# 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 O'R 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  $0.7\mu$ V at S/N 10 dB AM: Better than  $2\mu$ V 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

Antenna Requirements:

Random wire 0.25 MHz - 1.6 MHz 50 Ohm unbalanced feed 1.6 MHz - 29.9 MHz

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

IC	SN76514N	2		μPC14305	1
	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
	SP8646B	1		5082-7740	5
	μPA56C	1			
	μPD546C-1(CPU)	1			

### **ACCESSORIES**

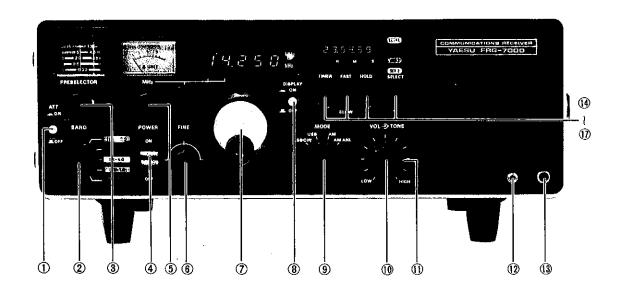
The following accessories are packaged along with your FRG-7000:

- (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.

### 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

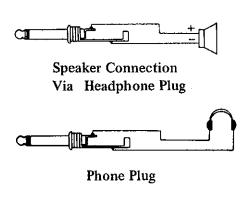
This lever switch is used for setting the digital clock. The fast speed is used for rapid advancement of the indicated time, and the slow speed is used for the final, fine adjustment.

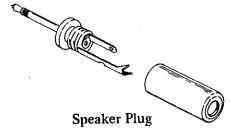
### (16) HOLD

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.

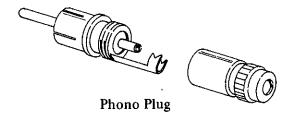
### (17) SELECT

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.

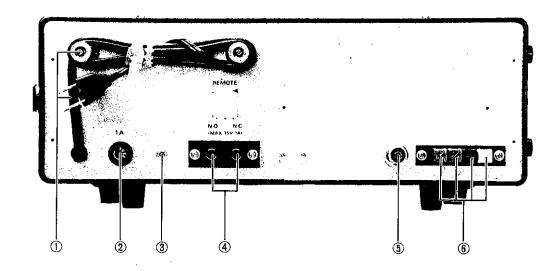








### REAR PANEL



### (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.

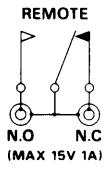
### (6) SW1, BC, E, MUTE

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

BC is a high-impedance connection for a randomlength 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.

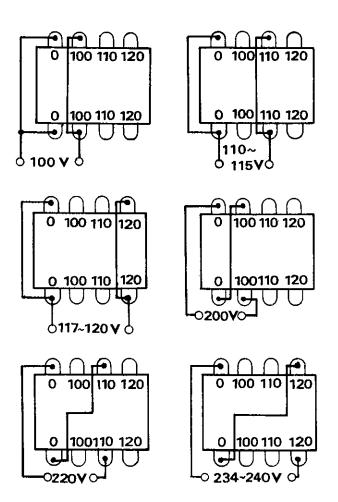


Fig.1 Transformer Primary Wiring

### **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.

		ODC CCL COT	Maria Dial	BAND	Maar
	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 ■ 1	3.525 //	1.6~4.0	LSB·CW
Amateur	7,050	8 - 7 - (	7.050 //	4.0~11.0	LSB·CW
,	14,175	15 - 13	14.175 //	11.0-29.9	USB
	21,225	23 20 20	21.225 //	11.0-29.9	USB
	28,850	26 u	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	1.2 = 1.0	1.170MHz	0.5~1.6	AM or AM/ANL
	2,\$00	2.6 2.3	2.500MHz	1.6~4.0	AM or AM/ANL
	5,000	5 4.	5.000 //	4.0~11.0	AM or AM/ANL
WWA\\11\	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	1,2	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	17.880 //	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		REM	OTE
Power Switch	Timer Switch		SET-I	SET-2	N.O.	N.C.
OFF	OFF	OFF	OFF	OFF	OPEN	CLOSE
ON	OFF	ON	ON	ON	OPEN	CLOSE
			ON	-	CLOSE	OPEN
OFF	ON	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.

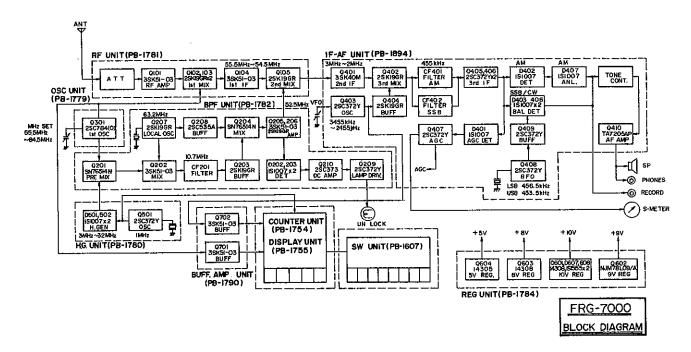
A 52.5 MHz heterodyne signal is produced as follows: the synthesized oscillator  $Q_{501}$  (2SC372Y) generates a 1 MHz signal, which is then fed to harmonic generator  $D_{501}$  -  $D_{502}$  (both 1S1007). This produces a series of harmonics from 3 to 32 NHz. This signal is fed to the first premixer,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

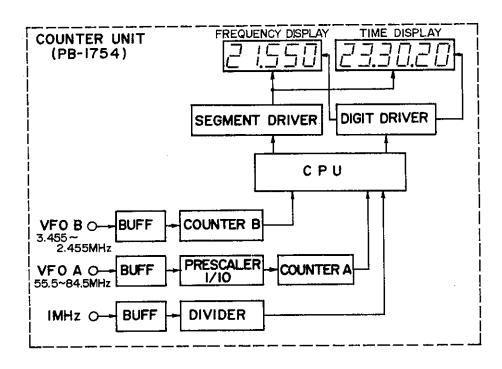
The 55.5 MHz - 84.5 MHz and 2455 kHz - 3455 kHz signals are amplified, respectively, by buffer amplifiers  $Q_{701}$  and  $Q_{702}$  (both 3SK51-03), and fed to the counter to display the received frequency.

FREQUENCY	1ST OSC	1ST IF (fo <sub>1</sub> -fi <sub>1</sub> )	REF FREQ	2ND OSC	2ND IF (fifo <sub>2</sub> )	3RD OSC	3RD IF
f	fo <sub>1</sub>	fi	fh	fo <sub>2</sub>	fi 2	fo <sub>3</sub>	fi a
500kHz	55.5MHz	55.0MHz	3MHz	52.5MHz	2,500kHz	2,955kHz	455kHz
1,500	56.5	55.0	4	н	2,500	2,955	0
2,500	57.5	55.0	5	н	2,500	2,955	н
3,500	58.5	55.0	6	n	2,500	2,955	n
4,500	59.5	55.0	7	n n	2,500	2,955	11
5,500	60.5	55.0	8	"	2,500	2,955	ı,
6,500	61.5	55.0	9	"	2,500	2,955	н
7,500	62.5	55.0°	10	"	2,500	2,955	н -
8,500	63.5	55.0	11	"	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	n
11,000	66.5	55.5	14	"	3,000	3,455	U
12,000	67.5	55,5	15	н	3,000	3,455	Ü
13,000	68.5	55.5	16	н	3,000	3,455	п
14,000	69.5	55.5	17	п	3,000	3,455	п
15,000	70.5	55.5	18	n	3,000	3,455	n
16,000	71.5	55.5	19	"	3,000	3,455	n
17,000	72.5	55.5	20	н	3,000	3,455	n
18,000	73.5	55.5	21	"	3,000	3,455	n
19,000	74.5	55.5	22	11	3,000	3,455	н
20,000	75.5	55.5	23	11	3,000	3,455	,,
21,100	76.5	55.4	24	"	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	)1	2,700	3,155	n
24,400	79.5	55.1	27	n,	2,600	3,055	n
25,500	80.5	55.0	28	n	2,500	2,955	n
26,600	81.5	54.9	29	n	2,400	2,855	и
27,700	82.5	54.8	30	п	2,300	2,755	н
28,800	83.5	54.7	. 31	п	2,200	2,655	н
29,900	84.5	54.6	32	n n	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 $T_{201}$ - $T_{206}$

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.

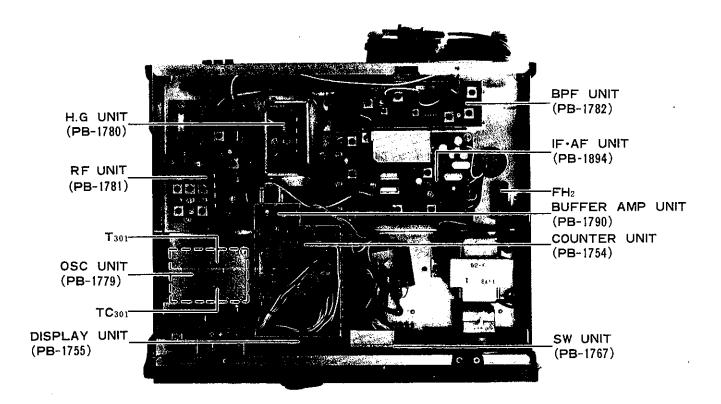
Set the signal generator to 2.9 MHz (the FRG-7000 digital display should indicate 100 kHz). Peak TC<sub>401</sub> and TC<sub>402</sub> for a maximum S-meter reading. Repeat the above adjustments until complete tracking is accomplished.

### (7) Third IF Alignment T<sub>404</sub>, T<sub>405</sub>

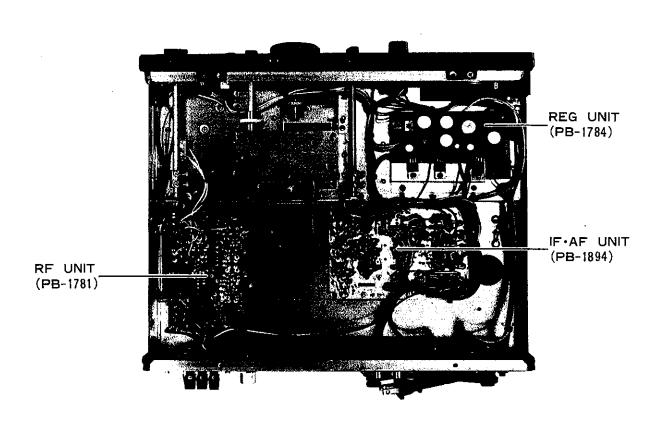
Connect a signal generator to  $TP_{401}$  and  $TP_{406}$  (ground), and set its output to 2.9 MHz (the FRG-7000 digital display should indicate 100 kHz). Peak  $T_{404}$  and  $T_{406}$  and  $T_{405}$  for a maximum S-meter reading.

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

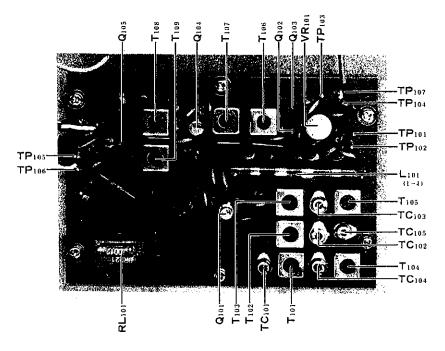
Connect a signal generator to SW2, and apply an 11 MHz 100 dB signal. Tune the receiver to 11 MHz, and adjust VR<sub>401</sub> for a full scale reading on the S-meter.



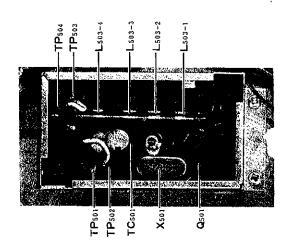
TOP VIEW



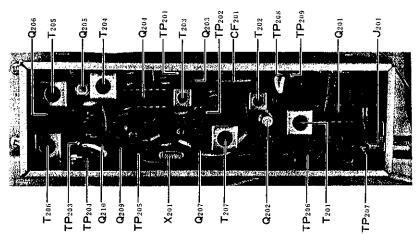
BOTTOM VIEW



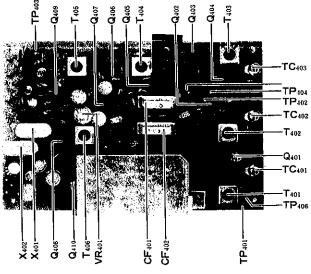
RF UNIT(PB-1781)



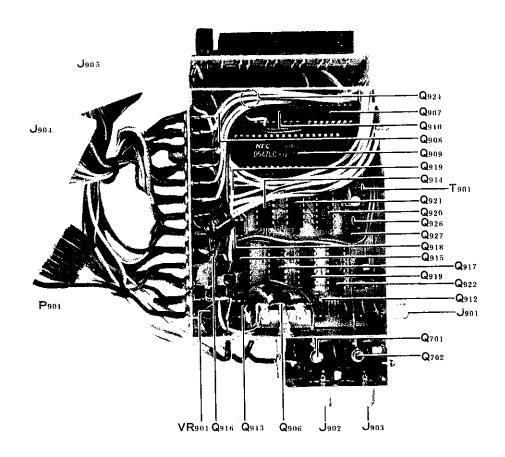
H.G.UNIT(PB-1780)



BPF UNIT(PB-1782)



IF-AF UNIT (PB-1894)



COUNTER UNIT(PB-1754)

## PARTS LIST

	MAI	N CHASSIS			
Symbol No.	Part No.	Description			
		RESISTOR		<del></del>	
R5	40143470	Carbon film 1/4W VJ 47Ω			FUSE
R3, 6	41143680	" " TJ 68Ω	F1	73000013	1A (100V~117V)
R1	41143222	" " " 2.2kΩ		73000012	0.5A (200V~234V)
R2	40143223	" " " VJ 22kΩ		73000003	3A
R4	42124120	" composition 1/2W GK 12Ω			
R7, 8, 9	42124225	" " " 2.2MΩ			
R10	44204339	Wire wound 2W 3.3Ω			
					FUSE HOLDER
	<u> </u>	1,000	FH1	69030005	SN-1301
	<del></del>		FH2	69030003	F3294
		POTENTIOMETER			
VR1	49800104	DM10A 10kΩB/10kΩB			
			D7 1 2 12 14	1.4000000	PILOT LAMP
	<del>-</del>	CAPACITOR	PL1, 2, 13, 14	14000033	BQ-034-22529A
C2	31820050	Ceramic disc 50WV 5PF CH	PL3, 9~12 PL4~8	14000031	BQ-034-22527A BQ-034-22528A
C3	30820103	" " " 0.01µF	11.40	14000032	BQ-034-22326A
C1	36825104	Mylar " $0.1\mu$ F			
C4 .	34220108	Electrolytic 25WV TT 1000µF			<u> </u>
<u> </u>	7.220100			<u> </u>	
····					
			· · · · · · · · · · · · · · · · · · ·	L	RF UNIT
******			Symbol No.	Parts No.	Description
				017811AZ	RF board with components
		VARIABLE CAPACITOR	PB-1781A	60417811	P.C. Board
VC1, 2	39000078	CY-31A 335PF x 2			
VC3	39000079	TSN 150S×04-1 4PF			
					FET
			Q102, 103, 105		2SK19GR
	5000000	POWER TRANSFORMER	Q104	23800401	3SK40M
PT1	52000062	52-62	Q101	22800513	3SK51-03
			<del></del>	-	DIODE
·			D101	21015550	Silicon 1S1555
		METER	DIOI	21013330	Silicon 15(555
M1	74000380	KTC-024		<del> </del>	· · · · ·
	74000300	K10-024			
					RESISTOR
			R121	40143100	Carbon film 1/4W VJ 10Ω
		SPEAKER	R119	40143330	" " " 33Ω
SP1	76000022	SM-92Y 4Ω 4W	R120	40143470	" " " 47Ω
			R107, 122	40143101	" " " " 100Ω
			R102, 108, 113,		" " " 220Ω
			116, 124		
		SWITCH	R103	41143221	" " " TJ 220Ω
S1	62000002	ESR-E365R20A	R104, 105	40143561	" " " VJ 560Ω
S2	62000020	ESR-E264R20	R112	40143681	" " " " 680Ω
83	65000012	PW-22	R115	40143152	" " " " 1.5kΩ
S4	65000038	PW-42	R110,	40143103	" " " " 10kΩ
S5	64000053	8H2011	R111	40143273	" " " <u>" 27kΩ</u>
<del></del> -		1	R118	40143393	" " " " 39kΩ
			R117	40143473	" " " 47kΩ
<del></del>			R101, 106, 109,	40143104	" " " 100kΩ
	-	RECEPTACLE	114, 123		
<u>J1</u>	68000011	M-BR-06D	,	<u> </u>	
<u>J2</u>	68040006	. SQ2450-03		<del> </del>	
J3, 5	68020012	SG8050-07	<del>-, ., </del>	<del> </del>	<del>                                     </del>
J4 J6	68030002 80043741	SG7814	· · · · · · · · · · · · · · · · · · ·	<del> </del>	<u> </u>
	141 CTUU	UP-021		<del></del>	<u> </u>

X7D 1 0 1	49905472	POTENTIOMETER SR19R 4.7kΩB			
VR101	49905472	5R19R 4./R22D		· · · -	
<u> <del> </del></u>					<u> </u>
				· •	
		THERMISTOR			DE LINUT
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 CH			
C106, 109, 124		" " " 3PF "			
	31820050	" " " 5PF "			IC, FET & TRANSISTOR
	31820150	" " 15PF "	Q201, 204	25000104	IC SN76514N
C113, 114, 126		" " 22PF "	Q203, 206, 207		FET 2SK19GR
		" " 27PF "		23800513	3SK51-03
	31820270	" " 33PF "	Q202, 203 Q209	22303724	Transistor 2SC372Y
C107, 108, 117				22303724	2SC373
C125	31820820	" " 82PF "	Q210		<u> </u>
C116	31829101	" " 100PF SL	Q208	22305351	2SC535A
C132	30820102	" " 0.001μF			
C101~105,	30820103	" " " 0.01μF			
112, 115, 118,					D. 200
121~123, 127					DIODE
C128, 133	30820473	" " " 0.047μF	D202, 203	21010070	Germanium 1S1007
C131	33824470	Dipped mica " 47PF	D201	21015550	Silicon 1S1555
C129	33824151	" " " 150PF			
			<u> </u>		CRYSTAL
			X201	71500189	HC-18/U 63.2MHz
	<u>.</u>	TRIMMER CAPACITOR	<del> </del>		
TC102	39000002	ECV-1ZW 20x32 20PF	<u>-</u>	<del></del>	
	139000002				
MO101 100		" 4022 40DE	1	ŀ	CERAMIC FILTER
TC101, 103~	39000004	" 40×32 40PF	CE201	21200020	CERAMIC FILTER
TC101, 103~ 105		" 40×32 40PF	CF201	71200020	CERAMIC FILTER 10.7MF-S23 (SFG-10.7MA)
		" 40×32 40PF	CF201	71200020	
		" 40×32 40PF	CF201	71200020	
		" 40×32 40PF	CF201	71200020	
		TRANSFORMER	CF201	71200020	10.7MF-S23 (SFG-10.7MA)
			CF201		10.7MF-S23 (SFG-10.7MA)  RESISTOR
105	39000004	TRANSFORMER	R224	71200020	10.7MF-S23 (SFG-10.7MA)  RESISTOR  Carbon film 1/4W VJ 47Ω
T101	39000004 55003293	TRANSFORMER R12-5830 #220360			10.7MF-S23 (SFG-10.7MA)  RESISTOR
T101 T102 T103	39000004 55003293 55003200 55003201	TRANSFORMER  R12-5830 #220360  R12-5828 #220046  R12-5781 #220047	R224	40143470	10.7MF-S23 (SFG-10.7MA)  RESISTOR  Carbon film 1/4W VJ 47Ω
T101 T102 T103 T104	39000004 55003293 55003200 55003201 55003202	TRANSFORMER R12-5830 #220360 R12-5828 #220046 R12-5781 #220047 R12-5707 #220048	R224 R207~209,	40143470	10.7MF-S23 (SFG-10.7MA)  RESISTOR  Carbon film 1/4W VJ 47Ω
T101 T102 T103 T104 T105	\$5003293 \$5003200 \$5003201 \$5003202 \$5003202 \$5003203	TRANSFORMER R12-5830 #220360 R12-5828 #220046 R12-5781 #220047 R12-5707 #220048 R12-5694 #220049	R224 R207~209, 214~217	40143470 40143101	10.7MF-S23 (SFG-10.7MA)  RESISTOR  Carbon film 1/4W VJ 47Ω  " " 100Ω
T101 T102 T103 T104	39000004 55003293 55003200 55003201 55003202	TRANSFORMER R12-5830 #220360 R12-5828 #220046 R12-5781 #220047 R12-5707 #220048	R224 R207~209, 214~217 R210 R206	40143470 40143101 40143151 40143221	10.7MF-S23 (SFG-10.7MA)  RESISTOR  Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 150Ω  " " " 220Ω
T101 T102 T103 T104 T105	\$5003293 \$5003200 \$5003201 \$5003202 \$5003202 \$5003203	TRANSFORMER R12-5830 #220360 R12-5828 #220046 R12-5781 #220047 R12-5707 #220048 R12-5694 #220049	R224 R207~209, 214~217 R210 R206 R 219, 223	40143470 40143101 40143151 40143221 40143331	10.7MF-S23 (SFG-10.7MA)  RESISTOR  Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 220Ω  " " " 330Ω
T101 T102 T103 T104 T105	\$5003293 \$5003200 \$5003201 \$5003202 \$5003202 \$5003203	TRANSFORMER R12-5830 #220360 R12-5828 #220046 R12-5781 #220047 R12-5707 #220048 R12-5694 #220049	R224 R207~209, 214~217 R210 R206 R 219, 223 R202, 220	40143470 40143101 40143151 40143221 40143331 40143471	10.7MF-S23 (SFG-10.7MA)  RESISTOR  Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 220Ω  " " " 330Ω  " " " 470Ω
T101 T102 T103 T104 T105	\$5003293 \$5003200 \$5003201 \$5003202 \$5003202 \$5003203	TRANSFORMER  R12-5830 #220360  R12-5828 #220046  R12-5781 #220047  R12-5707 #220048  R12-5694 #220049  R12-1041B #220050	R224 R207~209, 214~217 R210 R206 R 219, 223 R202, 220 R201	40143470 40143101 40143151 40143221 40143331 40143471 40143102	10.7MF-S23 (SFG-10.7MA)  RESISTOR  Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 220Ω  " " " 330Ω  " " " 470Ω  " " " 1kΩ
T101 T102 T103 T104 T105 T106~109	\$5003293 \$5003200 \$5003201 \$5003202 \$5003203 \$5003204	TRANSFORMER R12-5830 #220360 R12-5828 #220046 R12-5781 #220047 R12-5707 #220048 R12-5694 #220049 R12-1041B #220050	R224 R207~209, 214~217 R210 R206 R 219, 223 R202, 220 R201 R222	40143470 40143101 40143151 40143221 40143331 40143471 40143102 40143472	10.7MF-S23 (SFG-10.7MA)  RESISTOR  Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 220Ω  " " " 330Ω  " " " 470Ω  " " " 14Ω  " " 476Ω  " " " 476Ω
T101 T102 T103 T104 T105 T106~109	\$5003293 \$5003200 \$5003201 \$5003202 \$5003203 \$5003204	TRANSFORMER  R12-5830 #220360  R12-5828 #220046  R12-5781 #220047  R12-5707 #220048  R12-5694 #220049  R12-1041B #220050  INDUCTOR #220051	R224 R207~209, 214~217 R210 R206 R 219, 223 R202, 220 R201 R222 R204, 212, 221	40143470 40143101 40143151 40143221 40143331 40143471 40143102 40143472	10.7MF-S23 (SFG-10.7MA)  RESISTOR  Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 220Ω  " " " 330Ω  " " " 470Ω  " " " 1kΩ
T101 T102 T103 T104 T105 T106~109	\$5003293 \$5003200 \$5003201 \$5003202 \$5003203 \$5003204 \$5003212 \$5003212 \$5002018	TRANSFORMER  R12-5830 #220360  R12-5828 #220046  R12-5781 #220047  R12-5707 #220048  R12-5694 #220049  R12-1041B #220050  INDUCTOR  #220051  Micro inductor 10µH	R224 R207~209, 214~217 R210 R206 R 219, 223 R202, 220 R201 R222 R204, 212, 221	40143470 40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103	10.7MF-S23 (SFG-10.7MA)  RESISTOR  Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 220Ω  " " " 220Ω  " " " 470Ω  " " " 1 18Ω  " " " 10kΩ
T101 T102 T103 T104 T105 T106~109	\$5003293 \$5003200 \$5003201 \$5003202 \$5003203 \$5003204	TRANSFORMER  R12-5830 #220360  R12-5828 #220046  R12-5781 #220047  R12-5707 #220048  R12-5694 #220049  R12-1041B #220050  INDUCTOR #220051	R224 R207~209, 214~217 R210 R206 R 219, 223 R202, 220 R201 R222 R204, 212, 221 225 R203	40143470 40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103	10.7MF-S23 (SFG-10.7MA)   RESISTOR   Carbon film 1/4W VJ 47Ω   100Ω   150Ω   150Ω   160Ω   160Ω
T101 T102 T103 T104 T105 T106~109	\$5003293 \$5003200 \$5003201 \$5003202 \$5003203 \$5003204 \$5003212 \$5003212 \$5002018	TRANSFORMER  R12-5830 #220360  R12-5828 #220046  R12-5781 #220047  R12-5707 #220048  R12-5694 #220049  R12-1041B #220050  INDUCTOR  #220051  Micro inductor 10µH	R224 R207~209, 214~217 R210 R206 R 219, 223 R202, 220 R201 R222 R204, 212, 221 225 R203 R211	40143470 40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333	10.7MF-S23 (SFG-10.7MA)   RESISTOR
T101 T102 T103 T104 T105 T106~109	\$5003293 \$5003200 \$5003201 \$5003202 \$5003203 \$5003204 \$5003212 \$5003212 \$5002018	TRANSFORMER  R12-5830 #220360  R12-5828 #220046  R12-5781 #220047  R12-5707 #220048  R12-5694 #220049  R12-1041B #220050  INDUCTOR  #220051  Micro inductor 10µH	R224 R207~209, 214~217 R210 R206 R 219, 223 R202, 220 R201 R222 R204, 212, 221 225 R203	40143470 40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333	10.7MF-S23 (SFG-10.7MA)  RESISTOR  Carbon film 1/4W VJ 47Ω  " " " 100Ω  " " " 220Ω  " " " 220Ω  " " " 470Ω  " " " 470Ω  " " " 10kΩ  " " " 10kΩ
T101 T102 T103 T104 T105 T106~109	\$5003293 \$5003200 \$5003201 \$5003202 \$5003203 \$5003204 \$5003212 \$5003212 \$5002018	TRANSFORMER  R12-5830 #220360  R12-5828 #220046  R12-5781 #220047  R12-5707 #220048  R12-5694 #220049  R12-1041B #220050  INDUCTOR  #220051  Micro inductor 10μH  " " FL5H 68μH	R224 R207~209, 214~217 R210 R206 R 219, 223 R202, 220 R201 R222 R204, 212, 221 225 R203 R211	40143470 40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333	10.7MF-S23 (SFG-10.7MA)   RESISTOR
T101 T102 T103 T104 T105 T106~109  L101 L101 L103 L102	\$5003293 \$5003200 \$5003201 \$5003202 \$5003203 \$5003204 \$5003212 \$5003212 \$5002018	TRANSFORMER  R12-5830 #220360  R12-5828 #220046  R12-5781 #220047  R12-5707 #220048  R12-5694 #220049  R12-1041B #220050  INDUCTOR  #220051  Micro inductor 10μH  " " FL5H 68μH  RELAY	R224 R207~209, 214~217 R210 R206 R 219, 223 R202, 220 R201 R222 R204, 212, 221 225 R203 R211	40143470 40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333	10.7MF-S23 (SFG-10.7MA)   RESISTOR
T101 T102 T103 T104 T105 T106~109	\$5003293 \$5003200 \$5003201 \$5003202 \$5003203 \$5003204 \$5003212 \$5003212 \$5002018	TRANSFORMER  R12-5830 #220360  R12-5828 #220046  R12-5781 #220047  R12-5707 #220048  R12-5694 #220049  R12-1041B #220050  INDUCTOR  #220051  Micro inductor 10μH  " " FL5H 68μH	R224 R207~209, 214~217 R210 R206 R 219, 223 R202, 220 R201 R222 R204, 212, 221 225 R203 R211	40143470 40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333	10.7MF-S23 (SFG-10.7MA)   RESISTOR
T101 T102 T103 T104 T105 T106~109  L101 L101 L103 L102	\$5003293 \$5003200 \$5003201 \$5003202 \$5003204 \$5003204 \$5003212 \$3020018 \$3020008	TRANSFORMER  R12-5830 #220360  R12-5828 #220046  R12-5781 #220047  R12-5707 #220048  R12-5694 #220049  R12-1041B #220050  INDUCTOR  #220051  Micro inductor 10μH  " " FL5H 68μH  RELAY	R224 R207~209, 214~217 R210 R206 R 219, 223 R202, 220 R201 R222 R204, 212, 221 225 R203 R211	40143470 40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333	10.7MF-S23 (SFG-10.7MA)   RESISTOR
T101 T102 T103 T104 T105 T106~109	\$5003293 \$5003200 \$5003201 \$5003202 \$5003204 \$5003204 \$5003212 \$3020018 \$3020008	TRANSFORMER  R12-5830 #220360  R12-5828 #220046  R12-5781 #220047  R12-5707 #220048  R12-5694 #220049  R12-1041B #220050  INDUCTOR  #220051  Micro inductor 10μH  " " FL5H 68μH  RELAY	R224 R207~209, 214~217 R210 R206 R 219, 223 R202, 220 R201 R222 R204, 212, 221 225 R203 R211	40143470 40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333	10.7MF-S23 (SFG-10.7MA)
T101 T102 T103 T104 T105 T106~109	\$5003293 \$5003200 \$5003201 \$5003202 \$5003204 \$5003204 \$5003212 \$3020018 \$3020008	TRANSFORMER  R12-5830 #220360  R12-5828 #220046  R12-5781 #220047  R12-5707 #220048  R12-5694 #220049  R12-1041B #220050  INDUCTOR  #220051  Micro inductor 10μH  " " FL5H 68μH  RELAY	R224 R207~209, 214~217 R210 R206 R 219, 223 R202, 220 R201 R222 R204, 212, 221 225 R203 R211	40143470 40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333	10.7MF-S23 (SFG-10.7MA)
T101 T102 T103 T104 T105 T106~109	\$5003293 \$5003200 \$5003201 \$5003202 \$5003204 \$5003204 \$5003212 \$3020018 \$3020008	TRANSFORMER  R12-5830 #220360  R12-5828 #220046  R12-5781 #220047  R12-5707 #220048  R12-5694 #220049  R12-1041B #220050  INDUCTOR  #220051  Micro inductor 10μH  " " FL5H 68μH  RELAY	R224 R207~209, 214~217 R210 R206 R219, 223 R202, 220 R201 R222 R204, 212, 221 225 R203 R211 R205, 213, 218	40143470 40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333	10.7MF-S23 (SFG-10.7MA)   RESISTOR
T101 T102 T103 T104 T105 T106~109	\$5003293 \$5003200 \$5003201 \$5003202 \$5003203 \$5003204 \$5003212 \$53020018 \$53020008	TRANSFORMER  R12-5830 #220360  R12-5828 #220046  R12-5781 #220047  R12-5707 #220048  R12-5694 #220049  R12-1041B #220050  INDUCTOR  #220051  Micro inductor 10µH  " " FL5H 68µH   RELAY  BR221D012 12V  US PIN PLUG	R224 R207~209, 214~217 R210 R206 R 219, 223 R202, 220 R201 R222 R204, 212, 221 225 R203 R211 R205, 213, 218	40143470 40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333 40143473	10.7MF-S23 (SFG-10.7MA)   RESISTOR
T101 T102 T103 T104 T105 T106~109	\$5003293 \$5003200 \$5003201 \$5003202 \$5003204 \$5003204 \$5003212 \$3020018 \$3020008	TRANSFORMER  R12-5830 #220360  R12-5828 #220046  R12-5781 #220047  R12-5707 #220048  R12-5694 #220049  R12-1041B #220050  INDUCTOR  #220051  Micro inductor 10µH  " " FL5H 68µH  RELAY  BR221D012 12V	R224 R207~209, 214~217 R210 R206 R219, 223 R202, 220 R201 R222 R204, 212, 221 225 R203 R211 R205, 213, 218	40143470 40143101 40143151 40143221 40143331 40143471 40143102 40143472 ,40143103 40143273 40143333 40143473	10.7MF-S23 (SFG-10.7MA)   RESISTOR

C212 222	21920101	Committee Court 100DD CIV			T
C213, 233, 236, 238	31820101	Ceramic disc 50WV 100PF CH			048401705
	30820102	" " " 0.001μF	C301	31827070	CAPACITOR
216, 220, 223,		0.001μΓ	C301		Ceramic disc 50WV 7PF UJ
235, 239		 	C304	31827220	2211
C206, 214,	30820103	" " " 0.01μF	C302, 303	31827330	3311
217~219,221,	30020103	υ.01μ		30820103	0.0141
222, 224, 227,		<u> </u>	C307, 308	30820473	" " " 0.04 <b>7</b> μF
229~232,234,		ļ.			
237, 241					
C205, 207,	30820473	" " " 0.047μF	<del></del>		
208, 211, 215,		υ υ υ υ υ υ υ ο ο ο ο ο ο ο ο ο ο ο ο ο			
225, 228	İ	-		<del></del>	VARIABLE GARAGES
223, 220			1/0201	20000074	VARIABLE CAPACITOR
···			VC301	39000074	C343C 15PFx4
			·		
<u> </u>					
			<del></del> -	<del>-</del>	
<del></del>		TRANSFORMER	TC201	20000001	TRIMMER CAPACITOR
T201, 204~206	55003204	#220361	TC301	39000001	ECV-1ZW 10x32 10PF
T207, 204-200	55003295				
T202, 203	55003296	#220362		<u></u>	
, mon, 20J	33003270	#220187	<del></del>	<del> </del> -	TRANCEORAGE
			T301	55003208	TRANSFORMER
			1301	33003208	#220052
	····				
		INDUCTOR	<del></del>		
L201	55003206	#220053	L301	53010003	INDUCTOR
L202	55003207	#220054	L301	33010003	Micro inductor 250µH
L204, 206	53020013	Micro inductor 150μF		! !	AF UNIT
L203, 205	53020001	" " 1mH	Complet No.	Parts No.	
2200, 200	03020001	111111	Symbol No.	018940AZ	Description IF, AF unit with components
<u> </u>			PB-1894	60418940 60418940	P.C. Board
			1.0-1024	00416940	r.c. board
		US PIN JACK			
J101	68020008	SQ3056			IC, FET & TRANSISTOR
			Q410	25000162	IC TA7205A
			Q402, 404	22800195	
ı	l				1 FE 1 28K 19GR
•	91100008	Wrapping terminal C			- <del>                                     </del>
	91100008	Wrapping terminal C	Q401	23800401	FET 3SK40M
	91100008	Wrapping terminal C		23800401	- <del> </del>
	91100008	Wrapping terminal C	Q401	23800401	FET 3SK40M
	91100008	Wrapping terminal C	Q401	23800401	FET 3SK40M Transistor 2SC372Y
	91100008	Wrapping terminal C	Q401 Q403,405~409	23800401 22303724	FET 3SK40M Transistor 2SC372Y  DIODE
			Q401 Q403,405~409 D401~407	23800401 22303724 21010070	FET         3SK40M           Transistor         2SC372Y           DIODE         Germanium           1S1007
Symbol No.	0	SC UNIT	Q401 Q403,405~409 D401~407 D408~411	23800401 22303724 21010070 21015550	FET         3SK40M           Transistor         2SC372Y           DIODE         Silicon           IS1007         Silicon
Symbol No.	O Part No.	SC UNIT  Description	Q401 Q403,405~409 D401~407 D408~411 Q403,405~407,	23800401 22303724 21010070	FET         3SK40M           Transistor         2SC372Y           DIODE         Germanium           1S1007
Symbol No. PB-1779A	O Part No. 017791 AZ	SC UNIT  Description  OSC board with components	Q401 Q403,405~409 D401~407 D408~411	23800401 22303724 21010070 21015550	FET         3SK40M           Transistor         2SC372Y           DIODE         Silicon           Silicon         1S1555           Transistor         2SC372Y
	O Part No.	SC UNIT  Description	Q401 Q403,405~409 D401~407 D408~411 Q403,405~407,	23800401 22303724 21010070 21015550 22303724	FET         3SK40M           Transistor         2SC372Y           DIODE         Silicon           Germanium         1S1007           Silicon         1S1555           Transistor         2SC372Y
	O Part No. 017791 AZ	SC UNIT  Description  OSC board with components	Q401 Q403,405~409 D401~407 D408~411 Q403,405~407, 409	23800401 22303724 21010070 21015550 22303724 71600035	FET   3SK40M   Transistor   2SC372Y
	O Part No. 017791 AZ	SC UNIT  Description  OSC board with components	Q401 Q403,405~409 D401~407 D408~411 Q403,405~407,	23800401 22303724 21010070 21015550 22303724	FET   3SK40M   Transistor   2SC372Y
	O Part No. 017791 AZ	SC UNIT  Description  OSC board with components	Q401 Q403,405~409 D401~407 D408~411 Q403,405~407, 409	23800401 22303724 21010070 21015550 22303724 71600035	FET   3SK40M   Transistor   2SC372Y
PB-1779A	O Part No. 017791 AZ	SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR	Q401 Q403,405~409 D401~407 D408~411 Q403,405~407, 409	23800401 22303724 21010070 21015550 22303724 71600035	FET   3SK40M   Transistor   2SC372Y
	O Part No. 017791AZ 60417791	SC UNIT  Description OSC board with components P.C. Board	Q401 Q403,405~409 D401~407 D408~411 Q403,405~407, 409 X401 X402	21010070 21015550 22303724 71600035 71600034	FET   3SK40M     Transistor   2SC372Y     DIODE     Germanium   1S1007     Silicon   1S1555     Transistor   2SC372Y     CRYSTAL     HC-6/W   456.5kHz     " 453.5kHz     CERAMIC FILTER
PB-1779A	O Part No. 017791AZ 60417791	SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR	Q401 Q403,405~409 D401~407 D408~411 Q403,405~407, 409 X401 X402	21010070 21015550 22303724 71600035 71200012	Transistor   28C372Y
PB-1779A	O Part No. 017791AZ 60417791	SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR	Q401 Q403,405~409 D401~407 D408~411 Q403,405~407, 409 X401 X402	21010070 21015550 22303724 71600035 71600034	FET   3SK40M     Transistor   2SC372Y     DIODE     Germanium   1S1007     Silicon   1S1555     Transistor   2SC372Y     CRYSTAL     HC-6/W   456.5kHz     " 453.5kHz     CERAMIC FILTER
PB-1779A	O Part No. 017791AZ 60417791	SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR	Q401 Q403,405~409 D401~407 D408~411 Q403,405~407, 409 X401 X402	21010070 21015550 22303724 71600035 71200012	FET   3SK40M     Transistor   2SC372Y     DIODE     Germanium   1S1007     Silicon   1S1555     Transistor   2SC372Y     CRYSTAL     HC-6/W   456.5kHz     "   453.5kHz     CERAMIC FILTER     LF-C6
PB-1779A	Part No. 017791AZ 60417791	SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR  2SC784 O	Q401 Q403,405~409 D401~407 D408~411 Q403,405~407, 409 X401 X402	21010070 21015550 22303724 71600035 71200012	Transistor   28C372Y
РВ-1779A Q301 R304	Part No. 017791AZ 60417791 22307843	SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR  2SC784 O  RESISTOR  Carbon film 1/4W VJ 100Ω	Q401 Q403,405~409 D401~407 D408~411 Q403,405~407, 409 X401 X402	21010070 21015550 22303724 71600035 71200012	FET   3SK40M     Transistor   2SC372Y     DIODE     Germanium   IS1007     Silicon   1S1555     Transistor   2SC372Y     CRYSTAL     HC-6/W   456.5kHz
Q301 R304 R303	Part No. 017791AZ 60417791  22307843  40143101 40143821	SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR  2SC784 O  RESISTOR  Carbon film 1/4W VJ 100\(\Omega\)	Q401 Q403,405~409 D401~407 D408~411 Q403,405~407, 409 X401 X402 CF401 CF402	21010070 21015550 22303724 71600035 71600034 71200012 71200021	DIODE
PB-1779A  Q301  R304  R303  R302	Part No. 017791AZ 60417791  22307843  40143101 40143821 40143472	SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR  2SC784 O  RESISTOR  Carbon film 1/4W VJ 100Ω  """ 820Ω """ 4.7kΩ	Q401 Q403,405~409 D401~407 D408~411 Q403,405~407, 409 X401 X402 CF401 CF402	21010070 21015550 22303724 71600035 71600034 71200012 71200021	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
Q301 R304 R303	Part No. 017791AZ 60417791  22307843  40143101 40143821	SC UNIT  Description  OSC board with components  P.C. Board  TRANSISTOR  2SC784 O  RESISTOR  Carbon film 1/4W VJ 100Ω  """ 820Ω  """ 4.7kΩ	Q401 Q403,405~409 D401~407 D408~411 Q403,405~407, 409 X401 X402 CF401 CF402	21010070 21015550 22303724 71600035 71600034 71200012 71200021 40143150 40143470	PET   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
PB-1779A  Q301  R304  R303  R302	Part No. 017791AZ 60417791  22307843  40143101 40143821 40143472	SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR  2SC784 O  RESISTOR  Carbon film 1/4W VJ 100Ω  """ 820Ω """ 4.7kΩ	Q401 Q403,405~409 D401~407 D408~411 Q403,405~407, 409 X401 X402 CF401 CF402	21010070 21015550 22303724 71600035 71600034 71200012 71200021 40143150 40143470	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
PB-1779A  Q301  R304  R303  R302	Part No. 017791AZ 60417791  22307843  40143101 40143821 40143472	SC UNIT  Description OSC board with components P.C. Board  TRANSISTOR  2SC784 O  RESISTOR  Carbon film 1/4W VJ 100Ω  """ 820Ω """ 4.7kΩ	Q401 Q403,405~409 D401~407 D408~411 Q403,405~407, 409 X401 X402 CF401 CF402	21010070 21015550 22303724 71600035 71600034 71200012 71200021 40143150 40143470	FET   38K40M     Transistor   28C372Y     DIODE     Germanium   181007     Silicon   181555     Transistor   28C372Y     CRYSTAL     HC-6/W   456.5kHz     " 453.5kHz     CERAMIC FILTER     LF-C6     LF-C2A     RESISTOR     Carbon film 1/4W VJ   15Ω     " " " 47Ω

R420, 421	41143101	Carbon film 1/4W TJ	$100\Omega$	C438, 444	32824510	Dipped mic	a 50WV	51PF
	40143121	n n n n	$120\Omega$	C458	32824820	, n n		82PF
R408, 410, 414,	40143221	0 11 11 0	220Ω	C460	32824121	n n	"	120PF
424, 426, 433,				C435	32824271	0 0		270PF
435, 437, 453	1			C441	32824391	и и	"	390PF
R401	40143331	11 11 11 11	330Ω	C432	32824471	и и	п	470PF
		0 H O O						
R430	40143471		470Ω	C462	32824681	n n		680PF
R449	40143561	<i>11 11 11 11</i>	560Ω	C431, 463	32824102	и и		1000PF
R431	40143681	n n n n	$680\Omega$		36825332	Mylar	n	0.0033µF
R425, 440, 458	40143102	0 11 0 0	1kΩ	C427	36825472	"	"	$0.0047 \mu F$
R416	40143152	a n n n	1.5kΩ	C426	36825103	"	"	0.01µF
R415, 418, 419,	40143222	o n n n	2.2kΩ	C437	36825223	ıı .	n	0.022μF
422, 455, 457				C436	36825333	n	n	0.033μF
R413, 417, 428,	40143332	0 11 11 11	3.3kΩ	C416, 420, 422,	36825473	11	"	0.047µF
451				442, 468	1			
R448	40143392	n n n n	3.9kΩ	C445	36825104	n	"	0.1μF
R452	40143472	н и и и	4.7kΩ	C428		it		
R411	40143472	и и и и		C420	36825224			0.22μF
			8.2kΩ		34220105	Electrolytic		1μF
R427	40143103	н в н н	10kΩ	C425, 447	34220225	"	"	2.2µF
	40143153	H H H H	15kΩ	C439	34220226	n	"	22µF
R450, 460	40143183	n n n n	18kΩ		34220336	0	"	33µF
	40143223	1) It 11 11	22kΩ	C442, 446, 448	34220476	,,	77	47μF
R459	40143333	п п п	33kΩ	C440, 467, 469	34220107	**	11	100μF
R406	40143393	и и и и	39kΩ	-				<del> </del>
R404	40143473	n n n	47kΩ			<del></del>		··-··
R402	40143563	и в и и	56kΩ					
R436		и и и и	68kΩ					
	40143683							
R412, 434, 441,	40143104	н в п п	100kΩ			TRIMMER C		
456				TC403	39000002	ECV-1ZW		<del></del>
R405	40143154	0 " " "	150kΩ	TC401, 402	39000005	ECV-1ZW	50x32	50PF
R423, 438	40143224	n n n	220kΩ			•		-
				i l				
i l								
						TRANSFOR	MER	
				T401	55003209		MER	#220060
				T401 T402	55003209 55003210	R12-5783	MER	#220060 #220061
		THERMISTOR		T402	55003210	R12-5783 R12-5780	MER	#220061
771401	20000005	THERMISTOR	D 224	T402 T403	55003210 55003211	R12-5783 R12-5780 R12-5775	MER	#220061 #220062
TH401	29090005	THERMISTOR	D-22A	T402 T403 T404, 405	55003210 55003211 54140970	R12-5783 R12-5780 R12-5775 R12-4097	MER	#220061 #220062 #220101
TH401	29090005	THERMISTOR	D-22A	T402 T403	55003210 55003211	R12-5783 R12-5780 R12-5775	MER	#220061 #220062
TH401	29090005	THERMISTOR	D-22A	T402 T403 T404, 405	55003210 55003211 54140970	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099	MER	#220061 #220062 #220101
TH401	29090005		D-22A	T402 T403 T404, 405 T406	55003210 55003211 54140970 54140990	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099		#220061 #220062 #220101 #220156
		THERMISTOR		T402 T403 T404, 405	55003210 55003211 54140970	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099		#220061 #220062 #220101 #220156
TH401 VR401	29090005		D-22A 470ΩB	T402 T403 T404, 405 T406	55003210 55003211 54140970 54140990	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099	ctor FL4	#220061 #220062 #220101 #220156
		POTENTIOMETER		T402 T403 T404, 405 T406	55003210 55003211 54140970 54140990 53020022	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099 INDUCTOR Micro indu	etor FL4	#220061 #220062 #220101 #220156
		POTENTIOMETER		T402 T403 T404, 405 T406 L401, 402 L414	55003210 55003211 54140970 54140990 53020022 53020024	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099 INDUCTOR Micro indu	etor FL4 FL5 FL5	#220061 #220062 #220101 #220156 H 4.7µH H 27µH
		POTENTIOMETER		T402 T403 T404, 405 T406 L401, 402 L414 L415 L403	55003210 55003211 54140970 54140990 53020022 53020024 53020023 53020001	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099 INDUCTOR Micro indu	etor FL4 FL5 FL5 FL5	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH
		POTENTIOMETER SR19R		T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407,	55003210 55003211 54140970 54140990 53020022 53020024 53020023	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099 INDUCTOR Micro indu	etor FL4 FL5 FL5 FL5	#220061 #220062 #220101 #220156 H 4.7µH H 27µH
VR401	49905471	POTENTIOMETER SR19R CAPACITOR	470ΩΒ	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412	55003210 55003211 54140970 54140990 53020022 53020024 53020023 53020001 53020003	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099 INDUCTOR Micro indu	etor FL4 FL5 FL5 FL5 FL7	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH H 1mH
VR401 C415, 419	49905471 31820010	POTENTIOMETER SR19R CAPACITOR Ceramic disc 50WV	470ΩB 1PF CH	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409,	55003210 55003211 54140970 54140990 53020022 53020024 53020023 53020001	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099 INDUCTOR Micro indu	etor FL4 FL5 FL5 FL5 FL7	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH
VR401 C415, 419 C434	49905471 31820010 31820070	POTENTIOMETER SR19R  CAPACITOR Ceramic disc 50WV	470ΩB 1PF CH 7PF CH	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412	55003210 55003211 54140970 54140990 53020022 53020024 53020023 53020001 53020003	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099 INDUCTOR Micro indu	etor FL4 FL5 FL5 FL5 FL7	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH H 1mH
C415, 419 C434 C430	49905471 31820010 31820070 31820100	POTENTIOMETER SR19R  CAPACITOR Ceramic disc 50WV " " "	470ΩB 1PF CH 7PF CH 10PF CH	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409,	55003210 55003211 54140970 54140990 53020022 53020024 53020023 53020001 53020003	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099 INDUCTOR Micro indu	etor FL4 FL5 FL5 FL5 FL7	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH H 1mH
C415, 419 C434 C430 C461	31820010 31820070 31820100 31820220	CAPACITOR Ceramic disc 50WV	470ΩB  1PF CH 7PF CH 10PF CH 22PF CH	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409,	55003210 55003211 54140970 54140990 53020022 53020024 53020023 53020001 53020003	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099 INDUCTOR Micro induction """" """" """"""""""""""""""""""""""	etor FL4 FL5 FL5 FL5 FL7	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH H 1mH
C415, 419 C434 C430 C461 C465	31820010 31820070 31820100 31820220 31820270	CAPACITOR Ceramic disc 50WV	470ΩB  1PF CH 7PF CH 10PF CH 22PF CH 27PF CH	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	55003210 55003211 54140970 54140990 53020022 53020024 53020001 53020003 53030003	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099 INDUCTOR Micro induction """" """" """"""""""""""""""""""""""	etor FL4 FL5 FL5 FL5 FL7	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH H 1mH
C415, 419 C434 C430 C461 C465 C459	31820010 31820070 31820100 31820220 31820270 31827820	CAPACITOR Ceramic disc 50WV	470ΩB  1PF CH 7PF CH 10PF CH 22PF CH	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409,	55003210 55003211 54140970 54140990 53020022 53020024 53020023 53020001 53020003	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099 INDUCTOR Micro induction """" """" """"""""""""""""""""""""""	etor FL4 FL5 FL5 FL5 FL7	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH H 1mH
C415, 419 C434 C430 C461 C465	31820010 31820070 31820100 31820220 31820270	CAPACITOR Ceramic disc 50WV  " " "  " " "  " " "	470ΩB  1PF CH 7PF CH 10PF CH 22PF CH 27PF CH	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	55003210 55003211 54140970 54140990 53020022 53020024 53020001 53020003 53030003	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099 INDUCTOR Micro induction """" """" """"""""""""""""""""""""""	etor FL4 FL5 FL5 FL5 FL7	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH H 1mH
C415, 419 C434 C430 C461 C465 C459	31820010 31820070 31820100 31820220 31820270 31827820	CAPACITOR Ceramic disc 50WV  " " "  " " "  " " "  " " "  " " "	470ΩB  1PF CH 7PF CH 10PF CH 22PF CH 27PF CH 82PF UJ	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	55003210 55003211 54140970 54140990 53020022 53020024 53020001 53020003 53030003	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099 INDUCTOR Micro induction """" """" """"""""""""""""""""""""""	etor FL4 FL5 FL5 FL5 FL7 ed) S6-39	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH H 1mH H 3.9mH
C415, 419 C434 C430 C461 C465 C459 C421, 423 C453	31820010 31820070 31820100 31820220 31820270 31827820 31829101 31829151	POTENTIOMETER SR19R  CAPACITOR Ceramic disc 50WV  " " " "  " " " "  " " " "  " " " "  " " " "	470ΩB  1PF CH 7PF CH 10PF CH 22PF CH 27PF CH 82PF UJ 100PF SL	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	55003210 55003211 54140970 54140990 53020022 53020024 53020003 53020003 53030003	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099 INDUCTOR Micro induction """" """" """"" """" """ ""Shielde	etor FL4 FL5 FL5 FL5 FL7 ed) S6-39	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH H 1mH H 3.9mH
C415, 419 C434 C430 C461 C465 C459 C421, 423 C453	31820010 31820070 31820200 31820220 31820270 31827820 31829101 31829151 31829221	POTENTIOMETER SR19R  CAPACITOR Ceramic disc 50WV  " " " "  " " " "  " " " "  " " " "  " " " "	470ΩB  1PF CH 7PF CH 10PF CH 22PF CH 27PF CH 82PF UJ 100PF SL 150PF SL 220PF SL	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	55003210 55003211 54140970 54140990 53020022 53020024 53020003 53020003 53030003 67020007 91100008	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099  INDUCTOR Micro indu """" """" """"" """" """ ""Shielde  US PIN PLU SQ4052  Wrapping t	etor FL4 FL5 FL5 FL5 FL7 ed) S6-39	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH H 1mH H 3.9mH
C415, 419 C434 C430 C461 C465 C459 C421, 423 C453 C454 C424	31820010 31820070 31820200 31820270 31820270 31829201 31829101 31829151 31829221 30820102	CAPACITOR Ceramic disc 50WV  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "	1PF CH 7PF CH 10PF CH 22PF CH 27PF CH 82PF UJ 100PF SL 150PF SL 220PF SL 0.001μF	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	55003210 55003211 54140970 54140990 53020022 53020024 53020003 53020003 53030003	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099 INDUCTOR Micro induction """" """" """"" """" """ ""Shielde	etor FL4 FL5 FL5 FL5 FL7 ed) S6-39	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH H 1mH H 3.9mH
C415, 419 C434 C430 C461 C465 C459 C421, 423 C453 C454 C424 C401, 402, 406,	31820010 31820070 31820200 31820270 31820270 31829201 31829101 31829151 31829221 30820102 30820103	CAPACITOR Ceramic disc 50WV  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "	470ΩB  1PF CH 7PF CH 10PF CH 22PF CH 27PF CH 82PF UJ 100PF SL 150PF SL 220PF SL	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	55003210 55003211 54140970 54140990 53020022 53020024 53020003 53020003 53030003 67020007 91100008	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099  INDUCTOR Micro indu """" """" """"" """" """ ""Shielde  US PIN PLU SQ4052  Wrapping t	etor FL4 FL5 FL5 FL5 FL7 ed) S6-39	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH H 1mH H 3.9mH
C415, 419 C434 C430 C461 C465 C459 C421, 423 C453 C454 C424 C401, 402, 406, 407, 409~414,	31820010 31820070 31820200 31820270 31820270 318292101 31829101 31829151 31829221 30820102 30820103	CAPACITOR Ceramic disc 50WV  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "	1PF CH 7PF CH 10PF CH 22PF CH 27PF CH 82PF UJ 100PF SL 150PF SL 220PF SL 0.001μF	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	55003210 55003211 54140970 54140990 53020022 53020024 53020003 53020003 53030003 67020007 91100008	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099  INDUCTOR Micro indu """" """" """"" """" """ ""Shielde  US PIN PLU SQ4052  Wrapping t	etor FL4 FL5 FL5 FL5 FL7 ed) S6-39	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH H 1mH H 3.9mH
C415, 419 C434 C430 C461 C465 C459 C421, 423 C453 C454 C424 C401, 402, 406, 407, 409~414, 418, 429, 449,	31820010 31820070 31820200 31820270 31820270 318292101 31829101 31829151 31829221 30820102 30820103	CAPACITOR Ceramic disc 50WV  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "	1PF CH 7PF CH 10PF CH 22PF CH 27PF CH 82PF UJ 100PF SL 150PF SL 220PF SL 0.001μF	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	55003210 55003211 54140970 54140990 53020022 53020024 53020003 53020003 53030003 67020007 91100008	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099  INDUCTOR Micro indu """" """" """"" """" """ ""Shielde  US PIN PLU SQ4052  Wrapping t	etor FL4 FL5 FL5 FL5 FL7 ed) S6-39	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH H 1mH H 3.9mH
C415, 419 C434 C430 C461 C465 C459 C421, 423 C453 C454 C424 C401, 402, 406, 407, 409~414,	31820010 31820070 31820100 31820200 31820220 31820270 31829101 31829151 31829221 30820102 30820103	CAPACITOR Ceramic disc 50WV  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "  " " "	1PF CH 7PF CH 10PF CH 22PF CH 27PF CH 82PF UJ 100PF SL 150PF SL 220PF SL 0.001μF	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	55003210 55003211 54140970 54140990 53020022 53020024 53020003 53020003 53030003 67020007 91100008	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099  INDUCTOR Micro indu """" """" """"" """" """ ""Shielde  US PIN PLU SQ4052  Wrapping t	etor FL4 FL5 FL5 FL5 FL7 ed) S6-39	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH H 1mH H 3.9mH
C415, 419 C434 C430 C461 C465 C459 C421, 423 C453 C454 C424 C401, 402, 406, 407, 409~414, 418, 429, 449,	31820010 31820070 31820200 31820200 31820270 31829221 31829101 31829101 31829221 30820102 30820103	CAPACITOR Ceramic disc 50WV	1PF CH 7PF CH 10PF CH 22PF CH 27PF CH 82PF UJ 100PF SL 150PF SL 220PF SL 0.001μF	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	55003210 55003211 54140970 54140990 53020022 53020024 53020003 53020003 53030003 67020007 91100008	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099  INDUCTOR Micro indu """" """" """"" """" """ ""Shielde  US PIN PLU SQ4052  Wrapping t	etor FL4 FL5 FL5 FL5 FL7 ed) S6-39	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH H 1mH H 3.9mH
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 31820200 31820200 31820270 31829201 31829101 31829151 31829221 30820102 30820103	CAPACITOR Ceramic disc 50WV	1PF CH 7PF CH 10PF CH 22PF CH 27PF CH 82PF UJ 100PF SL 150PF SL 220PF SL 0.001μF	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416	55003210 55003211 54140970 54140990 53020022 53020024 53020003 53020003 53030003 67020007 91100008	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099  INDUCTOR Micro indu " " " " " " " (shielded  US PIN PLU SQ4052  Wrapping to	etor FL4 FL5 FL5 FL5 FL7 ed) S6-39	#220061 #220062 #220101 #220156 H 4.7µH H 27µH H 100µH H 1mH H 3.9mH
C415, 419 C434 C430 C461 C465 C459 C421, 423 C453 C454 C401, 402, 406, 407, 409~414, 418, 429, 449, 450, 464, 466 C403, 404, 405, 408, 417, 433,	31820010 31820070 31820200 31820200 31820270 31829201 31829101 31829151 31829221 30820102 30820103	CAPACITOR Ceramic disc 50WV	1PF CH 7PF CH 10PF CH 22PF CH 27PF CH 82PF UJ 100PF SL 150PF SL 220PF SL 0.001μF	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416  P401	55003210 55003211 54140970 54140990 53020022 53020024 53020003 53020003 53030003 67020007 91100008 80022070 Parts No.	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099  INDUCTOR Micro indu " " " " " " " (shielded)  US PIN PLU SQ4052  Wrapping to Heat sink	ctor FL4 FL5 FL5 FL7 ed) S6-39	#220061 #220062 #220101 #220156 H 4.7µH H 100µH H 100µH H 3.9mH
C415, 419 C434 C430 C461 C465 C459 C421, 423 C453 C454 C401, 402, 406, 407, 409~414, 418, 429, 449, 450, 464, 466 C403, 404, 405, 408, 417, 433, 451, 452, 455,	31820010 31820070 31820200 31820200 31820270 31829201 31829101 31829151 31829221 30820102 30820103	CAPACITOR Ceramic disc 50WV	1PF CH 7PF CH 10PF CH 22PF CH 27PF CH 82PF UJ 100PF SL 150PF SL 220PF SL 0.001μF	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416  P401  Symbol No.	55003210 55003211 54140970 54140990 53020022 53020024 53020001 53020003 53030003 67020007 91100008 80022070 Parts No. 017801AZ	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099  INDUCTOR Micro indu " " " " " " " (shielded)  US PIN PLU SQ4052  Wrapping to  Heat sink	ctor FL4 FL5 FL5 FL7 ed) S6-39	#220061 #220062 #220101 #220156 H 4.7µH H 100µH H 100µH H 3.9mH
C415, 419 C434 C430 C461 C465 C459 C421, 423 C453 C454 C401, 402, 406, 407, 409~414, 418, 429, 449, 450, 464, 466 C403, 404, 405, 408, 417, 433,	31820010 31820070 31820200 31820200 31820270 31829201 31829101 31829151 31829221 30820102 30820103	CAPACITOR Ceramic disc 50WV	1PF CH 7PF CH 10PF CH 22PF CH 27PF CH 82PF UJ 100PF SL 150PF SL 220PF SL 0.001μF	T402 T403 T404, 405 T406  L401, 402 L414 L415 L403 L404, 406, 407, 410~412 L405, 408, 409, 413, 416  P401	55003210 55003211 54140970 54140990 53020022 53020024 53020003 53020003 53030003 67020007 91100008 80022070 Parts No.	R12-5783 R12-5780 R12-5775 R12-4097 R12-4099  INDUCTOR Micro indu " " " " " " " (shielded)  US PIN PLU SQ4052  Wrapping to Heat sink	ctor FL4 FL5 FL5 FL7 ed) S6-39	#220061 #220062 #220101 #220156 H 4.7µH H 100µH H 100µH H 3.9mH

0501	22303724	TRANSISTOR 2SC372Y	Cumbal Ma	Part No.	REG UNIT  Description
Q501	22303/24	2SC372Y	Symbol No.	017841AZ	Regulator unit with components
	<del> </del>		PD 10011	<b></b>	P.C. Board
·	<del> </del>		PB-1784A	60417841	P.C. Board
<del></del>	<u> </u>	DIODE		<del></del>	· · · · · · · · · · · · · · · · · · ·
D501, 502	21010070	Germanium 1S1007			
DJ01, J02	21010070	Germanium 151007	<del></del>		IC
	<del></del>		Q604	25000105	
<del>-</del>	<del></del>		Q601, 603	25000103	μPC 14305 μPC 14308
	<del></del>	CRYSTAL	Q601, 603	25000110	
X501	71600026	HC-6/W 1MHz	Q002	23000170	NJM 78L09A
7,501	71000020	IIC-0/W IMIIZ			
·	<del></del>				
	<del> </del>				DIODE
·		RESISTOR	D607, 608	21015550	Silicon 1S1555
R505, 506	40143101	Carbon film 1/4W VJ 100Ω	D601~606	21090022	" V06B
R503	40143221	" " " 220Ω	D001 000	21070022	УООВ
R502	40143103	" " " 10kΩ			
R501	40143104	" " " 100kΩ			
		200.00			RESISTOR
<del></del>			R602	42124220	Carbon composition 1/2W GK 22
	<b>-</b>				
	1	<del> </del>	<del></del>	<del></del>	·
				<del> </del>	· · · · · · · · · · · · · · · · · · ·
	<del>                                     </del>	CAPACITOR			
C502, 510	31820080	Ceramic disc 50WV 8PF CH		<del> </del>	
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			
	<b></b>				MINI CONNECTOR
			J601	68110008	5047-11 #240063A
	<u> </u>	INDUCTOR	(with wire)		
L503	55000012	#220051		<u> </u>	
L502	53020022	Micro inductor FL4H 4.7mH		91100008	Wrapping terminal C
L501	53020001	" " FL5H 1mH			
L504	53020003	" " FL7H 3.9mH			
	1				
	1				
		US PIN PLUG			ER AMP UNIT
P501, 502	67020007	SQ4052	Symbol No.	Part No.	Description
	<del>_</del>			017901AZ	Buffer board with components
	1		PB-1790A	60417901	P.C. Board
	91100008	Wrapping terminal C			
	1				
					FET
		1	0701 702	122000401	207/4014
	<u> </u>	· · · · · · · · · · · · · · · · · · ·	Q701, 702	23800401	3SK40M
			Q701, 702	23800401	35K4UM

	<del></del>	RESISTOR			CHITOL
R703, 709	40143221	Carbon film 1/4W VJ 220Ω	S801	64000107	SWITCH SLE 72251
R704	40143152	" " " 1.5kΩ	S802	64000107	SLE 72251 SLE 62251
R710	40143272	" " " " 2.7kΩ	S803	64000103	SLE 82301
R702, 707	40143272	" " " 33kΩ	S804		
R705, 708	40143333	" " " 47kΩ	3804	64000108	SLE 64251
R701, 706	40143474	" " " 470kΩ			
					MINI CONNECTOR
		<del> </del>	J801	6000000	MINI CONNECTOR
<del> </del>			P801, 802	6 <u>8060008</u> 67150008	3024-15C
	_	<del> </del>		68150006	5048-15A
	<del> </del>	CAPACITOR	P803	66130006	3094-15A
C701~704	30820103	Ceramic disc 50WV 0.01µF			
C705	36226105	Tantalum 16WV 1µF			
C706	32821102	Feed thru $50WV 0.001\mu F$			
C/00	32821102	reed thru 30 w v 0.001μr	· · · · · · · · · · · · · · · · · · ·		<del> </del>
	91001102	Seal terminal A102		COL	UNTER UNIT
	91001102	Sear terminar A 102	Symbol No.	Part No.	Description
	91100008	Wrapping terminal C	Symbol No.	017541AZ	
	7110000	wanthing community		O17341AL	Counter unit assembly with Buffer Display board
<del> </del>	+	<del> </del>	PB-1754A	60417541	P.C. Board
		<del>                                     </del>	PR-1755	60417550	P.C. Board
			FD-1733	00417330	r.c. board
			•		
	SM	/ITCH UNIT	<u> </u>		
Symbol No.	Part No.	Description			IC & TRANSISTOR
	017671AZ-	Switch board with components	Q907, 910	25000143	IC MC1416
PB-1767A	60417671	P.C. Board	Q918	25000160	MC14518
		1	Q919	25000174	MC14519
<del></del>		<u> </u>	Q920	25000053	MSM5502
		<del></del>	Q912	25000067	MSM5592
	-	IC & TRANSISTOR	Q915, 923	25000140	SN74LS00N
Q801	25000114	IC MC14011	Q914, 921	25000171	SN7407N
Q803	25000176	MC14016	Q917	25000072	SN74LS90N
Q802	25000156	MC14027	Q913	25000170	SN74LS112N
Q804	25000093	MC14081	Q922	25000161	SN74LS390N
Q805~808	22303730	Transistor 2SC373	Q916	25000159	SP8646
Q809	21090147	Display 5082-7286	Q908	25000157	μPA56C
			Q909	25000158	μPA547C-1
			Q906	25000172	NJM78L05A
<del></del>			Q926, 927, 928		Transistor 2SC373
		DIODE	Q911	22308282	2SC828
D801~806	21015550	Silicon 1S1555	Q924, 925	22390001	MPSA13
		3111011 10100	Q901~905	21090135	Display 5082-7740
			32.22.200		
		RESISTOR			
R802~806	42184103	Carbon composition 1/8W GK 10kΩ		<del> </del>	
		" " " 47kΩ			DIODE
R801	42184473	4/8321		<del></del>	
R801	42184473	47,820	D901, 902, 905	21015550	Silicon 1S1555
R801	42184473	77/12	D901, 902, 905 D903, 904	21015550	Silicon
R801	42184473	7/1/2			
R801	42184473	7/1/2			
R801	42184473	7/1/2			
R801	42184473	CAPACITOR			
R801	30820102				
C802 C801		CAPACITOR		21090091	LED SL103D
C802	30820102	CAPACITOR Ceramic disc 50WV 0.001µF	D903, 904	21090091 40143390	LED SL103D  RESISTOR
C802 C801	30820102 30820473	CAPACITOR  Ceramic disc 50WV 0.001μF  " " 0.047μF	D903, 904  R922, 949~955	21090091 40143390	LED SL103D  RESISTOR  Carbon film RD1/4(F) 39Ω
C802 C801 C804	30820102 30820473 33824470	CAPACITOR  Ceramic disc 50WV 0.001μF  " " 0.047μF  Dipped mica " 47PF	R922, 949~955 R924, 928, 930,	21090091 40143390	LED   SL103D
C802 C801 C804	30820102 30820473 33824470	CAPACITOR  Ceramic disc 50WV 0.001μF  " " 0.047μF  Dipped mica " 47PF	R922, 949~955 R924, 928, 930, 956	21090091 40143390 40143221 40143271	LED   SL103D
C802 C801 C804	30820102 30820473 33824470	CAPACITOR  Ceramic disc 50WV 0.001μF  " " 0.047μF  Dipped mica " 47PF	R922, 949~955 R924, 928, 930, 956 R958	21090091 40143390 40143221 40143271	LED   SL103D
C802 C801 C804	30820102 30820473 33824470	CAPACITOR  Ceramic disc 50WV 0.001μF  " " 0.047μF  Dipped mica " 47PF	R922, 949~955 R924, 928, 930, 956 R958 R903, 908, 909,	40143390 40143221 40143271 40143102	LED   SL103D

R902	40143332	" " " 3.3kΩ	1	1	US PIN JACK
R918	40143472	" " 4.7kΩ	J901~903	68020008	SQ3056
ľ	40143562	" " 5.6kΩ	3901-903	0802000	80000
	40143103		<del>                                     </del>		
R920, 923,	40143223	IORAS		_	
939~941	40143223	" " " 22kΩ		<del></del>	IO COCKET
	40142250		00001 005	50440005	IC SOCKET
R901	40143273	" " " 27kΩ	QS901~905	68140005	314-AG37D
R957	40143563	" " " 56kΩ	QS906	68420001	116-42-30-114
R904, 906, 931	40143104	" " " 100kΩ			
R905	40143154	" " " 150kΩ			
R942	47000003	Block resistor 220Ωx7		67200003	Board joint 163740
R932	47000007	" " 22kΩ×7			
			1	-	
				ACCES	SORIES
			Symbol No.	Part No.	Description
	<del> </del>			67020003	Record plug & external Speaker
		<del></del>	-		plug P2240
			<del> </del>	67020002	Headphone plug SH3001
		POTENTIOMETER		67020002	RCA Pin plug CN7017P
VROOT	40900092		<del></del>		
VR901	49800083	PH822H501 500ΩB		67000005	Antenna plug MP-5
<del></del> .	ļ		-	96000025	Antenna wire A #250003
			<del></del>	96000026	Antenna wire B #250004
				73000013	Fuse (F1) 1A (100V~117V)
				73000012	0.5A (200V~234V)
•		CAPACITOR		73000003	Fuse (F2) 3A
C901, 902, 904,		Ceramic disc 50WV 0.01µF		<u> </u>	
912, 913, 942		<u> </u>			
C908, 910	30820473	" " " 0.047μF			
C944	33824300	Dipped mica " 30PF			1
C907	33824151	" " " 150PF			
C903, 905	36133104	Mylar 100WV 0.1μF			
		(B32560-A11045)			
			"]		
C906	36824102	Styrol 50WV 1000PF			
C909, 911	36326685	Tantalum 20WV 6.8µF			
C914~941	32821102	Feed thru 50WV 0.001µF			
C943	34220107	Electrolytic 16WV TW 100μF			
			<del></del>		
				1	
			<del>                                     </del>		
•	i i				
		TRANSFORMER			
T001	55002084	TRANSFORMER 7MC.312162NO #220188			
T901	55003084	TRANSFORMER 7MC-312162NO #220188			
T901	55003084				
T901	55003084				
T901	55003084	7MC-312162NO #220188			
		7MC-312162NO #220188			
T901 L901, 902	55003084	7MC-312162NO #220188			
		7MC-312162NO #220188			
		7MC-312162NO #220188			
		7MC-312162NO #220188			
		7MC-312162NO #220188			
		7MC-312162NO #220188  INDUCTOR  #220012			
L901, 902	55003069 67110004	7MC-312162NO #220188  INDUCTOR  #220012  MINI CONNECTOR 5048-11A			
L901, 902 P901 J904	55003069	7MC-312162NO #220188  INDUCTOR  #220012  MINI CONNECTOR			
L901, 902  P901  J904  with wire	55003069 67110004 68150007	7MC-312162NO #220188  INDUCTOR  #220012  MINI CONNECTOR  5048-11A  5047-15 #240061			
P901 J904 with wire	55003069 67110004	7MC-312162NO #220188  INDUCTOR  #220012  MINI CONNECTOR 5048-11A			
L901, 902  P901  J904  with wire	55003069 67110004 68150007	7MC-312162NO #220188  INDUCTOR  #220012  MINI CONNECTOR  5048-11A  5047-15 #240061			
P901 J904 with wire	55003069 67110004 68150007	7MC-312162NO #220188  INDUCTOR  #220012  MINI CONNECTOR  5048-11A  5047-15 #240061			
P901 J904 with wire	55003069 67110004 68150007	7MC-312162NO #220188  INDUCTOR  #220012  MINI CONNECTOR  5048-11A  5047-15 #240061			

# WORLD TIME CONVERSION CHART IN HOURS

Philippines. Perth,	ВАМ	9AM	OAM	1AM	oou	P.W	2PM	ЗРМ	4PM	5PM	<b>БРМ</b>	7P.M	BPM	M46	OPM	1 P.M	Mid Night	1 AM	2AM	3AM	4AM	5 AM	6AM	7 AM
Sumatra. Thailand, Laos.	7AM	8AM	9AM10	OAM1	1 AM	uoo	1PM	2PM	3PM .	4PM	SPM (	. М 49	7PM	8PM	9PM1	OP!M1	1PM N	Mid Night		2AM	3AM	4AM	5AM	6AM
Calculta, Novosi birsk Russia, Tibet.	6AM	7 AM	8AM	9 AM	OAM1	1 AM	noo	1 PM	2PM	зРМ	4PM	SPM	<b>ВРМ</b>	7PM	8PM	9PM1	0PM1	1 P.M	Mid Night	1 AM	2AM	3AM	4AM	5AM
Central Russia, Bombay, India.	5AM	6AM	7 AM	8AM	9AM1	0AM1	1 AM	loon	1 P.M	2PM	зРМ	4PM	5PM	<b>БРМ</b>	7PM	8PM	9РМ1	OPM	1PM	Night Sight	1 AM	2AM	3AM	4 AM
Mauritius, Iran. Reunion Island.	4AM	5AM	6AM	7 AM	8AM	9AM1	DAM1	1 AM	Noon	1 P M	2PM	3PM	4PM	5PM	<b>ВРМ</b>	7.P.M	8PM	9PM1	OPMI	11PM	Mid Night	1 AM	2AM	ЗАМ
Arabia, Armenia, Ethiopia, Madagas car,	3AM	4AM	5AM	бАМ	7AM	8AM	9AM	10AM	11AM	Noon	1PM	2PM	3PM	4PM	5PM	<b>6РМ</b>	7PM	8PM	9PM	10PM	_	Mid Night	1AM	2AM
Eastern Europe.At- hens, Cape Town. Cairo, Moscow	2AM	3AM	4AM	5AM	6AM	7 AM	8AM	9AM	10AM	11AM	Noon	1PM	2PM	ЗРМ	4PM	5PM	6PM	7PM	8PM	9PM	10PM	11PM	Mid Night	1 AM
Central Europe. Berlin, Geneva, Stockholm, Vienna.	1AM	2AM	3AM	4AM	5AM	<b>6AM</b>	7AM	8AM	MA6	10AM	1 1 AM	Noon	1PM	2PM	3PM	4PM	5PM	<b>БРМ</b>	7PM	M48	Wd6	10PM	11PM	Mid Night
TMĐ	0000	0100	0200	0300	0400	0500	0600	0700	0080	0060	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
Iceland. Canary Islands.	11PM	Mid Night	1 AM	2AM	3AM	4AM	5AM	6AM	7AM	8AM	9AM	10 AM	11AM	Noon	1 P.M	2PM	ЗРМ	4PM	SPM	BPM	7PM	8PM	₩46	10PM
29 10 s Å	10PM	11PM	Mid		2AM	3AM	4AM	5AM	6AM	7AM	8AM	9AM	10AM	1 1 AM	Noon	1 PM	2PM	3PM	4PM	SPM	6PM	7PM	8PM	9РМ
Greenland. Rio de Janeiro. Brazil.	9PM	10PM	1 1 PM	Mid Night	1 AM	2AM	3AM	4AM	5AM	6AM	7AM	8AM	9AM	10AM	1 1 AM	Noon	1PM	2PM	3PM	4PM	SPM	6PM	7PM	8PM
Atlantic Standard Time: Argentina. Mova Scotia	8PM	MH6	10PM	11PM	Night	1AM	2AM	3AM	4AM	5AM	6AM	7AM	8AM	9AM	10AM	1 1 AM	Noon	1PM	2PM	3PM	4PM	5PM	6PM	7PM
Eastern Standard Time, Montreal, New York, Peru.	Md2	8PM	Md6	10PM	11PM	Mid Night	1 AM	2AM	3AM	4AM	5AM	6AM	7AM	8AM	9AM	10AM	114M	Noon	1 PM	2PM	3PM	4PM	5PM	6PM
Central Standard Time: Chicago, Costa Rica,	6PM	7PM	8PM	9PM	10PM	1 1 PM	Mid Night	1 AM	2AM	3AM	4AM	5AM	6AM	7AM	8AM	9AM	10AM	11 AM	Noon	1 P.M	2PM	3PM	4PM	5PM
Mountain Standard Time, Calgary, Denver, Phoenix.	5PM	6PM	7PM	8PM	Md6	10PM	11PM	A Mid		2AM	3AM	4AM	5AM	6AM	7AM	8AM	9AM	10AM	111AM	Noon	1PM	2PM	3PM	4PM
Pacific Standard Time. Los Angeles. Seattle, Juneau.	ļi	5PM	6PM	7PM	BPM	Md6	10PM	11PM	Nid Sight	1AM	2AM	3AM	4AM	1 5AM	6AM	1 7 AM	1 8AM	MA6	110AM	11 1 AM	Noon	1PM	2PM	3PM
Eastern Alaska. Dawson		4PM	SPM	6PM	7PM	8PM	M 9PM	10PM	11 1 PM	Might	_	1 2AM	1 3AM	4 AM	1 SAM	1 6AM	7 AM	1 8AM	MA6	HOAM	111AM	Noon	1PM	A 2PM
i iswaH	1	3PM	4PM	SPM	Me9	7PM	BPM	M 6	10PM	111PN	Night Tight		1 2AM	1 3AM	4AM	5AM	1 6AM	7 AM	8 AM	MA6	110AM	10AM11AM	Noon	1PM
Nome, Alaska. Samoa Islands.	=	1 2PM	3PM	4PM	1 SPM	M ep M	1 7PM	1 SPM	M 6	9PM10PM11PM	111PM	Nid Night	_	1 2AM	3AM	4AM	1 SAM	1 6AM	1 7 AM	1 8AM	MA6	IOAN	111AM	Noon
lacernational Date Line, Zangalanda,	Š	1PM	1 2PM	3PM	4PM	SPM	M 6PM	1 7PM	M 8 PM		HOPM	11 1 PM	Nicht Nicht		2AM	1 3AM	4AM	5AM	1 6AM	7 AM	1 8AM	MA6	10AM	111AM
New Caledonia.	<b>Ⅱ</b> —	Noon	1 1 PM	2PM	3PM	4 P.M	1 SPM	F 6PM	TPM	R SPM	M 6	10PM	111PM	Night Sight	-	1 2AM	1 3AM		1 5AM	6AM	7 AM	A SAM	MA6	9AM10AM
Eastern Australia.	10	111AMN	Noon	1 1PM	1 2PM	1 3PM	1 4PM	1 SPM	F 6PM	1 7PM	N 8PM	9PM1	110PM	11 1 P.M	Night	-	2AM	3AM	4 4M	1 SAM	6AM	1 7 AM	f 8AM	
nagal	9AM	10AM	11 AMN	Noon	1PM	2PM	3PM	4PM	5PM	<b>ВРМ</b>	7PM	8PM	MG6	10PM	11PM	Mid Night	1 AM	2AM	3AM	4AM	5AM	6AM	7 AM	8AM



