

# INSTRUCTION MANUAL FRG-7000

YAESU MUSEN CO., LTD.

TOKYO JAPAN.

### TABLE OF CONTENTS

	(Page)
GENERAL DESCRIPTION	1
SPECIFICATIONS	2
CONTROLS AND SWITCHES	3
INSTALLATION	6
OPERATION	7
BLOCK DIAGRAM	10
CIRCUIT DESCRIPTION	10
ALIGNMENT AND MAINTENANCE	13
PARTS LIST	17
WORLD TIME CONVERSIONCHART IN HOURS	24

"WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE."

### COMMUNICATIONS RECEIVER FRG-7000



### GENERAL DESCRIPTION

The model FRG-7000 is a high-performance, all solid state, communications receiver designed to cover the entire medium and high-frequency spectrum from 0.25 MHz - 29.9 MHz.

The FRG-7000 features a digital frequency display using large, bright digits for easy viewing. Also included is a 24-hour digital clock for both local and GMT time, with a timing feature for automatic receiver on/off switching.

The FRG-7000 is a triple-conversion superheterodyne receiver, utilizing a synthesized heterodyne oscillator known as the "Wadley Loop System," offering extremely stable receiver performance.

The IF filtering in the FRG-7000 provides a bandwidth of 3 kHz for SSB and CW (at 6 dB down), and 6 kHz for AM (at 6 dB down), thus providing superb rejection of unwanted interference.

The FRG-7000's switchable front-end attenuator and amplified AGC assist in reception under a

variety of conditions, and the continuously variable audio filter provides for minimizing the high or low frequency audio response, as needed. A front panel recording jack plus relay connection jacks on the rear panel provide the flexibility demanded by the discriminating listener.

Plug-in circuit boards are used in the FRG-7000, providing high reliability and ease of servicing. FET's and IC's are used throughout the receiver, providing maximum performance within a compact cabinet.

A built-in AC power supply allows operation from 100/110/117/200/220/234 volts AC, 50/60 Hz. To reduce power consumption, the front panel lamps and digital display may be turned off.

The FRG-7000 is a precision-built instrument. Its performance, versatility, and reliability assure the discriminating listener of many hours of satisfying reception.

### **SPECIFICATIONS**

Frequency Range:

0.25 MHz - 29.9 MHz

Type of Emissions:

AM, SSB (USB or LSB), CW

Sensitivity:

SSB/CW: Better than 0.7µV at S/N 10 dB

AM:

Better than 2µV at S/N 10 dB

Selectivity:

SSB/CW ±1.5 kHz (-6 dB), ±4 kHz (-50 dB) AM ±3 kHz (-6 dB), ±7 kHz (-50 dB)

Stability:

Less than ±500 Hz at any 30 minutes after

warm-up

IC SN76514N

Antenna Requirements:

Random wire 0.25 MHz - 1.6 MHz

50 Ohm unbalanced feed 1.6 MHz - 29.9 MHz

μPC14305

5082-7740

Speaker Impedance:

4 ohms

Audio Output:

2 watts

Power Requirement:

100/110/117/200/220/234 volts

AC 50/60 Hz

Power Consumption:

AC 25 VA

Size:

360 (W), 125 (H), 295 (D) mm

Weight:

Approx. 7 kg

### SEMICONDUCTOR COMPLEMENT

2

TA7205AP	1		μPC14308	2
MC1416	2		NJM78L05A	1
MC14011	1	FET	3SK40M	7
MC14016	1		2SK19GR	8
MC14027	1	Tr.	2SC372Y	8
MC14081	1		2SC373	4
MC14518B	1		2SC535A	1
MC14519B	1		2SC784(O)	1
MSM5502	1		2SC828	1
MSM5592	1		MPS-A13	2
SN7407N	2	Ge Diode	1S1007	11
SN74LS00N	2	Si Diode	1S1555	17
SN74LS90N	1		V06B	8
SN74LS112N	1	LED	SL-103D	2
SN74LS390N	1	LED Display	5082-7286	1

### ACCESSORIES

The following accessories are packaged along with your FRG-7000:

- (1) MINIATURE PHONE PLUG 2 ea. For use in EXT SP or REC jacks.
- (2) PHONE PLUG lea. For use with headphones.
- (3) RCA TYPE PLUGS 2 ea.
  For use in control of station equipment through relay jacks on rear panel.
- (4) UHF COAX PLUG

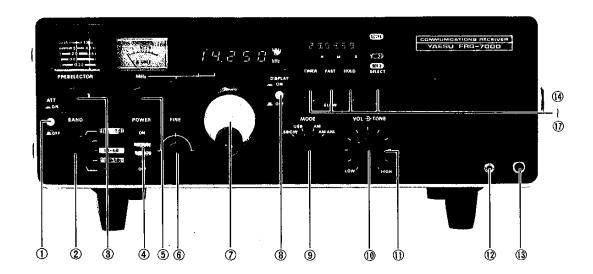
  For connection to HF antenna using coaxial feedline.
- (5) EXTRA FUSES 2 ea.
  3 amp fuse plus another 1 amp or 0.5 amp fuse, depending on local supply voltage.
- (6) WIRES 3M/10M 1 ea. For indoor antennas.

5

SP8646B μPA56C

μPD546C-1(CPU) 1

### CONTROLS AND SWITCHES



The FRG-7000 has been specifically designed for ease of operation. All controls have been adjusted at the factory to ensure peak performance. The operator may be unfamiliar with the operation of some of the controls, and improper settings thereof may result in poor reception. For this reason, please become throughly familiar with the function of every control before attempting to operate the receiver.

### FRONT PANEL

### (1) ATT (ON, OFF)

The ATT switch activates an attenuator for the receiver front end to minimize overloading under extreme conditions of strong adjacent signals. Maximum receiver sensitivity occurs with the ATT switch OFF.

### (2) BAND

The BAND switch has five positions for selecting the proper preselector range for peaking the receiver circuits.

### (3) PRESELECT

The preselector peaks the receiver circuits for maximum sensitivity on the frequency being received. The preselector bands are color coded to match the color code of the band switch, and the preselector control should be tuned to the frequency in use by observation of the calibration marks on the color coded scale, and by listening for maximum signal or noise strength from the speaker.

### (4) POWER

This is the main on/off switch for the receiver. When it is in the OFF position, the timer circuit will turn the receiver on or off, according to the settings of SET 1 and SET 2 on the digital clock.

### (5) MHz

The MHz control selects the 1 MHz band to be tuned for reception. When the control is not set correctly, e.g. between the 6 MHz and 7 MHz segments, the UNLOCK lamp will light to indicate that adjustment is needed.

### (6) **FINE**

This control allows fine tuning of the received frequency.

### (7) MAIN TUNING KNOB

This is the main tuning control for the receiver.

### (8) DISPLAY (ON, OFF)

For conservation of energy, the front panel digital frequency display and lamps may be switched off with this button. The digital clock is not affected by this control.

### (9) MODE (LSB/CW, USB, AM, AM/ANL)

This control selects the desired mode:

LSB/CW: Lower sideband and CW

USB: Upper sideband

AM: Amplitude modulation

AM/ANL: Amplitude modulation, automatic

noise limiter

### (10) VOL

This is the main volume control for the receiver.

### (11) TONE

This control varies the audio filter so as to emphasize either high or low audio tones.

### (12) REC

This jack is for recording purposes, and its output is set to approximately 50 mV, regardless of the setting of the volume control.

### (13) PHONES

This is a standard 1/4" headphone jack. When the headphone plug is inserted into the jack, the internal speaker is cut off.

### (14) TIMER

With proper setting of the SET 1 and SET 2 positions of the digital clock, placing the TIMER switch in the "down" position will allow automatic ON/OFF switching of the receiver by the digital clock.

### (15) FAST/SLOW

This lever switch is used for setting the digital clock. The fast speed is used for rapid advancement of the indicated time, and the slow speed is used for the final, fine adjustment.

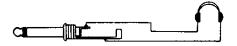
### (16) HOLD

This lever switch will lock the digital clock on the indicated time. This switch is useful for alignment of the GMT and LOCAL indications, and also for time setting if the FAST/SLOW control advances the time too far.

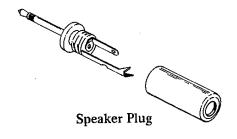
### (17) SELECT

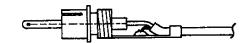
Each time the SELECT switch is pressed downward, the digital clock selection lamps are switched, corresponding to the change in the clock function. If the local time is being displayed (LOCAL lamp lighted), pressing the SELECT switch will cause the SET 1 lamp to light, and the clock will now display the time which has been programmed into the SET 1 position. Another press of the SELECT switch will cause SET 2 to be displayed, etc.

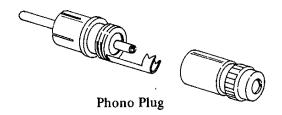




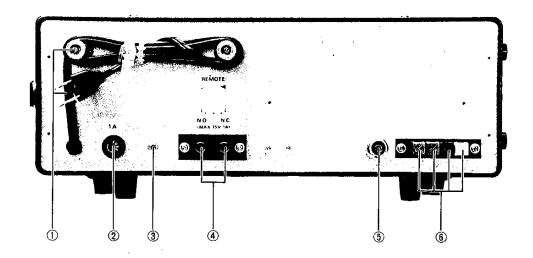
**Phone Plug** 







### REAR PANEL



### (1) POWER CORD AND CORD HOLDER

The power cord may be wrapped around the cord holder for packing purposes.

### (2) FUSE

For 100/110/117 volt operation, a 1 amp fuse should be installed here. For 200/220/234 volt operation, a 1/2 amp fuse should be installed. BE CERTAIN TO USE A FUSE OF THE PROPER RATING WHEN REPLACING FUSES.

### (3) EXT SP

This jack is for connection of an external speaker. The impedance is 4 ohms, and insertion of a plug into this jack disables the internal speaker.

# (4) REMOTE (N.O./N.C.) (N.O. = Normally Open; N.C. = Normally Closed)

These two phono jacks are used for switching peripheral station equipment such as tape recorders, etc. When the TIMER switch is activated, and the clock passes the SET 1 time, the relay is activated. When the SET 2 time is passed, the relay returns to its normal state. With the TIMER switch off, the relay is in its normal state. The relay contacts are rated at 15 V at 1A.

### (5) SW2

This is a standard UHF connector for coax-fed shortwave antennas.

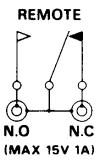
### (6) SW1, BC, E, MUTE

SW1 is a low-impedance connection for a randomlength shortwave antenna.

BC is a high-impedance connection for a random-length shortwave antenna.

E is a ground connection.

MUTE is a connection for muting FRG-7000, as, for example, with an external standby switch. Shorting the MUTE terminal to ground will mute the receiver.



### INSTALLATION

Carefully remove FRG-7000 from its carton, and inspect it for any signs of physical damage. Should any damage be observed, immediately notify the shipping company, stating the damage in detail. Save the carton and the packing material for possible future use.

### LOCATION

In general, the location of the FRG-7000 is not critical. However, it is recommended that excessively warm locations be avoided.

The FRG-7000 is supplied with a multi-voltage power transformer (export model only). Thus, when moving to an area where the supply voltage is different from your accustomed supply voltage, your FRG-7000 may still be used. Before commencing operation initially, BE SURE THAT THE VOLTAGE MARKED ON THE REAR OF THE RECEIVER AGREES WITH THE LOCAL AC SUPPLY VOLTAGE.

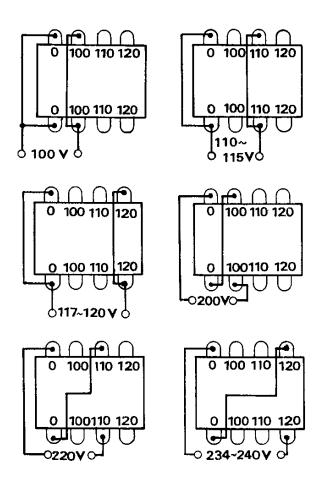


Fig.1 Transformer Primary Wiring

### **CAUTION**

PERMANENT DAMAGE WILL RESULT IF IMPROPER AC SUPPLY VOLTAGE IS APPLIED TO THE RECEIVER. THE WARRANTY DOES NOT COVER DAMAGE CAUSED BY IMPROPER AC SUPPLY VOLTAGE.

Should it become necessary to adapt the FRG-7000 to a different AC supply voltage, refer to the chart below for the proper connections. After modification, make a notation on the rear panel regarding the AC supply voltage in use.

If fuse substitution is required, be certain to use a fuse of the proper rating. For 100 - 117 volt operation, use a 1 amp fuse; for 200 - 234 volts, use a 1/2 amp fuse. The fuse holder is located on the rear apron. The counter unit also has a fuse of 3 amps (for all voltages). This fuse is installed inside the cabinet.

### **CAUTION**

BE CERTAIN TO USE A FUSE OF THE PROP-ER RATING. WARRANTY DOES NOT COVER DAMAGE CAUSED BY USE OF AN IMPROP-ER FUSE.

### ANTENNA AND GROUND

The antenna is the most important part of the communications receiver installation. The FRG-7000 is designed for use with a random-length antenna for 0.25 MHz - 1.6 MHz, and the antenna should be as long and high as possible. For 1.6 MHz - 29.9 MHz, maximum performance is secured through the use of a resonant antenna having an impedance of 50 to 75 ohms at the operating frequency. A center-fed dipole antenna cut for the desired frequency will easily satisfy this requirement, and it should be fed with coaxial cable. The length of a center-fed dipole can be determined by the formula

Length (feet) = 468/frequency (MHz) Length (meters) = 142.5/frequency (MHz)

The FRG-7000 should be connected to a good earth ground. The ground lead should be of a heavy-gauge braided cable or wire, and should be connected to the terminal marked E on the rear panel of the receiver.

### **OPERATION**

### FREQUENCY SELECTION

The operating frequency is read directly from the digital display. All digits of the operating frequency are displayed, with resolution to 1 kHz. The main tuning dial provides rapid frequency change, and the fine tuning control allows ±2.5 kHz adjustment for precise zeroing on the desired station.

The main tuning dial tunes a 1 MHz range, and thus controls the last three digits of the displayed frequency (000 to 999). For setting the digital display to the desired frequency, rotate the MHz control until the desired MHz range is reached, then rotate the main tuning dial to set the last three digits of the displayed frequency. The MHz control is somewhat critical in adjustment, and care should be taken to adjust it so that the UNLOCK lamp is not illuminated.

### PRESELECTOR OPERATION

For peaking the receiver circuits for maximum sensitivity on the desired frequency, the preselector must be tuned to that frequency. The BAND switch should be rotated so that the preselector band appropriate for the operating frequency is selected. For example, for peaking for reception on 6.910 MHz, the 4.0 MHz - 11.0 MHz (green) range should be selected.

Next, rotate the PRESELECTOR control and observe the color-coded calibration of the preselector dial drum. The calibration marking should correspond to the operating frequency; precise adjustment is made by peaking the noise level or signal strength at the speaker, while carefully adjusting the PRESELECTOR control. The ATT switch should be OFF during peaking of the preselector.

Refer to Table 1 for details regarding the various switch and controls.

			<del></del>		
	Frequency	PRESELECT	Main Dial	BAND	MODE
	kHz 1,910	2.0 == 1.8 ==	1,910 MHz	1.6~4.0	LSB·CW
	3,525	3.6 • 3.3 ■ :	3.525 //	1.6~4.0	LSB·CW
Amateur	7,050	8 - 7 - 0	7.050 //	4.0~11.0	LSB·CW
,	14,175	15	14.175 //	11.0-29.9	USB
	21,225	23 = 20 =	21.225 //	11.0-29.9	USB
	28,850	26	28.850 //	11.0~29.9	USB
	590	0.6	590 kHz	0.5~1.6	AM or AM/ANL
Medium Wave	980	1.0 -0.1	980 "	0.5~1.6	AM or AM/ANL
	1,170	<b>1.2</b> 1.0	1.170MHz	0.5~1.6	AM or AM/ANL
	2,500	2.6 2.3	2.500MHz	1.6~4.0	AM or AM/ANL
YLIVVWW	5,000	5 4.	5.000 //	4.0~11.0	AM or AM/ANL
WW V/JJY	10,000	11-10-9	10,000 //	4.0~11.0	AM or AM/ANL
	15,000	17 = 15	15 000 //	11.0~29.9	AM or AM/ANL
	3,925	4.0 3.6	3.925MHz	1.6~4.0	AM or AM/ANL
	5,980	6	5.980 //	4.0-11.0	AM or AM/ANL
	9,715	10 = 9 =	9.715 //	4.0~11.0	AM or AM/ANL
Short Wave	11,705	12 111	11.705 //	11.0~29.9	AM or AM/ANL
	15,120	17 - 15 -	15.120 //	11.0-29.9	AM or AM/ANL
	17,880	20 = 17	17.880 //	11.0~29.9	AM or AM/ANL
	21,550	23 20	21.550 //	LI ,0~29.9	AM or , AM/ANL

Table 1

# BROADCAST BAND (0.5 MHz - 1.6 MHz) OPERATION

Special caution should be observed when attempting broadcast band reception, as the MHz control may appear to select more than one range for the segment of the band below 1 MHz. Use only the position of the MHz control immediately adjacent to the 1.0 MHz - 2.0 MHz band.

### SHORTWAVE BROADCAST RECEPTION

International shortwave broadcast stations use the AM mode. Turn the POWER switch ON (TIMER switch OFF), place the MODE switch in the AM position, and select the desired frequency as described in the previous section. The VOLUME control should be adjusted for a comfortable listening level. The TONE control may be adjusted to provide the desired fidelity, and the FINE control will allow precise adjustment of the received frequency.

In the presence of extremely strong signals, the ATT switch may be placed in the ON position to prevent overload of the receiver front end. Should impulse noise be present, the MODE switch may be placed in the AM/ANL position.

### AMATEUR BAND RECEPTION

### SSB Voice Signals:

Virtually all amateurs use lower sideband (LSB) on the frequency bands below 7.3 MHz, and upper sideband (USB) above 14.0 MHz. Set the MODE switch to USB or LSB, as appropriate, and rotate the main tuning dial until a signal is clearly heard. The FINE control is extremely useful when tuning in SSB signals. The VOLUME and TONE controls should be adjusted for the clearest reception level.

### CW (Morse Code Signals):

Amateur and commercial Morse Code transmissions may be received by placing the MODE switch in the LSB/CW position, and tuning the main dial and FINE controls for the desired listening tone.

			RECEIVER		RÉM	OTE
Power Switch	Timer Switch		SET-I	SET-2	N.O.	N.C.
OFF	0FF	OFF	OFF	OFF	OPEN	CLOSE
ON	OFF	ON	ON	ON	OPEN	CLOSE
	ON		ON		CLOSE	OPEN
OFF		OFF	-	OFF	OPEN	CLOSE
			OFF	-	CLOSE	OPEN
ON	ON	ON	_	ON	OPEN	CLOSE

Table 2

### DIGITAL CLOCK OPERATION

The built-in digital clock will provide display of both your local time and Greenwich Mean Time (GMT). When the FRG-7000 is initially plugged in, the clock will indicate "00.00.00" and begin counting the seconds as they pass.

To set the clock to your local time, place the SELECT switch in the LOCAL position. Then use the FAST and SLOW switches to set the clock to the proper time. If desired, the clock may be set to some precise hour (for example, 11.00.00), and then the HOLD switch should be activated to hold the time at that point. When the time reaches exactly 11.00.00, release the HOLD switch, and the clock will resume counting. This technique is recommended for precise time calibration to a time standard such as WWV or JJY.

For setting to GMT time, it is recommended that the HOLD switch technique be used. Align the LOCAL time to a suitable point (e.g. 16.00.00) and activate the HOLD switch. Place the SELECT switch in the GMT position, and use the FAST and SLOW switch to calibrate the GMT clock with the GMT appropriate for the LOCAL time being held (e.g. 16.00.00 Eastern Standard Time = 21.00.00 GMT). Release the HOLD switch to start both clocks simultaneously.

The HOLD switch will freeze the time on both clocks. The FAST and SLOW switch will advance only the clock being displayed. The clock is operative as long as the FRG-7000 is plugged in.

### TIMER OPERATION

The SET 1 and SET 2 positions of the SELECT switch may be set to provide automatic ON and OFF control of the FRG-7000. For example, if a favorite program starts at 0730 local time, 07.30.00 may be stored in the SET 1 position for automatically turning the receiver on at that time. When it is desired to turn the receiver off automatically, that time may be stored in the SET 2 position. The TIMER circuitry may also be used for controlling peripheral equipment such as a tape recorder, as the timer relay actuates the REMOTE jacks on the rear apron.

The timer circuitry has the effect of switching the condition of the receiver as determined by the POWER switch. That is, when the POWER switch is OFF, and the TIMER switch ON, the receiver will be OFF until the SET 1 time. Between the SET 1 and SET 2 times, the receiver will be ON, and between the SET 2 and SET 1 times the receiver will again be OFF.

When the POWER switch is in the ON position, these relations are reversed. That is, with the POWER switch ON, and the TIMER switch ON, the receiver will be ON until the SET 1 time. From the SET 1 time until the SET 2 time, the receiver will be OFF, and after the SET 2 time the receiver will be ON until the SET 1 time.

The REMOTE contacts are controlled by the TIMER relay. In the period between the SET 1 and SET 2 times, the normally open (N.O.) jack will be CLOSED, and the normally closed (N.C.) jack will be OPEN. With the TIMER switch OFF, regardless of the position of the POWER switch, the jacks are in their "normal" states.

For example, if you must be away from your station, but want to record a program, proceed as follows: preset the receiver to the proper frequency and peak the preselector, etc. Connect the FRG-7000 REC jack to the recording input of the tape recorder, and connect the tape recorder "footswitch" jack to the REMOTE N.O. jack. Align the SET 1 time to the start of the program, and the SET 2 time to the end of the program. Place the POWER switch in the OFF position, and the TIMER switch ON. Place the tape recorder in the record condition; it should not operate because the REMOTE N.O. jack is open. When the SET 1 time is reached, the FRG-7000 will turn on, the tape recorder will be activated, and both will operate until the SET 2 time (the end of the program).

### CIRCUIT DESCRIPTION

The block diagram will provide you with a better understanding of this receiver. Basically, the FRG-7000 is a triple-conversion superheterodyne receiver utilizing a synthesized local oscillator for both the first and second mixers. The result is drift-free VFO operation.

The signal from the antenna is fed through the RF attenuator to the gate of the FET RF amplifier  $Q_{101}$  (3SK51-03). The amplified signal is fed through a low-pass filter (cutoff frequency 35 MHz) to the first balanced mixer, consisting of  $Q_{102}$  and  $Q_{103}$  (both 2SK19GR), where the incoming signal is mixed with a signal from the heterodyne oscillator. The first heterodyne oscillator,  $Q_{301}$  (2SC784O), provides a signal varying between 55.5 and 84.5 MHz.

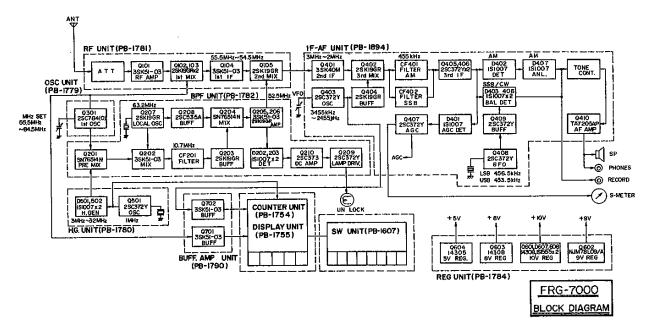
A 52.5 MHz heterodyne signal is produced as follows: the synthesized oscillator  $Q_{501}$  (2SC372Y) generates a 1 MHz signal, which is then fed to harmonic generator  $D_{501}$  -  $D_{502}$  (both 1S1007). This produces a series of harmonics from 3 to 32 NHz. This signal is fed to the first premixer,  $Q_{201}$  (SN76514), where the 55.5 MHz - 84.5 MHz and 3 MHz - 32 MHz signals are mixed, producing a 52.5 MHz signal.

The 52.5 MHz output signal from  $Q_{201}$  is fed to the second premixer  $Q_{202}$  (3SK51-03), where the 52.5 MHz signal is mixed with a 63.2 MHz signal generated by  $Q_{207}$  (2SK19GR), producing a 10.7 MHz IF signal.

The 10.7 MHz IF signal passes through a 10.7 MHz ceramic filter and is amplified by  $Q_{203}$  (2SK19GR) and fed to mixer  $Q_{204}$  (SN76514), where the 10.7 MHz signal is mixed with a 63.2 MHz signal generated by  $Q_{207}$ , producing a filtered 52.5 MHz signal.

The 52.5 MHz signal is then amplified by  $Q_{205}$  (3SK51-03) and  $Q_{206}$  (2SK19GR), and returned to the RF UNIT as the heterodyne signal for the second mixer,  $Q_{105}$  (2SK19GR). A portion of the output signal from  $Q_{206}$  is rectified by  $D_{202}$  (both 1S1007). The DC voltage is then amplified by  $Q_{210}$  (2SC372Y) and fed to the LOCK indicator driver  $Q_{209}$  (2SC372Y), which turns the LOCK lamp PL<sub>3</sub> on when the synthesizer is unlocked.

The 54.5 MHz - 55.5 MHz signal is mixed with the 52.5 MHz heterodyne signal by  $Q_{105}$  (2SK19GR), resulting in a 2 MHz - 3 MHz IF



**BLOCK DIAGRAM** 

signal. This IF signal is amplified by  $Q_{401}$  (3SK40M) and fed to a third mixer  $Q_{402}$  (2SK19GR), where the IF signal is mixed with a 2455 kHz - 3455 kHz heterodyne signal, producing a 455 kHz third IF signal. The 2455 kHz - 3455 kHz heterodyne signal is generated by VFO oscillator  $Q_{403}$  (2SC372Y) and fed through buffer amplifier  $Q_{404}$  (2SK19GR) to  $Q_{402}$ . The 455 kHz IF signal is fed through a ceramic filter, CF-401, for AM, or CF-402 for SSB and CW, to eliminate adjacent-frequency interference.

The signal is then amplified by the third IF amplifier  $Q_{405}$  and  $Q_{406}$  (both 2SC372Y), and fed to the appropriate detector. The AM signal is detected by diode detector  $D_{402}$  (1S1007).

Balanced demodulator  $D_{403}$  -  $D_{406}$  (all 1S1007) is used for the detection of SSB and CW signals. The carrier signal for SSB and the beat frequency signal for CW (generated by BFO oscillator  $Q_{408}$  (2SC372Y)), are fed to the balanced demodulator through buffer amplifier  $Q_{409}$ 

(2SC372Y). The MODE switch shifts the BFO frequency for reception of an LSB or USB signal.

The output from the detectors is amplified by O<sub>410</sub> (TA7205AP) for delivery to the speaker.

A portion of the output from the last IF amplifier  $Q_{406}$  is fed to the AGC (Automatic Gain Control) rectifier  $D_{401}$  (1S1007). The rectified AGC voltage is then amplified by AGC amplifier  $Q_{407}$  (2SC372Y) and fed to  $Q_{101}$ ,  $Q_{401}$ , and  $Q_{405}$  to control the gain of these stages automatically according to the strength of the received signal. Thus, the receiver output is not affected by variations in signal strength which may be caused by phase shift on the incoming signal. The S-meter is placed in the emitter circuit of  $Q_{407}$ , in which the emitter current changes in accordance with the incoming signal'strength.

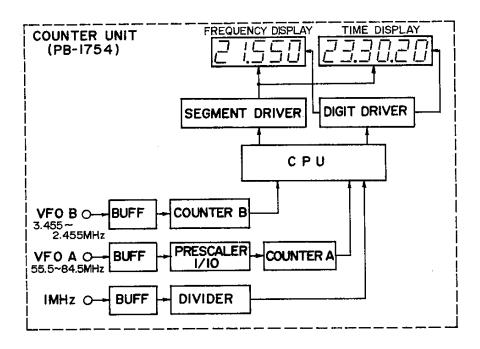
The 55.5 MHz - 84.5 MHz and 2455 kHz - 3455 kHz signals are amplified, respectively, by buffer amplifiers  $Q_{701}$  and  $Q_{702}$  (both 3SK51-03), and fed to the counter to display the received frequency.

FREQUENCY	1ST OSC	1ST IF	REF FREQ	2ND OSC	2ND IF	3RD OSC	3RD IF
		$(\mathbf{fo_1} - \mathbf{fi_4})$	(1MHz×n)	(fo <sub>1</sub> -fh)	(fi <sub>1</sub> -fo <sub>2</sub> )		(fo <sub>3</sub> -fi <sub>2</sub> )
f	foi	fi,	fh	fo <sub>2</sub>	fi 2	fo <sub>3</sub>	fi,
500kHz	55.5MHz	55.0MHz	3MHz	52.5MHz	2,500kHz	2,955kHz	455kHz
1,500	56.5	55.0	4	n n	2.500	2,955	"
2,500	57.5	55.0	5	н	2,500	2,955	n n
3,500	58.5	55.0	6	н	2,500	2,955	n
4,500	59.5	55.0	7	n	2.500	2,955	11
5,500	60.5	55.0	8	п	2,500	2,955	n
6,500	61.5	55.0	9	11	2,500	2,955	н
7,500	62.5	55.0°	10	н	2,500	2,955	и ·
8,500	63.5	55,0	11	n	2,500	2,955	11
9,500	64.5	55.0	12	"	2,500	2,955	"
10,000	65.5	55.5	13	n	3,000	3,455	11
11,000	66.5	55.5	14	11	3,000	3,455	0
12,000	67.5	55.5	15	п	3,000	3,455	11
13,000	68.5	55.5	16	n .	3,000	3,455	"
14,000	69.5	55.5	17	11	3,000	3,455	п
15,000	70.5	55.5	18	п	3,000	3,455	"
16,000	71.5	55.5	19	"	3,000	3,455	11
17,000	72.5	55.5	20	и	3,000	3,455	"
18,000	73.5	55.5	21	n	3,000	3,455	11
19,000	74.5	55.5	22	11	3,000	3,455	и
20,000	75.5	55.5	23	н	3,000	3,455	Jt .
21,100	76.5	55.4	24	0	2,900	3,355	н
22,200	77.5	55.3	25	'n	2,800	3,255	n
23,300	78.5	55.2	26	ņ	2,700	3,155	n
24,400	79.5	55.1	27	11	2,600	3,055	"
25,500	80.5	55.0	28	п	2,500	2,955	n
26,600	81.5	54.9	29	n	2,400	2,855	п
27,700	82.5	54.8	30	n	2,300	2,755	
28,800	83.5	54.7	. 31	п	2,200	2,655	"
29,900	84.5	54.6	32	п	2,100	2,555	н

Table 3 Frequency Relationship

The counter unit utilizes a 4-bit microcomputer unit (CPU) to display the frequency being received. The CPU also drives the digital clock, which displays both local and GMT time. The clock section of the CPU controls the timer function for ON/OFF control of the receiver and peripheral station equipment.

The regulated power supply consists of four regulators:  $Q_{601}$  (14308),  $Q_{602}$  (NJM 78L09A),  $Q_{603}$  (14308), and  $Q_{604}$  (14305), to deliver stabilized voltages of 10V, 9V, 8V, and 5V to various circuits in the receiver.



### MAINTENANCE & ALIGNMENT

### **GENERAL**

The FRG-7000 has been carefully aligned and tested at the factory prior to shipment, and, with normal usage, it should not require other than the usual attention given to electronic equipment. Service or replacement of a major component many entail substantial realignment; under no circumstances, however, should realignment be attempted unless the operation of the receiver is fully understood and the malfunction has been definitely attributed to misalignment rather than component failure. Service work should be performed by experienced personnel using proper test equipment.

### (1) Local Oscillator T<sub>207</sub>

Connect a VTVM between  $TP_{202}$  and  $TP_{204}$  (ground). Adjust  $T_{207}$  for 0.6V RMS as indicated on the VTVM. Connect a frequency counter to  $TP_{202}$ , and make sure that the output frequency is 63.2 MHz.

### (2) Output level T<sub>201</sub> - T<sub>206</sub>

Connect a VTVM between  $TP_{108}$  and  $TP_{109}$  (ground). Set the FRG-7000 MHz control to 29 MHz. Carefully adjust the MHz control for a maximum VTVM reading. Then peak  $T_{201}$  -  $T_{201}$  for a maximum VTVM reading.

### (3) Harmonic generator TC<sub>501</sub>

Connect a frequency counter between  $TP_{502}$  and  $TP_{501}$  (ground), and adjust  $TC_{501}$  for a reading of 1 MHz. The output voltage at  $TP_{502}$  should be approximately 0.2V RMS.

### (4) Oscillator Unit T<sub>301</sub>, TC<sub>301</sub>

Connect a frequency counter between  $TP_{107}$  and  $TP_{104}$  (ground). Set the FRG-7000 MHz control to the fully counterclockwise position. Adjust  $T_{301}$  for a reading of 54.0 MHz on the counter. Set the MHz control to the fully clockwise position, and adjust  $TC_{301}$  for a reading of 85.2 MHz on the counter. Repeat the above adjustments, if necessary, until the UNLOCK lamp turns off at every 1 MHz incremental advancement of the MHz control.

### (5) VFO Frequency T<sub>403</sub>, TC<sub>403</sub>

This alignment should be performed after the receiver has been allowed to warm up 30 minutes. Connect a frequency counter between  $TP_{402}$  and  $TP_{404}$  (ground). Set the main tuning knob to the fully clockwise position, and adjust  $T_{403}$  for a reading of 2380 kHz on the counter. Set the main tuning knob next to the fully counterclockwise position, and adjust  $TC_{403}$  for a counter reading of 3480 kHz. Repeat this adjustment, if necessary, until complete tracking is accomplished The output voltage at  $TP_{402}$  should be 0.3V - 0.6V RMS.

## (6) Second IF Alignment $T_{401}$ , $T_{402}$ , $TC_{401}$ , $TC_{402}$

Connect a signal generator between  $TP_{105}$  and  $TP_{106}$  (ground). Set the MODE switch to the AM position, and set the signal generator output frequency to 2.1 MHz (the FRG-7000 display should indicate 900 kHz). Peak  $T_{401}$  and  $T_{402}$  for a maximum S-meter reading.

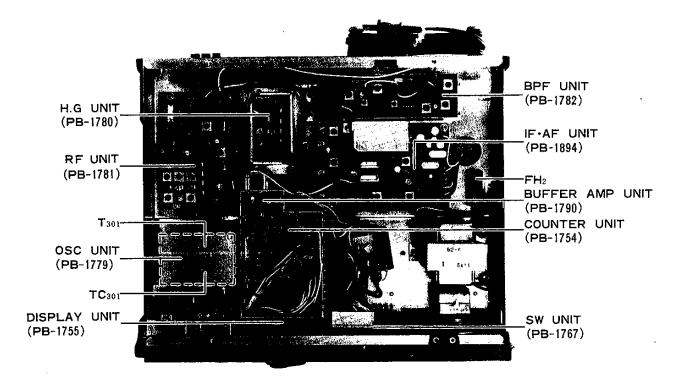
Set the signal generator to 2.9 MHz (the FRG-7000 digital display should indicate 100 kHz). Peak TC<sub>401</sub> and TC<sub>402</sub> for a maximum S-meter reading. Repeat the above adjustments until complete tracking is accomplished.

### (7) Third IF Alignment $T_{404}$ , $T_{405}$

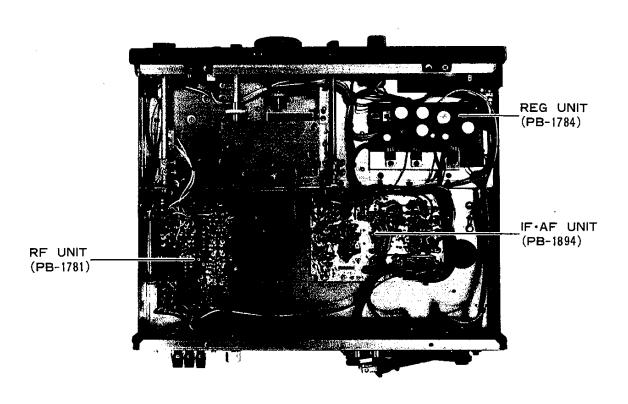
Connect a signal generator to  $TP_{401}$  and  $TP_{406}$  (ground), and set its output to 2.9 MHz (the FRG-7000 digital display should indicate 100 kHz). Peak  $T_{404}$  and  $T_{406}$  and  $T_{405}$  for a maximum S-meter reading.

### (8) S-meter Sensitivity VR<sub>401</sub>

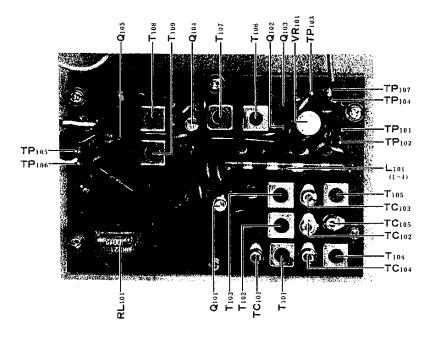
Connect a signal generator to SW2, and apply an 11 MHz 100 dB signal. Tune the receiver to 11 MHz, and adjust  $VR_{401}$  for a full scale reading on the S-meter.



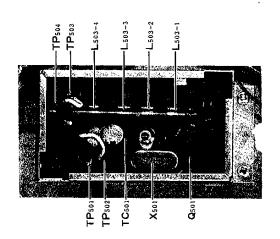
TOP VIEW



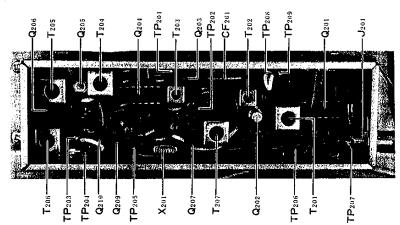
BOTTOM VIEW



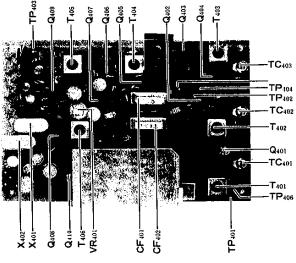
RF UNIT(PB-1781)



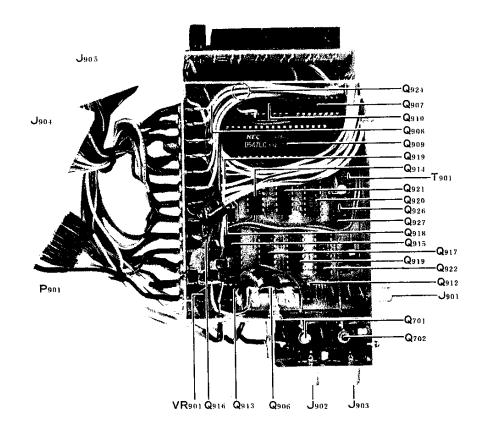
H.G.UNIT(PB-1780)



BPF UNIT(PB-1782)



IF-AF UNIT (PB-1894)



COUNTER UNIT(PB-1754)

### PARTS LIST

	0/41	N CHASSIS			1
Symbol No.	Part No.	Description		-	
<u> </u>		RESISTOR			
R5	40143470	Carbon film 1/4W VJ 47Ω	<del></del>		FUSE
R3, 6	41143680	" " " TJ 68Ω	F1	73000013	1A (100V~117V)
R1	41143222	" " " 2.2kΩ		73000013	0.5A (200V~234V)
R2	40143223	" " " VJ 22kΩ	F2	73000012	3A
R4	42124120	" composition 1/2W GK 12Ω	1 4	7,5000000	
R7, 8, 9	42124225	" " " 2.2ΜΩ			
R10	44204339	Wire wound 2W $3.3\Omega$			
KIO	11201337	Wife Would 2W 5.322		<b></b>	FUSE HOLDER
			FH1	69030005	SN-1301
	+		FH2	69030003	F3294
		POTENTIOMETER	1112	03030003	1 1 3 2 7 4
VR1	49800104	DM10A 10kΩB/10kΩB	·		
7 101	47000104	DIGITOR TORSED/TORSED		<del> </del>	
				<del> </del>	PILOT LAMP
	-		PL1, 2, 13, 14	14000033	BQ-034-22529A
	<del>-</del>	CAPACITOR	PL3, 9~12	14000033	BQ-034-22527A BQ-034-22527A
C2	31820050	Ceramic disc 50WV 5PF CH	PL4~8		BQ-034-22527A BQ-034-22528A
C3	30820103	" " " 0.01µF	T 75-A O	14000032	DQ-03T-22320A
C1	36825104	Mylar " 0.1μF		<del>                                     </del>	<del> </del>
C4	34220108	Electrolytic 25WV TT 1000µF			<u> </u>
	37220100	Disciplific 25 if V 11 1000µ1		<del></del>	ļ ·
				<u> </u>	<u> </u>
	<del>-</del>			<u> </u>	RF UNIT
			Symbol No.	Parts No.	Description
			Syllion NO.	017811AZ	RF board with components
	<del></del>	VARIABLE CAPACITOR	PB-1781A	60417811	P.C. Board
VC1, 2	20000070	<del> </del>	FD-1761A	00417011	r.c. board
VC3	39000078 39000079			<del> </del>	
	39000079	TSN 150S×04-1 4PF			
			<del></del>	ļ	FET
			Q102, 103, 105	22800105	2SK19GR
		POWER TRANSFORMER	Q102, 103, 103 Q104	23800401	35K40M
PT1	52000062	52-62	Q101 Q101	22800513	3SK51-03
	32000002	32-62	QIOI	22800313	33831-03
			<del></del>	<u> </u>	
					DIODE
· · · · · · · · · · · · · · · · · · ·	<del></del>		D101	21015550	Silicon 1S1555
	<del></del>	METER	DIOI	21013330	Silicon 131333
M1	74000380			<del> </del>	
	74000380	KTC-024			
					RESISTOR
	<del></del>		R121	40143100	
	<del>-</del>	CDEAVED	R121 R119	40143100	Carbon film 1/4W VJ 10Ω  " " " 33Ω
SD1	76000022	SPEAKER SM 93V 40 4W	R119 R120	40143330	" " " 47Ω
SP1	10000022	SM-92Y 4Ω 4W	R120 R107, 122	40143470	" " " 4/Ω
	<del>-</del>		R107, 122 R102, 108, 113,		" " " 100Ω
<del></del>	<del></del>		116, 124	70143221	22012
<del></del>		SWITCH	R103	41143221	" " TJ 220Ω
S1	62000002	ESR-E365R20A	R104, 105	40143561	" " " VJ 560Ω
S2	6200002	ESR-E365R20A ESR-E264R20	R104, 103	40143561	" " " 71 36042
\$3	65000012	PW-22	<del></del>	40143681	
S4	65000012	PW-22 PW-42	R115	+	" " " " 1.5kΩ
S5	64000053	8H2011	R110,	40143103	· · · · · · · · · · · · · · · · · · ·
57	04000033	0112011	R111	40143273	" " " " 27kΩ
·····		<del>  </del>	R118	40143393	" " " 47kΩ
<del></del>	<del></del>		R117	40143473	" " " " 100kΩ
		RECEPTACLE	R101, 106, 109	, 40143104	" " " " 100K32
	60000011		114, 123		
J1	68000011	M-BR-06D	,	<u> </u>	-
<u>J2</u>	68040006	. SQ2450-03		<del> </del>	
J3, 5	68020012	SG8050-07			
J4	68030002	SG7814	<del></del>	<del> </del>	
J6	80043741	UP-021		<u> </u>	

		POTENTIOMETER			
VR101	49905472	SR19R 4.7kΩB	··· · · · · · · · · · · · · · · · · ·		
110101					
		THERMISTOR			DE LIMIT
TH101	29090005	D-22A			PF UNIT
			Symbol No.	Part No.	Description
				017821AZ	BPF unit with components
			PB-1782A	60417821	P.C. Board
		CAPACITOR			
C119	31820020	Ceramic disc 50WV 2PF C	ЭН		
C106, 109, 124		" " " 3PF	n		
	31820050	" " " 5PF	"		IC, FET & TRANSISTOR
	31820150	" " " 15PF	" Q201, 204	25000104	IC SN76514N
C113, 114, 126		" " 22PF			FET 2SK19GR
		" " " 27PF		23800513	3SK51-03
	31820270	" " " 33PF		22303724	Transistor 2SC372Y
C107, 108, 117					
	31820820	" " 82PF		22303730	2SC373
	31829101	" " " 100P1		22305351	2SC535A
	30820102	" " " 0.001		ļ	
C101~105,	30820103	" " " 0.01μ	ıF	<u> </u>	
112, 115, 118,	!				
121~123, 127					DIODE
C128, 133	30820473	" " " 0.047	· •	21010070	Germanium 1S1007
C131	33824470	Dipped mica " 47PF	D201	21015550	Silicon 1S1555
C129	33824151	" " 150P	F		
-					
	·			<del></del>	
	ļ			<del> </del>	CRYSTAL
			X201	71500189	HC-18/U 63.2MHz
		<u></u>	X201	/1300189	HC-16/U 03.2MHZ
		TRIMMER CAPACITOR			
TC102	39000002	ECV-1ZW 20x32 20PF			
TC101, 103~	39000004	" 40x32 40PF			CERAMIC FILTER
105			CF201	71200020	10.7MF-S23 (SFG-10.7MA)
	1				
		TRANSFORMER			
T101	55002202	TRANSFORMER			RESISTOR
T101	55003293	R12-5830 #220360	<del></del>	40142470	RESISTOR Corbon film 1/4W VI 470
T102	55003200	R12-5830 #220360 R12-5828 #220040	6 R224	40143470	Carbon film 1/4W VJ 47Ω
T102 T103	55003200 55003201	R12-5830 #220360 R12-5828 #220040 R12-5781 #22004	6 R224 7 R207~209,	40143470 40143101	<u> </u>
T102 T103 T104	55003200 55003201 55003202	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040	6 R224 7 R207~209, 8 214~217	40143101	Carbon film 1/4W VJ 47Ω " " " 100Ω
T102 T103 T104 T105	55003200 55003201 55003202 55003203	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040 R12-5694 #220040	6 R224 7 R207~209, 8 214~217 9 R210	40143101 40143151	Carbon film 1/4W VJ 47Ω " " " 100Ω " " " 150Ω
T102 T103 T104	55003200 55003201 55003202	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040	6 R224 7 R207~209, 8 214~217 9 R210 0 R206	40143101 40143151 40143221	Carbon film 1/4W VJ 47Ω " " " 100Ω " " " " 150Ω " " " 220Ω
T102 T103 T104 T105	55003200 55003201 55003202 55003203	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040 R12-5694 #220040	6 R224 7 R207~209, 8 214~217 9 R210 0 R206 R 219, 223	40143101 40143151 40143221 40143331	Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 150Ω  " " " 220Ω  " " " 330Ω
T102 T103 T104 T105	55003200 55003201 55003202 55003203	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040 R12-5694 #220040	6 R224 7 R207~209, 8 214~217 9 R210 0 R206	40143101 40143151 40143221	Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 150Ω  " " " 220Ω  " " " 330Ω  " " " 470Ω
T102 T103 T104 T105	55003200 55003201 55003202 55003203	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040 R12-5694 #220040	6 R224 7 R207~209, 8 214~217 9 R210 0 R206 R 219, 223	40143101 40143151 40143221 40143331	Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 150Ω  " " " 220Ω  " " " 330Ω
T102 T103 T104 T105	55003200 55003201 55003202 55003203	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040 R12-5694 #220040	6 R224 7 R207~209, 8 214~217 9 R210 0 R206 R 219, 223 R202, 220	40143101 40143151 40143221 40143331 40143471	Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 150Ω  " " " 220Ω  " " " 330Ω  " " " 470Ω  " " 1 1kΩ  " " " 4.7kΩ
T102 T103 T104 T105 T106~109	55003200 55003201 55003202 55003203 55003204	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040 R12-5694 #220040 R12-1041B #220050	6 R224 7 R207~209, 8 214~217 9 R210 0 R206 R 219, 223 R202, 220 R201 R222	40143101 40143151 40143221 40143331 40143471 40143102 40143472	Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 150Ω  " " " 220Ω  " " " 330Ω  " " " 470Ω  " " 1 1kΩ
T102 T103 T104 T105 T106~109 L101	55003200 55003201 55003202 55003203 55003204 55003212	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040 R12-5694 #220040 R12-1041B #220050	6 R224 7 R207~209, 8 214~217 9 R210 0 R206 R 219, 223 R202, 220 R201 R222 1 R204, 212, 221	40143101 40143151 40143221 40143331 40143471 40143102 40143472	Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 150Ω  " " " 220Ω  " " " 330Ω  " " " 470Ω  " " 1 1kΩ  " " " 4.7kΩ
T102 T103 T104 T105 T106~109  L101 L103	55003200 55003201 55003202 55003203 55003204 55003212 53020018	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040 R12-5694 #220040 R12-1041B #220050  INDUCTOR #220050 Micro inductor 10µ1	6 R224 7 R207~209, 8 214~217 9 R210 0 R206 R 219, 223 R202, 220 R201 R222 1 R204, 212, 221 H 225	40143101 40143151 40143221 40143331 40143471 40143102 40143472	Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 150Ω  " " " 220Ω  " " " 330Ω  " " " 470Ω  " " 1 1kΩ  " " " 4.7kΩ
T102 T103 T104 T105 T106~109	55003200 55003201 55003202 55003203 55003204 55003212	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040 R12-5694 #220040 R12-1041B #220050  INDUCTOR #220050 Micro inductor 10µ1	6 R224 7 R207~209, 8 214~217 9 R210 0 R206 R 219, 223 R202, 220 R201 R222 1 R204, 212, 221 H 225 H R203	40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103	Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 150Ω  " " " 220Ω  " " " 330Ω  " " " 470Ω  " " " 14ΩΩ  " " " 10kΩ  " " " 10kΩ
T102 T103 T104 T105 T106~109  L101 L103	55003200 55003201 55003202 55003203 55003204 55003212 53020018	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040 R12-5694 #220040 R12-1041B #220050  INDUCTOR #220050 Micro inductor 10µ1	6 R224 7 R207~209, 8 214~217 9 R210 0 R206 R 219, 223 R202, 220 R201 R222 1 R204, 212, 221 H 225 H R203 R211	40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333	Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 150Ω  " " " 220Ω  " " " 330Ω  " " " 470Ω  " " " 16ΩΩ  " " " 100Ω
T102 T103 T104 T105 T106~109  L101 L103	55003200 55003201 55003202 55003203 55003204 55003212 53020018	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040 R12-5694 #220040 R12-1041B #220050  INDUCTOR #220050 Micro inductor 10µ1	6 R224 7 R207~209, 8 214~217 9 R210 0 R206 R 219, 223 R202, 220 R201 R222 1 R204, 212, 221 H 225 H R203	40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333	Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 150Ω  " " " 220Ω  " " " 330Ω  " " " 470Ω  " " " 14ΩΩ  " " " 10kΩ  " " " 10kΩ
T102 T103 T104 T105 T106~109  L101 L103	55003200 55003201 55003202 55003203 55003204 55003212 53020018	R12-5830 #220366 R12-5828 #220046 R12-5781 #220047 R12-5707 #220047 R12-5694 #220047 R12-1041B #220056  INDUCTOR #22005  Micro inductor 10µ1 " " FL5H 68µ1	6 R224 7 R207~209, 8 214~217 9 R210 0 R206 R 219, 223 R202, 220 R201 R222 1 R204, 212, 221 H 225 H R203 R211	40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333	Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 150Ω  " " " 220Ω  " " " 330Ω  " " " 470Ω  " " " 16ΩΩ  " " " 100Ω
T102 T103 T104 T105 T106~109  L101 L103 L102	55003200 55003201 55003202 55003203 55003204 55003212 53020018 53020008	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040 R12-5694 #220040 R12-1041B #220050  INDUCTOR  #22005  Micro inductor 10µ1 " " FL5H 68µ1  RELAY	6 R224 7 R207~209, 8 214~217 9 R210 0 R206 R 219, 223 R202, 220 R201 R222 1 R204, 212, 221 H 225 H R203 R211	40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333	Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 150Ω  " " " 220Ω  " " " 330Ω  " " " 470Ω  " " " 16ΩΩ  " " " 100Ω
T102 T103 T104 T105 T106~109  L101 L103	55003200 55003201 55003202 55003203 55003204 55003212 53020018	R12-5830 #220366 R12-5828 #220046 R12-5781 #220047 R12-5707 #220047 R12-5694 #220047 R12-1041B #220056  INDUCTOR #22005  Micro inductor 10µ1 " " FL5H 68µ1	6 R224 7 R207~209, 8 214~217 9 R210 0 R206 R 219, 223 R202, 220 R201 R222 1 R204, 212, 221 H 225 H R203 R211	40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333	Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 150Ω  " " " 220Ω  " " " 330Ω  " " " 470Ω  " " " 16ΩΩ  " " " 100Ω
T102 T103 T104 T105 T106~109  L101 L103 L102	55003200 55003201 55003202 55003203 55003204 55003212 53020018 53020008	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040 R12-5694 #220040 R12-1041B #220050  INDUCTOR  #22005  Micro inductor 10µ1 " " FL5H 68µ1  RELAY	6 R224 7 R207~209, 8 214~217 9 R210 0 R206 R 219, 223 R202, 220 R201 R222 1 R204, 212, 221 H 225 H R203 R211	40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333	Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 150Ω  " " " 220Ω  " " " 330Ω  " " " 470Ω  " " " 16ΩΩ  " " " 100Ω
T102 T103 T104 T105 T106~109  L101 L103 L102	55003200 55003201 55003202 55003203 55003204 55003212 53020018 53020008	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040 R12-5694 #220040 R12-1041B #220050  INDUCTOR  #22005  Micro inductor 10µ1 " " FL5H 68µ1  RELAY	6 R224 7 R207~209, 8 214~217 9 R210 0 R206 R 219, 223 R202, 220 R201 R222 1 R204, 212, 221 H 225 H R203 R211	40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333	Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 150Ω  " " " 220Ω  " " " 330Ω  " " " 470Ω  " " " 16ΩΩ  " " " 100Ω
T102 T103 T104 T105 T106~109  L101 L103 L102	55003200 55003201 55003202 55003203 55003204 55003212 53020018 53020008	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040 R12-5694 #220040 R12-1041B #220050  INDUCTOR  #22005  Micro inductor 10µ1 " " FL5H 68µ1  RELAY	6 R224 7 R207~209, 8 214~217 9 R210 0 R206 R 219, 223 R202, 220 R201 R222 1 R204, 212, 221 H 225 H R203 R211	40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333	Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 150Ω  " " " 220Ω  " " " 330Ω  " " " 470Ω  " " " 16ΩΩ  " " " 100Ω
T102 T103 T104 T105 T106~109  L101 L103 L102	55003200 55003201 55003202 55003203 55003204 55003212 53020018 53020008	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040 R12-5694 #220040 R12-1041B #220050  INDUCTOR  #22005  Micro inductor 10µ1 " " FL5H 68µ1  RELAY	6 R224 7 R207~209, 8 214~217 9 R210 0 R206 R 219, 223 R202, 220 R201 R222 1 R204, 212, 221 H 225 H R203 R211	40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333	Carbon film 1/4W VJ 47Ω  " " " " 100Ω  " " " " 220Ω  " " " " 330Ω  " " " 470Ω  " " " 47kΩ  " " " 10kΩ  " " " 33kΩ  " " " 47kΩ  " " " 47kΩ  " " " 47kΩ  " " " 47kΩ
T102 T103 T104 T105 T106~109  L101 L103 L102  RL101	55003200 55003201 55003202 55003203 55003204 55003212 53020018 53020008	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040 R12-5694 #220040 R12-1041B #220050  INDUCTOR  #220050  Micro inductor 10µ1 " " FL5H 68µ1  RELAY BR 221D012 12V  US PIN PLUG	6 R224 7 R207~209, 8 214~217 9 R210 0 R206 R 219, 223 R202, 220 R201 R222 1 R204, 212, 221 H 225 H R203 R211 R205, 213, 218	40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143273 31820050	Carbon film 1/4W VJ 47Ω  " " " " 100Ω  " " " 220Ω  " " " 220Ω  " " " 470Ω  " " 47kΩ  " " " 10kΩ  " " " 47kΩ  " " " 33kΩ  " " " 47kΩ  " " " 47kΩ  " " " 47kΩ
T102 T103 T104 T105 T106~109  L101 L103 L102	55003200 55003201 55003202 55003203 55003204 55003212 53020018 53020008	R12-5830 #220360 R12-5828 #220040 R12-5781 #220040 R12-5707 #220040 R12-5694 #220040 R12-1041B #220050  INDUCTOR  #220050  Micro inductor 10µ1 " " FL5H 68µ1  RELAY BR 221D012 12V	6 R224 7 R207~209, 8 214~217 9 R210 0 R206 R219, 223 R202, 220 R201 R222 1 R204, 212, 221 H 225 H R203 R211 R205, 213, 218	40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143273 31820050	Carbon film 1/4W VJ 47Ω  " " " " 100Ω  " " " 220Ω  " " " 220Ω  " " " 470Ω  " " 47kΩ  " " 10kΩ  " " " 33kΩ  " " " 47kΩ  " " 47kΩ  " " " 47kΩ  " " " 47kΩ  " " " 47kΩ  " " " 57kΩ  " " " 47kΩ  " " " 57kΩ  " " " 47kΩ  " " " 57kΩ  " " " 57kΩ  " " " 57kΩ

C213, 233,	31820101	Ceramic disc 50WV 100PF CH			
236, 238	31020101	Ceramic disc 50WV 100FF CH			CAPACITOR
C209, 210,	30820102	" " " 0.001μF	C301	31827070	Ceramic disc 50WV 7PF UJ
216, 220, 223,	1	0.00141	C304	31827070	" " 22PF "
235, 239		<u> </u>		31827220	**************************************
C206, 214,	30820103	" " " 0.01μF	C302, 303		
217~219,221,	1			30820103	0.0141
	1	ļ	C307, 308	30820473	" " " 0.047μF
222, 224, 227,					
229~232,234,		į .			
237, 241					
C205, 207,	30820473	" " " 0.047μF			
208, 211, 215,	.]				
225, 228					VARIABLE CAPACITOR
	1		VC301	39000074	C343C 15PFx4
			· · · · · ·		
					TRIMMER CAPACITOR
		TRANSFORMER	TC301	39000001	
T201, 204~206	55003294	#220361	10301	22000001	ECV-1ZW 10x32 10PF
T207	55003295				
T202, 203	55003296	#220362			
1202, 203	33003290	#220187			
	<del>                                     </del>		T201	### T	TRANSFORMER
	ļ	<del> </del>	T301	55003208	#220052
	ļ		<del></del>		
		INDUCTOR			INDUCTOR
L201	55003206	#220053	L301	53010003	Micro inductor 250µH
L202	55003207	#220054			<u>L.,, ,,</u> ,
L204, 206	53020013	Micro inductor 150µF		IF,	AF UNIT
L203, 205	53020001	" " lmH	Symbol No.	Parts No.	Description
				018940AZ	IF, AF unit with components
			PB-1894	60418940	P.C. Board
		US PIN JACK			
J101	68020008	US PIN JACK SQ3056			IC, FET & TRANSISTOR
J101	68020008		Q410	25000162	
J101	68020008		Q410 Q402, 404		IC TA7205AP
J101		SQ3056		22800195	IC TA7205AP FET 2SK19GR
J101	68020008 91100008		Q402, 404 Q401	22800195 23800401	IC         TA7205AP           FET         2SK19GR           FET         3SK40M
J101		SQ3056	Q402, 404	22800195 23800401	IC TA7205AP FET 2SK19GR
J101		SQ3056	Q402, 404 Q401	22800195 23800401	IC         TA7205AP           FET         2SK19GR           FET         3SK40M
J101		SQ3056	Q402, 404 Q401	22800195 23800401	IC         TA7205AP           FET         2SK19GR           FET         3SK40M           Transistor         2SC372Y
J101		SQ3056	Q402, 404 Q401 Q403, 405~409	22800195 23800401 22303724	IC         TA7205AP           FET         2SK19GR           FET         3SK40M           Transistor         2SC372Y
J101	91100008	SQ3056  Wrapping terminal C	Q402, 404 Q401 Q403, 405~409 D401~407	22800195 23800401 22303724 21010070	IC         TA7205AP           FET         2SK19GR           FET         3SK40M           Transistor         2SC372Y           DIODE         Germanium           1S1007
	91100008	SQ3056  Wrapping terminal C  SC UNIT	Q402, 404 Q401 Q403, 405~409 D401~407 D408~411	22800195 23800401 22303724 21010070 21015550	IC         TA7205AP           FET         2SK19GR           FET         3SK40M           Transistor         2SC372Y           DIODE         Germanium           Silicon         1S1555
J101 Symbol No.	91100008 0 Part No.	SQ3056  Wrapping terminal C  SC UNIT  Description	Q402, 404 Q401 Q403, 405~409 D401~407 D408~411 Q403, 405~407,	22800195 23800401 22303724 21010070 21015550	IC         TA7205AP           FET         2SK19GR           FET         3SK40M           Transistor         2SC372Y           DIODE         Germanium           1S1007
Symbol No.	91100008 0 Part No. 017791AZ	SQ3056  Wrapping terminal C  SC UNIT  Description  OSC board with components	Q402, 404 Q401 Q403, 405~409 D401~407 D408~411	22800195 23800401 22303724 21010070 21015550	IC         TA7205AP           FET         2SK19GR           FET         3SK40M           Transistor         2SC372Y           DIODE         Germanium           Silicon         1S1555           Transistor         2SC372Y
	91100008 0 Part No.	SQ3056  Wrapping terminal C  SC UNIT  Description	Q402, 404 Q401 Q403, 405~409 D401~407 D408~411 Q403, 405~407, 409	22800195 23800401 22303724 21010070 21015550 22303724	IC         TA7205AP           FET         2SK19GR           FET         3SK40M           Transistor         2SC372Y           DIODE         Germanium           Silicon         1S1555           Transistor         2SC372Y    CRYSTAL
Symbol No.	91100008 0 Part No. 017791AZ	SQ3056  Wrapping terminal C  SC UNIT  Description  OSC board with components	Q402, 404 Q401 Q403, 405~409 D401~407 D408~411 Q403, 405~407, 409	22800195 23800401 22303724 21010070 21015550 22303724 71600035	IC         TA7205AP           FET         2SK19GR           FET         3SK40M           Transistor         2SC372Y           DIODE         Germanium           Silicon         1S1555           Transistor         2SC372Y           CRYSTAL         456.5kHz
Symbol No.	91100008 0 Part No. 017791AZ	SQ3056  Wrapping terminal C  SC UNIT  Description  OSC board with components	Q402, 404 Q401 Q403, 405~409 D401~407 D408~411 Q403, 405~407, 409	22800195 23800401 22303724 21010070 21015550 22303724	IC         TA7205AP           FET         2SK19GR           FET         3SK40M           Transistor         2SC372Y           DIODE         Germanium           Silicon         1S1555           Transistor         2SC372Y    CRYSTAL
Symbol No.	91100008 0 Part No. 017791AZ	SQ3056  Wrapping terminal C  SC UNIT  Description OSC board with components P.C. Board	Q402, 404 Q401 Q403, 405~409 D401~407 D408~411 Q403, 405~407, 409	22800195 23800401 22303724 21010070 21015550 22303724 71600035	IC         TA7205AP           FET         2SK19GR           FET         3SK40M           Transistor         2SC372Y           DIODE         Germanium           Silicon         1S1555           Transistor         2SC372Y           CRYSTAL         456.5kHz
Symbol No. PB-1779A	91100008  O Part No. 017791AZ 60417791	SQ3056  Wrapping terminal C  SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR	Q402, 404 Q401 Q403, 405~409 D401~407 D408~411 Q403, 405~407, 409	22800195 23800401 22303724 21010070 21015550 22303724 71600035	IC         TA7205AP           FET         2SK19GR           FET         3SK40M           Transistor         2SC372Y           DIODE         Germanium           Silicon         1S1555           Transistor         2SC372Y           CRYSTAL         456.5kHz
Symbol No.	91100008 0 Part No. 017791AZ	SQ3056  Wrapping terminal C  SC UNIT  Description OSC board with components P.C. Board	Q402, 404 Q401 Q403, 405~409 D401~407 D408~411 Q403, 405~407, 409 X401 X402	22800195 23800401 22303724 21010070 21015550 22303724 71600035 71600034	IC         TA7205AP           FET         2SK19GR           FET         3SK40M           Transistor         2SC372Y           DIODE         Germanium           Silicon         1S1507           Silicon         2SC372Y           CRYSTAL         456.5kHz
Symbol No. PB-1779A	91100008  O Part No. 017791AZ 60417791	SQ3056  Wrapping terminal C  SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR	Q402, 404 Q401 Q403, 405~409 D401~407 D408~411 Q403, 405~407, 409	22800195 23800401 22303724 21010070 21015550 22303724 71600035	IC TA7205AP FET 2SK19GR FET 3SK40M Transistor 2SC372Y  DIODE Germanium 1S1007 Silicon 1S1555 Transistor 2SC372Y  CRYSTAL HC-6/W 456.5kHz " 453.5kHz
Symbol No. PB-1779A	91100008  O Part No. 017791AZ 60417791	SQ3056  Wrapping terminal C  SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR	Q402, 404 Q401 Q403, 405~409 D401~407 D408~411 Q403, 405~407, 409 X401 X402	22800195 23800401 22303724 21010070 21015550 22303724 71600035 71600034	IC         TA7205AP           FET         28K19GR           FET         38K40M           Transistor         28C372Y           DIODE           Germanium         181007           Silicon         181555           Transistor         28C372Y           CRYSTAL           HC-6/W         456.5kHz           "         453.5kHz           CERAMIC FILTER
Symbol No. PB-1779A	91100008  O Part No. 017791AZ 60417791	SQ3056  Wrapping terminal C  SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR	Q402, 404 Q401 Q403, 405~409 D401~407 D408~411 Q403, 405~407, 409 X401 X402	22800195 23800401 22303724 21010070 21015550 22303724 71600035 71600034	IC TA7205AP FET 2SK19GR FET 3SK40M Transistor 2SC372Y   DIODE Germanium 1S1007 Silicon 1S1555 Transistor 2SC372Y  CRYSTAL HC-6/W 456.5kHz " 453.5kHz  CERAMIC FILTER LF-C6
Symbol No. PB-1779A	91100008  O Part No. 017791AZ 60417791	SQ3056  Wrapping terminal C  SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR	Q402, 404 Q401 Q403, 405~409 D401~407 D408~411 Q403, 405~407, 409 X401 X402	22800195 23800401 22303724 21010070 21015550 22303724 71600035 71600034	IC TA7205AP FET 2SK19GR FET 3SK40M Transistor 2SC372Y   DIODE Germanium 1S1007 Silicon 1S1555 Transistor 2SC372Y  CRYSTAL HC-6/W 456.5kHz " 453.5kHz  CERAMIC FILTER LF-C6
Symbol No. PB-1779A	91100008  O Part No. 017791AZ 60417791	SQ3056  Wrapping terminal C  SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR  2SC784 O	Q402, 404 Q401 Q403, 405~409 D401~407 D408~411 Q403, 405~407, 409 X401 X402	22800195 23800401 22303724 21010070 21015550 22303724 71600035 71600034	IC TA7205AP FET 2SK19GR FET 3SK40M Transistor 2SC372Y   DIODE Germanium 1S1007 Silicon 1S1555 Transistor 2SC372Y  CRYSTAL HC-6/W 456.5kHz " 453.5kHz  CERAMIC FILTER LF-C6
Symbol No. PB-1779A  Q301	91100008  Part No. 017791AZ 60417791	SQ3056  Wrapping terminal C  SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR  2SC784 O	Q402, 404 Q401 Q403, 405~409 D401~407 D408~411 Q403, 405~407, 409 X401 X402	22800195 23800401 22303724 21010070 21015550 22303724 71600035 71600034	IC TA7205AP FET 2SK19GR FET 3SK40M Transistor 2SC372Y   DIODE Germanium 1S1007 Silicon 1S1555 Transistor 2SC372Y  CRYSTAL HC-6/W 456.5kHz " 453.5kHz  CERAMIC FILTER LF-C6 LF-C2A
Symbol No.  PB-1779A  Q301  R304	91100008  Part No. 017791AZ 60417791  22307843  40143101 40143821	SQ3056  Wrapping terminal C  SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR  2SC784 O  RESISTOR Carbon film 1/4W VJ 100Ω " " " 820Ω	Q402, 404 Q401 Q403, 405~409  D401~407 D408~411 Q403, 405~407, 409  X401 X402  CF401 CF402	22800195 23800401 22303724 21010070 21015550 22303724 71600035 71600034 71200012	IC TA7205AP FET 2SK19GR FET 3SK40M Transistor 2SC372Y   DIODE Germanium IS1007 Silicon 1S1555 Transistor 2SC372Y  CRYSTAL HC-6/W 456.5kHz " 453.5kHz  CERAMIC FILTER LF-C6 LF-C2A  RESISTOR
Symbol No.  PB-1779A  Q301  R304  R303  R302	91100008  Part No. 017791AZ 60417791  22307843  40143101 40143821 40143472	SQ3056  Wrapping terminal C  SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR  2SC784 O  RESISTOR  Carbon film 1/4W VJ 100Ω  " " " 820Ω " " 4.7kΩ	Q402, 404 Q401 Q403, 405~409  D401~407 D408~411 Q403, 405~407, 409  X401 X402  CF401 CF402	22800195 23800401 22303724 21010070 21015550 22303724 71600035 71600034 71200012 71200021	IC       TA7205AP         FET       2SK19GR         FET       3SK40M         Transistor       2SC372Y         DIODE         Germanium       1S1007         Silicon       1S1555         Transistor       2SC372Y         CRYSTAL         HC-6/W       456.5kHz         "       453.5kHz         CERAMIC FILTER         LF-C6       LF-C2A         RESISTOR         Carbon film 1/4W VJ       15Ω
Symbol No.  PB-1779A  Q301  R304  R303	91100008  Part No. 017791AZ 60417791  22307843  40143101 40143821	SQ3056  Wrapping terminal C  SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR  2SC784 O  RESISTOR  Carbon film 1/4W VJ 100Ω  " " " 820Ω " " 4.7kΩ	Q402, 404 Q401 Q403, 405~409  D401~407 D408~411 Q403, 405~407, 409  X401 X402  CF401 CF402  R429 R439	22800195 23800401 22303724 21010070 21015550 22303724 71600035 71600034 71200021 40143150 40143470	IC TA7205AP FET 2SK19GR FET 3SK40M Transistor 2SC372Y   DIODE Germanium 1S1007 Silicon 1S1555 Transistor 2SC372Y  CRYSTAL HC-6/W 456.5kHz " 453.5kHz  CERAMIC FILTER LF-C6 LF-C2A  RESISTOR Carbon film 1/4W VJ 15Ω " 47Ω
Symbol No.  PB-1779A  Q301  R304  R303  R302	91100008  Part No. 017791AZ 60417791  22307843  40143101 40143821 40143472	SQ3056  Wrapping terminal C  SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR  2SC784 O  RESISTOR  Carbon film 1/4W VJ 100Ω  " " " 820Ω " " 4.7kΩ	Q402, 404 Q401 Q403, 405~409  D401~407 D408~411 Q403, 405~407, 409  X401 X402  CF401 CF402	22800195 23800401 22303724 21010070 21015550 22303724 71600035 71600034 71200021 40143150 40143470	IC TA7205AP FET 2SK19GR FET 3SK40M Transistor 2SC372Y   DIODE Germanium 1S1007 Silicon 1S1555 Transistor 2SC372Y  CRYSTAL HC-6/W 456.5kHz " 453.5kHz  CERAMIC FILTER LF-C6 LF-C2A  RESISTOR Carbon film 1/4W VJ 15Ω
Symbol No.  PB-1779A  Q301  R304  R303  R302	91100008  Part No. 017791AZ 60417791  22307843  40143101 40143821 40143472	SQ3056  Wrapping terminal C  SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR  2SC784 O  RESISTOR  Carbon film 1/4W VJ 100Ω  " " " 820Ω " " 4.7kΩ	Q402, 404 Q401 Q403, 405~409  D401~407 D408~411 Q403, 405~407, 409  X401 X402  CF401 CF402  R429 R439	22800195 23800401 22303724 21010070 21015550 22303724 71600035 71600034 71200021 40143150 40143470	IC TA7205AP FET 2SK19GR FET 3SK40M Transistor 2SC372Y   DIODE Germanium 1S1007 Silicon 1S1555 Transistor 2SC372Y  CRYSTAL HC-6/W 456.5kHz " 453.5kHz  CERAMIC FILTER LF-C6 LF-C2A  RESISTOR Carbon film 1/4W VJ 15Ω " 47Ω
Symbol No.  PB-1779A  Q301  R304  R303  R302	91100008  Part No. 017791AZ 60417791  22307843  40143101 40143821 40143472	SQ3056  Wrapping terminal C  SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR  2SC784 O  RESISTOR  Carbon film 1/4W VJ 100Ω  " " " 820Ω " " 4.7kΩ	Q402, 404 Q401 Q403, 405~409  D401~407 D408~411 Q403, 405~407, 409  X401 X402  CF401 CF402  R429 R439	22800195 23800401 22303724 21010070 21015550 22303724 71600035 71600034 71200021 40143150 40143470	IC TA7205AP FET 2SK19GR FET 3SK40M Transistor 2SC372Y   DIODE Germanium 1S1007 Silicon 1S1555 Transistor 2SC372Y  CRYSTAL HC-6/W 456.5kHz " 453.5kHz  CERAMIC FILTER LF-C6 LF-C2A  RESISTOR Carbon film 1/4W VJ 15Ω " 47Ω
Symbol No.  PB-1779A  Q301  R304  R303  R302	91100008  Part No. 017791AZ 60417791  22307843  40143101 40143821 40143472	SQ3056  Wrapping terminal C  SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR  2SC784 O  RESISTOR  Carbon film 1/4W VJ 100Ω  " " " 820Ω " " 4.7kΩ	Q402, 404 Q401 Q403, 405~409  D401~407 D408~411 Q403, 405~407, 409  X401 X402  CF401 CF402  R429 R439	22800195 23800401 22303724 21010070 21015550 22303724 71600035 71600034 71200021 40143150 40143470	IC TA7205AF FET 2SK19GR FET 3SK40M Transistor 2SC372Y   DIODE Germanium IS1007 Silicon 1S1555 Transistor 2SC372Y  CRYSTAL HC-6/W 456.5kHz " 453.5kHz  CERAMIC FILTER LF-C6 LF-C2A  RESISTOR Carbon film 1/4W VJ 15Ω " " 47Ω

D420 421	41142101	Carbon film 1/4W TJ 100Ω	C420 444	22024610	Discount CONSTR. CIDE
R420, 421	41143101 40143121	Carbon film 1/4W TJ 100Ω " " " 120Ω	C438, 444 C458	32824510 32824820	Dipped mica 50WV 51PF
R408, 410, 414,	40143121	" " " " 220Ω	C460	32824320	" " " 120PF
424, 426, 433,	40143221	22032	C435	32824271	" " 270PF
435, 437, 453	1		C441	32824391	" " " 390PF
R401	40143331	" " " 330Ω	C432	32824471	" " 470PF
R430	40143331	" " " 470Ω	C462	32824681	" " " 680PF
R449	40143561	" " " " 560Ω	C431, 463	32824102	" " 1000PF
R431	40143681	" " " " 680Ω	C431, 403	36825332	Mylar " 0.0033μF
R425, 440, 458	40143102	" " " " 1kΩ	C427	36825472	
R423, 440, 436	40143152	" " " 1.5kΩ	C426		" " $0.0047\mu\text{F}$ " $0.01\mu\text{F}$
R415, 418, 419,	40143132	" " " 2.2kΩ	C426	36825103 36825223	" " 0.01μF " 0.022μF
422, 455, 457	40143222	2.2R32	C436	36825333	
R413, 417, 428,	40143332	" " " 3.3kΩ	C416, 420, 422,	36825473	" " 0.033μF " " 0.047μF
451	40143332	3.3K42	442, 468	30023473	
R448	40143392	" " " 3.9kΩ	C445	36825104	" 0.1μF
R452	40143472	" " " 4.7kΩ	C428	36825224	" " 0.22µF
R411	40143822	" " " 8.2kΩ	C+20	34220105	Electrolytic 16WV 1μF
R427	40143103	" " " 10kΩ	C425, 447	34220225	" " 2.2μF
N421	40143153	" " " 15kΩ	C439	34220225	" " 22μF
R450, 460	40143183	" " " 18kΩ	C435	34220226	" " 33μF
11750, TOU	40143183	" " " " 22kΩ	C442, 446, 448	34220336	" " 33μF " 47μF
R459	40143223	" " " " 33kΩ	C442, 446, 448	34220476	" " 47μF " 100μF
R439	40143333	" " " " 39kΩ	C440, 407, 409	3422010/	. 100hr
R406	40143393	" " " " 39κι		<del></del>	
R402	40143473	" " " " 56kΩ			
R436	40143683	" " " 68kΩ			
R412, 434, 441,	40143104	" " " " 100kΩ			TRIMMER CAPACITOR
456	40143104	" " " 100K32	TC403	39000002	ECV-1ZW 20x32 20PF
R405	40143154	" " " 150kΩ	TC401, 402	39000002	ECV-1ZW 20x32 20FF ECV-1ZW 50x32 50PF
R423, 438	40143134	" " " " 220kΩ	10401, 402	39000003	ECV-1ZW JUX32 JUFF
1423, 430	40143224	220832			· <del></del>
					TRANSFORMER
			T401	55003209	R12-5783 #220060
			T402	55003210	R12-5780 #220061
		THERMISTOR	T403	55003211	R12-5775 #220062
TH401	29090005	THERMISTOR D-22A	T403 T404, 405	55003211 54140970	R12-5775 #220062 R12-4097 #220101
TH401	29090005	THERMISTOR D-22A	T403 T404, 405 T406	54140970	R12-4097 #220101
TH401	29090005		T404, 405		
TH401	29090005		T404, 405	54140970	R12-4097 #220101 R12-4099 #220156
TH401	29090005		T404, 405 T406	54140970 54140990	R12-4097 #220101 R12-4099 #220156 INDUCTOR
TH401 VR401	29090005	D-22A	T404, 405	54140970	R12-4097 #220101 R12-4099 #220156 INDUCTOR Micro inductor FL4H 4.7μH
		D-22A POTENTIOMETER	T404, 405 T406 L401, 402	54140970 54140990 53020022 53020024	R12-4097 #220101 R12-4099 #220156 INDUCTOR Micro inductor FL4H 4.7μH " " FL5H 27μH
		D-22A POTENTIOMETER	T404, 405 T406 L401, 402 L414	54140970 54140990 53020022 53020024 53020023	R12-4097 #220101 R12-4099 #220156 INDUCTOR Micro inductor FL4H 4.7µH " " FL5H 27µH
		D-22A POTENTIOMETER	T404, 405 T406 L401, 402 L414 L415	54140970 54140990 53020022 53020024 53020023 53020001	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7μH  " " FL5H 27μH  " " FL5H 100μH  " " FL5H 1mH
		D-22A POTENTIOMETER	T404, 405 T406 L401, 402 L414 L415 L403	54140970 54140990 53020022 53020024 53020023 53020001	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7μH  " " FL5H 27μH  " " FL5H 100μH  " " FL5H 1mH
		D-22A  POTENTIOMETER  SR19R 470ΩB	T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407,	54140970 54140990 53020022 53020024 53020023 53020001	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7μH  " " FL5H 27μH  " " FL5H 100μH  " " FL5H 1mH
VR401	49905471	D-22A  POTENTIOMETER  SR19R 470ΩB  CAPACITOR	T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409,	54140970 54140990 53020022 53020024 53020023 53020001 53020003	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7μH  " " FL5H 27μH  " " FL5H 100μH  " " FL5H 1mH  " " FL7H 3.9mH
VR401 C415, 419	49905471 31820010	D-22A  POTENTIOMETER  SR19R 470ΩB  CAPACITOR  Ceramic disc 50WV 1PF CH	T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409,	54140970 54140990 53020022 53020024 53020023 53020001 53020003	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7μH  " " FL5H 27μH  " " FL5H 100μH  " " FL5H 1mH  " " FL7H 3.9mH
VR401  C415, 419 C434	49905471 31820010 31820070	D-22A  POTENTIOMETER  SR19R 470ΩB  CAPACITOR  Ceramic disc 50WV 1PF CH  " " " 7PF CH	T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409,	54140970 54140990 53020022 53020024 53020023 53020001 53020003	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7μH  " " FL5H 27μH  " " FL5H 100μH  " " FL5H 1mH  " " FL7H 3.9mH
VR401  C415, 419 C434 C430	49905471 31820010 31820070 31820100	D-22A  POTENTIOMETER  SR19R 470ΩB  CAPACITOR  Ceramic disc 50WV 1PF CH  " " " 7PF CH  " " " 10PF CH	T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409,	54140970 54140990 53020022 53020024 53020023 53020001 53020003	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7μH  " " FL5H 27μH  " " FL5H 100μH  " " FL5H 1mH  " " FL7H 3.9mH
VR401  C415, 419  C434  C430  C461	31820010 31820070 31820100 31820220	D-22A  POTENTIOMETER  SR19R 470ΩB  CAPACITOR  Ceramic disc 50WV 1PF CH  " " " 7PF CH  " " " 10PF CH  " " " 22PF CH	T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409,	54140970 54140990 53020022 53020024 53020023 53020001 53020003	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7μH  " " FL5H 27μH  " " FL5H 100μH  " " FL5H 1mH  " " FL7H 3.9mH  " (shielded) S6-392 3.9 mH
VR401  C415, 419  C434  C430  C461  C465	31820010 31820070 31820100 31820220 31820220	D-22A	T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	54140970 54140990 53020022 53020024 53020001 53020003	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7μH  " " FL5H 27μH  " " FL5H 100μH  " " FL5H 1mH  " " FL7H 3.9mH  " (shielded) S6-392 3.9 mH
VR401  C415, 419  C434  C430  C461  C465  C459	31820010 31820070 31820100 31820220 31820270 31827820	D-22A  POTENTIOMETER  SR19R 470ΩB  CAPACITOR  Ceramic disc 50WV 1PF CH  " " " 7PF CH  " " " 10PF CH  " " " 22PF CH  " " " 27PF CH  " " " 82PF UJ	T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	54140970 54140990 53020022 53020024 53020001 53020003	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7μH  " " FL5H 27μH  " " FL5H 100μH  " " FL5H 1mH  " " FL7H 3.9mH  " (shielded) S6-392 3.9 mH  US PIN PLUG SQ4052
VR401  C415, 419  C434  C430  C461  C465  C459  C421, 423	31820010 31820070 31820100 31820200 31820270 31827820 31827820 31829101	D-22A  POTENTIOMETER  SR19R 470ΩB  CAPACITOR  Ceramic disc 50WV 1PF CH  " " " 7PF CH  " " " 10PF CH  " " " 22PF CH  " " " 27PF CH  " " " 32PF UJ  " " 100PF SL	T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	54140970 54140990 53020022 53020024 53020003 53020003 53030003	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7μH  " " FL5H 27μH  " " FL5H 100μH  " " FL5H 1mH  " " FL7H 3.9mH  " (shielded) S6-392 3.9 mH
VR401  C415, 419  C434  C430  C461  C465  C459  C421, 423  C453	31820010 31820070 31820200 31820200 31820220 31820270 31827820 31829101 31829151	D-22A  POTENTIOMETER  SR19R 470ΩB  CAPACITOR  Ceramic disc 50WV 1PF CH  " " " 7PF CH  " " " 10PF CH  " " " 22PF CH  " " " 27PF CH  " " " 27PF CH  " " " 100PF SL  " " " 150PF SL	T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	54140970 54140990 53020022 53020024 53020003 53020003 53030003	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7μH  " " FL5H 27μH  " " FL5H 100μH  " " FL5H 1mH  " " FL7H 3.9mH  " (shielded) S6-392 3.9 mH  US PIN PLUG SQ4052
VR401  C415, 419  C434  C430  C461  C465  C459  C421, 423  C453  C454	31820010 31820070 3182020 3182020 31820220 31820270 31827820 31829101 31829151 31829221 30820102	D-22A  POTENTIOMETER  SR 19R 470ΩB  CAPACITOR  Ceramic disc 50WV 1PF CH  " " " 7PF CH  " " " 10PF CH  " " " 22PF CH  " " " 27PF CH  " " " 100PF SL  " " " 150PF SL  " " " 220PF SL	T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	\$4140970 \$4140990 \$54140990 \$53020022 \$53020024 \$53020001 \$53020003 \$53030003 \$67020007	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7μH  " " FL5H 27μH  " " FL5H 100μH  " " FL5H 1mH  " " FL7H 3.9mH  " (shielded) S6-392 3.9 mH  US PIN PLUG SQ4052  Wrapping terminal C
C415, 419 C434 C430 C461 C465 C459 C421, 423 C453 C454 C424 C401, 402, 406,	31820010 31820070 31820200 31820200 31820220 31820270 31827820 31829101 31829151 31829221 30820102 30820103	D-22A  POTENTIOMETER  SR 19R 470ΩB  CAPACITOR  Ceramic disc 50WV 1PF CH  " " " 7PF CH  " " " 10PF CH  " " " 22PF CH  " " " 27PF CH  " " " 100PF SL  " " " 150PF SL  " " " 220PF SL  " " " 0.001μF	T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	\$4140970 \$4140990 \$54140990 \$53020022 \$53020024 \$53020001 \$53020003 \$53030003 \$67020007	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7μH  " " FL5H 27μH  " " FL5H 100μH  " " FL5H 1mH  " " FL7H 3.9mH  " (shielded) S6-392 3.9 mH  US PIN PLUG SQ4052  Wrapping terminal C
C415, 419 C434 C430 C461 C465 C459 C421, 423 C453 C454 C424 C401, 402, 406, 407, 409~414,	31820010 31820070 31820070 3182020 31820220 31820270 31827820 31829101 31829151 31829221 30820102 30820103	D-22A  POTENTIOMETER  SR 19R 470ΩB  CAPACITOR  Ceramic disc 50WV 1PF CH  " " " 7PF CH  " " " 10PF CH  " " " 22PF CH  " " " 27PF CH  " " " 100PF SL  " " " 150PF SL  " " " 220PF SL  " " " 0.001μF	T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	\$4140970 \$4140990 \$54140990 \$53020022 \$53020024 \$53020001 \$53020003 \$53030003 \$67020007	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7μH  " " FL5H 27μH  " " FL5H 100μH  " " FL5H 1mH  " " FL7H 3.9mH  " (shielded) S6-392 3.9 mH  US PIN PLUG SQ4052  Wrapping terminal C
C415, 419 C434 C430 C461 C465 C459 C421, 423 C453 C454 C424 C401, 402, 406, 407, 409~414, 418, 429, 449,	31820010 31820070 31820070 3182020 31820220 31820270 31827820 31829101 31829151 31829221 30820102 30820103	D-22A  POTENTIOMETER  SR 19R 470ΩB  CAPACITOR  Ceramic disc 50WV 1PF CH  " " " 7PF CH  " " " 10PF CH  " " " 22PF CH  " " " 27PF CH  " " " 100PF SL  " " " 150PF SL  " " " 220PF SL  " " " 0.001μF	T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	\$4140970 \$4140990 \$54140990 \$53020022 \$53020024 \$53020001 \$53020003 \$53030003 \$67020007	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7μH  " " FL5H 27μH  " " FL5H 100μH  " " FL5H 1mH  " " FL7H 3.9mH  " (shielded) S6-392 3.9 mH  US PIN PLUG SQ4052  Wrapping terminal C
C415, 419 C434 C430 C461 C465 C459 C421, 423 C453 C454 C424 C401, 402, 406, 407, 409~414, 418, 429, 449, 450, 464, 466	31820010 31820070 31820070 3182020 31820220 31820270 31827820 31829101 31829151 31829221 30820102 30820103	D-22A	T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	\$4140970 \$4140990 \$3020022 \$3020024 \$3020023 \$3020001 \$3020003 \$3030003 \$67020007 \$91100008	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7μH  " " FL5H 27μH  " " FL5H 100μH  " " FL5H 1mH  " " FL7H 3.9mH  " (shielded) S6-392 3.9 mH  US PIN PLUG SQ4052  Wrapping terminal C
C415, 419 C434 C430 C461 C465 C459 C421, 423 C453 C454 C424 C401, 402, 406, 407, 409~414, 418, 429, 449, 450, 464, 466 C403, 404, 405,	31820010 31820070 31820070 31820100 31820220 31820270 31827820 31829101 31829151 31829221 30820102 30820103	D-22A	T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416  P401	\$4140970 \$4140990 \$54140990 \$53020022 \$53020024 \$53020003 \$53020003 \$53030003 \$67020007 \$91100008	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7μH  " " FL5H 27μH  " " FL5H 100μH  " " FL5H 1mH  " " FL7H 3.9mH  " (shielded) S6-392 3.9 mH  US PIN PLUG SQ4052  Wrapping terminal C  Heat sink
C415, 419 C434 C430 C461 C465 C459 C421, 423 C453 C454 C424 C401, 402, 406, 407, 409~414, 418, 429, 449, 450, 464, 466 C403, 404, 405, 408, 417, 433,	31820010 31820070 31820070 31820100 31820220 31820270 31829101 31829151 31829221 30820102 30820103	D-22A	T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	54140970 54140990 53020022 53020024 53020003 53020003 53030003 67020007 91100008 80022070	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7µH  " " FL5H 27µH  " " FL5H 100µH  " " FL5H 1mH  " " FL7H 3.9mH  " (shielded) S6-392 3.9 mH  US PIN PLUG SQ4052  Wrapping terminal C  Heat sink  HG UNIT  Description
C415, 419 C434 C430 C461 C465 C459 C421, 423 C453 C454 C424 C401, 402, 406, 407, 409~414, 418, 429, 449, 450, 464, 466 C403, 404, 405,	31820010 31820070 31820070 31820100 31820220 31820270 31829101 31829151 31829221 30820102 30820103	D-22A	T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416  P401	\$4140970 \$4140990 \$54140990 \$53020022 \$53020024 \$53020003 \$53020003 \$53030003 \$67020007 \$91100008	R12-4097 #220101 R12-4099 #220156  INDUCTOR  Micro inductor FL4H 4.7µH  " " FL5H 27µH  " " FL5H 100µH  " " FL5H 1mH  " " FL7H 3.9mH  " (shielded) S6-392 3.9 mH  US PIN PLUG SQ4052  Wrapping terminal C  Heat sink

1

		TRANSISTOR			REG UNIT
Q501	22303724	2SC372Y	Symbol No.	Part No.	Description
<del></del>	<del>                                     </del>			017841AZ	Regulator unit with components
	<del> </del>		PB-1784A	60417841	P.C. Board
				1	
	- <del> </del>	DIODE		<del> </del>	
D501, 502	21010070	Germanium 1S1007		<del>                                     </del>	
<del></del>				<del></del>	IC
	<del> </del>		Q604	25000105	μPC 14305
			Q601, 603	25000116	μPC 14308
		CRYSTAL	Q602	25000170	NJM 78L09A
X501	71600026	HC-6/W 1MHz		200001.0	TIME TODAY
74001	- 12000020	110 0/ 11 11112	<del></del>	+	
	<del></del>				
·	<del>                                     </del>				DIODE
		RESISTOR	D607, 608	21015550	
R505, 506	40143101	Carbon film 1/4W VJ 100Ω	D601~606	21013330	
R503, 300	40143221		D601~606	21090022	" V06B
R502		22000			
	40143103	TORGE			
R501	40143104	" " " 100kΩ		<del>_</del>	DECISION -
<del></del>			D (00	1010100	RESISTOR
	<del></del>		R602	42124220	Carbon composition 1/2W GK 22
	<del>                                     </del>	ļ	<del></del>		
<del></del>				<u> </u>	
		CAPACITOR			
C502, 510	31820080	Ceramic disc 50WV 8PF CH			
C511	31820150	" " " 15PF "			CAPACITOR
C509, 514	31820270	" " 27PF "	C610, 611	30820473	Ceramic disc 50WV 0.047µF
C508	31820330	" " " 33PF "	C605	34220336	Electrolytic 16WV 33µF
C506	31820680	" " " 68PF "	C604, 607,	34220107	" " 100μF
C501, 504,	30820103	" " " 0.01μF	608		
505, 507			C606, 609	34220108	" " 1000μF
C503	33824820	Dipped mica " 82PF	C601~603	34320108	" 25WV 1000μF
C512	34220476	Electrolytic 16WV TW 47µF			
					RELAY
			RL601	70000036	AW 62209 HB2-DC 6V
		TRIMMER CAPACITOR	•		
TC501	39000004	ECV-1ZW 40x32 40PF			
• • •					
					MINI CONNECTOR
			J601	68110008	5047-11 #240063A
		INDUCTOR	(with wire)		
L503	55000012	#220051	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
L502	53020022	Micro inductor FL4H 4.7mH		91100008	Wrapping terminal C
L501	53020001	" " FL5H 1mH		7110000	Trupping Communic
L504	53020003	" " FL7H 3.9mH		<del>-  </del>	<del></del>
,	000000	1 D.H J./III		<del> </del>	
		<u> </u>		<del> </del>	<del></del>
				<del> </del>	
		US PIN PLUG		RILE	FER AMP UNIT
P501, 502	67020007	SQ4052	Symbol No.	Part No.	Description
-001,002	0,020001	527002	Oymborido.	017901AZ	Buffer board with components
	<del></del>	+	PB-1790A	60417901	P.C. Board
	91100008	Wrapping terminal C	15-1700	0041/301	c. Domu
	21100008	мтаррик селишаг С	<u> </u>	<del> </del> -	
			<u> </u>		<u> </u>
	+	<del> </del>	ļ		<del> </del>
					FET
			Q701, 702	23800401	3SK40M
<del></del>			ļ		
	1	l	I	1	

		RESISTOR		· · · · · · · · · · · · · · · · · · ·	SWITCH
R703, 709	40143221	Carbon film 1/4W VJ 220Ω	S801	64000107	SLE 72251
R704	40143152	" " " 1.5kΩ	S802	64000107	SLE 62251
R710	40143272	" " " 2.7kΩ	S803	64000103	SLE 82301
R702, 707	40143333	" " " 33kΩ	S804		
R705, 708	40143473	" " " 47kΩ	3004	64000108	SLE 64251
		" " " 470kΩ			
R701, 706	40143474	" " " 4/0K12			
		<u> </u>	7001	60060000	MINI CONNECTOR
			J801	68060008	3024-15C
		· -	P801, 802	67150008	5048-15A
	<del> </del>	CAPACITOR	P803	68150006	3094-15A
C701~704	30820103	Ceramic disc 50WV 0.01µF		<del></del>	
C701-704	36226105	Tantalum 16WV 1µF			
C706	32821102	Feed thru $50WV 0.001\mu F$			
C/06	32821102	reed thru 30WV 0.001µr	<del></del>		
	91001102	Seal terminal A102	<b>=,</b>	COL	INTED HAUT
	91001102	Sear terminar A 102	Symbol No.		UNTER UNIT
· · · · · · · · · · · · · · · · · · ·	91100008	Wrapping terminal C	аутьог ио.	Part No.	Description
	21100008	wrapping terminal C		017541AZ	Counter unit assembly
	+	<del> </del>	DD 1754A	60417541	with Buffer Display board
		<del>                                     </del>	PB-1754A PR-1755	60417541 60417550	P.C. Board P.C. Board
	<del></del>		PB-1755	60417330	P.C. Board
•	+		<del></del>	<del> </del>	
	- CV	UTCLLUNUT			
Symbol No.	Part No.	ITCH UNIT  Description			IC & TRANSISTOR
Dymbol 140.	017671AZ-	Switch board with components	Q907, 910	25000143	IC MC1416
PB-1767A	60417671	P.C. Board	Q918	25000143	MC14518
15-1707.4	00417071	T.C. Board	Q919	25000100	MC14518 MC14519
<del>.</del>	<del></del>		Q920	25000174	MSM5502
	<del></del>		Q912	25000033	MSM5592
	-	IC & TRANSISTOR	Q915, 923	25000140	SN74LS00N
Q801	25000114	IC MC14011	Q914, 921	25000171	SN7407N
Q803	25000176	MC14016	Q917 Q917	25000171	SN74LS90N
Q802	25000176	MC14027	Q913	25000170	SN74LS112N
Q804	25000093	MC14081	Q922	25000170	SN74LS390N
Q805~808	22303730	Transistor 2SC373	Q916	25000101	SP8646
Q809	21090147	Display 5082-7286	Q908	25000157	μPA56C
QUU	21070117	2.55.63 5002 7200	Q909	25000157	μPA547C-1
			Q906	25000170	NJM78L05A
<del></del>			Q926, 927, 928		Transistor 2SC373
		DIODE	Q920, 921, 928 Q911	22308282	2SC828
D801~806	21015550	Silicon 1S1555	Q924, 925	22390001	MPSA13
2001 000	21013330	Billeon 101333	Q901~905	21090135	Display 5082-7740
			Q301 300	21030130	Display 3002-17-10
	1				
	<del>                                     </del>	RESISTOR		<del></del>	
R802~806	42184103	Carbon composition 1/8W GK 10kΩ	<del>.</del>	<del>                                     </del>	1
R801	42184473	" " " 47kΩ		<u> </u>	DIODE
	T	27.4.4	D901, 902, 905	21015550	Silicon 1S1555
•	1		D903, 904	21090091	LED SL103D
	<del>- </del>			<u> </u>	
		CAPACITOR		<b>†</b>	
C802	30820102	Ceramic disc 50WV 0.001µF		1	RESISTOR
C801	30820473	" " " 0.047μF	R922, 949~955	40143390	Carbon film RD1/4(F) 39Ω
C804	33824470	Dipped mica " 47PF	R924, 928, 930,		" " " 220Ω
C803	36326685	Tantalum 20WV 6.8µF	956	1	2234
	1		R958	40143271	" " " 270Ω
<del></del>	1		R903, 908, 909,		" " " 1kΩ
			919		
	1	†	R907, 925, 926	40142222	" " " 22k0
	1	į į	11,701,723,720	70143ZZZ	" " " 2.2kΩ

B002	40143332	" " " 3 3ኩር	1	<del></del>	LIC BIAL LACK
-17	40143332	" " " 3.3kΩ " " 4.7kΩ	7001 002	(0000000	US PIN JACK
R927, 929, 959		" " 5.6kΩ	J901~903	68020008	SQ3056
	40143103			<b>-</b>	
	40143103	TORGO			
939~941	40143223	" " " 22kΩ		<del> </del>	IC SOCKET
	40143273	" " " 27kO	00001-006	60140005	314-AG37D
~	40143273	" " " 27kΩ " " 56kΩ	QS901~905 QS906	68140005	116-42-30-114
R904, 906, 931		" " " 100kΩ	Q5906	68420001	110-42-30-114
		" " " 150kΩ	<del></del>		<del> </del>
	40143154	10000	<del> </del>	67200003	Board joint 163740
	47000003	Block resistor 220Ωx7		07200003	Board Joint 103740
K932	47000007	" " 22kΩ×7			
		**************************************			<del>                                     </del>
•			<del> </del>		
	•			ACCES	SORIES
			Symbol No.	Part No.	Description
——————————————————————————————————————			Symbol No.		Record plug & external Speaker
			1	67020003	plug P2240
	<u></u>	<u> </u>	<del>                                     </del>	67030000	
		POTENTIOMETER		67020002	Headphone plug SH3001  RCA Pin plug CN7017P
VR901	49800083	PH822H501 500ΩB	<b> </b>	67020001	
1 1 2 0 1	77000000	1 1102211301 300120	<del> </del>	67000005	Antenna plug MP-5 Antenna wire A #250003
				96000025	
		<del> </del>	<del> </del>	96000026	Antenna wire B #250004
	<del> </del>			73000013	Fuse (F1) 1A (100V~117V)
		CAPACITOR	<del> </del>	73000012	0.5A (200V~234V)
C901, 902, 904,	30820103	Ceramic disc 50WV 0.01µF	<b></b>	73000003	Fuse (F2) 3A
912, 913, 942	50020103	Cerainic disc 30w v 0.01µF		<del> </del>	
C908, 910	30820473	" " " 0.047μF	<del></del>		
C944	33824300	Dipped mica " 30PF		+	
C944 C907	33824350	" " " 150PF	<del> </del>		
C903, 905	36133104	Mylar 100WV 0.1μF	<del>                                     </del>		
C903, 903	30133104	(B32560-A11045)		-	
		(B32300-A11043)	+	<del>-  </del> -	
C906	36824102	Styrol 50WV 1000PF	,	- <del></del> -	
C909, 911	36326685	Tantalum 20WV 6.8µF			
C914~941	32821102	Feed thru 50WV 0.001µF	<del> -</del> ·		
C943	34220107	Electrolytic 16WV TW 100µF	+		
	34220107	Electrony de 16 W V 1 W 160pl	<del></del>		<u> </u>
			<del> </del>	<del></del>	
· · · · · · · · · · · · · · · · · · ·	-	<u> </u>	<del> </del>		
	<del> </del>		<del> </del>		<del> </del>
			<del> </del>	+	· · · · · · · · · · · · · · · · · · ·
		TRANSFORMER	<del></del>	+ -	
T901	55003084	7MC-312162NO #220188	1		
1/01	33303307	312102110 #220100	<del>                                     </del>		
	<u> </u>		1		
		,	•	1	<del></del>
	<del> </del>				
		INDUCTOR			
1001 002	55002060	INDUCTOR #220012			
L901, 902	55003069	INDUCTOR #220012			
L901, 902	55003069				
L901, 902	55003069				
L901, 902	55003069	#220012			
		#220012 MINI CONNECTOR			
P901	67110004	#220012 MINI CONNECTOR 5048-11A			
P901 J904		#220012 MINI CONNECTOR			
P901 J904 with wire	67110004 68150007	#220012  MINI CONNECTOR  5048-11A  5047-15 #240061			
P901 J904 with wire J905	67110004	#220012 MINI CONNECTOR 5048-11A			
P901 J904 with wire	67110004 68150007	#220012  MINI CONNECTOR  5048-11A  5047-15 #240061			
P901 J904 with wire J905	67110004 68150007	#220012  MINI CONNECTOR  5048-11A  5047-15 #240061			
P901 J904 with wire J905	67110004 68150007	#220012  MINI CONNECTOR  5048-11A  5047-15 #240061			

# WORLD TIME CONVERSION CHART IN HOURS

	AM	AM	Σ	Σ	Ĕ	Δ	PM	Σ	Σ	Σ	Σ	Σ	Σd	Σ	Σ	Σ	υĘ	AM						
Philippines. Perth,	ω	<b>О</b>	10AM	11A	Noon	_	2	3P	4P	1 5P	1 6P	_	8	6	10P	1111	Mid Night	-	2	3	4	9	9	7
Somatra. Thailand, Laos.	7AM	8AM	9AM	10AM	1 1 AM	Noon	1PM	2PM	ЗРМ	4PM	M4S	6PM	7 P.M	8PM	9PM	10PM	Nd11	Mid Night	1AM	2AW	3AM	4AM	5AM	БАМ
Calcutta, Novasi- birsk Russia, Tibet.	6AM	7 AM	8AM	9AM	10AM	11AM	Noon	1 P M	2PM	ЗРМ	4PM	SPM	<b>6PM</b>	7PM	8PM	9PM	10PM	11PM	Mid Night	1 AM	2AM	3AM	4AM	5AM
Central Russia, Bombay, India.	5AM	<b>6AM</b>	7 AM	8AM	9AM	10AM	11AM	Noon	1 P.M	2PM	зРМ	4PM	<b>5PM</b>	6РМ	7PM	8PM	9РМ	10PM	11PM	Mid Night	1 AM	2AM	3AM	4AM
Mauritius, Iran. Reunion Island.	4AM	SAM	<b>6AM</b>	7 AM	8AM	9AM	10AM	11AM	Noon	1 P M	2PM	3PM	4PM	SPM	<b>ВРМ</b>	7PM	8PM	Md6	10PM	11PM	Mid Night	1AM	2AM	зАМ
Arabia, Armenia, Ethiopia, Madagas car,	3AM	4AM	5AM	6AM	7 AM	8AM	9AM	10AM	11AM	Noon	1PM	2PM	3PM	4PM	5PM	6РМ	7PM	8PM	9PM	10PM	1 1 P M	Mid Night	1 AM	2AM
Eastern Europe.At- hens, Cape Town. Cairo, Moscow	2AM	3AM	4AM	5AM	6АМ	7 AM	8AM	9AM	OAM	11AM	Noon	1 P M	2PM	ЗРМ	4PM	5PM	6РМ	7PM	8РМ	М46	OPM	I 1PM	Mid Night	1 AM
Central Europe. Berlin, Geneva, Stockholm, Vienna.	1 AM	2AM	3AM	4AM	5AM	<b>6AM</b>	7 AM	8AM	9AM	OAM	1 AM	Noon	1 P.M	2PM	3PM	4PM	5PM	вРМ	7 P.M	8PM	9РМ	Mdo	1 PM	Night tght
TMĐ	0000	0100	0200	0300	0400	0200	0090	0020	0800	0060	10001	1100	1200	300	1400	1500	1600	1700	800	1900	2000	2100	2200	2300
lceland. Canary Islands.	1 P M	Mid Night	~	2AM	3AMC	4AM	5AM	6AM	7 AM	8AM	9AM	0 AM	1 AM	Noon 1	1PM	2PM 1	ЗРМ	4PM	SPM	₩d9	7PM	8PM	9PM	10PM
29 Yoz A	OPM1	1 P M	Mid	1 AM	2AM	3AM	4AM	5AM	6AM	7AM	8AM	9AM1	OAM1	1 AM	Noon	1 P.M	2PM	3PM	4PM	5PM	6PM	7PM	8PM	9PM1
Greenland. Rio de Janeiro. Brazil.	9PM1	OPM1	1 P.M	Mid Night	1 AM	2AM	3AM	4AM	5AM	6AM	7 AM	8AM	9AM	OAM	1 AM	Noon	1PM	2PM	3PM	4PM	5PM	6PM	7PM	8PM
Atlantic Standard Time, Argentina, Nova Scotia	8PM	9PM	- MHO	11PM	Mid Night	1 AM	2AM	3AM	4AM	5AM	6AM	7 AM	8AM	9AM	10AM	11AM	Noon	1PM	2PM	ЗРМ	4PM	5PM	6PM	7PM
Eastern Standard Time, Montreal, New York, Peru.	7PM	8PM	9P₩.	10PM	11PM	Mid	1 AM	2AM	3AM	4AM	5AM	6AM	7AM	8AM	9AM	10AM	1 1 AM	Noon	1 PM	2PM	ЗРМ	4PM	5PM.	<b>БРМ</b>
Central Standard Time, Chicago, Costa Rica.	вРМ	7PM	<b>8PM</b>	9PM	Mdo		Mid	1 AM	2AM	3AM	4AM	5AM	6AM	7AM	8AM	9AM	10AM	1 AM	Noon	1PM	2PM	3PM	4PM	5PM
Mountain Standard Time, Calgary, Denver, Phoenix.	5PM	6PM	7PM	8PM	M46	Mdo	11PM	Mid Night	1 AM	2AM	3AM	4AM	5AM	6АМ	7 AM	8AM	9АМ	10AM	11AM	Noon	1PM	2PM	ЗРМ	4PM
Pacific Standard Time. Los Angeles. Seattle, Juneau.	4PM	5PM	<b>6PM</b>	7PM	8PM	Md6	MdO	11 P.M	Nid Night	1 AM	2AM	3AM	4AM	5AM	6AM	7AM	8AM	9AM	IOAM	11AM	Noon	1PM	2PM	зъм
Eastern Alaska. Dawson	зРМ	4PM	SPM	6PM	7PM	8PM	9PM	10PM	1 1 PM	Night Taht	1AM	2AM	3AM	4AM	5AM	6AM	7AM	8AM	9AM	HOAM	11AM	Noon	1 PM	2PM
i iswah .ekanasy sambil?.	2PM	3PM	4PM	5PM	₩49	7PM	<b>8PM</b>	Md6	10PM	P.M	Night Night	1 AM	2AM	3AM	4AM	SAM	6AM	7AM	8AM	9AM	10AM	11AM	Noon	1 P.M
Nome, Alaska. Samas Islands.	1 P.M	2PM	3PM	4 P.M	<b>5PM</b>	6PM	7PM	8PM	9PM10	9PM10PM1		Mid	1AM	2AM	3AM	4 AM	5 AM	6AM	7 AM	8AM	9AM	9AM10AM		Noon
laternational Date Line, Fili Islands.	Noon	1PM	2PM	3PM	4PM	5PM	<b>ВРМ</b>	7PM	8PM	Md6	10PM11PM	11PM	Nich	1 AM	2AM	3AM	4AM	5AM	6AM	7 AM	8AM	9AM	10AM11AM	1 1 AMN
New Caledonia. New Nealand.	\$	Noon	1 PM	2PM	ЗРМ	4PM	5PM	<b>ВРМ</b>	7PM	8PM	9PM1	10PM	1 1 P.M	Night Spt	1 AM	2AM	3AM	4AM	5AM	6AM	7 AM	8AM	9AM	10AM
Eastern Australia. Melbourne, Sydney.	MAC	OAM11AM	Noon	1PM	2PM	3PM	4PM	5PM	6PM	7PM	ВРМ	Md6	9PM10PM	OPM11PM	Night	1 AM	2AM	3AM	4AM	5 AM	6AM	7 AM	8AM	9AM
nagal	9AM1	10AM	11AMN	Noon	1 P.M	2PM	3PM	4PM	5PM	<b>ВРМ</b>	7PM	8PM	Md6	10PM	11PM	Mid	1 AM	2 AM	3AM	4AM	5 AM	6AM	7 AM	8AM



