow buttons
   - Pressing the left/right arrow key of the computer's keyboard
   - Entering the value ("−20.00" - "20.00") in the "Currend Data" box from the computer's keyboard
4. After getting the desired deviation, click the "PTT" button or press the "SPACE" bar to stop transmitting.
5. Click the "OK" button to finish the CTCSS Deviation alignment and save the data.

You may align the deviation level by any CTCSS tone frequency (default: 67.0 Hz) by changing the value of the "CTCSS Freq" box located at the bottom of the screen, if needed.

DCS Deviation <Wide> / <Narrow>

This parameter is to align "DCS Deviation" of the selected channel.

1. Press the "DCS (W/N)" button to open the "DCS Deviation Alignment" window.
2. Click the "PTT" button or press the "SPACE" bar of the computer's keyboard to transmit the radio.
3. Set the value to get desired deviation (Nominal: Wide: 0.65 kHz, Narrow: 0.4 kHz) on the deviation meter according to the following ways:
   - Dragging the slide bar
   - Clicking the arrow buttons
   - Pressing the left/right arrow key of the computer's keyboard
   - Entering the value ("−20.00" - "20.00") in the "Currend Data" box from the computer's keyboard
4. After getting the desired deviation, click the "PTT" button or press the "SPACE" bar to stop transmitting.
5. Click the "OK" button to finish the DCS Deviation alignment and save the data.
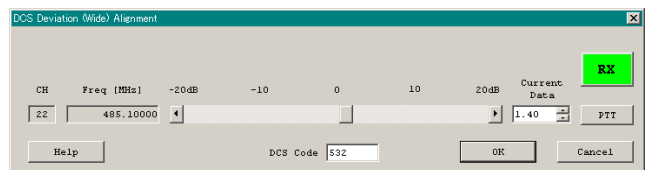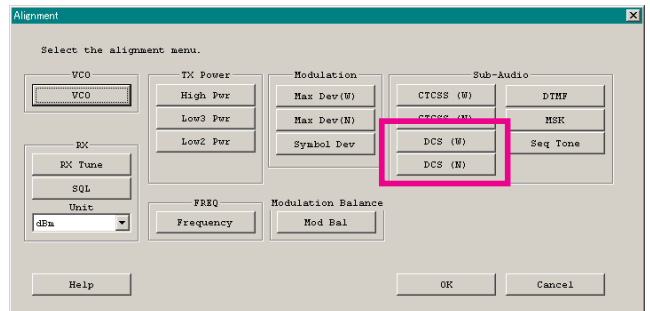
You may align the deviation level by any DCS code (default: 532) by changing the value of the "DCS Code" box located at the bottom of the screen, if needed.

DTMF DEVIATION

This parameter is to align "DTMF Deviation".

1. Press the "DTMF" button to open the "DTMF Deviation Alignment" window.
2. Click the "PTT" button or press the "SPACE" bar of the computer's keyboard to transmit the radio.
3. Set the value to get desired deviation (Nominal: 3.0 kHz) on the deviation meter according to the following ways:
   ● Dragging the slide bar
   ● Clicking the arrow buttons
   ● Pressing the left/right arrow key of the computer's keyboard
   ● Entering the value ("−20.00" - "20.00") in the "Currend Data" box from the computer's keyboard
4. After getting the desired deviation, click the "PTT" button or press the "SPACE" bar to stop transmitting.
5. Click the "OK" button to finish the DTMF Deviation alignment and save the data.

You may align the deviation level by any DTMF tone (default: "A", available selection: "0" - "9", "A" - "D", "E(*)", and "F(#)") by changing the value of the "DTMF Code" box located at the bottom of the screen, if needed.
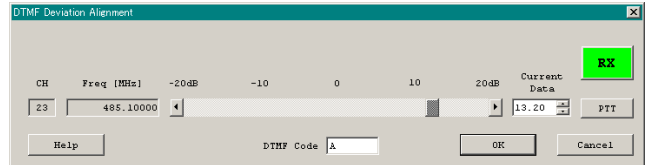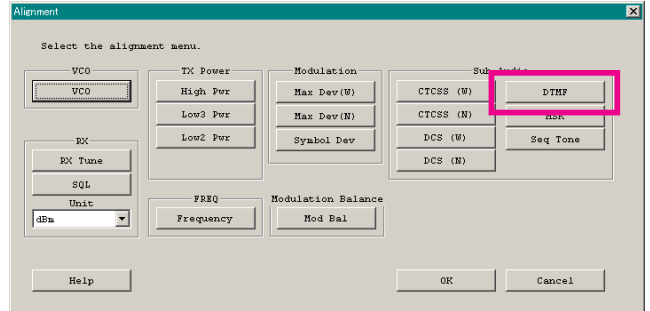
MSK DEVIATION

This parameter is to align "MSK Deviation" which use for the ANI operation of the MDC1200 System.

1. Press the "MSK" button to open the "MSK Deviation Alignment" window.
2. Click the "PTT" button or press the "SPACE" bar of the computer's keyboard to transmit the radio.
3. Set the value to get desired deviation (Nominal: 3.0 kHz) on the deviation meter according to the following ways:
   ● Dragging the slide bar
   ● Clicking the arrow buttons
   ● Pressing the left/right arrow key of the computer's keyboard
   ● Entering the value ("−20.00" - "20.00") in the "Currend Data" box from the computer's keyboard
4. After getting the desired deviation, click the "PTT" button or press the "SPACE" bar to stop transmitting.
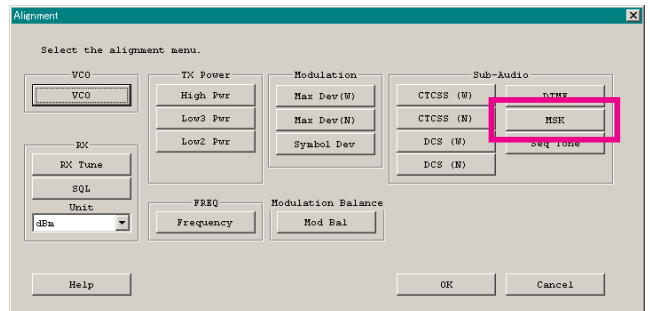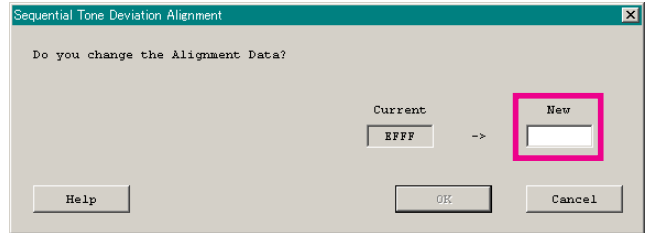5. Click the "OK" button to finish the MSK Deviation alignment and save the data.
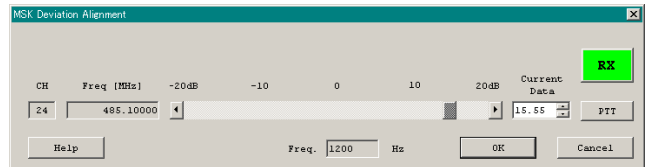
SEQUENTIAL TONE DEVIATION

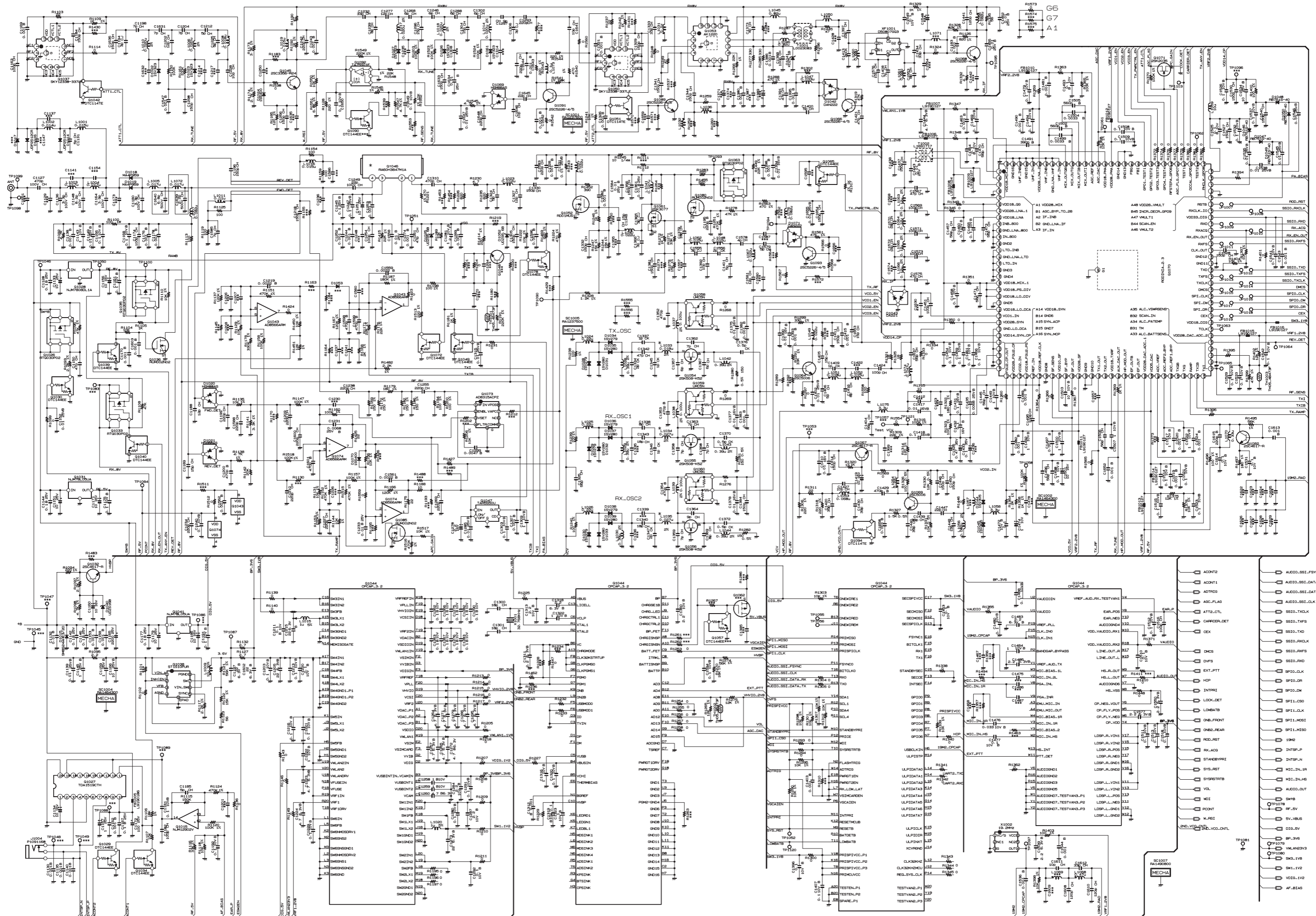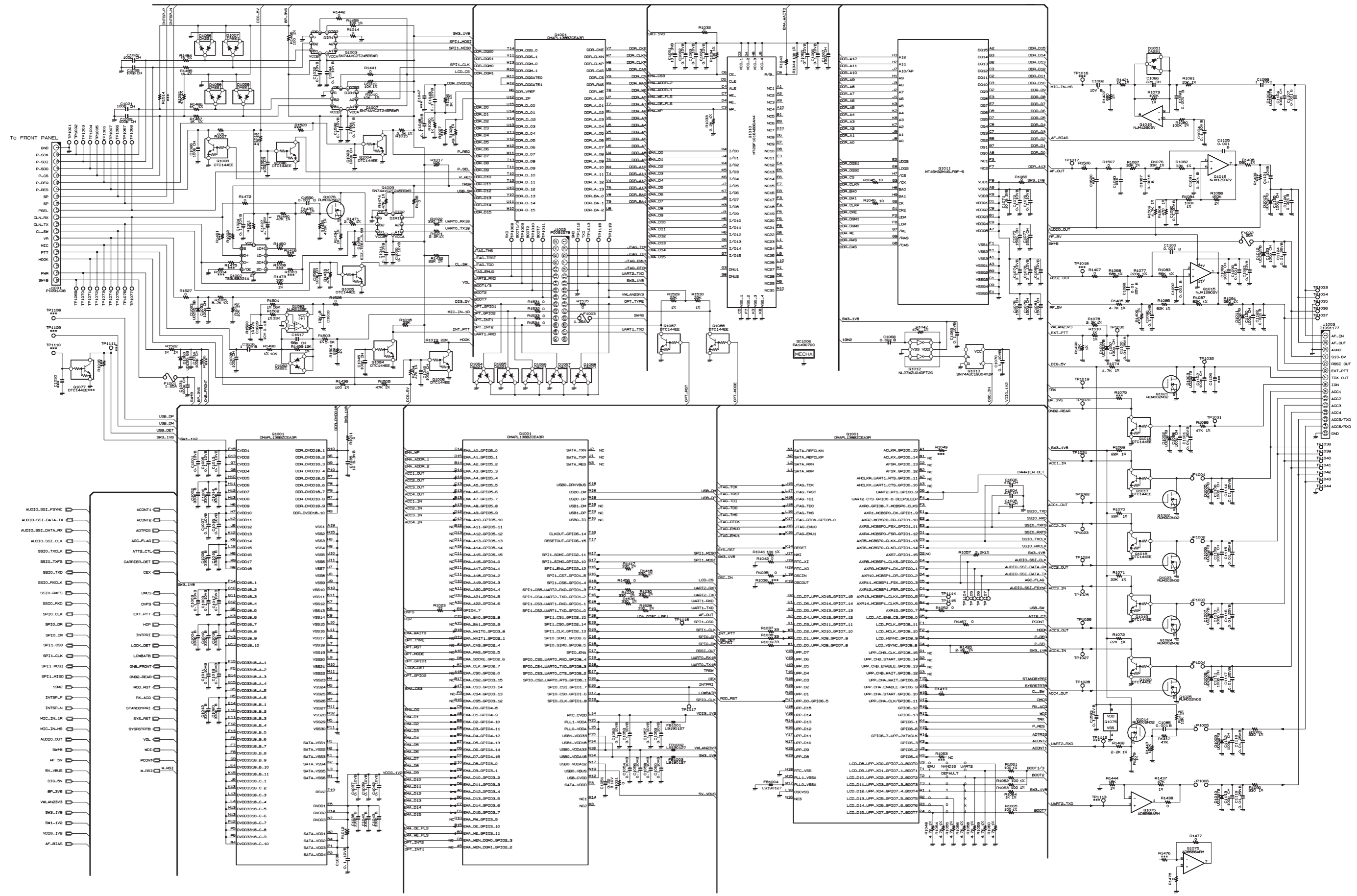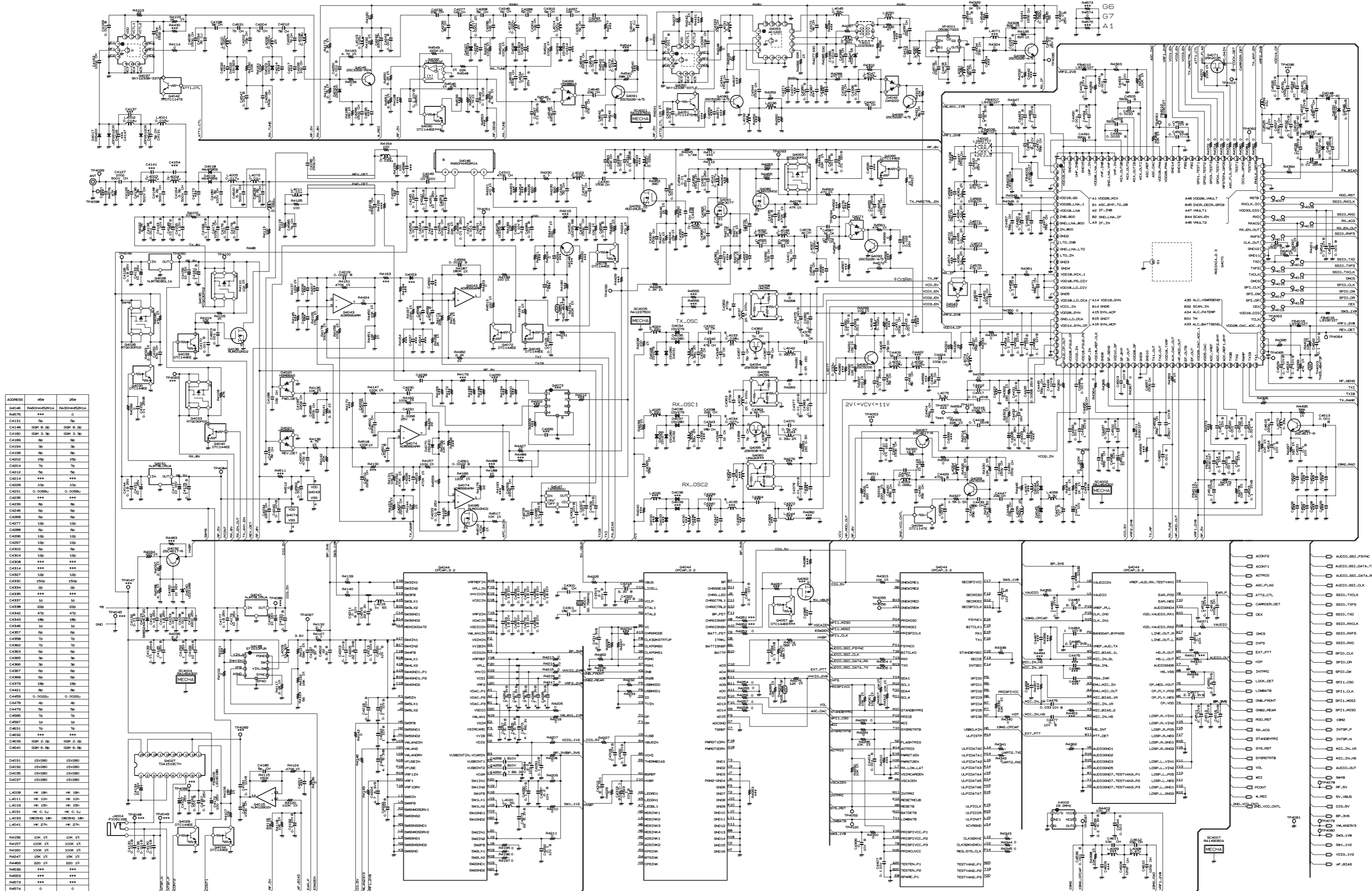This parameter is to fine-tune of the "Sequential Tone Deviation" for the 2-Tone and 5-Tone Encoder.
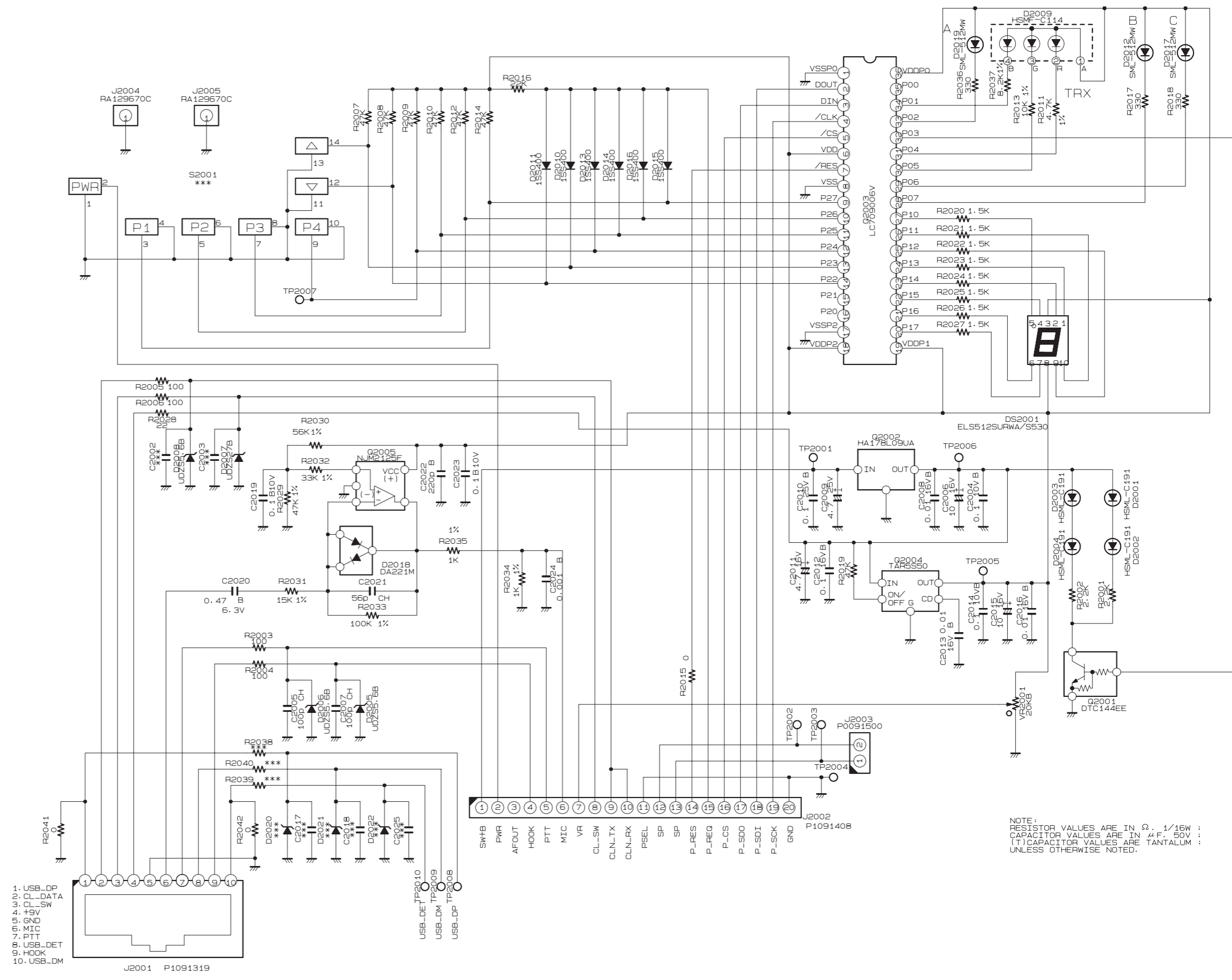
1. Press the "Seq Tone" button to open the "Sequential Tone Deviation Alignment" window.
2. Entering the desired value in the "New" box from the computer's keyboard.
3. Click the "OK" button to finish the Sequential Tone Deviation alignment and save the data.
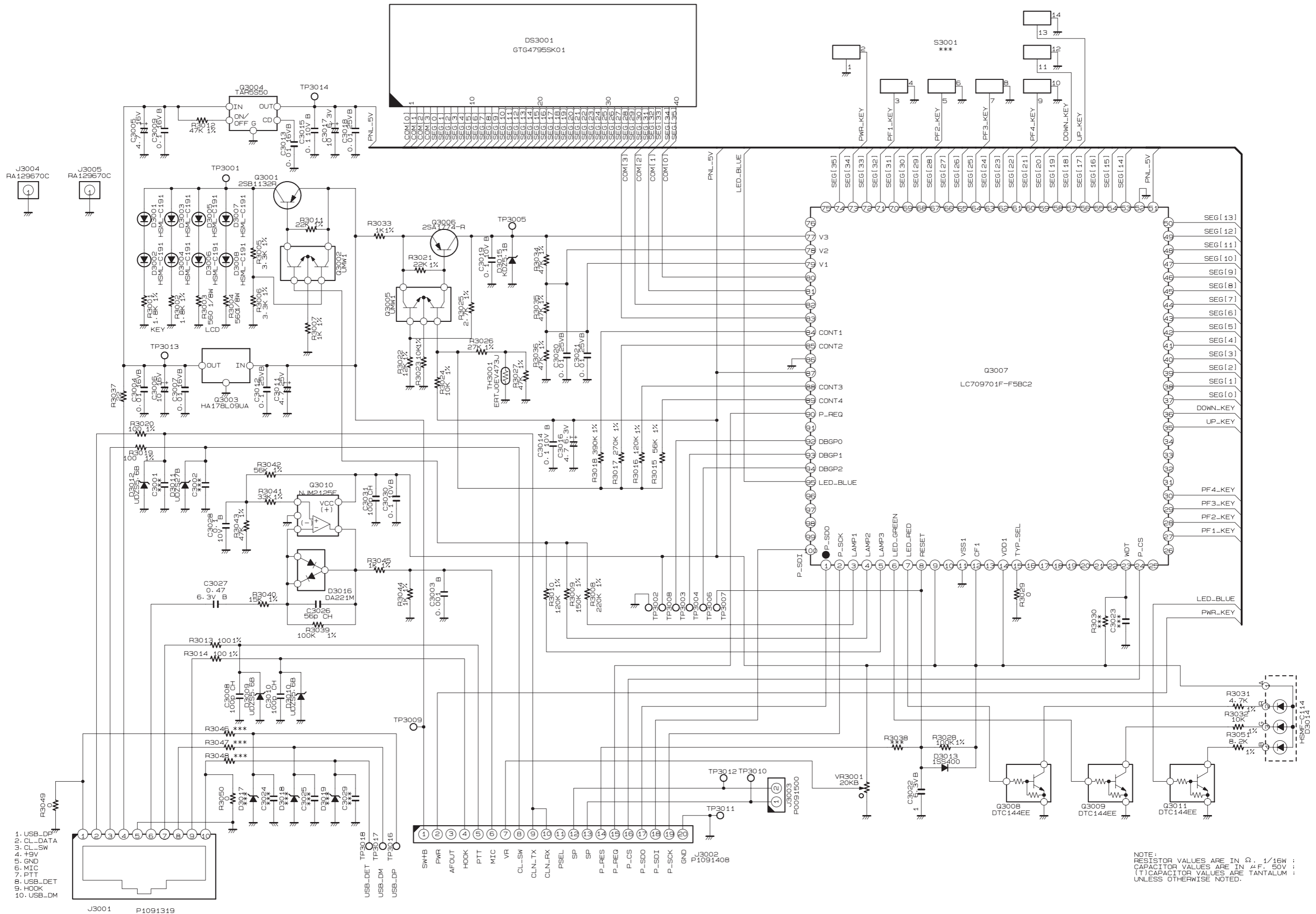
ADDRESS	45W	25W
G4046	RA60H4452M1A	RA30H4452M1A
R4575	***	0
R4131	***	0
C4148	9GH 8.2p	9GH 8.2p
C4180	9GH 3.3p	9GH 3.3p
R4189	10	10
C4194	3p	3p
C4198	8p	8p
C4202	15p	15p
C4204	7p	7p
C4212	5p	5p
C4214	***	***
C4228	10p	10p
C4231	0.006Bu	0.006Bu
C4295	***	***
C4239	8p	8p
C4246	8p	8p
C4268	6p	6p
C4277	12p	12p
C4288	8p	8p
C4297	12p	12p
C4302	6p	6p
C4304	12p	12p
C4308	***	***
C4314	***	***
C4327	12p	12p
C4330	150p	150p
C4334	2p	2p
C4335	***	***
C4337	1p	1p
C4338	22p	22p
C4342	47p	47p
C4343	18p	18p
C4357	10	10
C4358	7p	7p
C4362	7p	7p
C4363	3p	3p
C4365	3p	3p
C4366	3p	3p
C4367	6p	6p
C4368	6p	6p
C4379	18p	18p
C4421	6p	6p
C4465	0.002Bu	0.002Bu
C4478	40	40
C4479	5p	5p
C4595	7p	7p
C4587	10	10
C4631	7p	7p
C4632	***	***
C4639	9GH 2.2p	9GH 2.2p
C4640	9GH 6.8p	9GH 8.2p
D4031	15V280	15V280
D4032	15V280	15V280
D4035	15V280	15V280
D4037	15V280	15V280
L4008	HK 18n	HK 18n
L4011	HK 10n	HK 10n
L4019	HK 15n	HK 15n
L4031	HK 0.1u	HK 0.1u
L4033	0805HQ 18n	0805HQ 18n
L4041	HK 27n	HK 27n
R4156	10K 1%	10K 1%
R4157	100K 1%	100K 1%
R4160	100K 1%	100K 1%
R4247	15K 1%	15K 1%
R4469	220 1%	220 1%
R4539	***	***
R4553	***	***
R4573	***	***
R4574	0	0

NOTE:
RESISTOR VALUES ARE IN Ω. 1/16W
CAPACITOR VALUES ARE IN μF. 50V
(T)CAPACITOR VALUES ARE TANTALUM
UNLESS OTHERWISE NOTED.

1. USB_DP
2. CL_DATA
3. CL_SW
4. +9V
5. GND
6. MIC
7. PTT
8. USB_DET
9. HOOK
10. USB_DM

J2001 P1091319

Vertex Standard