

**INSTRUCTION
MANUAL
FV-707DM**

YAESU MUSEN CO., LTD.

TOKYO JAPAN

YAESU DIGITAL VFO FV-707DM



GENERAL

The FV-707DM is a highly sophisticated digitally synthesized external VFO for the FT-707 transceiver. Featuring a dual loop PLL system which provides up/down scanning in 10 Hz steps, the FV-707DM includes clarifier and memory shift circuits which allow unlimited offset from VFO or memory channels within the normal 500 kHz working range of the VFO. As many as twelve memory channels may be programmed.

Scanning controls on the optional YM-35 microphone for the FT-707 allow fingertip frequency control of the operating frequency when using the FV-707DM. When using the scanning controls on SSB or CW, the 10 Hz channel steps are not discernible, so the sound you hear as you sweep the band sounds just like a regular analog VFO.

A product of the most modern solid state technology, the FV-707DM stands only slightly more than an inch tall (27 mm). It is designed for mounting beneath the FT-707 transceiver, providing a synthesized communications module considerably smaller than most transceivers on the market today. All power connections are made via the FT-707 transceiver.

We recommend that you read this manual in its entirety, so as to become better acquainted with the exciting new FV-707DM. With proper care in operation, this equipment will provide many years of reliable operation.

SPECIFICATIONS

Output frequency:

4.9–5.6 MHz

Output level:

150 mV rms at 50 ohms

Output impedance:

50 ohms

Frequency stability:

±75 Hz from switch-on (0° – 50°C)

Memory channels:

12

Power requirements:

13.5 VDC, negative ground (supplied by FT-707)

Current consumption:

0.5 amps maximum

Case size:

27(H) x 238(W) x 235(D) mm

Weight:

Approx. 1.6 kg

SEMICONDUCTORS

Transistors:

2SC535A	9
2SC945	1
2SC1815GR	1
MPS-A13	2

FETs:

2SK19TM-GR	9
3SK73GR	3

Diodes:

1N270 (Ge)	4
10D1 (Si)	1
1S1555 (Si)	6
MV-104 (Varactor)	2

LEDs:

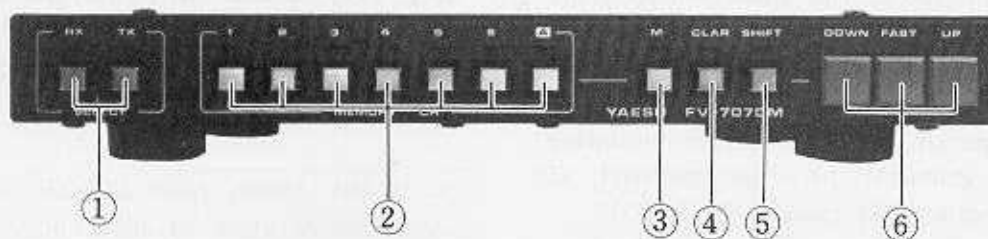
TLR-205	5
TLG-205	6
TLY-205	1

ICs:

78L08	2
TC5081P	2
TC9122P	2
μPB551C	2
μPC14305	2
μPD5101LC	5
MM74C00	1
MM74C90	1
MSM4011	1

MC14001B	1
MC14008B	1
MC14011B	2
MC14016B	2
MC14025B	1
MC14093B	1
MC14510B	10
MC14518B	2
MC14519B	5
SN76514N	4
SN74LS90N	2
SN74LS123N	1
SN74LS192N	5
SN74LS390N	1

FRONT PANEL CONTROLS AND SWITCHES



(1) SELECT switches

- RX** Push this button to select FV-707DM control of the receive frequency. Transmit frequency control will remain on the FT-707 main dial or fixed channel.
- TX** Push this button to select FV-707DM control of the transmit frequency. Receive frequency control will remain on the FT-707 main dial or fixed channel.
- RX/TX** Push both buttons to select FV-707DM control of the transceive frequency.

(2) MEMORY CHANNEL switches

These switches select the memory channel in use. Push switches 1 through 6 to select the desired channel. By pushing switch A, switches 1 through 6 become channels 7 through 12. See the section on operation for details.

(3) M

Push this switch to store a frequency in memory.

(4) CLAR

The Clarifier switch allows offset of the receive

frequency from any memory channel previously stored (and recalled by appropriate selection of the memory channel switches). Offset is in 10 Hz synthesized steps, and the UP, DOWN, and FAST switches allow selection of the direction and speed of the scan.

(5) SHIFT

In the same manner as the CLAR switch, the SHIFT switch allows offset of the transceive (TX and RX) frequency from any memory channel frequency. The UP, DOWN, and FAST switches are again used.

(6) DOWN/FAST/UP

When the desired selection of the CLAR or SHIFT switch has been made, push the DOWN switch to scan lower in frequency, and push the UP switch to scan higher in frequency. Push the FAST switch for fast scanning. The scan rate is 10 kHz per second during fast scan, 1 kHz per second during normal scan.

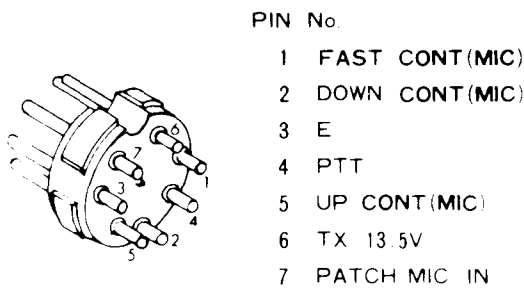
INSTALLATION

When you first open the packing carton, inspect the VFO for any visible signs of damage. If any damage is present, notify the shipping company immediately, and document the damage completely. Save the packing material for possible use at a later date.

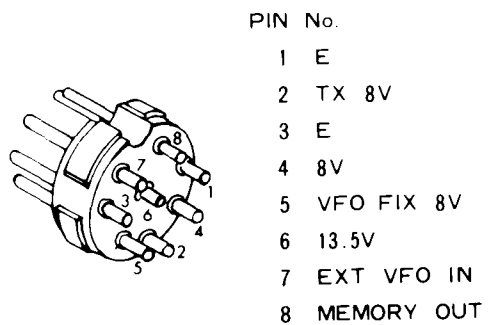
The FV-707DM is designed for installation beneath the FT-707 transceiver. The space between the two units allows free circulation of air, but it must not be obstructed by papers or other material placed between the two units. For mobile installations, the special MMB-2 mobile mounting

bracket may be used to mount the transceiver and the FV-707DM together. See your Yaesu dealer for details.

The only interconnections required are to connect the 7 pin DIN plug from the FV-707DM to the FT-707ACC socket, and the 8 pin DIN plug from the FV-707DM should be connected to the FT-707 EXT VFO socket. All power and switching connections are accomplished by these two cables. Be certain that the FT-707 power switch is OFF when making interconnections.

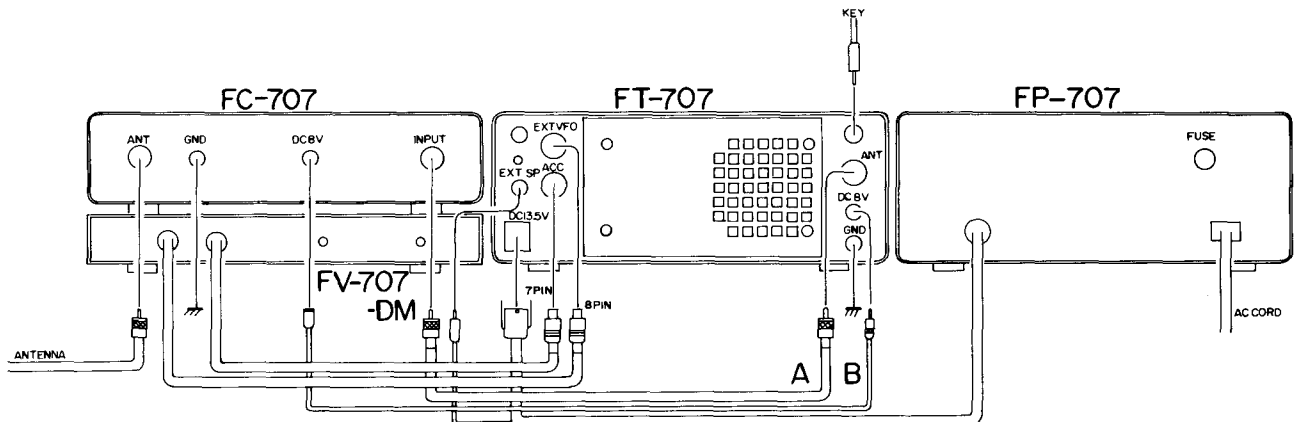


ACC Plug



EXT VFO Plug

INTERCONNECTIONS



OPERATION

- (1) Preset the controls and switches as follows:

SELECT switches	RX/TX both OFF (button not pushed)
MEMORY CH	Push channel 1
M	OFF (button not pushed)
CLAR	OFF (button not pushed)
SHIFT	OFF (button not pushed)

- (2) Turn the FT-707 POWER switch ON. The FV-707DM CH 1 LED will become illuminated.
- (3) Rotate the FT-707 main tuning dial to a frequency you want to store in memory. Now press the M button to store that frequency into memory channel 1.
- (4) In like fashion, other frequencies may be stored in memory channels 2 through 6 by pressing the appropriate memory channel button. To store frequencies in memory channels 7 through 12, press the memory channel A button and one of the memory 1–6 buttons. For example, for memory channel 7 push the channel A and the channel 1 buttons; for channel 8, push the channel A and the channel 2 buttons, etc.
- (5) Once a frequency is stored in memory, it may be recalled by pushing one or both of the SELECT switches. To recall a frequency for control on receive only, push the RX button (transmit frequency control will remain on the FT-707 main dial). To recall a frequency for control on transmit only, push the TX button (receive frequency control will remain on the FT-707 main dial). To use the FV-707DM to control both the transmit and receive frequencies, push both the TX and RX buttons.
- (6) Note that if you are using memory channel 2, and you want to select memory channel 8, the only switching that you need to do is to push the memory channel A switch.

CLARIFIER OPERATION

The Clarifier feature allows offset of the receive frequency from memory channels. This feature is very useful for following drifting stations, or for setting a particular CW station to your favorite beat note. The Clarifier will not affect the transmit frequency.

- (1) Push the CLAR switch to activate the Clarifier. The CLAR LED will become illuminated.
- (2) To move higher in frequency, push the FV-707DM UP switch. The synthesizer will scan in 10 Hz steps at a rate of 1 kHz per second. Release the UP switch to stop the scan.
- (3) To move lower in frequency, use the same procedure, but push the DOWN switch.
- (4) To increase the scan speed, push both the UP or DOWN buttons and the FAST button. The scanning rate will now be 10 kHz per second.
- (5) Do not attempt to scan outside of the 500 kHz VFO range. If you do, the PLL will eventually unlock, and the memory will have to be reset. Turn the CLAR switch off in the case of PLL unlock.
- (6) The Clarifier feature shifts all memory channels at the same time. Therefore, some cautions should be observed, as can be seen from the following example: let us say that 14.1000 MHz is stored in memory channel 1, and 14.250 MHz is stored in memory channel 5. If you push the RX select switch, the CLAR button, and the channel 5 button, and then scan upward 50 kHz, the receive frequency will become 14.3000 MHz. However, if you push the channel 1 button, you will not return to 14.1000 MHz, but to 14.1500 MHz, because of the shift feature. Switch the Clarifier OFF to return to 14.1000 MHz. See the practical examples to follow to learn how to use the parallel memory shifting feature to good advantage.

- (7) When you switch the CLAR switch OFF, then ON again, the Clarifier will reset to the original frequency (the frequency originally stored in memory). Please see the practical examples for details on how to hold a shifted frequency in memory.

MEMORY SHIFT OPERATION

To move the transceive frequency (both TX and RX frequencies) off of memory channels, use the SHIFT button. Operation is identical to that of the Clarifier system, as can be seen from the discussion to follow.

- (1) Once a frequency is stored in memory, push the TX and RX select switches to set up the FV-707DM for control of the transceive frequency on the memorized channel. Now push the SHIFT button.
- (2) With the SHIFT button activated, all frequency control will be via the memory channel switch and the UP, DOWN, and FAST controls. Push the UP switch to scan higher in frequency at a rate of 1 kHz per second. Push the DOWN switch to scan lower in frequency at 1 kHz per second. Push both the UP or DOWN button and the FAST button to increase the scanning speed to 10 kHz per second.
- (3) Note that if you push only the RX select switch, the transmit frequency will not be affected by the SHIFT control, because transmit frequency control will be exercised via the FT-707 main dial.
- (4) If, when a frequency is initially recalled from memory by pushing the TX and RX buttons, you then push both the CLAR and SHIFT buttons, the CLAR button will have priority. That is, when both CLAR and SHIFT are pressed, only the receive frequency will be changed by the UP or DOWN switch.
- (5) If you are using the SHIFT button, and then press additionally the CLAR button, the transmit frequency will be fixed on the frequency being occupied when the CLAR button was pushed; the receive frequency will

then be varied in accordance with the commands of the UP and DOWN switches.

For example, store 7.0050 kHz in memory channel 1, and press the TX and RX buttons. Now press the SHIFT button, and press the UP switch so as to move the operating frequency to 7.0100 MHz. Now close the PTT switch briefly to see that both the transmit and receive frequencies are 7.0100 MHz. Now press the CLAR switch, and press the UP switch so as to obtain a reading of 7.0150 MHz on the FT-707 digital display. This is the new receive frequency; press the PTT, and you will see that the transmit frequency is still 7.0100 MHz, the frequency on which you were operating when the CLAR button was pushed.

PRACTICAL OPERATING EXAMPLES

- (1) You are operating on 20 meter SSB, with a favorite operating frequency of 14.225 MHz. Begin your operating by pressing the memory channel 1 button, rotating the FT-707 main dial to 14.225 MHz, and pressing M. Now press the TX and RX buttons for transceive frequency control on the FV-707DM, memory channel 1.

To sweep the band looking for other stations, just press the SHIFT button and the UP or DOWN button. For instant return to 14.225 MHz, press the SHIFT button to turn the memory shift off. To start another sweep of the band, turn the memory shift on again; the starting point for your sweep will have automatically been reset to 14.225 MHz.

- (2) You hear DX1DX on 7.090 MHz, listening on 7.225 MHz for calls. Use the memory on receive to handle this situation with ease.

Rotate the FT-707 main dial to 7.090 MHz. Press the desired memory channel button, and press M. Now rotate the FT-707 main dial to 7.225 MHz to locate the pile-up of stations calling DX1DX. Press the FT-707DM RX button. You will now be transmitting on 7.225 MHz, and receiving on 7.090 MHz. If DX1DX starts to drift, press the FT-707DM

CLAR (or SHIFT) button, and activate the UP or DOWN button as needed to follow the unstable DX1DX signal. To check 7.225 MHz, your transmitting frequency, press the FV-707DM RX button again (to return RX frequency control to the FT-707 main dial).

- (3) You find DX1DX on 21.270 MHz, working stations by order of call area. You also find DX0AA on 14.145 MHz, listening on 14.205 MHz for calls. The memory and no tune-up capability make this situation easy to cover.

First, tune to 21.270 MHz on the FT-707 main dial, push the memory 1 button, and press M. Now, set the band switch to 14 MHz, the FT-707 main dial to 14.145 MHz, push the memory channel 2 button, and press M. Now move the transceiver main dial to 14.205 MHz.

To check DX0AA's frequency (14.145 MHz), press the M2 button and the RX button. To check DX1DX's frequency (21.270 MHz), set the bandswitch to 21 MHz and press the M1 button. To call DX1DX (remember that he is listening on his own frequency), press the TX button. Both the TX and RX LEDs will be illuminated, and you will be transceive on 21.270 MHz. To call DX0AA, push the TX button again (turning it off), push the M2 button, and set the bandswitch to 14 MHz. You will be receiving on 14.145 MHz (M2 frequency) and transmitting on 14.205 MHz (FT-707 dial frequency).

Because there is no "preselector tuning" control, nor any transmitter peaking whatsoever, it may be seen that several stations on different bands may be checked in a matter of seconds, without touching a VFO dial. The next example will further demonstrate the versatility of the FV-707DM memory system.

- (4) Let us say you are operating on 28 MHz SSB, and hear several stations you would like to work. To hold them in memory, one need not touch the FT-707 main dial, once a starting frequency is memorized.

Begin your operation on 28.500 MHz by setting the FT-707 main dial to 28.500 MHz, pressing the memory 1 button and pressing M. Now press the RX and TX buttons to put full frequency control on the remote VFO.

Now press the SHIFT button, and the UP button, and begin scanning for desired stations. If one is encountered at 28.520 MHz, press the M2 button and M. Continue scanning, if you wish: if you find a station on 28.545 MHz, press the M3 button and M. Continue this process until the desired stations have all been stored in memory. Now press the SHIFT button again, turning it off.

When you press the M1, M2, or other memory buttons, the frequencies stored as you were sweeping the band will be recalled. This parallel memory shift is not found in other memory offset systems, and the added flexibility it provides means you have seconds to spare while others are busy twisting dials.

MEMORY BACKUP FEATURE

Provision for memory backup is a convenient feature of your FV-707DM. The memory backup requires two AA size penlight cells (batteries optional). These may be installed as shown in Figure 1. Be absolutely certain to observe the correct polarity of the batteries during installation. Battery consumption is very low, but we recommend that the batteries be replaced once per year. If you have not used the FV-707DM for a long time, check the batteries to ensure that leakage has not started from the batteries. Damage caused by battery leakage or improper polarity of the batteries is not covered by our warranty.

When the batteries are installed, the memory backup feature is always activated. However, you should exercise caution when turning the set off, so as not to cause inadvertant loss of memory. If you are using the SHIFT or CLAR controls, these should both be turned OFF before turning the FT-707/FV-707DM off. If you do not, the microprocessor circuitry could be placed in a random state when the sets are turned on again, with a corresponding loss of memory. If the SHIFT and CLAR switches are both OFF when the sets are turned off, there will be no problem.

If you want to store a frequency in memory that you are using during SHIFT or CLAR operation, store it in memory and then turn the SHIFT and CLAR switches off. The parallel memory system used makes this easy, as described earlier.

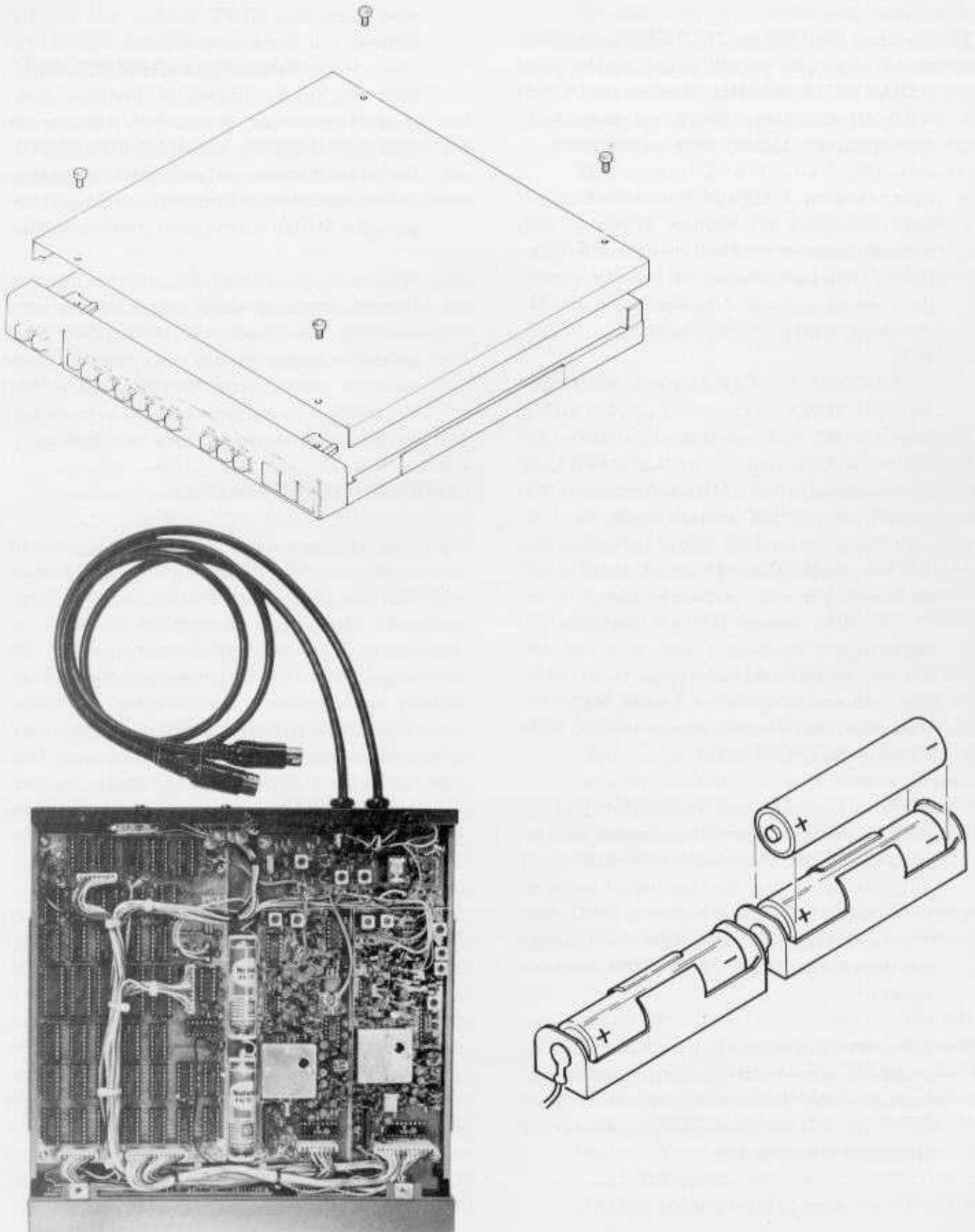
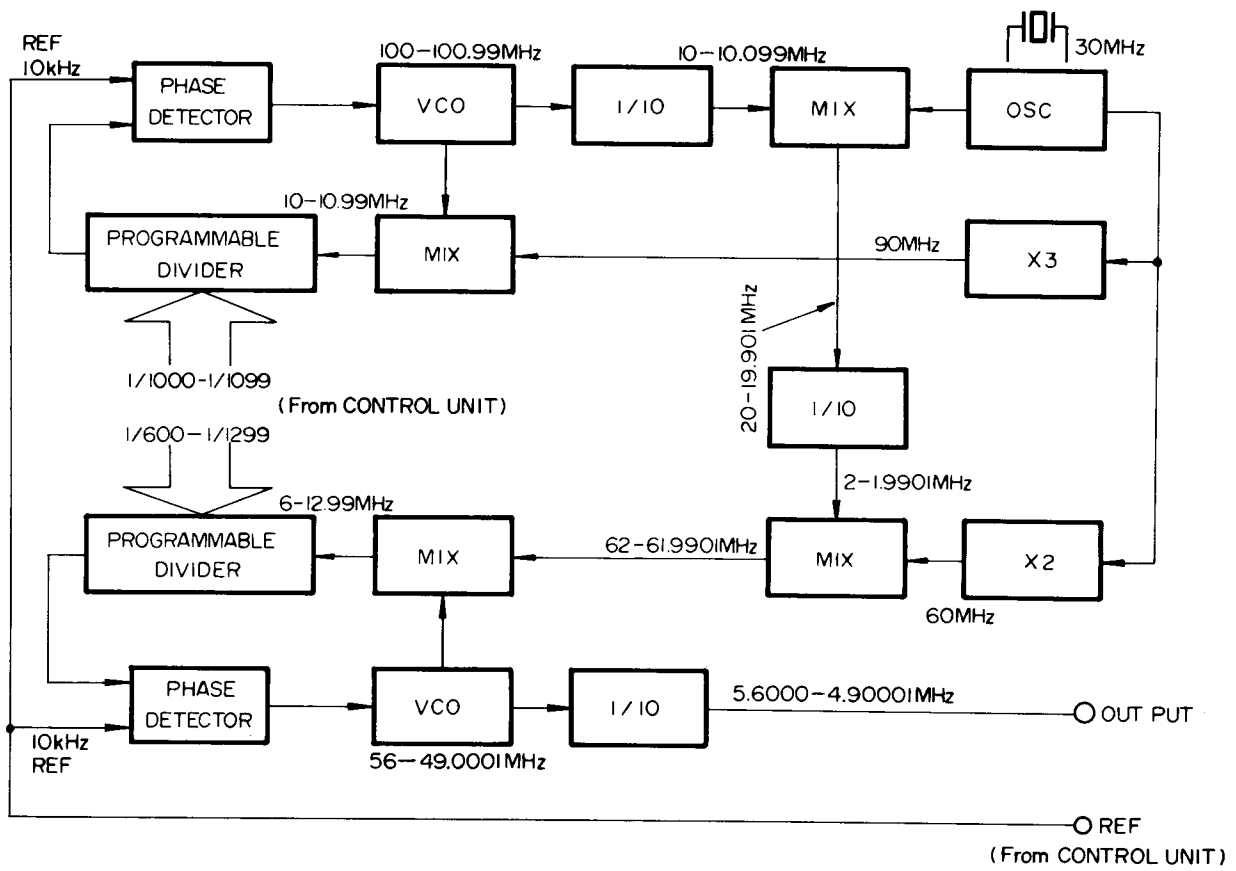


Figure 1



Q2005,2017, 2019,2026, 2027,2030, 2033,2036	G3305351	TR	2SC535A			CAPACITOR
				C2021,2061, 2073,2024	K02172020	Ceramic disk 50WV CH2pF
				C2057,2115	K02172050	" " " " 5pF
Q2034	G3309450	"	2SC945	C2050	K06172050	" " " UJ 5pF
Q2013	G3318150G	"	2SC1815GR	C2053	K02173060	" " " CH7pF
Q2002,2014	G3090005	"	MPS-A13	C2108	K06173060	" " " UJ 6pF
				C2004	K06173070	" " " UJ 7pF
		DIODE		C2008	K02173080	" " " CH8pF
D2003	G2015550		1S1555	C2005,2012, 2016, 2125,2130, 2139	K02173100	" " " " 10pF
D2001,2002	G2090043		MV104			
		CRYSTAL				
X2001	H0102280	HC-18/U	30MHz	C2033,2035, 2086,2088	K06175150	" " " UJ 15pF
		RESISTOR		C2096,2099	K06179004	" " " " 20pF
R2008,2013, 2016,2020, 2039,2044, 2047,2053, 2054,2056, 2072,2075, 2076,2080, 2083,2084, 2087-2091	J00245101	Carbon film	1/4W VJ 100Ω	C2006,2007, 2051,2114, 2138	K02179009	" " " " CH22pF
				C2020,2052, 2065	K02179012	" " " " 30pF
				C2011,2034, 2056,2087	K06179006	" " " UJ 30pF
				C2097,2098	K06175390	" " " " 39pF
				C2070	K02179015	" " " CH43pF
R2004,2032	J00245151	" " " "	150Ω	C2066,2069	K06175470	" " " UJ 47pF
R2001,2009, 2017,2021, 2026,2040, 2048,2057, 2062,2071, 2079	J00245331	" " " "	330Ω	C2049,2067, 2068	K06175101	" " " " 100pF
				C2143,2145, 2150-2170	K10179003	" " " " 470pF
				C2144	K10179001	" " " 1000pF
R2018,2022, 2028,2049, 2050,2058	J00245511	" " " "	510Ω	C2003,2010, 2013-2015, 2017-2019, 2022-2032, 2036-2040, 2048,2055, 2058-2060, 2062-2064, 2071,2072, 2074-2085, 2089-2093, 2100-2107, 2109-2113, 2116-2123, 2126-2128, 2131-2137, 2140-2142, 2149,2172	K13179001	" " " " 0.01μF
R2002,2003, 2023,2059, 2064,2066, 2068	J00245102	" " " "	1kΩ	C2174,2175	K70127335	Tantalum 16WV 3.3μF
R2030	J00245182	" " " "	1.8kΩ	C2002,2009, 2041-2043, 2045,2054, 2094,2095, 2146,2147, 2171	K70107106	Tantalum 10WV 10μF
R2025,2061	J00245222	" " " "	2.2kΩ			
R2052	J00245332	" " " "	3.3kΩ	C2148	K70127106	" 16WV 10μF
R2033-2035, 2067				C2046,2047	K50177333	Mylar film 50WV 0.033μF
R2015,2027, 2029,2031, 2046,2051, 2070,2074, 2078,2081, 2086	J00245103	" " " "	10kΩ	C2001	K54200006	B32560-A1104J 100WV 0.1μF
R2014,2045, 2069,2077	J00245333	" " " "	33kΩ	C2044	K54200001	B32561-A1105J " 1μF
R2073,2085	J00245563	" " " "	56kΩ			
R2005-2007, 2010-2012, 2019,2024, 2036-2038, 2041,2042, 2043,2055, 2060,2063, 2065,2082	J00245104	" " " "	100kΩ			
		THERMISTOR		TC2001,2002	K91000028	TRIMMER CAPACITOR ECV-1ZW 10x53, 10pF
Th2001,2002	G9090008		31D26			

		INDUCTOR				DIODE	
L2004,2016	L1190004	FL4HR68K	0.68 μ H	D4001-4003	G2090137	LED	TLR-205
L2035,2036	L1190007	FL4H1R8K	1.8 μ H				
L2024,2025	L1190014	FL4H100K	10 μ H				
L2008,2009	L1190015	FL5H120K	12 μ H	R4001,4002	J00245561	RESISTOR	Carbon film 1/4W VJ 560 Ω
L2029-2031	L1190019	FL5H150K	15 μ H				
L2005,2017, 2019-2021	L1190023	FL5H220K	22 μ H			SWITCH	
L2003,2006, 2007,2010, 2011,2015, 2018,2022, 2023,2026, 2027, 2032-2034	L1190020	FL5H151K	150 μ H	S4001	N4090032		SUT-31A
UP/DOWN SW UNIT							
		Symbol No.	Parts No.	Description			
			C0021200	P.C.B with Components			
			F0002120	Printed Circuit Board			
L2001,2012, 2013,2028	L1190017	FL5H102K	1mH	S5001-5003	N4090033	SWITCH	DC-MDP-AG-LG
L2002	L0190016						
L2014	L0190017						
		TRANSFORMER					
T2001,2002	L0020209						
T2004	L0020801						
T2005,2006	L0020802						
T2011	L0020803						
T2012	L0020804						
T2008-2010, 2013	L0020805						
T2003	L0020806						
T2007	L0020807						
		RELAY					
RL2001	M1190001	BR211AD009M					
		RECEPTACLE					
J2002	P0090136	PI051-08M					
J2001	P0090141	PI051-13M					
J2003-2012	P1090178	WP-22-1B					
	Q5000011	Wrapping terminal C					
SWITCH A UNIT							
	Symbol No.	Parts No.	Description				
		C0021210	P.C.B with Components				
		F0002121	Printed Circuit Board				
		DIODE					
D3001,3002	G2090137	LED	TLR-205				
D3003-3008	G2090136	"	TLG-205				
D3009	G2090134	"	TLY-205				
		RESISTOR					
R3003,3004	J00245331	Carbon film	1/4W VJ 330 Ω				
R3001,3002	J00245561	" "	" " 560 Ω				
		SWITCH					
S3001	N4090031	SUT-91A					
SWITCH B UNIT							
	Symbol No.	Parts No.	Description				
		C0021190	P.C.B with Components				
		F0002119	Printed Circuit Board				

