

# **CAT-700B**

## **Repeater Controller**

### ***Computer Automation Technology, Inc***

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## Foreword

For your convenience, this manual is divided into seventeen chapters. A brief description of each chapter and its contents are listed below. Control and programming of the CAT-700B has been carefully structured. Once you become familiar with the procedures described in this manual, you will find it easy to program and control the CAT-700B to suit your particular requirements.

**Chapter 1** - This chapter describes some of the CAT-700B features. Also included are the technical specifications.

**Chapter 2** - This chapter describes the various configurations for the CAT-700B, dipswitch settings and modes of operation.

**Chapter 3** - This chapter describes how to control the CAT-700B. The control operator prefix code [100] must precede each control command. **Do not unlock the CAT-700B when changing control channels.**

**Chapter 4** - This chapter describes how to use the features of the CAT-700B. These are considered repeater user commands.

**Chapter 5** - This chapter describes how to program the CAT-700B with DTMF tones. **During programming the CAT-700B must be un-locked.** Key-up and enter [1234567].

**Chapter 6** - This chapter describes how to program the CAT-700B through the RS-232 computer port using the Windows editor and Communications program.

**Chapter 7** - This chapter describes how to interface the CAT-700B to a RF package. It defines the input - output connections and how to adjust the audio levels.

**Chapter 8** - This chapter describes how to connect the MF-1000 to the CAT-700B to obtain 24 additional user function output switches.

**Chapter 9** - This chapter describes how to connect the CAT-700B through the Doug Hall RBI-1 Interface unit to a Kenwood transceiver.

**Chapter 10** - This chapter describes how to connect the CAT-700B to the ICOM IC-706 HF/UHF Transceiver.

**Chapter 11** - This chapter contains a list of the vocabulary words used to program the voice synthesizer.

**Chapter 12** - This chapter contains PC board layouts for part location for the CAT-700B and MF-1000.

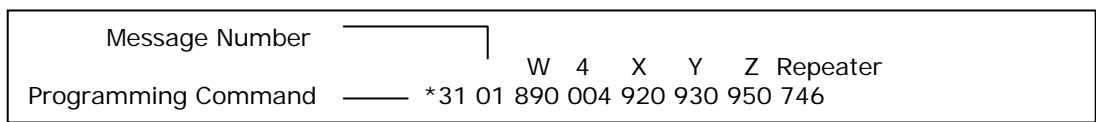
**Chapter 13** - This chapter contains the schematics diagrams (3) sheets for the CAT-700B, (1) sheet for the MF-1000.

**Chapter 14** - This chapter contains part lists for the CAT-700B and the MF-1000.

### I Don't Have Time To Read This Manual

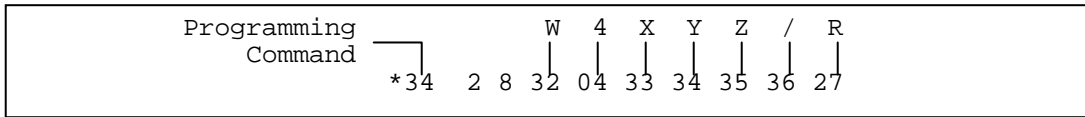
If you are anxious to get the CAT-700B in operating and don't have time to read this manual, the following short version will appeal to you. This is a list of the minimum steps required to install the CAT-700B and verify its operation. Now fire-up your soldering iron and lets get started.

1. Open the connector kit, remove the 2.5mm power plug and the 25 pin "D" male connector. Solder a +12 volt wire to the center connector and a ground wire to the outer connector of the plug. Connect the wires to a +12VDC power supply.
2. Solder five wires to the 25 pin "D" male connector. Connect wires to pins 6, 10, 11, 13 and 24.
3. Connect the pin 10 wire to the transmitter's PTT, the pin 11 wire to the transmitter's modulation input and pin 24 to receiver/transmitter chassis ground.
4. Turn the +12VDC power supply ON, the repeater should transmit and you should hear the voice synthesizer say: "CAT700 VERSION 2.00" Refer to Figure 7-1 and adjust TX1 control for proper transmitter deviation.
5. Turn the +12VDC power supply OFF. Connect pin 6 wire to the receiver's COR or COS output. Connect pin 13 wire to the receiver's RECEIVE audio output.
6. Turn the +12VDC power supply ON. Monitor TP3 with a DC voltmeter. Open and close the repeater's squelch control while observing the voltage on TP3. If TP3 goes from LOW to HIGH dipswitch #1 should be left in the OFF position. If TP3 goes from HIGH to LOW set dipswitch #1 to ON. If TP3 stays LOW, turn the power supply OFF and add a 2200 ohm pull-up resistor on the CAT-700B at the R1 pull-up resistor position. Note: LOW is any voltage less than 0.8VDC. HIGH is any voltage between 3VDC and 15VDC.
7. Turn the +12VDC power supply ON. Connect an AC voltmeter to TP5. Using a typical transceiver, key-up and send a DTMF tone. Adjust RX1 control for 200mV as indicated on the AC voltmeter. If this causes the repeater to over deviate, readjust TX1. Make sure that RF from the transceiver does not give a false voltmeter indication.
8. Compare the receive and synthesized voice audio and adjust the VOICE Level as desired. For best quality speech, the synthesized voice should not exceed 3KHz deviation and always be lower than the receive audio.
9. Compare the receive and courtesy tone audio and adjust the DTMF TX1 control for the desired courtesy tone level. For best results the courtesy tone should not exceed 1.5KHz deviation. This control also sets the CW ID and will insure that repeater users will always be able to talk over the CW ID when it comes on during a QSO in progress.
10. Key-up and enter the seven digit unlock number [1234567]. The voice will say: "CAT-700 CONTROL."
11. Key-up and send [\*3101], followed by the three digit numbers that represents your call letters for voice ID #1. Refer to Chapter 14, Voice Vocabulary Word List. Example: Load Repeater ID #1 with "W4XYZ Repeater"



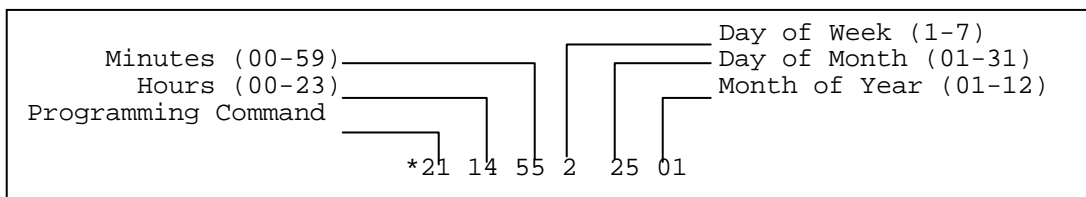
12. Key-up and send [\*3102], followed by the three digit numbers that represents your call letters for voice ID #2.

13. Key-up and send [\*34], followed by the two digit numbers that represents your call letters for the CW ID. Refer to the CW ID programming table. Example: Load the CW ID memory buffer with W4XYZ/R.



CW ID PROGRAMMING TABLE												
00=0	03=3	06=6	09=9	12=C	15=F	18=I	21=L	24=O	27=R	30=U	33=X	36=/
01=1	04=4	07=7	10=A	13=D	16=G	19=J	22=M	25=P	28=S	31=V	34=Y	
02=2	05=5	08=8	11=B	14=E	17=H	20=K	23=N	26=Q	29=T	32=W	35=Z	

14. To read the time, key-up and send [\*20]. Un-key, the voice will read the time, day of week, month, day of month and year.
15. To set the clock, key-up and send [\*21] followed by the hours, minutes, day of week, day of month, month and year. Un-key and the voice will say "CONTROL OK." Example: 2:55 PM Monday January 25th. All entries must be double digit, except the day of week.



16. Key-up and send [\*0]. Un-key, the controller will lock-up and the voice will say: "MANUAL EXIT." The CAT-700B will lock-up automatically when the programming timer expires. The voice will say: "TIMER EXIT."
17. Program a new seven digit UNLOCK code. Set dipswitch #8 to ON and the voice will say: "ENTER CONTROL." Key-up and enter a seven-digit number. Un-key, if the number is accepted, the voice will say: "DATA INPUTS OK." If rejected, the voice will say: "ENTER CONTROL." Key-up and enter the seven-digit number again. Set dipswitch #8 to the OFF position.
18. DTMF muting is a feature that prevents your DTMF tones from being transmitted. To enable this feature, key-up and enter [100171]. The voice will say: "ONE SEVEN ON."
19. To test your DTMF keypad, key-up and enter [3751234567890\*#ABC]. The voice will read back all the numbers that were decoded.
20. To check the time, key-up and enter [400].

## **Chapter 1 - Introduction and Specifications**

Congratulations on your purchase of the CAT-700B Repeater Controller. The CAT-700B is packed with features normally reserved for controllers costing thousands of dollars more.

Programming the CAT-700B is a snap, with its carefully structured uniform programming commands. The manual is easy to follow with numerous examples. The voice synthesizer interacts with you during control and programming operation.

### **Scheduler**

An advanced [40] position scheduler fully automates repeater operation. Any command that can be manually executed can also be scheduled to one-minute accuracy. Program the hours, minutes, day of week, or day of month and month of year. The CAT-700B will do the rest.

### **Voice Synthesizer**

A vocabulary base of 330 words carefully selected for amateur repeater operation are available to ID your repeater, announce the time and interact with you during control and programming operations. Additional message buffers can be activated on demand, through hardware inputs or by the scheduler.

### **CW ID**

The controller will switch to CW when a repeater user talks over the voice ID. When both voice IDs are disabled, the controller will ID in CW only. You program the speed and tone frequency.

### **Digital Voice Clock**

The digital voice clock will announce the time upon request, at the completion of an autopatch, during repeater IDs, or on the hour through the grandfather clock feature.

### **Courtesy Tone**

Memory space is provided for the storage of [8] custom courtesy tones. Each tone can consist of up to three different tone frequencies of various lengths and separations. Separate courtesy tones denote repeater and link receiver activity.

### **Link Control**

The CAT-700B will support a link transceiver. You can enable the transceiver or just the receiver to monitor activity on the transceiver frequency while you use the repeater. After a pre-selected period of inactivity the transceiver will automatically disconnect. The CAT-700B will suppress your repeater identification from being transmitted on the transceiver frequency.

### **Remote Base Transceiver With RBI-1 Interface**

The CAT-700B supports the Doug Hall RBI-1 Interface. The RBI-1 receives serial data and clock information from the CAT-700B and converts it to the format required to control Kenwood transceivers. All connections to the transceivers are made through the microphone jack. In addition to band, frequency, offset and transmitter power, CTCSS tones can be selected remotely.

### **ICOM IC-706 HF Frequency Control**

The CAT-700B offers a bi-directional serial port to control the IC-706 transceiver. Upon receipt of a DTMF command the CAT-700B will generate the required ASCII commands to control the transceiver. Since this serial port is bi-directional it is possible to interrogate the transceiver and receive information concerning the frequency and status.

### **Digital Voice Recorder**

An optional DVR, controlled by the CAT-700B can be added to your repeater. Control of the DVR is fully integrated into the CAT-700B control and command structure. The CAT-700B will permit you to substitute any of the [16] DVR tracks in place of the messages normally generated by the voice synthesizer. In fact: you can even intermix DVR tracks with voice synthesizer messages. A signal report test is also included. Enter a DTMF command to record a seven second test message. Un-key and the test message will playback. You instantly know how your signal sounds through the repeater.

### **User Function Output Switches**

Four open collector user function output switches control equipment at your repeater site. These switches can be controlled manually by DTMF commands, or by the scheduler during automatic operation. They can be made to turn OFF, ON or Momentarily change state, any time you choose.

### **DTMF Regenerator**

The CAT-700B will mimic your DTMF input. In sophisticated repeater systems it is often necessary to pass DTMF commands to distant repeaters within the linking system. The CAT-700B will swallow your DTMF tones and regenerate the tones distortion and noise free as they were received. This will insure reliable control of your linking network.

### **DTMF Command Generator**

Forty DTMF commands can be stored in the CAT-700B memory. These commands can be sent manually by entering a prefix code or automatically by the scheduler.

### **User Function Inputs**

Four inputs activated by a voltage change from other equipment at the repeater site, causes the CAT-700B to execute any repeater command. External control, or information about the repeater site will be instantly available.

### **Repeater Control Prefix**

A total of [13] prefix numbers control repeater operation. Each prefix is programmable from one to seven digits depending on the security you require.

### **Repeater Timers**

A total of [16] timers control repeater operation. Each timer is user programmable to afford maximum flexibility to suite your special requirements.

### **DTMF Keypad Test**

A DTMF keypad test will read back the numbers decoded in a synthesized voice.

### **Macro**

By entering a macro control number, the CAT-700B will execute up to ten commands in a string. Memory space is provided for the storage of [40] macro strings. This feature permits the repeater owner to customize the control functions.

### **Active Memory Save**

Configure the CAT-700B to suite your special requirements. Active Memory Save permits you to store the current settings of the control channels, timers, codes and the first [10] voice messages. Memory space is provided for [6] memory saves. These memory saves can be later recalled with a simple DTMF command.

### **DTMF Access**

This feature requires the user to enter a DTMF code, to activate the repeater. The voice will say: "OK UP" and the controller will respond to a carrier input. After a short period of inactivity, the DTMF code will again be required.

### **Repeater CTCSS Override**

When CTCSS is enabled, a user without a CTCSS encoder can activate the repeater by entering the DTMF Access code. The voice will say: "OK UP" and the controller will respond to a carrier input. After a short period of inactivity, the DTMF code will again be required.

## Specifications

Microprocessor	87C251SB
Memory	EPROM 512K X 8 - RAM 8K X 8 (non volatile)
Clock Accuracy	$\pm 1$ minute per month at +25 degrees C. In the absence of power, data and time will be maintained for ten years.
Voice Synthesizer	Texas Instruments TSP53C30 Linear Predictive Coded
Voice Vocabulary	330 Words
DTMF Receiver	MT8888 (2)
Operating Temperature	-15 to +55 degrees C
Call Letter ID	Buffer size VOICE (23) - CW (28)
Control Codes	(13) Buffer size (7)
Timers	(16) Short (0.1 to 9.9) - Long (1.0 to 1799) seconds
Scheduler	(40) Commands (one minute resolution)
Macro	(40) Five Function
Memory Saves	(6) Zone Control Channels, Timers, Codes, First (10) Voice Messages
Voice Synthesizer	(20) Messages, Maximum Word Length (23)
Digital Voice Recorder	(16) Tracks, Maximum Record Time (2 minutes)
User Function Outputs	(4) Switch 40VDC @ 150mA.
Hardware Inputs	(4) 10K ohm input impedance
Audio Input	Receiver 0.2 - 2VAC adjustable 10K ohms
Audio Output	Transmitter 2VAC adjustable 600 ohms
Logic Inputs	Low (0 to 0.8VDC) High (2.4 to 15VDC)
Logic Outputs	Open Collector Relay Driver (28VDC at 150mA)
Power	+9 to +15VDC at 80mA
Size	6.5" X 8.5"
Warranty	Limited one-year, parts and labor.

### FCC Part 15 RF Interference

When installed in the RME-1000 rack mount enclosure, the CAT-700B has been tested and found to meet the standards for a Class A digital device, as specified in Part 15 of the FCC Rules. These specifications are designed to provide reasonable protection against such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation.



## Chapter 2 - System Configuration

### Repeater With Fixed Frequency Transceiver

In this configuration the CAT-700B supports a repeater with a CTCSS decoder and a transceiver on a fixed frequency.

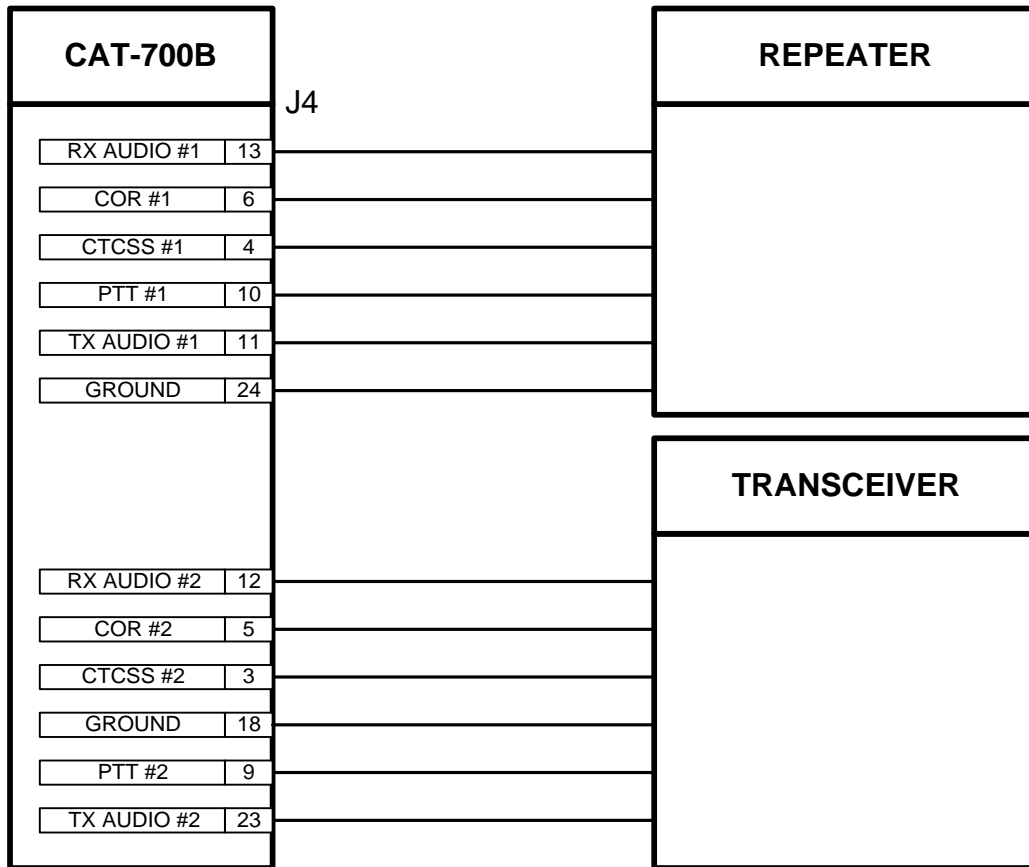


Figure 2-1

### Repeater And Transceiver Without COR Output

The CAT-700B will support a repeater and a transceiver that does not supply a COR output signal. If the transceiver outputs discriminator audio the CAT-700B's on board COR generator will produce the necessary COR logic. Set jumper J3 between pins 1 and 2.

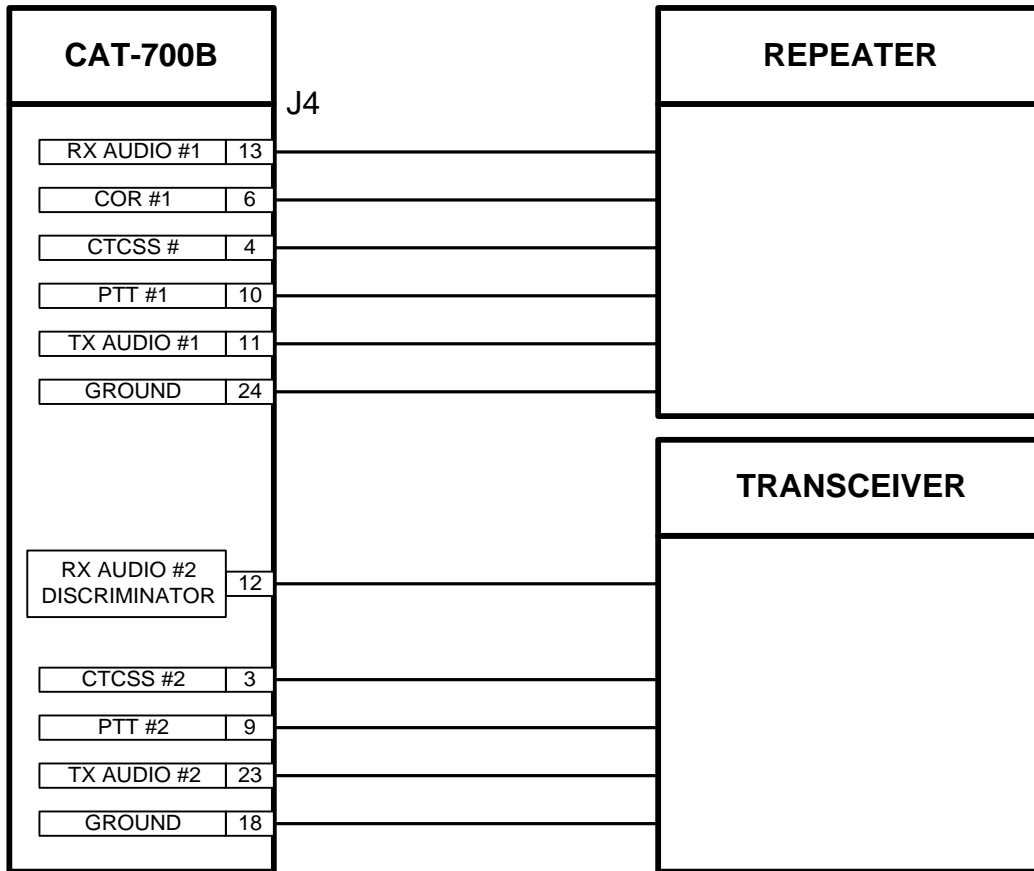


Figure 2-2

### Repeater With Serial Tuned Transceiver

In this configuration the CAT-700B supports a repeater and the Doug Hall RBI-1 Interface to control the Kenwood mobile transceivers. The RBI-1 converts the serial data from the CAT-700B to the format require to control the Kenwood transceivers. All connections to the Kenwood transceivers are made through the microphone jack. In addition to frequency, offset, and CTCSS tone selection, transmitter power can be remotely controlled through the repeater input.

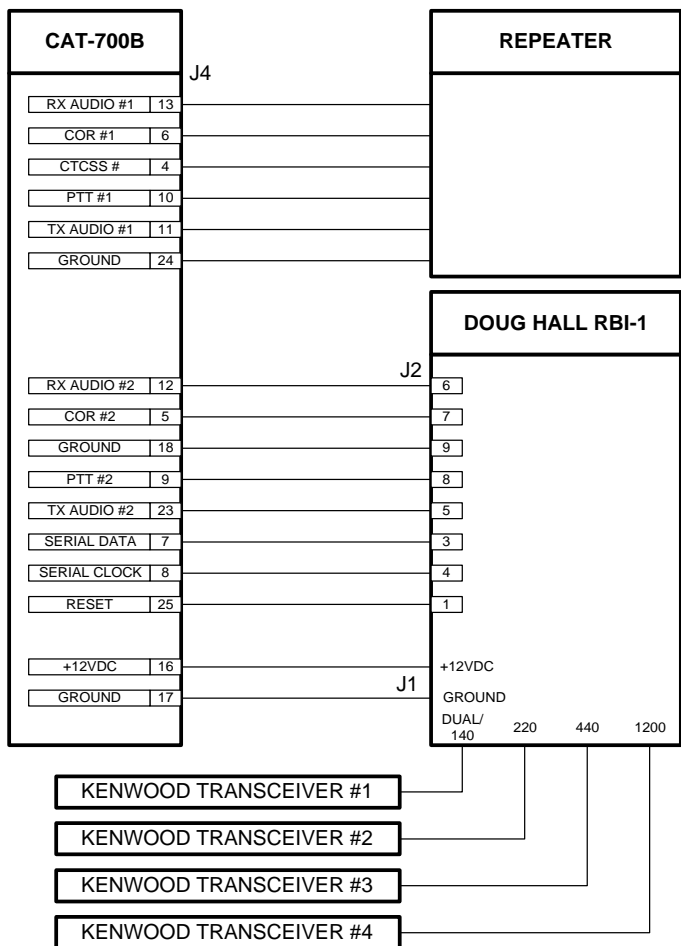


Figure 2-3

The Doug Hall RBI-1 Remote Base Interface supports the Kenwood transceivers listed in Figure 2-4. Not all transceivers are capable of remote control of CTCSS encoder frequency and transmitter power settings. Consult the Kenwood manual.

140 MHz	220 MHz	440 MHz	1200 MHz	DUAL BAND
TM-221	TM-321	TM-421	TM-521	TM-621 TM-731
TM-231	TM-331	TM-431	TM-531	TM-631 TM-701
TM-241		TM-441	TM-541	TM-721

Figure 2-4

## Repeater With IC-706 Serial Tuned Transceiver

In this configuration the CAT-700B supports a repeater and the ICOM transceiver. All connections to the ICOM transceiver are made through the din connector jack.

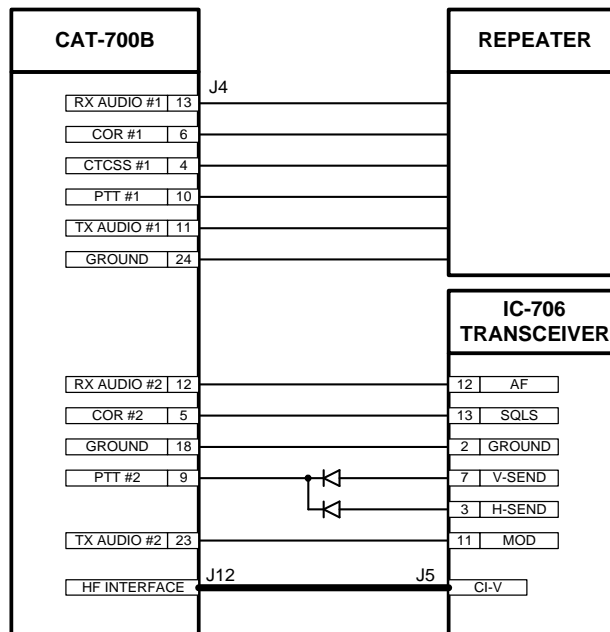


Figure 2-5

**Dip Switch** A eight position dip-switch configures various functions of the CAT-700B.

**Switch 1** This switch determines Repeater COR input logic. Switch #1 should be ON if the repeater receiver's COR is an active low and OFF if COR is active high.

**Switch 2** This switch determines Repeater CTCSS input logic. Switch #2 should be ON if the repeater receiver's CTCSS is an active low and OFF if COR is active high.

**Switch 3** This switch determines Link COR input logic. This switch should be ON if the link receiver's COR is an active low and OFF if COR is active high.

**Switch 4** This switch determines Link CTCSS input logic. Switch #4 should be ON if the link receiver's CTCSS is an active low and OFF if COR is active high.

**Switch 5** This switch is used to set the CAT-700B for dual transceiver IC mode. In this mode when a signal is received by the port #1 receiver, the CAT-700B will only activate the Port #2 transmitter. When a signal is received by the port #2 receiver, the CAT-700B will only activate the Port #1 transmitter. In this mode the Grandfather clock, Scheduler, User Inputs and Timed Messages are not operational. The CAT-700B will accept the following DTMF commands: Unlock Code, Control Operator Codes, Linking Control and all forty Macros.

**Switch 6** This switch is used to define the expanded output switch interface. Set the switch OFF for the DR-1000 Digital Voice Recorder and ON for the MF-1000 Interface Card.

**Switch 7** This switch is used to initialize the CAT-700B. Set this switch to ON. Cycle the power OFF and back ON. During power-up, the memory will be flushed and reloaded with default values. The voice will say: "RESET DATA LOAD COMPLETED." Set dipswitch #7 to the OFF position.

### Switch 8

This switch is used to program a new unlock number. Set switch #8 to ON. The voice will say: "ENTER CONTROL." After the seven-digit unlock number is entered, set switch #8 to OFF.

NOTE: When the dipswitch is changed, DC power must be cycled for the microprocessor to read the new setting.

### Chapter 3 - Repeater Control

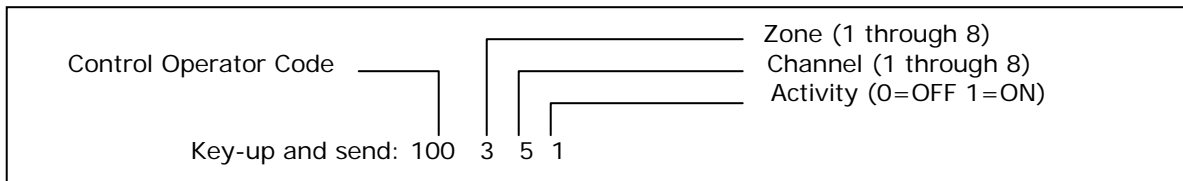
The CAT-700B has 8 Zones for a total of 64 remote control channels. In addition to being controlled by the scheduler, macros or memory saves, these channels can be manually controlled by DTMF commands on the repeater input.

#### Interrogation of Repeater Control Status by Radio

Key-up and send the control operator code [100] followed by the zone number and a zero. Un-key and the voice will read back the channels that are turned on in that zone. Example: "ONE TWO FIVE ON." If all the channels are turned off, the voice will say: "ALL CLEAR."

#### Changing Repeater Control Status by Radio

To change the status of a channel, key-up and send the control operator code [100] followed by the zone number, channel number and a [1] to turn the channel ON or a [0] to turn the channel OFF. Un-key and the voice will read back the zone, channel number and control activity. The voice will say: "ONE ONE ON." or "THREE FIVE OFF." Example: With a control operator prefix of 100, turn Zone 3 Channel 5 ON.



Un-key and the voice will say: "THREE FIVE ON."

#### Repeater Control Channels

ZONE 1			ZONE 2		
1	Repeater Transmit	Enable	1	Repeater Time-out Timer	Enable
2	Repeater CTCSS	Enable	2	Transmitter Hang Time	Enable
3	DTMF Access	Enable	3	DTMF Regenerator Link	Enable
4	CTCSS Override	Enable	4	DTMF Pad Test	Enable
5	Turn on Delay	Enable	5	Scheduler	Enable
6	CTCSS or COR Logic	Enable	6	Courtesy Tone	Enable
7	DTMF Muting	Enable	7	DTMF Generator	Enable
8	Control Operator CTCSS	Enable	8	DTMF Regenerator	Enable

ZONE 3			ZONE 4		
1	Repeater ID #1 (At Rest)	Enable	1	Link Receive	Enable*
2	Repeater ID #2 (Active)	Enable	2	Link Transmit	Enable*
3	Squelch Tail Message	Enable	3	Link Auto Disconnect	Enable
4	Transmitter Drop Message	Enable	4	Link CTCSS	Enable
5	Timed Message #1	Enable	5	Link Control	Enable*
6	Timed Message #2	Enable	6	Link Activity Check	Enable
7	Time of Day Request	Enable	7	Link Macro	Enable
8	Grandfather Clock	Enable	8	Link Control Operator	Enable*

ZONE 5			ZONE 6		
1	User Function Input #1	Enable	1	Expanded Output #1	Enable
2	User Function Input #2	Enable	2	Expanded Output #2	Enable
3	User Function Input #3	Enable	3	Expanded Output #3	Enable
4	User Function Input #4	Enable	4	Expanded Output #4	Enable
5	User Function Output #1	Enable	5	Expanded Output #5	Enable
6	User Function Output #2	Enable	6	Expanded Output #6	Enable
7	User Function Output #3	Enable	7	Expanded Output #7	Enable
8	User Function Output #4	Enable	8	Expanded Output #8	Enable

ZONE 7			ZONE 8		
1	Expanded Output #9	Enable	1	Expanded Output #17	Enable
2	Expanded Output #10	Enable	2	Expanded Output #18	Enable
3	Expanded Output #11	Enable	3	Expanded Output #19	Enable
4	Expanded Output #12	Enable	4	Expanded Output #20	Enable
5	Expanded Output #13	Enable	5	Expanded Output #21	Enable
6	Expanded Output #14	Enable	6	Expanded Output #22	Enable
7	Expanded Output #15	Enable	7	Expanded Output #23	Enable
8	Expanded Output #16	Enable	8	Expanded Output #24	Enable

\* During initialization these control channels are set to the enable position.

### Zone 1 Repeater Control

#### 1. Repeater Transmitter Enable

This is the master repeater switch. This channel must be enabled for normal repeater operation. The CAT-700B will continue to respond to control operator commands even when the repeater's transmitter is disabled. This channel will automatically be enabled after a dipswitch #7 initialization reset.

#### 2. Repeater CTCSS Enable

When this channel is enabled, in addition to a COR input, a input from a CTCSS decoder at J3-4 must also be present before the repeater will activate. A COR input by itself will have no affect. To prevent loss of control, DO NOT ENABLE THIS CHANNEL unless a CTCSS decoder is connected to J4-4.

#### 3. DTMF Access Enable

When this channel is enabled, a DTMF Access number selected by programming command [\*505\*] must be entered to activate the repeater. Once this number is entered and the user un-keys, the voice synthesizer will say: "OK". A COR input will activate the repeater until it returns to rest. A rest period of up to 29 minutes can be selected with the [\*602\*] programming command. When the CAT-700B is initialized, this timer defaults to 60 seconds. To return to DTMF Access mode key-up and enter the same DTMF Access number.

#### 4. Repeater CTCSS Override

When this channel is enabled, and CTCSS is also enabled, a repeater user without a CTCSS encoder can activate the repeater by entering the DTMF Access number. Once this number is entered and the user un-keys, the voice will say: "OK". A COR input will activate the repeater until it returns to rest.

#### 5. Turn on Delay Enable

When this channel is enabled, a deliberate and sustained input must be present before the controller will activate the repeater. Once active, input less than one second will not produce a courtesy tone or a squelch tail. A time delay of 0.1 to 9.9 seconds can be selected with the [\*603\*] programming commands. When the CAT-700B is initialized, this timer defaults to 1.0 second. Use this channel during periods when noise is present on the repeater input.

#### 6. Repeater CTCSS OR Logic Enable

When this channel is enabled, the COR and CTCSS inputs will function as a (OR) logic input. This means activity on either the COR or CTCSS inputs will cause the controller to key the repeater's transmitter. This is a layered command. Therefore, Repeater CTCSS Enable, Zone 1 Channel 2 must be ON or this control function will have no effect.

#### 7. DTMF Muting Enable

When this channel is enabled, anytime a DTMF tone is received, the audio will be turned off to the repeater's transmitter. The transmit audio will remain muted until a pre-determined time after the last DTMF tone is received. This time is set by the [\*606\*] programming command. During the mute period, cover beeps are transmitted each second to indicate repeater activity. This feature prevents control commands from being repeated. It provides a extra measure of security. There may be times when it is desirable to pass the DTMF tones through the repeater. To temporarily disable DTMF muting, precede the DTMF string with a pound (#). Refer to Zone 2 Channel 8 for additional information.

## **8. Control Operator CTCSS Enable**

When this channel is enabled, a CTCSS input is required for the CAT-700B to accept control or program commands from the control operator.

### **Zone 2 Repeater Control**

#### **1. Repeater Timer Enable**

Repeater time-out is user programmable with the [\*601\*] timer programming commands. When the CAT-700B is initialized, this timer defaults to 3 minutes. When this channel is turned off, the repeater will not time-out.

#### **2. Transmitter Hang Time Enable**

When this channel is enabled, the repeater's transmitter will remain on for a period of time determined by the COR to Beep and Beep to transmitter drop timers. Turn this channel to make the transmitter turn off the instant COR is lost. This feature is useful when linking to other repeaters or during band openings.

#### **3. DTMF Regenerator Link Only Enable**

When DTMF muting Zone 1 Channel 7 and DTMF Regenerator Zone 2 Channel 8 are enabled, the controller will mute the original tones while storing the entry in memory. When the user un-keys, the controller will regenerate the same DTMF command on the repeater's transmitter. If this channel is enabled, the controller will regenerate the DTMF command on the Link transmitter only.

#### **4. DTMF Pad Test Enable**

When this channel is enabled, a repeater user can test their radio's keypad. As the numbers decode, they are stored in memory. When the repeater user stops transmitting the controller will read back all the numbers that were decoded.

#### **5. Scheduler Enable**

When this channel is enabled, all action by the scheduler will be executed per the times programmed in the scheduler table. There may be times, during emergency net operations, when it is not desirable to have channels change automatically. To suspend scheduler operation, turn this channel off.

#### **6. Courtesy Tone Enable**

When this channel is enabled, a courtesy tone will occur when the COR signal is lost. To eliminate the courtesy tone, turn this channel OFF. The timeout timer will continue to be reset.

#### **7. DTMF Generator Enable**

This channel enables the DTMF Generator. DTMF commands stored in memory can be accessed by a prefix code followed by the memory table position. The CAT-700B will key-up the transmitter and sent the DTMF command. This feature is similar to the regeneration of DTMF tones during an autopatch. It provides noise and distortion free commands for other repeaters or equipment in a linking system.

#### **8. DTMF Regenerator Enable**

When DTMF muting is enabled and a user wants to pass a DTMF command through the repeater, the entry must be preceded by a [#]. If the DTMF regenerator is enabled, the controller will mute the original tones while storing the entry in memory. When the user un-keys, the controller will regenerate the same DTMF command. Like the DTMF generator, this feature is intended to provide noise and distortion free tones at the repeater's output.

### **Zone 3 Voice Message Control**

#### **1. Repeater ID #1 (At Rest) Enable**

When this channel is enabled, repeater ID message #1 will repeat subject to the setting of the ID timer. This ID will consist of up to 23 words selected from the voice vocabulary table and is programmed with the [\*3101\*] command.

#### **2. Repeater ID #2 (Active) Enable**

When this channel is enabled, the Repeater ID Message #2 will repeat subject to the setting of the ID timer. This ID will consist of up to 23 words selected from the voice vocabulary table and is programmed with the [\*3102\*] command. When Repeater ID #1 and #2 are enabled, ID messages selection will be determined by whether the repeater is at rest or a QSO is in progress.

### **3. Squelch Tail Message Enable**

When this channel is enabled, the squelch tail message occurs when a repeater user un-keys their transmitter. This message will repeat subject to the setting of the [\*608\*] squelch tail message timer. This message will consist of up to 23 words selected from the vocabulary table and programmed with the [\*3103\*] command.

### **4. Transmitter Drop Out Message Enable**

When this channel is enabled, the voice drop out message will occur just before the repeater transmitter turns off. This message will repeat subject to the setting of the [\*609\*] drop out message timer. This message will consist of up to 23 words selected from the voice vocabulary table and is programmed with the [\*3104] command.

### **5. Timed Message #1 Enabled**

When this channel is enabled, the timed voice message will occur on a regular schedule subject to the setting of the timed message timer. This message will consist of up to 23 words selected from the voice vocabulary table and is programmed with the [\*3105\*] command.

### **6. Timed Message #2 Enabled**

When this channel is enabled, the timed voice message will occur on a regular schedule subject to the setting of the timed message timer. This message will consist of up to 23 words selected from the voice vocabulary table and is programmed with the [\*3106\*] command.

### **7. Time of Day Request Enable**

When this channel is enabled, repeater users can request a time of day announcement by entering the time of day request number. This message will consist of up to 23 words selected from the voice vocabulary table and is programmed with the [\*3107\*] command. When the CAT-700B is initialized, this message defaults to: "THE TIME IS 7:15 PM."

### **8. Grandfather Clock Enable**

When this channel is enabled, the CAT-700B will announce the time of day every hour on the hour. This message will consist of up to 23 words selected from the voice synthesizer vocabulary table and programmed with the [\*3108\*] command. When the CAT-700B is initialized, this message defaults to: "CAT-700B REPEATER THE TIME IS 7:15 PM."

## **Zone 4 Transceiver Control**

### **1. Link Receive Enable**

When this channel is enabled, the CAT-700B will accept the [5002] link receive command. This feature permits monitoring of the Link receiver without transmitting on the Link transmitter.

### **2. Link Transmit Enable**

When this channel is enabled, the CAT-700B will accept the [5001] link transmit command. This feature permits monitoring of the Link receiver and activation of the Link transmitter.

### **3. Link Auto Disconnect Enable**

When this channel is enabled, the link will disconnect automatically after a period of repeater inactivity. Voice message #15 will announce the link has disconnected. This message will consist of up to 23 words selected from the vocabulary table and programmed with the [\*3115\*] command. A repeater or transceiver COR will keep the Link activate until the repeater returns to rest. A rest period of up to 29 minutes can be selected with the [\*616\*] programming command. When the CAT-700B is initialized, this timer defaults to 10 minutes.

### **4. Link CTCSS Enable**

When this channel is enabled, in addition to a Link COR input at J3-5, a input from a CTCSS decoder at J3-3 must also be present before the controller will activate the repeater. A COR input by itself will have no affect. DO NOT ENABLE THIS CHANNEL unless a CTCSS decoder is connected to J4-3.

### **5. Link Control Enable**

The CAT-700B will only respond to the Link control commands [5000] and [5001] through the Repeater input. This greatly reduces the possibility of the CAT-700B responding to a command meant for another repeater in the linking system. When this channel is enabled, Link control commands will be accepted through the Link receiver input.



## **6. Link Activity Check Enable**

When this channel is enabled, the CAT-700B will check for link activity before transmitting on the link frequency. This will reduce interference on the link system.

## **7. Link Macro Enable**

When this channel is enabled, the CAT-700B will accept macro commands from the link side.

## **8. Link Control Operator Enable**

When this channel is enabled, the CAT-700B will accept control operator commands to change the settings of the zone channels from the link side. The default code is [200]. This code can be changed with the [\*513\*] programming command.

### **Zone 5 User Function Inputs**

#### **1. User Function Input #1 Enable**

When this channel is enabled, a logic input on connector J3-1 by executing the command stored in the Input #1 memory buffer.

#### **2. User Function Input #2 Enable**

When this channel is enabled, a logic input on connector J3-2 will execute the command stored at the Input #2 memory buffer.

#### **3. User Function Input #3 Enable**

When this channel is enabled, a logic input on connector J3-21 will execute the command stored at the Input #3 memory buffer.

#### **4. User Function Input #4 Enable**

When this channel is enabled, a logic input on connector J3-22 will execute the command stored at the Input #4 memory buffer.

#### **5. User Function Output #1 Enable**

When this channel is enabled, user function switch #1 is turned on. Connector J3 pin 14 will sink 150 MA.

#### **6. User Function Output #2 Enable**

When this channel is enabled, user function switch #2 is turned on. Connector J3 pin 15 will sink 150 MA.

#### **7. User Function Output #3 Enable**

When this channel is enabled, user function switch #3 is turned on. Connector J3 pin 19 will sink 150 MA.

#### **8. User Function Output #4 Enable**

When this channel is enabled, user function switch #4 is turned on. Connector J3 pin 20 will sink 150 MA.

### **Zone 6 Expanded Outputs 1 Thru 8**

#### **1. Expanded Output #1 Enable**

When this channel is enabled, expanded output switch #1 is turned on. Connector J2 pin 1 on the DR-1000B or J1 pin 1 on the MF-1000 will sink 150 MA.

#### **2. Expanded Output #2 Enable**

When this channel is enabled, expanded output switch #2 is turned on. Connector J2 pin 3 on the DR-1000B or J1 pin 2 on the MF-1000 will sink 150 MA.

#### **3. Expanded Output #3 Enable**

When this channel is enabled, expanded output switch #3 is turned on. Connector J2 pin 5 on the DR-1000B or J1 pin 3 on the MF-1000 will sink 150 MA.

#### **4. Expanded Output #4 Enable**

When this channel is enabled, expanded output switch #4 is turned on. Connector J2 pin 7 on the DR-1000B or J1 pin 4 on the MF-1000 will sink 150 MA.

#### **5. Expanded Output #5 Enable**

When this channel is enabled, expanded output switch #5 is turned on. Connector J2 pin 8 on the DR-1000B or J1 pin 5 on the MF-1000 will sink 150 MA.

#### **6. Expanded Output #6 Enable**

When this channel is enabled, expanded output switch #6 is turned on. Connector J2 pin 6 on the DR-1000B or J1 pin 6 on the MF-1000 will sink 150 MA.

#### **7. Expanded Output #7 Enable**

When this channel is enabled, expanded output switch #7 is turned on. Connector J2 pin 4 on the DR-1000B or J1 pin 7 on the MF-1000 will sink 150 MA.

#### **8. Expanded Output #8 Enable**

When this channel is enabled, expanded output switch #8 is turned on. Connector J2 pin 2 on the DR-1000B or J1 pin 8 on the MF-1000 will sink 150 MA.

### **Zone 7 Expanded Outputs 9 Thru 16**

#### **1. Expanded Output #9 Enable**

When this channel is enabled, expanded user function switch #9 is turned on. Connector J1 pin 9 on the MF-1000 will sink 150 MA.

#### **2. Expanded Output #10 Enable**

When this channel is enabled, expanded user function switch #10 is turned on. Connector J1 pin 10 on the MF-1000 will sink 150 MA.

#### **3. Expanded Output #11 Enable**

When this channel is enabled, expanded user function switch #11 is turned on. Connector J1 pin 11 on the MF-1000 will sink 150 MA.

#### **4. Expanded Output #12 Enable**

When this channel is enabled, expanded user function switch #12 is turned on. Connector J1 pin 12 on the MF-1000 will sink 150 MA.

#### **5. Expanded Output #13 Enable**

When this channel is enabled, expanded user function switch #13 is turned on. Connector J1 pin 13 on the MF-1000 will sink 150 MA.

#### **6. Expanded Output #14 Enable**

When this channel is enabled, expanded user function switch #14 is turned on. Connector J1 pin 14 on the MF-1000 will sink 150 MA.

#### **7. Expanded Output #15 Enable**

When this channel is enabled, expanded user function switch #15 is turned on. Connector J1 pin 15 on the MF-1000 will sink 150 MA.

#### **8. Expanded Output #16 Enable**

When this channel is enabled, expanded user function switch #16 is turned on. Connector J1 pin 16 on the MF-1000 will sink 150 MA.

## **Zone 8 Expanded Outputs 17 Thru 24**

### **1. Expanded Output #17 Enable**

When this channel is enabled, expanded user function switch #17 is turned on. Connector J1 pin 17 on the MF-1000 will sink 150 MA.

### **2. Expanded Output #18 Enable**

When this channel is enabled, expanded user function switch #18 is turned on. Connector J1 pin 18 on the MF-1000 will sink 150 MA.

### **3. Expanded Output #19 Enable**

When this channel is enabled, expanded user function switch #19 is turned on. Connector J1 pin 19 on the MF-1000 will sink 150 MA.

### **4. Expanded Output #20 Enable**

When this channel is enabled, expanded user function switch #20 is turned on. Connector J1 pin 20 on the MF-1000 will sink 150 MA.

### **5. Expanded Output #21 Enable**

When this channel is enabled, expanded user function switch #21 is turned on. Connector J1 pin 21 on the MF-1000 will sink 150 MA.

### **6. Expanded Output #22 Enable**

When this channel is enabled, expanded user function switch #22 is turned on. Connector J1 pin 22 on the MF-1000 will sink 150 MA.

### **7. Expanded Output #23 Enable**

When this channel is enabled, expanded user function switch #23 is turned on. Connector J1 pin 23 on the MF-1000 will sink 150 MA.

### **8. Expanded Output #24 Enable**

When this channel is enabled, expanded user function switch #24 is turned on. Connector J1 pin 24 on the MF-1000 will sink 150 MA.

## Chapter 4 - Repeater Operation

### Time of Day Request

Key-up, and enter [400], the time of day access code. Un-key, and the voice synthesizer will announce the time. Example: The voice will say: "THE TIME IS 7:30 PM". The time of day announcement is stored in voice message 7 and can be changed with the [\*3107] programming command.

### DTMF Keypad Test

Key-up, and enter [375], the DTMF keypad access code followed by the keypad numbers and letters to be tested. The entries can be in any order. Un-key, and the voice will read-back all numbers and letters that were decoded including the "STAR" and "POUND". Note: The "D" key cannot be tested. See Forced DTMF Command Entry.

### Forced DTMF Command Entry

During normal operation a DTMF command is entered at the drop of receiver COR. It is possible to force a DTMF command entry even while COR is present. The CAT-700B will accept the [D] key as an entry command.

### DTMF Access

When the repeater is in the DTMF Access mode, you must enter the DTMF Access code to activate the repeater. The voice will say: "OK UP" and the repeater will respond to a carrier input. When the repeater returns to rest, for a time determined by the sleep timer, the DTMF Access code must be re-entered to activate the repeater. You can bypass the rest period and return the repeater to DTMF access mode by re-entering [325], the DTMF access code. The voice will say: "OK DOWN".

### Repeater CTCSS Override

When repeater CTCSS is enabled, a repeater user without a CTCSS encoder can activate the repeater by entering [325], the DTMF Access number. The voice will say: "OK UP" and the repeater will respond to a carrier input. After a rest period, the DTMF Access code must be re-entered to override the CTCSS requirement. You can bypass the rest period and return the repeater to DTMF access mode by re-entering the DTMF access code. The voice will say: "OK DOWN".

### Link Control By Repeater Input

This feature permits a connection between the Repeater and Link.

### Link Disconnect

Key-up on the repeater's input and enter the link control prefix [500], followed by a [0]. The CAT-700B will disconnect the link and the voice will announce the link disconnect message 13. This message can be changed with the [\*3113] programming command. With a link control prefix of [500], turn off the link. Example: Key-up and enter [5000].

### Link Connect

Key-up on the repeater's input and enter the link control prefix [500], followed by a [1]. The CAT-700B will connect the repeater and link and the voice will announce the link connect message 14. This message can be changed with the [\*3114] programming command. With a link control prefix of [500], turn on the link. Example: Key-up and enter [5001].

### Link Receive Only

Key-up on the repeater's input and enter the link control prefix [500], followed by a [2]. The CAT-700B will connect the repeater and link receiver and the voice will say: "RECEIVER CONNECT." This mode is identical to link connect, except the link transmitter is disabled. With a link control number of [500], turn on the link receiver. Example: Key-up and enter [5002].

### RBI-1 Reset

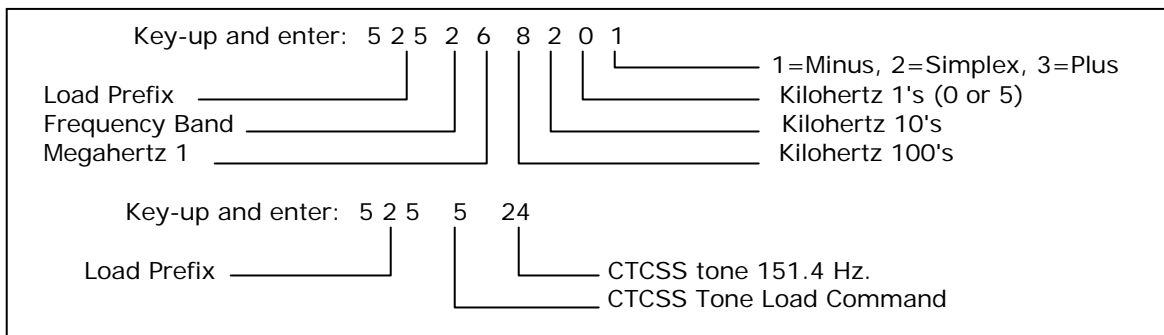
This command will reset the RBI-1 interface. Example: Key-up and enter [525#].

### Read Remote Base Frequency

Key-up and enter the remote base frequency prefix number followed by a 0. Un-key and the voice will read back the current frequency including the offset and the setting of transmitter power. With a prefix number of 525, read the remote base frequency. Example: Key-up and enter [5250].

### Load RBI-1 Remote Base Frequency

Key-up and enter the remote base frequency prefix, followed by the band, frequency, offset and CTCSS encoder frequency if desired. Example: With a prefix of 525, load 146.820 MHz, minus offset, and CTCSS tone 151.4 Hz. To suppress the voice read back add a [#] at the end of the entry.



### Select Transceiver Memory

To select a transceiver memory, key-up and enter the Remote Base Frequency Load prefix, followed by a [\*] and the memory number. With a prefix of 525, select memory 5. The voice will say: "M5". Example: Key-up and enter [525\*05].

### Load Remote Base Frequency From CAT-700B Memory

Key-up and enter the remote base frequency prefix, followed by the memory table position. Example: With a prefix of 525, load contents of memory 22. The voice will say: "FREQUENCY LOAD 22." Example: Key-up and enter [52522].

### Voice Message Demo

Key-up and enter the voice prefix followed by a message number. The CAT-700B will key the transmitter and say the message stored at that location. With a voice prefix number of 700, play message 7. Example: Key-up and enter [70007].

### DR Track Selection

Key-up and enter the DVR prefix followed by a DVR track number. The CAT-700B will key the transmitter and play the digital voice recorder track. With a DVR prefix number of 725 play track 14, Example: Key-up and enter [72514].

### DVR Signal Report

Key-up and enter the DVR prefix [725] followed by a [\*]. Un-key, the voice will say: "START TEST NOW". Key-up and record a seven second message. Un-key and the message will play back. You instantly know how your signal sounds.

### Macro Execute

A macro is a series of commands, defined by the repeater owner. Macros permit the owner to customize certain aspects of repeater operation. Once the CAT-700B decodes the macro number, the commands will execute in the order they were stored within the macro string.

### **User Function Control By Repeater Input**

This feature permits repeater users to control the four user function switches with a simple DTMF entry. To control one of the switches, key-up and enter the user function control number followed by the switch number to be controlled and a [0] to turn the switch OFF, a [1] to turn the switch ON or a [2] to momentarily change the switch for 0.5 seconds. With a user function control number of [150], turn on switch three. Example: Key-up and enter [15031].

### **DTMF Tone Generator**

Key-up and enter the DTMF Generator prefix followed by a table position. The controller will key the transmitter and send the DTMF tones stored at that location. Example: With a DTMF tone generator prefix of [300], send the DTMF command stored at table position [3]. Example: Key-up and enter [30003].

### **Memory Files**

Space is provided for six memory files. Each memory file includes: control channel settings, codes, timer values, and voice messages 1 through 6. When the CAT-700B is initialized, all memory files are filled with the default values. To store active memory as a memory file, you must unlock the CAT-700B and use the [\*19X] programming commands.

### **Active Memory Identification**

Key-up and enter the memory recall prefix [175] followed by [0]. Un-key and the voice will read back the memory file number. With a memory recall prefix of [175], and active memory compares to file 3. Example: Key-up and enter [1750]. The voice will say: "FILE ID IS THREE." If changes were made to active memory and it no longer agrees with the original file in storage, the voice will say: "FILE ID IS THREE MODIFIED."

### **Memory Recall**

To copy a memory file into active memory, key-up and enter the memory recall prefix [175] followed by the file number [1] through [6]. With a memory recall prefix of [175], move file [3] to active memory. Example: Key-up and enter [1753].

### **Expanded Output Switch Control**

To control the eight user function switches located on DR-1000, or the twenty-four switches on the MF-1000 Interface Card, key-up and enter the Expanded Output Switch prefix [550] followed by the table position. The CAT-700B will change the settings of the switches to conform to the pattern stored by the [\*44XX] or [\*47X] programming commands. With a prefix number of [550], set the switches to the conditions previously stored in memory at table position [5]. Example: Key-up and enter [55005].

### **Repeater ID #1 (At Rest)**

If the repeater has been at rest for a period in excess of the ID timer setting, when the repeater is keyed, the CAT-700B will send ID #1. This ID should be longer than ID #2 and include additional information about the repeater or sponsoring organization. Example: "WITH ONE HUNDRED WATTS OF RF POWER AT YOUR SERVICE THIS IS THE W4XYZ REPEATER SYSTEM -- GOOD AFTERNOON".

### **Repeater ID #2 (Active)**

If a QSO is in progress and it's time to identify the repeater, the CAT-700B will wait until COR drops to send ID #2. This ID should be short so as not to interfere with the QSO in progress. Example: "W4XYZ REPEATER." This ID is also called as the final ID of the ten-minute period.

### **Unique Courtesy Tones**

The CAT-700B determines which courtesy tone to send by reading voice messages 9 and 10. Since the courtesy tones are assigned a three-digit number and called from a voice message, any word, tone, chime or sound effect listed in Chapter 11 can be used as a courtesy tone. The choice is yours.

### **Read Firmware Version**

To check the firmware version, enter the control operator prefix code followed by 98. Example: Key-up and enter [10098]. The voice synthesizer will announce the power-up message that includes the ROM version.

## Chapter 5 - Repeater Programming By DTMF Tone

This chapter describes how to program the CAT-700B controller with a DTMF keypad. The various types of program commands are described in detail and examples are given in the following text.

### Initialization

To initialize the CAT-700B, set dipswitch #7 to on and cycle DC power. During power-up, the voice will say: "RESET DATA LOAD COMPLETED." Set dipswitch #7 to off. Initialization consists of the following operations:

#### Dipswitch #7 Initialization

1. All memory locations are cleared.
2. All control channels marked with a [\*] are enabled.
3. The unlock number is loaded with the default value [1234567].
4. The control operator prefix code is loaded with [100].
5. The control numbers are set to default values.
6. The timers are set to default values.
7. The voice message buffers are loaded with default messages.
8. All six memory saves are loaded with default values.

#### Programming the Unlock Control Number

To program the UNLOCK code, set dipswitch #8 to the on position. The voice will say: "ENTER CONTROL." Key-up and enter a seven-digit number. Un-key, if the number is accepted, the voice will say: "DATA INPUTS OK." If the number is rejected, the voice will say: "CONTROL ERROR" followed by "ENTER CONTROL." Key-up and enter the seven-digit number. Set dipswitch #8 to off. When the CAT-700B is powered up with dipswitch #7 set to on, the un-lock number defaults to: [1234567].

#### Unlocking the Controller By Radio

To unlock the controller, key-up and enter the seven-digit unlock number. The voice will say: "CAT 700 CONTROL."

#### Locking the Controller By Radio

Key-up and send [\*0]. Un-key, the controller will lockup and the voice will say: "MANUAL EXIT." The controller will lock-up automatically when the programming timer expires. The voice will say: "TIMER EXIT." The programming time limit can be set with the [\*615\*] programming command.

NOTE: The CAT-700B must be unlocked to perform the following programming functions.

### Internal Commands

The Internal Command Structure is a series of commands used to program the scheduler, user function input switches and macros. Each command is four digits. The following operations are controlled by the Internal Commands.

INTERNAL COMMANDS	POINTER	CHANNEL	ACTION
Control Repeater Zone 1	11	1-8	0-1
Control Repeater Zone 2	12	1-8	0-1
Control Repeater Zone 3	13	1-8	0-1
Control Repeater Zone 4	14	1-8	0-1
Control Repeater Zone 5	15	1-8	0-1
Control Repeater Zone 6	16	1-8	0-1
Control Repeater Zone 7	17	1-8	0-1
Control Repeater Zone 8	18	1-8	0-1
	POINTER		
Send Voice Message Repeater	30	01-20	
Send Voice Message Repeater & Link	31	01-20	
Send Time of Day Repeater	32	00	
Send Time of Day Repeater & Link	33	00	
Send Day of Week	33	01	
Send Day and Month	33	02	
Send Salutation	33	03	
Send DTMF Tones Repeater	34	01-20	
Send DTMF Tones Repeater & Link	35	01-20	
Send DTMF Tones Link	36	01-20	
Play DVR Track Repeater	37	01-16	
Play DVR Track Repeater & Link	38	01-16	
Set DVR Switches	39	01-20	
Load Repeater Courtesy Tone	50	01-08	
Load Link Courtesy Tone	51	01-08	
Set MF-1000 Switches	57	1-8	
Execute Macro	58	01-40	
Load Memory File	59	01-06	
Time Delay Control (Seconds)	60	01-99	
PTT#1 Control	61	00-01	
PTT#2 Control	62	00-01	
PTT#1-PTT#2 Control	63	00-01	
PTT#1 Control with Voice Delay	64	00-01	
PTT#2 Control with Voice Delay	65	00-01	
PTT#1-PTT#2 Control Voice Delay	66	00-01	
Link Control OFF/ON/RECEIVE/STATUS	70	00-01-02-03	
Kenwood Memory Channel Select	74	01-20	
Kenwood RF Power Set [LO-MED-HI]	76	01-02-03	
Kenwood DC Power [OFF-ON]	78	00-01	
Send Voice Word Repeater	8	000-999	
Send Voice Word Link	9	000-999	

Figure 5-1

NOTE: Macro commands 5801-5840 can only be activated by the scheduler or hardware logic input. One macro cannot call another macro.



**Load Courtesy Tones**

Use the internal command to change the Repeater and Link courtesy tones. Use [50] followed by the courtesy tone number [01-08] for the repeater and [51] followed by the courtesy tone number [01-08] for link input.

**Scheduler Command Memory**

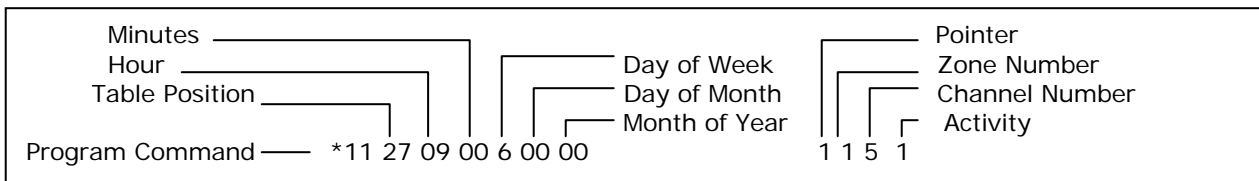
This memory area is reserved for storage of scheduler activity. This includes the time the command is to be executed, and the action to be taken.

**Read Scheduler Locations (01-40)**

Key-up and send [\*10XX]. Un-key and the voice will read back the status of the memory location. If there is no command stored at that memory location, the voice will say: "All CLEAR." If a command is stored at that memory location, the voice will read back the time, day, and command stored.

**Program Scheduler Locations (01-40)**

Key-up and send [\*11XX] followed by the hours, minutes, day of week, or day of month and month of year, and the command to be executed. Un-key and the voice will say: "CONTROL OK." Example: Set Zone 1 Channel 5 (ON) - 9:00 AM Every Friday (Store at Table Location 27)



Example: Play DVR Track 7 on the repeater transmitter, 15 minutes after every hour, (Stored at Table Location 6) Key-up and enter [\*1106\*\*15000003707].

Example: Announce Time of Day on the repeater transmitter at 7:30 AM on December 25th (Store at Table Location 40) Key-up and enter [\*11400730025123200].

Example: Set Zone 4 Channel 1 (OFF) at 11:00 PM every day (Store at Table Location 26) Key-up and enter [\*1126230000001410].

DAY OF WEEK SCHEDULER PROGRAMMING TABLE	
0=Daily	2=Monday 4=Wednesday 6=Friday 8=Weekdays
1=Sunday	3=Tuesday 5=Thursday 7=Saturday 9=Weekends

**Erase Scheduler Locations (01-40)**

Key-up and send [\*12XX]. Un-key, the voice will say: "CONTROL OK."

**Macro Command Memory**

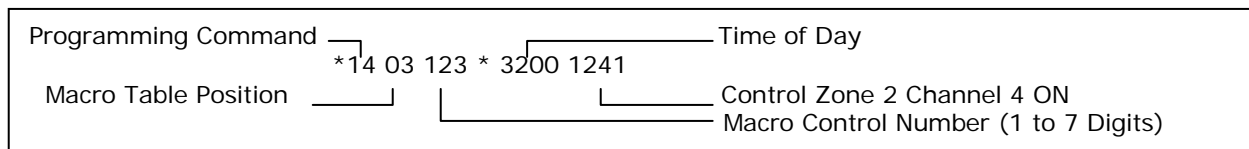
Macros are used to store custom commands of up to ten operations that will execute with a single DTMF entry. Macro [40] is a power-up macro and will execute anytime power is applied to the controller.

**Read Macro Locations (01-40)**

Key-up and send [\*13XX]. Un-key and voice will read back the macro control number followed by the macro data commands stored at that memory location. If the location is empty, the voice will say: "NO MACRO."

**Program Macro Locations (01-40)**

Key-up and send [\*14XX] followed by the macro control number and the string of internal commands to be executed. See figure 5-1. Un-key and the voice will say: "CONTROL OK." Example: Program macro #3 with a control number of [123] to announce the time and turn on Zone 2, Channel 4. The Macro Control number [123] is the number entered by a repeater user to execute the macro.



**Erase Macro Locations (01-40)**

Key-up and send [\*15XX]. Un-key, the voice will say: "CONTROL OK."

**User Function Inputs**

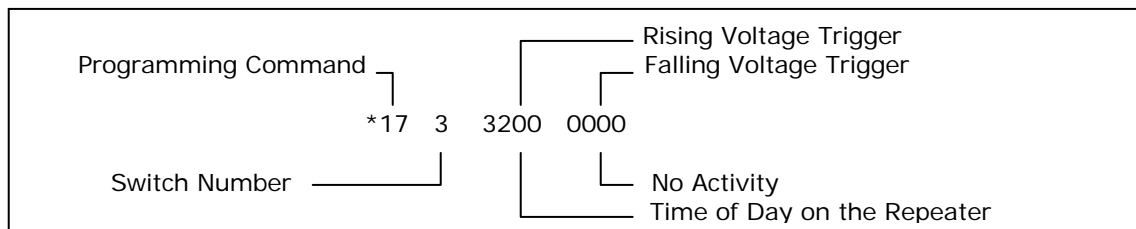
The CAT-700B has 4 logic inputs and 2 memories are provided for each input. The first location executes on the rising voltage while the second executes on the falling voltage. If a location is loaded with [0000] no action will take place.

**Read User Function Inputs (1-4)**

Key-up and send [\*16X]. Un-key and voice will read back the Internal command stored at that switch memory location. If the location is empty, the voice will say: "ALL CLEAR."

**Program User Function Inputs (1-4)**

Key-up and send [\*17X] followed by the internal command to be stored. See Figure 5-1. Un-key and the voice will say: "CONTROL OK." Example: Announce the time of day on the repeater transmitter when switch #3 is activated by a rising logic voltage.



Example: Turn the link on when switch #1 is activated by a falling voltage input. Key-up and enter [\*17100007001].

Example: Turn user function output switch #2 [Zone 5 Channel 6] on when input switch #2 is activated by a rising voltage and off with a falling voltage. Key-up and enter [\*17215611560].

**Erase User Function Switches (1-4)**

Key-up and send [\*18X]. Un-key and the voice will say: "CONTROL OK."

**Save Active Memory File (1-6)**

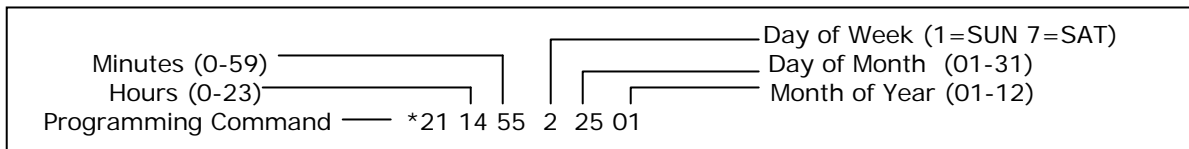
Save the current settings of active memory to be recalled later. Memory space is provided for six files. Configure the active memory to suite your special requirements. Use the [\*19X] programming command to save the current settings of the control channels, codes, timers and first ten voice messages. Example: Save active memory as File #3. Key-up and send [\*193]. Un-key and the voice will say: "CONTROL OK."

**Check Time of Day**

Key-up and send [\*20]. Un-key, the voice will read the time, day of week, day of month, month and year. Example: "THE TIME IS TWELVE FIFTEEN PM MONDAY JUNE FIVE."

**Setting the Clock**

Key-up and send [\*21] followed by the hours, minutes, day of week, day of month, month of year and year. Un-key and the voice will say "CLOCK SET OK." Example: 2:55 PM Monday January 25th. All entries must be double digit, except the day of week.



**Increase - Decrease Hour**

Key-up and send [\*22] to advance the clock one hour at the start of daylight savings time. Key-up and send [\*23] to set the clock back one hour at the end of daylight savings time.

**Voice Synthesizer Memory Storage**

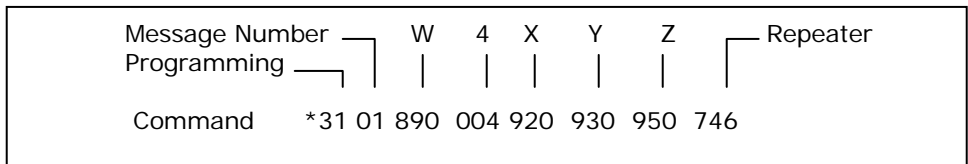
Space is provided for twenty programmable messages of up to 23 words each.

**Send Synthesized Voice Message Locations (01-20)**

Key-up and send [\*30XX]. Un-key and the voice synthesizer will say the message stored at memory location "XX".

**Program Synthesized Voice Message Locations (01-20)**

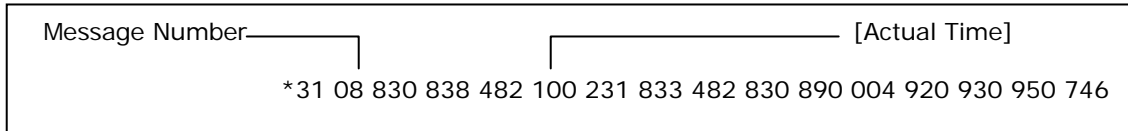
Key-up and send [\*31XX], followed by the three digit numbers that represents the words required to construct the message. Memory space is provided for 23 entries. Refer to Chapter 13, Voice Vocabulary Word List. Example: Load Repeater ID #1 with "W4XYZ Repeater."



VOICE MESSAGE NUMBER TABLE			
01	Repeater ID #1 (AT REST)	11	Remote Base Off
02	Repeater ID #2 (ACTIVE)	12	Remote Base On
03	Squelch Tail Message	13	Link Clear
04	Transmitter Drop Message	14	Repeater Time Out Exit
05	Timed Message #1	15	Repeater Time Out Clear
06	Timed Message #2	16	Message #16
07	Time of Day Message	17	Message #17
08	Grandfather Clock Message	18	Message #18
09	Courtesy Tone Repeater	19	Message #19
10	Courtesy Tone Link	20	Message #20

**Program Voice Message With Time Variables**

To insert the time-of-day into a voice messages load the number [100]. Example: Load the grandfather clock message with "THE TIME IS [ACTUAL TIME] AND THIS IS THE W4XYZ REPEATER." Other time variables include: [102 - Day of the Week], [103 - Day and Month], [104 - Year] and [105 - Salutation].



**User Function Switch Control by Voice Message**

The voice message buffers can also control the seven user function output switches. If during the execution of a voice message, a user function output switch command (111 through 122) is encountered, the CAT-700B will set the switch and then continue with the remainder of the voice message.

111=UF#1 OFF	114=UF#2 OFF	117=UF#3 OFF	120=UF#4 OFF
112=UF#1 ON	115=UF#2 ON	118=UF#3 ON	121=UF#4 ON
113=UF#1 MOM	116=UF#2 MON	119=UF#3 MON	122=UF#4 MON

**DVR Track Selection by Voice Message**

The voice message buffers can be used to play one of the sixteen DVR tracks. If during the execution of a voice message, a DVR track command (131 through 146) is encountered the CAT-700B will play the recorded message stored at that track.

**Digital Voice Recorder Track Control Commands**

131=TRACK #1	135=TRACK #5	139=TRACK #9	143=TRACK #13
132=TRACK #2	136=TRACK #6	140=TRACK #10	144=TRACK #14
133=TRACK #3	137=TRACK #7	141=TRACK #11	145=TRACK #15
134=TRACK #4	138=TRACK #8	142=TRACK #12	146=TRACK #16

**Courtesy Tone Selection by Voice Message**

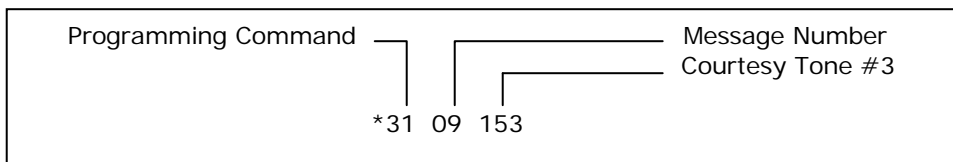
The voice message buffers can be used to generate courtesy tones. If during the execution of a voice message, a courtesy tone command (151 through 158) is encountered, the CAT-700B will generate the courtesy tone stored at that memory location.

**Courtesy Tone Control Command**

151=TONE #1	152=TONE #2	153=TONE #3	154=TONE #4
155=TONE #5	156=TONE #6	157=TONE #7	158=TONE #8

**Load Courtesy Tone For Repeater Receiver**

Key-up and send [\*3109], followed by the three-digit number that represents the desired courtesy tone from the courtesy tone command table. Un-key and the voice will say: "CONTROL OK." Example: Select courtesy tone #3.



**Load Courtesy Tone For Link Receiver**

Key-up and send [\*3110], followed by the three-digit number that represents the desired courtesy tone from the courtesy tone command table. Un-key and the voice will say: "CONTROL OK"

**Erase Synthesized Voice Message Locations (01-20)**

Key-up and send [\*32XX]. Un-key and the voice will say: "CONTROL OK." The voice message will be erased at location [XX].

**CW ID Memory Storage**

Memory space is provided for a CW identification. The buffer will accept 28 characters. If a repeater user talks over a voice ID, the CAT-700B will switch to the CW ID. If the voice ID messages are disabled, (Zone 3 Channels 1, 2 are off), the controller will ID in CW only. During initialization, the CW buffers are loaded with "CAT700 REPEATER."

**Send Repeater CW ID**

Key-up and send [\*33]. Un-key and the CAT-700B will send the CW ID at the frequency and speed programmed.

**Program Repeater CW ID**

Key-up and send [\*34] followed by the frequency, speed and two digit numbers that represent the call letter identification. Memory space is provided for (28) entries. Refer to the CW ID programming table. Example: Load CW ID memory buffer with DE W4XYZ/R at 20 WPM and a tone frequency of 1206Hz.



**CW ID Programming Table**

00=ZERO	10=A	20=K	30=U	40=;	1=24 WPM	1=697 Hz
01=ONE	11=B	21=L	31=V	41=,	2=20 WPM	2=770 Hz
02=TWO	12=C	22=M	32=W	42=:	3=18 WPM	3=852 Hz
03=THREE	13=D	23=N	33=X	43=?	4=15 WPM	4=941 Hz
04=FOUR	14=E	24=O	34=Y	44= -	5=13 WPM	5=1206 Hz
05=FIVE	15=F	25=P	35=Z	45=(	6=10 WPM	6=1336 Hz
06=SIX	16=G	26=Q	36=/	46=SK		7=1477 Hz
07=SEVEN	17=H	27=R	37=AR			8=1633 Hz
08=EIGHT	18=I	28=S	38=SPACE			
09=NINE	19=J	29=T	39=[.]			

**Erase Repeater CW ID**

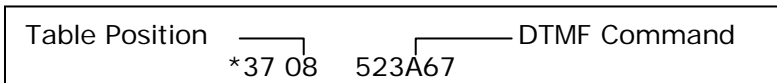
Key-up and send [\*35]. Un-key and the voice will say: "CONTROL OK." If the CW ID buffer is empty and a repeater user keys-up during a voice ID, the voice ID will continue.

**Read DTMF Generator Locations (01-20)**

Key-up and send [\*36XX]. Un-key and the voice will read back the DTMF command stored at that memory location. If the location is empty, the voice will say: "ALL CLEAR."

**Program DTMF Generator Locations (01-20)**

Key-up and send [\*37XX] followed by the DTMF command to be stored. Un-key and the voice will say: "CONTROL OK." Example: Store the DTMF command [523A67] at table position 8.



**Erase DTMF Generator Locations (01-20)**

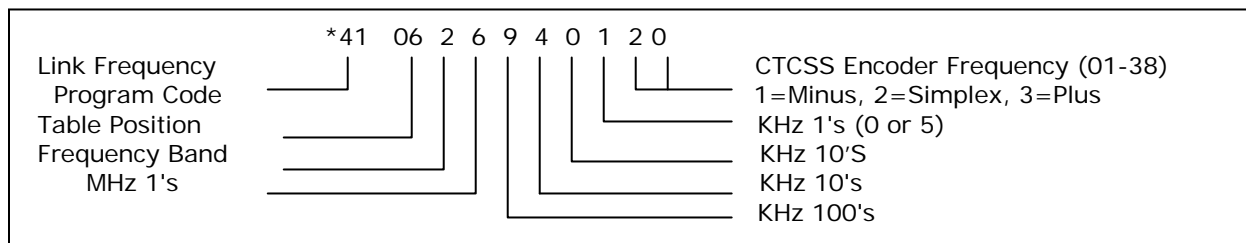
Key-up and send [\*38XX]. Un-key and the voice will say: "CONTROL OK."

**Read Remote Base Frequency Locations RBI-1 Interface (01-40)**

Key-up and send [\*40XX]. Un-key and the voice will announce the frequency, offset, and CTCSS encoder setting stored at memory [XX]. Example: The voice will say: "ONE FORTY SIX POINT NINE FOUR MINUS CTCSS 20 ON OFF." or "ONE FORTY SIX POINT NINE FOUR MINUS NO CTCSS." If the memory location is empty, the voice will say: "FREQUENCY POSITION XX IS CLEAR".

**Program Remote Base Frequency Locations RBI-1 Interface (01-40)**

Key-up and send [\*41XX] followed by the band, frequency (4 digits), offset, and CTCSS encoder frequency. Un-key and the voice will say: "CONTROL OK." Example: At table position 6, load frequency of 146.940 MHz, minus offset, with CTCSS encoder enabled and set to 131.8 Hz. For Band and CTCSS tone selection see Figures 15-2 and 15-3.



**Erase Remote Base Frequency Locations (01-40)**

Key-up and send [\*42XX]. Un-key and the voice will say: "CONTROL OK."

**DR-1000 Expanded Output Switches**

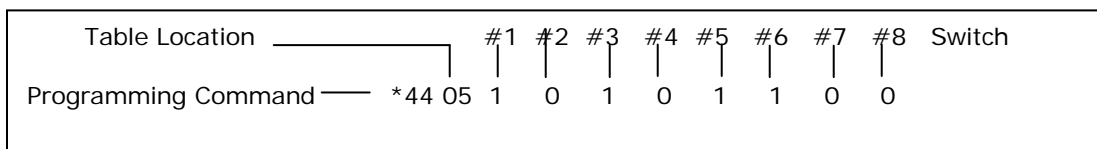
The DR-1000 contains eight switches to control other equipment at the repeater site. A twenty-position table stores the switch settings. These switches can be changed by a DTMF command, scheduler, macro or user function input switch.

**Read DR-1000 Expanded Switch Locations (01-20)**

Key-up and send [\*43XX]. Un-key and the voice will announce the settings of each switch stored at memory location [XX]. If all switches are off, the voice will say: "ALL CLEAR". If some switches are on, the voice will read back the switches from switch #1 to switch #8.

**Program DR-1000 Expanded Switch Locations (01-20)**

Key-up and send [\*44XX] followed by the settings of the eight switches. Un-key and the voice synthesizer will say: "CONTROL OK". Example: On DR-1000, at table position 5, set switches 1,3,5 and 6 to on.



**Erase DR-1000 Expanded Switch Locations (1-20)**

Key-up and send [\*45XX]. Un-key and the voice will say: "CONTROL OK".

**MF-1000 Expanded Switches**

The MF-1000 Interface Card contains twenty-four switches to control other equipment at the repeater site. An eight-position table stores the switch settings. These switches can be changed by a DTMF command, scheduler, macro or user function input switch.

**Read MF-1000 Expanded Switch Locations (1-8)**

Key-up and send [\*46X]. Un-key and the voice will announce the settings of each switch stored at memory location [X]. If all switches are off, the voice will say: "ALL CLEAR". If some switches are on, the voice will read back the switches from switch #1 to switch #24.

**Program MF-1000 Expanded Switch Locations (1-8)**

Key-up and send [\*47X] followed by the settings of the twenty-four switches. Un-key and the voice synthesizer will say: "CONTROL OK". Example: On MF-1000, at table position 8, set switches 1,3,5,6,12, and 21 to on.

Table Location _____	Zone 6	Zone 7	Zone 8
Programming _____	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8
Command _____ *47 8	1 0 1 0 1 1 0 0	0 0 0 1 0 0 0 0	0 0 0 0 1 0 0 0

**Erase MF-1000 Expanded Switch Locations (1-8)**

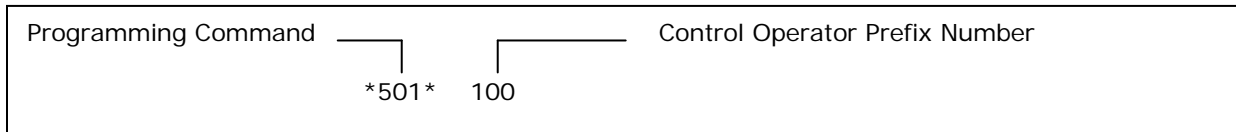
Key-up and send [\*48X]. Un-key and the voice will say: "CONTROL OK".

**Control Code And Prefix Number Memory**

This memory area is reserved for storage of control and prefix numbers. These numbers can be from one to seven digits and will change to a default value when the CAT-700B is powered up with dip-switch #7 set to the on position.

**Control Operator Port #1 Prefix Number [\*501\*]**

This programming command selects the control operator prefix number for the repeater port. This number must precede the command to change the zone control channels. Example: To program a Control Operator Prefix of [100], key-up and send:



Un-key, the voice will say: "CONTROL OK." The default number is [100].

**User Output Switch Prefix Number [\*502\*]**

This programming command selects the user function switch prefix number. This number precedes the switch and activity numbers. The default number is [150].

**Memory Recall Prefix Number [\*503\*]**

This programming command selects the memory recall prefix number. This number precedes the memory save number being moved into active memory. The default number is [175].

**DTMF Generator Prefix Number [\*504\*]**

This programming command selects the DTMF generator prefix number. This number precedes the DTMF generator table position number. The default number is [300].

**DTMF Access Code [\*505\*]**

This programming command selects the DTMF access prefix number. When the repeater is in the DTMF Access Mode it will not respond to a COR input. The repeater user must enter the DTMF access number to activate the repeater. When the repeater returns to rest for a period determined by the sleep timer, this number must be re-entered to activate the repeater. The default number is [325].

**DTMF Pad Test Code [\*506\*]**

This programming command selects the DTMF pad test prefix number. This number must be entered to initiate a DTMF keypad test. The default number is [375].

**Time Of Day Request Code [\*507\*]**

This programming command selects the time request number. This number must be entered to request a time of day announcement. The default number is [400].

**Link Control Prefix Number [\*508\*]**

This programming command selects the link control prefix number. This number must precede the command used to activate or deactivate the link. The default number is [500].

**Control Operator Port #2 Prefix Number [\*509\*]**

This programming command selects the control operator prefix number for the link port. This number must precede the command to change the zone control channels through the link input. The default number is [200].

**Expanded Output Switch Prefix [\*510\*]**

This programming command selects the expanded user function prefix number. This number must precede the command to change the settings of the expanded user function switches on the DR-1000 or the MF-1000 determined by the setting of dipswitch #6. The default number is [550].

**Voice Demonstration Prefix Number [\*511\*]**

This programming command selects the voice demo prefix number. This number must precede the message number to play a voice message. The default number is [700].

**DVR Track Play Prefix Number [\*512\*]**

This programming command selects the DVR prefix number. This number must precede the DVR track number to play a DVR track. The default number is [725].

**External Modem Connect Code [\*513\*]**

This programming command selects the external modem connect number. When this number is entered, user function switch #4 will turn on. Connect switch #4 to a relay to enable an external modem. Exit the computer communications mode and the switch #4 will turn off. The default number is [825]. Note: This feature must be selected in the windows editor configuration section.

**Remote Base Frequency Load Number [\*514\*]**

This number must precede the command used to change the frequency of the Kenwood transceiver through the RBI-1 interface. Example: To program a remote base Frequency Load Number of 525, key-up and send [\*514\*525]. Un-key and the voice will say: "CONTROL OK."

**Remote HF Base Control Number [\*515\*]**

This number must precede the command used to enable control of the IC-706 Transceiver. Example: To program a Remote Base Control number of 560, key-up and send [\*514\*560]. Un-key and the voice will say: "CONTROL OK."

**Read Control And Prefix Numbers [\*501 - \*515]**

Use any of these programming commands to read the assigned prefix number. Example: Read the voice demo prefix number. Key-up and enter [\*511], un-key and the voice will say: "PRESET CODE FIVE ELEVEN IS SEVEN ZERO ZERO."

**Timer Memory**

This memory area is reserved for storage of [20] timers. These timers are user programmable. If the CAT-700B is initialize by applying power with dip-switch #7 in the on position, the timers will be automatically loaded with default times.

**Repeater Time-out [\*601\*]**

The repeater time-out timer limits the maximum length of a transmission. This timer is programmable between 1.0 and 1799 seconds. Example: To program the timer for 3 minutes, key-up and enter [\*601\*180]. Un-key and the voice will say: "CONTROL OK." When initialize, this timer defaults to 180 seconds.



**Repeater Sleep Timer [\*602\*]**

This timer determines the time required for the repeater to be at rest before the DTMF access code is required to activate the repeater. This timer is programmable between 1.0 and 1799 seconds. The timer default is 60 seconds.

**Repeater Turn on Delay Timer [\*603\*]**

When the repeater is at rest, this timer determines the time COR must be present before the repeater activates. It is programmable between 0.1 and 9.9 seconds. Example: To program this timer to 1.5 seconds, key-up and enter [\*603\*15]. Un-key and the voice will say: "CONTROL OK." The timer default is 1.0 seconds.

**COR Drop to Courtesy Beep Timer [\*604\*]**

This timer determines the time between loss of COR and the generation of the courtesy beep. This timer is programmable between 0.1 and 9.9 seconds. The timer default is 1 second.

**Courtesy Beep to PTT Drop Timer [\*605\*]**

This timer determines the time between the generation of the courtesy beep and the time the repeater transmitter turns off. This timer is programmable between 0.1 and 9.9 seconds. The timer default is 4 seconds.

**DTMF Mute Delay Timer [\*606\*]**

This timer determines the time the transmit audio will continue to be muted after the entry of the last DTMF tone. This timer is programmable between 0.1 and 9.9 seconds. The timer default is 1 second.

**Repeater ID Timer [\*607\*]**

This timer sets the time between transmissions of the repeater ID. The ID occurs when a repeater user stops transmitting. This timer is programmable between 1.0 and 1799 seconds. The timer default is 480 seconds.

**Squelch Tail Message Timer [\*608\*]**

This timer sets the time between transmissions of the squelch tail message. The message occurs when a repeater user stops transmitting. This timer is programmable between 1.0 and 1799 seconds. The timer default is 1799 seconds.

**Drop Out Message Timer [\*609\*]**

This timer sets the time between transmissions of the drop out message. The message occurs when a repeater stops transmitting. This timer is programmable between 1.0 and 1799 seconds. The timer default is 1799 seconds.

**Voice Delay Timer [\*610\*]**

The CAT-700B generates a PTT output and after a short delay the voice speaks. This delay is field programmable. This feature is useful in repeater systems using CTCSS tone squelch or multiple linking where the system is slow to come up. The voice delay timer can be programmed between 0.1 and 9.9 seconds. The timer default is 1.0 seconds.

**Program Max Length Timer [\*611\*]**

During the programming mode, this timer determines the maximum time the controller remains unlocked. This timer is programmable between 1 and 1799 seconds. The timer default is 300 seconds.

**Test Tone Length Timer [\*612\*]**

The courtesy beep tone generator will produce a continuous tone to adjust audio levels to the transmitter. This timer is programmable between 1 and 1799 seconds. The timer default is 30 seconds.

**Timed Message #1 Timer [\*613\*]**

This timer sets the timed message repeat period. This timer is programmable between 1.0 and 1799 seconds. The timer default is 1799 seconds.

**Timed Message #2 Timer [\*614\*]**

This timer sets the timed message repeat period. This timer is programmable between 1.0 and 1799 seconds. The timer default is 1799 seconds.

**RS-232 Port Connect Timer [\*615\*]**

During programming by computer terminal, this timer determines the maximum time the modem will remain on line. This timer is programmable between 1 and 1799 seconds. The timer default is 1200 seconds.

**Link Auto Disconnect Timer [\*616\*]**

During link operation if Zone 6 channel 3 is enabled the link will disconnect automatically after a period inactivity. Voice message #15 will be called to announce the transceiver has disconnected. This timer is programmable between 1.0 and 1799 seconds. The timer default is 600 seconds.

**Read Timer Settings [\*601 - \*616]**

Key-up and send [\*601]. Un-key and the voice synthesizer will read back the setting of the repeater's time-out timer. The voice will say: "TIMER 601 IS THREE MINUTES."

**Audio Test Tone**

The CAT-700B will generate a 941Hz test tone. This tone is used as a reference when setting audio levels on the CAT-700B. To activate the tone, key-up and enter [\*901] for the repeater tone and [\*902] for the link tone. Timer [\*612\*] sets the length of the tone.

**Courtesy Tone**

Memory space is provided for [8] custom courtesy tones. Each tone can consist of up to three different tone frequencies of various lengths and separations.

**Send Courtesy Tone (1-8)**

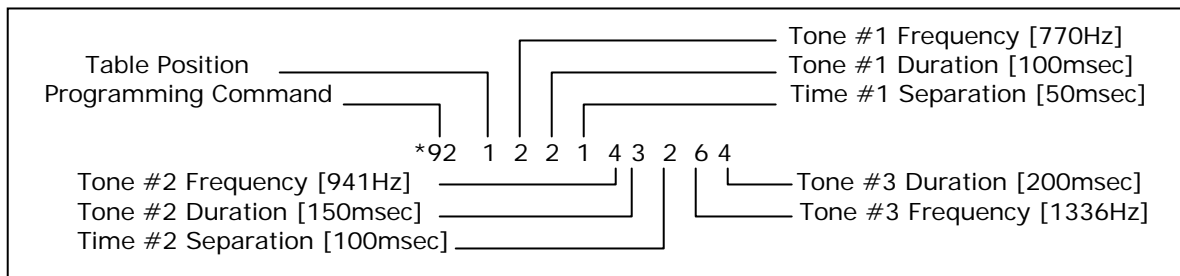
Key-up and send [\*91X]. Un-key and the CAT-700B will transmit the courtesy tone. "X" represents the courtesy tone table location.

**Program Courtesy Tone (1-8)**

Key-up and send [\*92X], followed by the frequency, duration and separation numbers from the courtesy tone table. This programming command is used to develop eight custom courtesy tones 151 through 158. The tone created with the [\*925] programming command is identified as tone "155". Program courtesy tone table location 5 with a tone of 941Hz and a duration of 150msec. Example: Key-up and enter [\*92543].

TONE FREQUENCY									
1=697Hz	2=770Hz	3=852Hz	4=941Hz	5=1206Hz	6=1336Hz	7=1477Hz	8=1633Hz		
TONE TIMING (milliseconds)									
0=0	1=50	2=100	3=150	4=200	5=250	6=300	7=350	8=400	9=450

To program a multiple courtesy tone, key-up and send [\*92X], followed by the desired tone frequency, duration and separation numbers. Example: Program courtesy tone table location 1 with a three-frequency tone.



**Erase Courtesy Tone (1-8)**

Key-up and send [\*93X]. Un-key and the voice will say: "CONTROL OK."

### Select Courtesy Tone

To select tone "153" as the Repeater courtesy beep, load Voice Message 9 with "153." Example: Enter \*3109 153. To select tone "157" as the Link courtesy beep, load Voice Message 10 with "157". Enter \*3110 157.

### Digital Voice Recorder

The CAT-700B supports the DR-1000 Digital Voice Recorder for true voice message announcements. Substitute DVR tracks for voice messages, speed dial IDs and courtesy tones. For additional information on how to record tracks over the telephone line, consult Chapter 10.

### Play Digital Voice Recorder Tracks (01-16)

Key-up and send [\*94XX]. Un-key and the CAT-700B will play the prerecorded message stored at track "XX"

### Record Digital Voice Recorder Tracks (01-16)

Key-up and send [\*95XX]. Un-key and the voice will say: "START MESSAGE". Key-up and enter the message to be stored at track "XX".

### Erase Digital Voice Recorder Tracks (01-16)

Key-up and send [\*96XX]. Un-key and the voice will say: "CONTROL OK".

### Exit Programming Mode [\*0]

To exit the programming mode and return to normal repeater operation, key-up and send [\*0]. Un-key and the voice will say: "MANUAL EXIT." If you fail to exit the programming mode, when the programming timer [\*611\*] expires, the CAT-700B will return to normal repeater operation. The voice will say: TIMER EXIT."

### DTMF Programming Commands

COMMAND	DESCRIPTION
*10XX	READ SCHEDULER COMMAND
*11XX	PROGRAM SCHEDULER COMMAND
*12XX	ERASE SCHEDULER COMMAND
*13XX	READ MACRO
*14XX	PROGRAM MACRO
*15XX	ERASE MACRO
*16X	READ LOGIC INPUT SWITCH
*17X	PROGRAM LOGIC INPUT SWITCH
*18X	ERASE LOGIC INPUT SWITCH
*19X	SAVE ACTIVE MEMORY
*20	SEND TIME OF DAY
*21	PROGRAM TIME OF DAY
*22	INCREASE CLOCK ONE HOUR
*23	DECREASE CLOCK ONE HOUR
*30XX	SEND VOICE SYNTHESIZER
*31XX	PROGRAM VOICE SYNTHESIZER
*32XX	ERASE VOICE SYNTHESIZER
*33	SEND CW ID
*34	PROGRAM CW ID
*35	ERASE CW ID
*36XX	READ DTMF GENERATOR
*37XX	PROGRAM DTMF GENERATOR
*38XX	ERASE DTMF GENERATOR
*40XX	READ LINK FREQUENCY

*41XX	PROGRAM LINK FREQUENCY
*42XX	ERASE LINK FREQUENCY
*43XX	READ DVR SWITCHES
*44XX	PROGRAM DVR SWITCHES
*45XX	ERASE DVR SWITCHES
*46XX	READ MF-1000 SWITCHES
*47XX	PROGRAM MF-1000 SWITCHES
*48XX	ERASE MF-1000 SWITCHES
*501*	CONTROL OPERATOR CODE (RPT)
*502*	USER OUTPUT SWITCH
*503*	MEMORY RECALL PREFIX
*504*	DTMF GENERATOR PREFIX
*505*	DTMF ACCESS CODE
*506*	DTMF PAD TEST CODE
*507*	TIME OF DAY REQUEST CODE
*508*	LINK CONTROL PREFIX

COMMAND	CONTROL NUMBER DESCRIPTION		DEFAULT
*509*	CONTROL OPERATOR CODE(LINK)		200
*510*	EXPANDED OUTPUT SWITCH		550
*511*	VOICE DEMO PREFIX		700
*512*	DVR PREFIX		725
*513*	RS-232 PORT CONNECT CODE		825
*514*	REMOTE BASE FREQUENCY LOAD PREFIX		525
*515*	REMOTE HF BASE CONTROL PREFIX		560
COMMAND	TIMER DESCRIPTION	RANGE	DEFAULT
*601*	REPEATER TIME-OUT	1-1799	180
*602*	REPEATER SLEEP	1-1799	60
*603*	TURN ON DELAY	.1-9.9	1.0
*604*	COR DROP TO BEEP	.1-9.9	1.0
*605*	BEEP TO PTT DROP	.1-9.9	4.0
*606*	DTMF MUTE DELAY	.1-9.9	1.0
*607*	REPEATER ID	1-1799	480
*608*	SQUELCH TAIL MESSAGE	1-1799	1799
*609*	DROP OUT MESSAGE	1-1799	1799
*610*	VOICE DELAY	.1-9.9	1.0
*611*	PROGRAM MAX LENGTH	1-1799	300
*612*	TEST TONE LENGTH	1-1799	30
*613*	TIMED MESSAGE #1	1-1799	1799
*614*	TIMED MESSAGE #2	1-1799	1799
*615*	EXT MODEM CONNECT	1-1799	1200
*616*	LINK AUTO DISCONNECT	1-1799	600

COMMAND	DESCRIPTION	
*901	GENERATE 941Hz TONE [REPEATER]	
*902	GENERATE 941Hz TONE [LINK]	
*91X	SEND COURTESY TONE	
*92X	PROGRAM COURTESY TONE	
*93X	ERASE COURTESY TONE	
*94XX	PLAY DIGITAL VOICE RECORDER	
*95XX	RECORD DIGITAL VOICE RECORDER	
*96XX	ERASE DIGITAL VOICE RECORDED	
*0	MANUAL EXIT	

## Chapter 6 - Repeater Programming By Computer

This chapter describes how to communicate with the CAT-700B through the RS-232 computer interface. The rate is fixed at [4800] baud with [8] bits, no parity and [1] stop bit. The default password is [cat700]. The password is case sensitive. The command prompt is: [->]. Entries must be in lower case. In the examples the carriage return is displayed as (C/R). The following commands are described in Figure 6-1 below:

COMMAND	DEFINITION
U	Xmodem file UPLOAD to send to CAT-700B memory
D	Xmodem file DOWNLOAD to save CAT-700B memory to disk
q	QUIT the computer terminal mode

Figure 6-1

Fabricate the cable described in Figure 7-7 of this manual. Use the cable to connect the computer's serial port to the J10 header on the CAT-700B controller. Start the [COMM32] communications program. Click on "Configuration" and "Comm Setup." Select the Port, 4800 baud, Parity NONE, Data Bits 8 and Stop Bits 1. Click OK. Select Program Setup and select CAT-700 communications. Click OK. **Note: Jumper J11 must be in the CRT position.**

Press **(C/R)** and the CAT-700B will send: **Enter Password:** Enter the default password cat700. The controller will send: **Data Transfer, D=Download... U=Upload... Q=Quit. Select>**

These commands are used to transfer the contents of the CAT-700B memory between the controller and computer, where it can be stored on disk as a back-up file or used with the editor program.

### Data Transfer Download

To **DOWNLOAD** the memory and save it to disk, Type: **d (C/R)**. The CAT-700B will send: **Select Xmodem download protocol.** Place the arrow on the download button and click the left mouse button. Name the file to be down loaded and click OK. Once the download sequence starts, monitor the download window display until the download is complete.

### Data Transfer Upload

To **UPLOAD** the memory from disk, Type: **u (C/R)**. The CAT-700B will send: **Select Xmodem upload protocol.** Place the arrow on the upload button and click the left mouse button. Select the file to be uploaded and click OK. Once the upload sequence starts, monitor the upload window display until the upload is complete.

### Exit Terminal Routine

To quit the terminal mode, Type: **q (C/R)**. The sign-off message will appear.

### CAT-700 Windows Editor

The CAT Windows Editor offers a monumental break through in repeater controller programming. No endless string of DTMF tones to enter of confusing script files to write. Completely mouse driven, just point and click.

### Print Driver

The CAT-700 Windows Editor Program includes a print driver to produce a hard copy of the data in the controller's memory. Use the printed material to prepare manuals for the system control operators. From the print driver window select from the following print command boxes: [Repeater Codes], [Repeater Timers], [Voice Messages], [Control Zones], [Memory Saves 1-6], [Remote Base Frequencies], [Macros], [Scheduler], [Courtesy Tones], [CW Message], [DTMF Tones].

## Chapter 7 - Interfacing to Other Equipment

Interfacing the CAT-700B to your repeater system is a simple matter. A minimum of two inputs and two outputs are required for the CAT-700B to control a repeater. They are:

1. A COR signal to indicate when a signal is being received.
2. A receive audio signal containing DTMF tones to be processed for control.
3. A Push-To-Talk signal to tell the repeater transmitter to turn ON.
4. A transmit audio signal containing a combination of receive audio, synthesized voice, and courtesy tone.

Additional connections are required to realize all features of the CAT-700B.

### Determining COR Logic

Locate your repeater receiver's COR output. This line has a DC voltage that changes state when a signal is being received. If the COR line is 0 volts and goes to a positive voltage when a signal is received it is said to be (positive logic) or active HIGH. If the COR line is a positive voltage, and goes to 0 volts when a signal is received it is said to be (negative logic) or active LOW. Note: 0 volts is any voltage less than 0.8VDC. A positive voltage is any voltage greater than 3.0VDC. Set dipswitch #1 on the CAT-700B to ON for (negative logic) and OFF for (positive logic).

### Connection to Receiver

Connect the repeater receiver audio output to J4-13 and the COR to J4-6 of the CAT-700B. When the repeater's receiver is active, measure the COR level at TP3. Verify this line changes from less than 0.8VDC to greater than 3.0 VDC. If the COR line will not meet these limits it may be necessary to add a pull-up resistor to the COR #1 line. This may also be true for the COR #2 input. Space is provided on the CAT-700B board.

### Connection to Transmitter

Locate your repeater's Push-To-Talk input. When grounded, this line will make the repeater transmit. Connect the CAT-700B PTT #1 output (J4-10) to this line. Locate your repeater's TX audio input. This is the line where the audio signal used to modulate the transmitter is applied. Connect the TX1 AUDIO (J4-11) to this line.

### Connection to CTCSS Decoder

If your repeater receiver has a CTCSS decoder output, connect it to J4-4. In addition to COR, the CAT-700B requires a positive logic input to represent a CTCSS input.

### Interface Review

1. Are dipswitches #1 through #8 in their proper positions?
2. Is the PTT-1 output at J4-10 connected to the transmitter PTT input?
3. Is the TX1 Audio at J4-11 connected to the transmitter audio input?
4. Is the COR-1 at J4-6 connected to the repeater receiver COR output?
5. Is dipswitch #1 ON for active low COR or OFF for active high COR?
6. Is the COR level changing from less than 0.8 VDC to greater than 3.0 VDC?
7. Is the RX1 AUDIO at J4-13 connected to the receiver audio output?
8. Is the audio input level sufficient for the DTMF decoder?

### Connector Kit

Included with the controller is a connector kit containing a 25 pin "D" connector to mate with J4, a 2.5mm power plug to mate with J1 (center pin is [+]), connector cable for J10 serial port, two 2200 ohm resistors and two .0047uF capacitors. If the COR inputs are active low, install the 2200 ohm resistors as pull-ups on the board at the R1 and R2 positions. If the receiver's COR circuit is not capable of pulling down the 2200 ohm resistor increase the resistor value to 10K ohms. If the controller is supplied with discriminator audio install the .0047uF capacitors on the board at the C19 and C21 positions to de-emphasize the audio.

### Audio Level Adjustment

The audio mixing-switching circuits of the CAT-700B are optimized around an input and output of -10dBm (220mV RMS). For best results the receiver audio input at J4 pin 13 should be 220mV with a test signal of 1000Hz 3Khz deviation.

Connect a signal generator to the repeater's receiver input. Adjust the signal generator's output for a test tone signal of 1000 Hz at 3KHz deviation. If a signal generator is not available, select a handy-talkie that you suspect has the DTMF tone pad adjusted for approximately 3KHz deviation.

Key-up on the repeater's receiver input and send a DTMF tone. Adjust the RX1 control R24 for 220mVAC at TP5. Key-up and send the LINK enable command [5001]. Key-up on the repeater's receiver input and send a DTMF tone. Adjust the TX1 control R11 for 220mVAC at TP1. Adjust the TX2 control R12 for 220mVAC at TP2. Key-up on the LINK receiver input and send a DTMF tone. Adjust RX2 control R37 for 220mVAC at TP6. Verify transmit audio at TP1 is 220mVAC.

Unlock the CAT700 by keying-up on the repeater's receiver input and entering [1234567]. Key-up and enter the [\*901] REPEATER test tone programming command. Adjust DTMF TX1 control R55 for 90mVAC at TP1. Key-up and enter the [\*902] LINK test tone programming command. Adjust DTMF TX2 control R56 for 90mVAC at TP2.

Once the RX1, RX2, DTMF TX1, and DTMF TX2 audios are balanced, key-up on the repeater's receiver input and send a DTMF tone. Monitor the REPEATER transmitter. Adjust the TX1 Audio level control (R11) as required to set the repeater transmitter deviation to 3KHz or as desired. If the transmitter audio input is very sensitive and you find the TX1 Audio level control near minimum, it is strongly recommended that an external voltage divider be installed at the audio input of the repeater's transmitter.

Key-up on the repeater's receiver input and send a DTMF tone. Monitor the LINK transmitter. Adjust the TX2 Audio level control (R12) as required to set the link transmitter deviation to 3KHz or as desired. If the link transmitter audio input is very sensitive and you find the TX2 Audio level control is near minimum, set the jumper plug at J7 between pins 1 and 2.

Compare the receive and synthesized voice audio and adjust the voice Level (R48) as desired. The synthesized voice should be slightly lower than the receive audio. Adjust R55 for the repeater's desired CW ID and courtesy beep levels.

**Test Point TP1 - Transmitter Audio (TX1)**

This test point displays the audio generated by the controller to modulate the REPEATER transmitter.

**Test Point TP2 - Transmitter Audio (TX2)**

This test point displays the audio generated by the controller to modulate the LINK transmitter.

**Test Point TP3 - COR #1**

This test point displays the COR logic level from the REPEATER receiver.

**Test Point TP4 - COR #2**

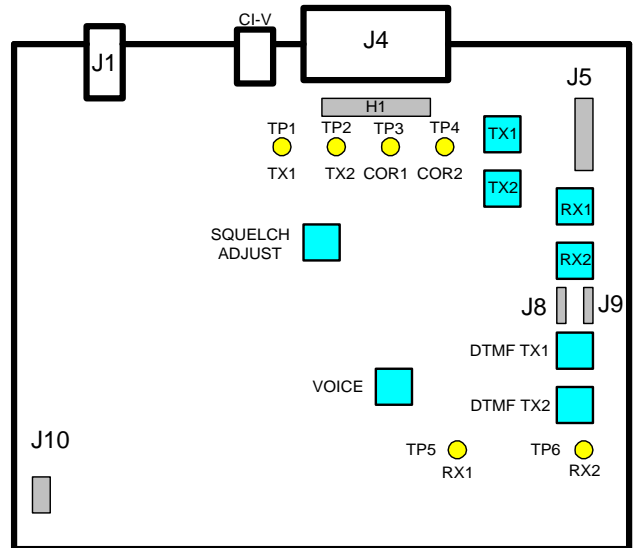
This test point displays the COR logic level from the LINK receiver.

**Test Point TP5 - Receiver Audio (RX1)**

This test point displays the audio received from the REPEATER receiver at the input of the DTMF decoder #1.

**Test Point TP6 - Receiver Audio (RX2)**

This test point displays the audio received from the LINK receiver at the input of the DTMF decoder #2.





**Repeater Interface (J4)**

Connector J4 provides an interface to the repeater and transceiver.

REPEATER INTERFACE J4 (DB25-F)		
1. USER INPUT #1	10. PTT #1	19. USER OUTPUT #3
2. USER INPUT #2	11. TX AUDIO #1	20. USER OUTPUT #4
3. CTCSS #2	12. RX AUDIO #2	21. USER INPUT #3
4. CTCSS #1	13. RX AUDIO #1	22. USER INPUT #4
5. COR #2	14. USER OUTPUT #1	23. TX AUDIO #2
6. COR #1	15. USER OUTPUT #2	24. GROUND
7. RBI-1 DATA	16. +12VDC OUTPUT	25. RBI-1 RESET
8. RBI-1 CLOCK	17. GROUND	
9. PTT #2	18. GROUND	

Figure 7-2

**Internal Interface Header H1**

Header H1 provides an internal interface to all the signals on the J4 connector and the three RBS Control outputs. Extra ground pins are also provided.

INTERNAL INTERFACE H1		
1. USER INPUT #1	2. USER OUTPUT #1	3. USER INPUT #2
4. USER OUTPUT #2	5. CTCSS #2	6. +12VDC OUTPUT
7. CTCSS #1	8. GROUND	9. COR #2
10. GROUND	11. COR #1	12. USER OUTPUT #3
13. RBI-1 DATA	14. USER OUTPUT #4	15. RBI-1 CLOCK
16. USER INPUT #3	17. PTT #2	18. USER INPUT #4
19. PTT #1	20. TX AUDIO #2	21. TX AUDIO #1
22. GROUND	23. RX AUDIO #2	24. RBI-1 RESET
25. RX AUDIO #1	26. GROUND	

Figure 7-3

**Accessory Interface (J5)**

Connector J5 provides the interface for the DVR-1000 Digital Voice Recorder.

DVR INTERFACE (J5)	
1. +12VDC	7. SERIAL CLOCK
2. GROUND	12. DVR PLAY AUDIO
5. DVR BUSY	14. DVR RECORD AUDIO
6. SERIAL DATA	

Figure 7-4

**Audio Delay Interface (J9) (J8)**

This interface is used to connect a audio delay board. The CAT-700B is shipped from the factory with jumpers installed across J9 REPEATER and J8 LINK at pins 1 and 2. This jumper completes the receiver audio path. The audio delay board will eliminate the receiver squelch noise crash and the chirp of the first DTMF tone when muting is enabled.

AUDIO DELAY INTERFACE (J9) (J8)			
1. AUDIO INPUT	2. AUDIO OUTPUT	3. GROUND	4. +12VDC

Figure 7-5

**RS-232 Interface (J10)**

This interface is used to connect a computer or an external modem to the CAT-700B controller. Programming is accomplished through this serial port. The serial port of the computer or terminal must be configured for 4800 baud, 8 bit, NO parity, 1 stop bit. Fabricate the computer interface cable as shown in Figure 7-7.

RS-232 INTERFACE (J10)			
1. +12VDC	4. RS232 OUT	7. USER OUT #4	10. N/C
2. GROUND	5. RTS/CTS	8. N/C	
3. N/C	6. RS232 IN	9. N/C	

Figure 7-6

**RS-232 Interface Cable**

The CAT-700B controller's RS-232 port is available at header J10. Included in the connector kit is a three-wire cable terminated with a header plug on one end. Solder a "DB" connector of your choice per Figure 7.

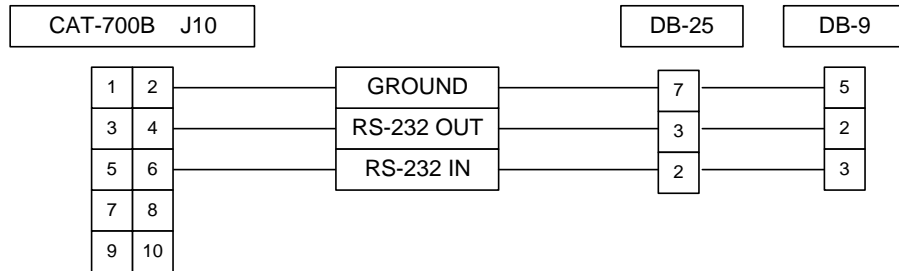


Figure 7-7

**IC-706 Transceiver Interface**

This interface is used to connect the ICOM IC-706 transceiver to the CAT700B. The jumper at J11 must be set to the [HF] position.

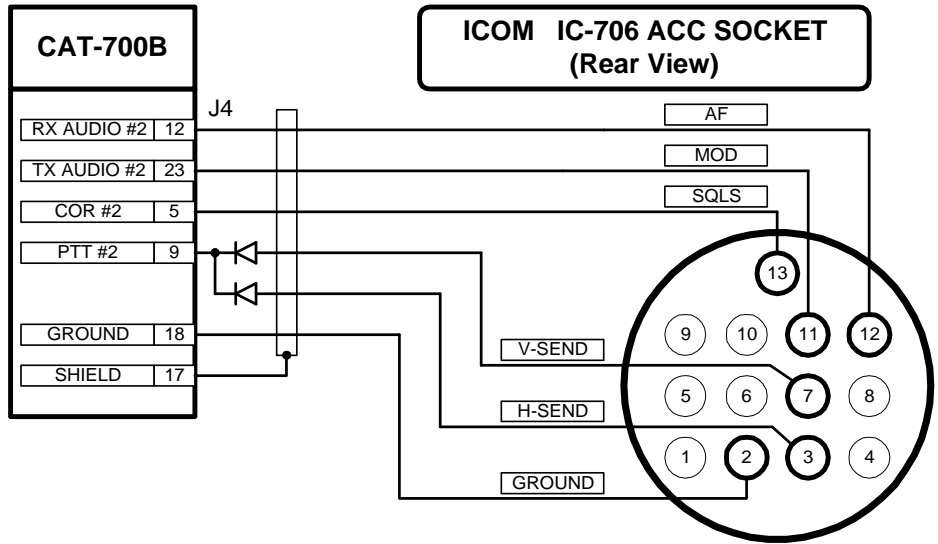


Figure 7-8

**IC-756 Transceiver Interface**

This interface is used to connect the ICOM IC-756 transceiver to the CAT700B. The jumper at J11 must be set to the [HF] position.

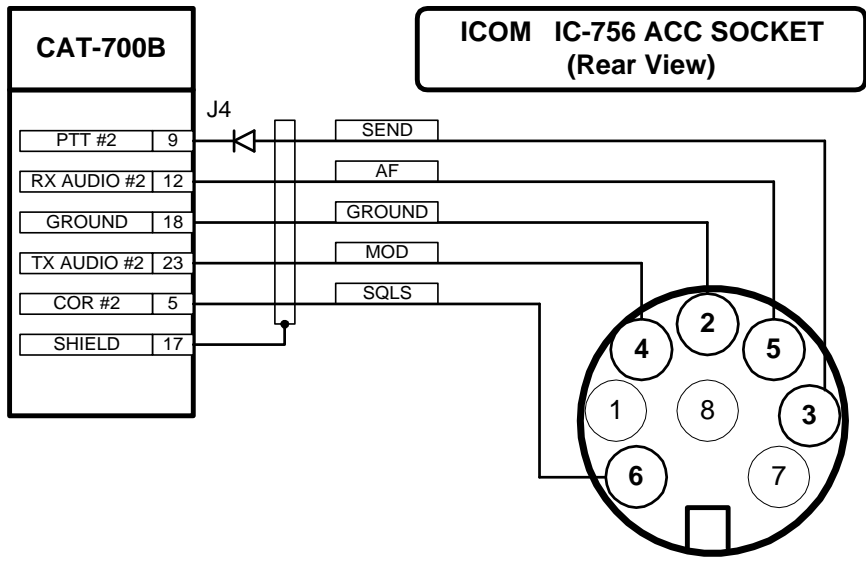


Figure 7-9

**HF Transceiver Installation**

The CAT-700B uses a ferrite block filtered 25 pin "D" connector and a low pass filter on the DC power input. It is important to keep the HF transmitter's RF energy out of the controller's audio circuitry. Antenna placement, additional shielding, good grounding techniques and additional bypassing and filtering may be required for proper operation.

**CTCSS Decoder**

Connect the TS-64 CTCSS Encoder/Decoder assembly to the CAT-700B as described in Figure 7-10. The decoder must be connected to discriminator audio. Speaker or volume control audio will have insufficient low frequency CTCSS tone content.

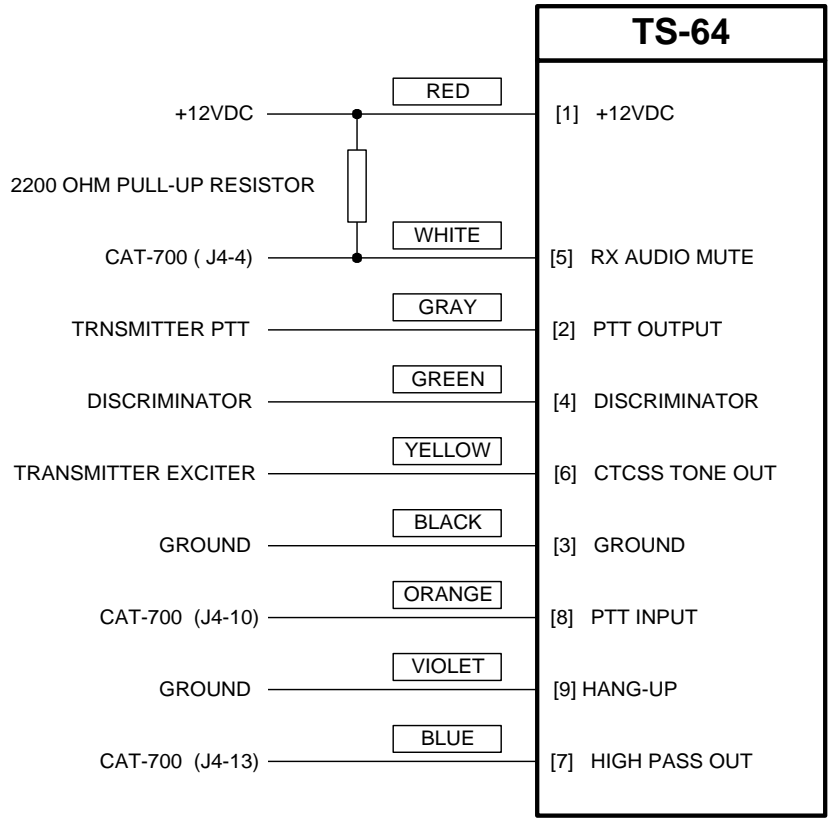


Figure 7-10

**P-700 Connector Kit**

The connector kit contains a DB25 male connector with hood, a 2.5 mm DC power plug, two 2200ohm pull-up resistors, a three-wire cable terminated with a header plug for the RS-232 interface and two .0047uF capacitors. If the CAT-700B is supplied with discriminator audio, install the .0047uF capacitor on the board at positions C19 and C21.

**Header Pin Assignments**

Header connectors on the CAT-700B, DL-1000C, and DR-1000 use the same numbering system. Looking at the board's solder side, one of the header pins is connected to a square solder pad. This is always pin one. One row of pins are assigned odd numbers while the other row are assigned even numbers. See Figure 7-12.

**Component Side View Of Headers**

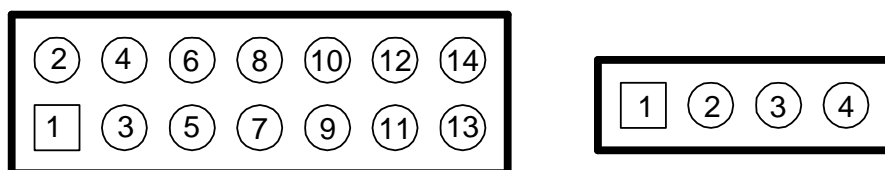


Figure 7-11

## Chapter 8 - MF-1000 Serial Interface Card

The CAT-700B supports the MF-1000 Serial Interface Card. Driven by a 24 bit serial word with supporting clock, data, and strobe signals, the MF-1000 card will convert the serial signal to a series of latched parallel outputs. Set dip switch #6 to the ON position.

OUTPUT	DESCRIPTION
J1	Expanded User Function Output Zone #8 Channel #8
J2	Expanded User Function Output Zone #8 Channel #7
J3	Expanded User Function Output Zone #8 Channel #6
J4	Expanded User Function Output Zone #8 Channel #5
J5	Expanded User Function Output Zone #8 Channel #4
J6	Expanded User Function Output Zone #8 Channel #3
J7	Expanded User Function Output Zone #8 Channel #2
J8	Expanded User Function Output Zone #8 Channel #1
J9	Expanded User Function Output Zone #7 Channel #8
J10	Expanded User Function Output Zone #7 Channel #7
J11	Expanded User Function Output Zone #7 Channel #6
J12	Expanded User Function Output Zone #7 Channel #5
J13	Expanded User Function Output Zone #7 Channel #4
J14	Expanded User Function Output Zone #7 Channel #3
J15	Expanded User Function Output Zone #7 Channel #2
J16	Expanded User Function Output Zone #7 Channel #1
J17	Expanded User Function Output Zone #6 Channel #8
J18	Expanded User Function Output Zone #6 Channel #7
J19	Expanded User Function Output Zone #6 Channel #6
J20	Expanded User Function Output Zone #6 Channel #5
J21	Expanded User Function Output Zone #6 Channel #4
J22	Expanded User Function Output Zone #6 Channel #3
J23	Expanded User Function Output Zone #6 Channel #2
J24	Expanded User Function Output Zone #6 Channel #1
J25	+5VDC
J26	+12VDC
J27	Ground
J28	Ground
J29	Ground
J30	Ground
J31	Ground
J32	Ground
J33	Ground
J34	Ground

MF-1000 Output Definitions  
Table 8-1

The twenty-four outputs are open collector darlington relay drivers. Each driver can sink up to 200ma and switch 40 VDC. Place diodes across the relay coils to protect the driver from negative spikes produced when the relay coil collapses.

### Jumper Selection

Jumper JP1 sets the logic level of the twenty-four outputs. With the jumper in position "C" all outputs are pulled up to +12VDC through 4700 ohm resistors. In position "B" the outputs are pulled up to +5VDC. In position "A" the outputs are pulled down to ground. JP2 selects the serial strobe input. This jumper should be between JP2 pins 1 and 2.



### Read CTCSS Frequency

To read a CTCSS frequency, key-up and enter the prefix, followed by [5].

### Load CTCSS Frequency

To load a CTCSS frequency, key-up and enter the Remote Base Frequency Load prefix, followed by a [5] and the two digit number that represents the CTCSS tone frequency from the table. With a prefix of 525, load 151.4 Hz tone. The voice will say: "CTCSS-TWENTY-FOUR-ON-OFF." Example: Key-up and send [525524].

01 = 67.0	08 = 88.5	15 = 110.9	22 = 141.3	29 = 179.9	36 = 233.6
02 = 71.9	09 = 91.5	16 = 114.8	23 = 146.2	30 = 186.2	37 = 241.5
03 = 74.4	10 = 94.8	17 = 118.8	24 = 151.4	31 = 192.5	38 = 250.3
04 = 77.0	11 = 97.4	18 = 123.0	25 = 156.7	32 = 203.5	
05 = 79.7	12 = 100.0	19 = 127.3	26 = 162.2	33 = 210.7	
06 = 82.5	13 = 103.5	20 = 131.8	27 = 167.9	34 = 216.1	
07 = 85.4	14 = 107.2	21 = 136.5	28 = 173.8	35 = 225.7	

Figure 9-2

During a CTCSS load, the CAT-700B will automatically send the commands to turn on the CTCSS Encoder. If the CTCSS Decoder is desired, it must be manually enabled.

### Set CTCSS Encoder - Decoder

To set the CTCSS Encoder to on, key-up and enter the Remote Base Frequency Load prefix, followed by the two-digit number that represents CTCSS Encoder ON. The voice will say: "CTCSS-ON." Example: Key-up and send [52551].

CTCSS Control			
50 Encoder	51 Encoder ON	52 Decoder OFF	53 Decoder ON

### Read Remote Base RF Power

To check the setting of the Remote Base RF power, key-up and enter the Remote Base Frequency Load prefix, followed by [6]. Example: Key-up and send [5256].

### Set Remote Base RF Power

To set the RF power, key-up and enter the Remote Base Frequency Load prefix, followed by the two-digit number that represents the desired power setting. With a prefix of 525, set RF power to high. The voice will say: "RF-POWER-HIGH." Example: [52563]. To set the power to medium the command is [52562]. To set the power to low the command is [52561].

### Read Remote Base DC Power

To check the setting of the Remote Base DC power, key-up and enter the Remote Base Load prefix, followed by [8].

### Set Remote Base DC Power

To set the remote base DC power, key-up and enter the Remote Base Frequency Load prefix, followed by the two-digit number that represents the DC power command. Example: With a prefix of 525, turn off the DC power. The voice will say: "DC POWER OFF." Example: Key-up and send [52580] To turn the DC power on key-up and send [52581]. "The voice will say: "DC POWER ON."

### Reset the RBI-1 Interface

To reset the RBI-1 by remote control, (push the reset switch on the back of the RBI-1), key-up and enter the Remote Base Frequency Load prefix, followed by the #. Example: Key-up and send [525#]

**CAT-700B - RBI-1 Interface**

Fabricate a cable between J4 on the CAT-700B and J2 on the RBI-1 Remote Base Interface. Follow the wiring described in Figure 9-3. Provide +12VDC and GROUND to the PHONO jack on the rear of the RBI-1 interface. Connect the Kenwood interface cables between the RBI-1 and the various MIC connectors on the Kenwood transceivers. Consult the RBI-1 Manual to determine if all the control features are available on a particular transceiver.

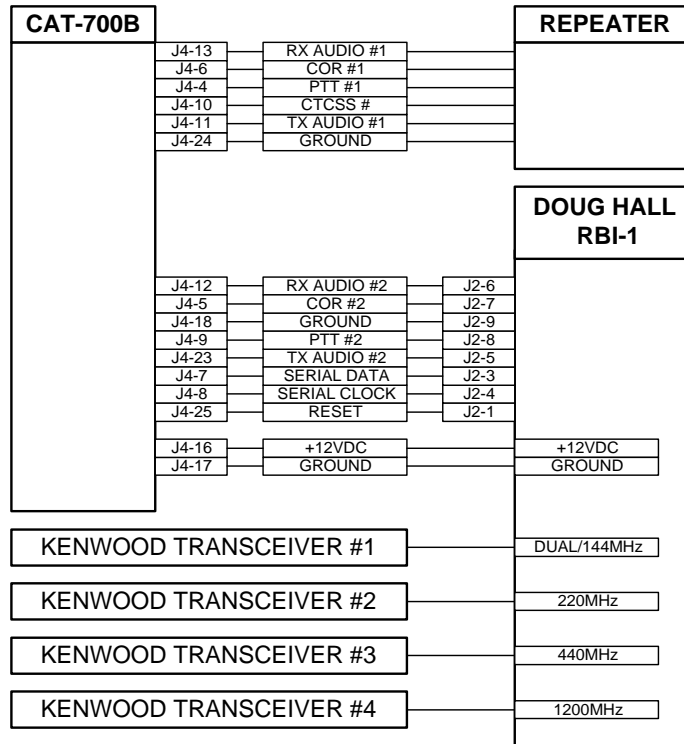


Figure 9-3

**Link Audio Frequency Response**

If the transmit audio out of the Kenwood remote base is muffled or has little or no high frequency response, remove capacitor C17 or both C17 and C16 on the RBI-1 Interface board.

For more information concerning the RBI-1 Interface contact:

Doug Hall Electronics  
 815 E. Hudson Street  
 Columbus, Ohio 43211  
 (614) 261-8871



## Chapter 10 – ICOM IC-706 Transceiver Interface

The CAT-700B offers a bi-directional serial port to control the IC-706 transceiver. Upon receipt of a DTMF command the CAT-700B will generate the required ASCII commands to control the transceiver. Since this serial port is bi-directional it is possible to interrogate the transceiver and receive information concerning the frequency and status. The CAT-700B acts like a computer providing full control. The CAT-700B will use its voice synthesizer to announce the status of the various transceiver functions.

Connect the CAT-700B, IC-706 transceiver and repeater as shown in Figure 10-1. See Figure 7-8 for the connections to the IC-706 ACC connector. On the CAT-700B set the jumper at (J11) to the "HF" position. Set dipswitch #3 to the ON position because the IC-706 COR output is active low. Enable Zone 9 Channel 1. Key-up and send: [100 9 1 1] Un-key and the voice will say: "NINE ONE ON."

### ICOM IC-706 Set-up

Set the IC-706 to "Initial Set Mode Operation" by applying power while pressing the [LOCK] button. Press the [MENU] button one or more times to select [25 CI-V ADDRESS]. Rotate the Main Dial to select an address of [4EH].

Press [MENU] to select [26 CI-V BAUD]. Set the BAUD to [AUTO] or [4800].

Press [MENU] to select [27 CI-V TRN]. Set the TRN to [OFF].

Press [MENU] to select [28 CI-V 731]. Set the 731 to [OFF].

Exit "Initial Set Mode Operation" by turning the POWER to [OFF].

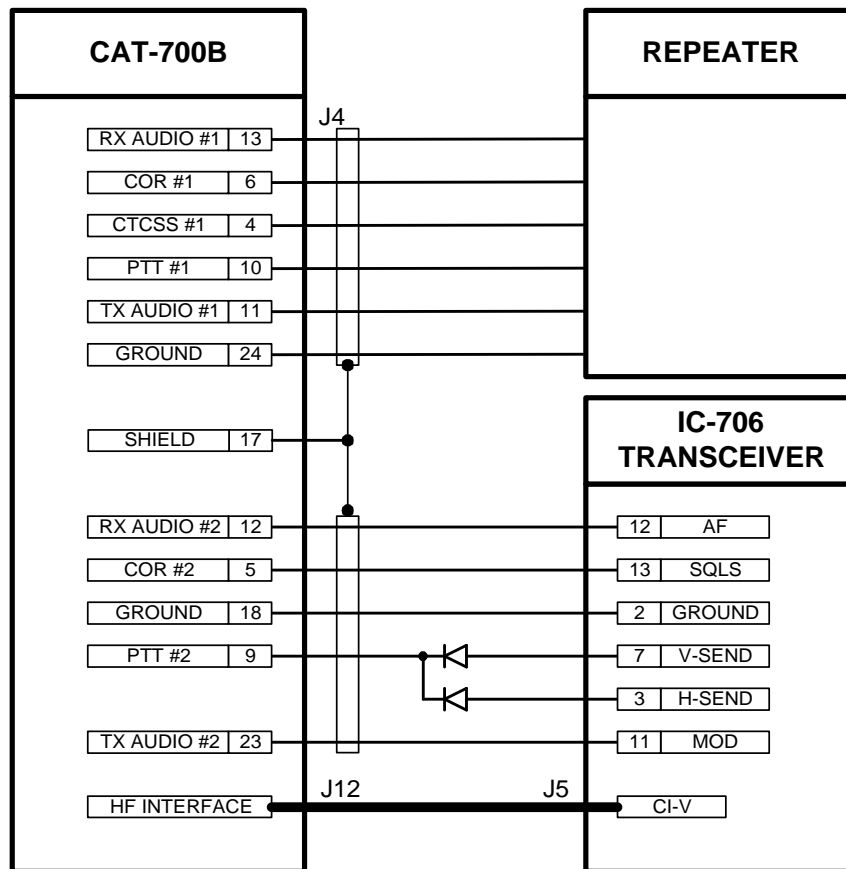


Figure 10-1

### HF Remote Base Control Commands

In response to DTMF inputs from the repeater operator the CAT-700B will issue control and programming commands to the transceiver. The CAT-700B will convert ASCII information received from the transceiver into voice messages describing the frequency and control settings of the transceiver. Use any of the commands described below to control the transceiver through the computer interface. The HF transceiver control prefix number must precede the commands used to activate the HF transceiver. The default number is [560].

Command	HF Control Mode
(Prefix) 1	Remote HF Base Receive Only
(Prefix) 2	Remote HF Base Receive/Transmit
(Prefix) 3	Remote HF Base Receive Only with Squelch
(Prefix) 4	Remote HF Base Receive/Transmit with Squelch

Figure 10-2

#### Remote HF Base Receive Only [560-1]

In this mode the CAT-700B will continuously key the repeater's transmitter and repeat the signals received by the ICOM IC-706. Signals received by the repeater's receiver will have priority over the HF transceiver but not cause the transceiver to transmit.

#### Remote HF Base Receive/Transmit [560-2]

In this mode the CAT-700B will continuously key the repeater's transmitter and repeat the signals received by the ICOM IC-706. Signals received by the repeater's receiver will have priority over the HF transceiver and cause the transceiver to transmit.

#### Remote HF Base Receive Only with Squelch [560-3]

In this mode the CAT-700B will respond to transceiver COR and only key the repeater's transmitter when a signal is received by the IC-706 transceiver. Signals received by the repeater's receiver will have priority over the HF transceiver but not cause the transceiver to transmit.

#### Remote HF Base Receive/Transmit with Squelch [560-4]

In this mode the CAT-700B will respond to transceiver COR and key the repeater's transmitter when a signal is received by the IC-706 transceiver. Signals received by the repeater's receiver will have priority over the HF transceiver and cause the transceiver to transmit.

#### Exit Remote HF Base Control Mode [#]

Key-up and press [#] to exit the Remote HF Base Control mode.

#### HF Transceiver Installation

The CAT-700B uses a ferrite block filtered 25 pin "D" connector and a low pass filter on the DC power input. It is important to keep the HF transmitter's RF energy out of the controller's audio circuitry. Antenna placement, additional shielding, good grounding techniques and additional bypassing and filtering may be required for proper operation.

## Quick Command Keypad Definitions

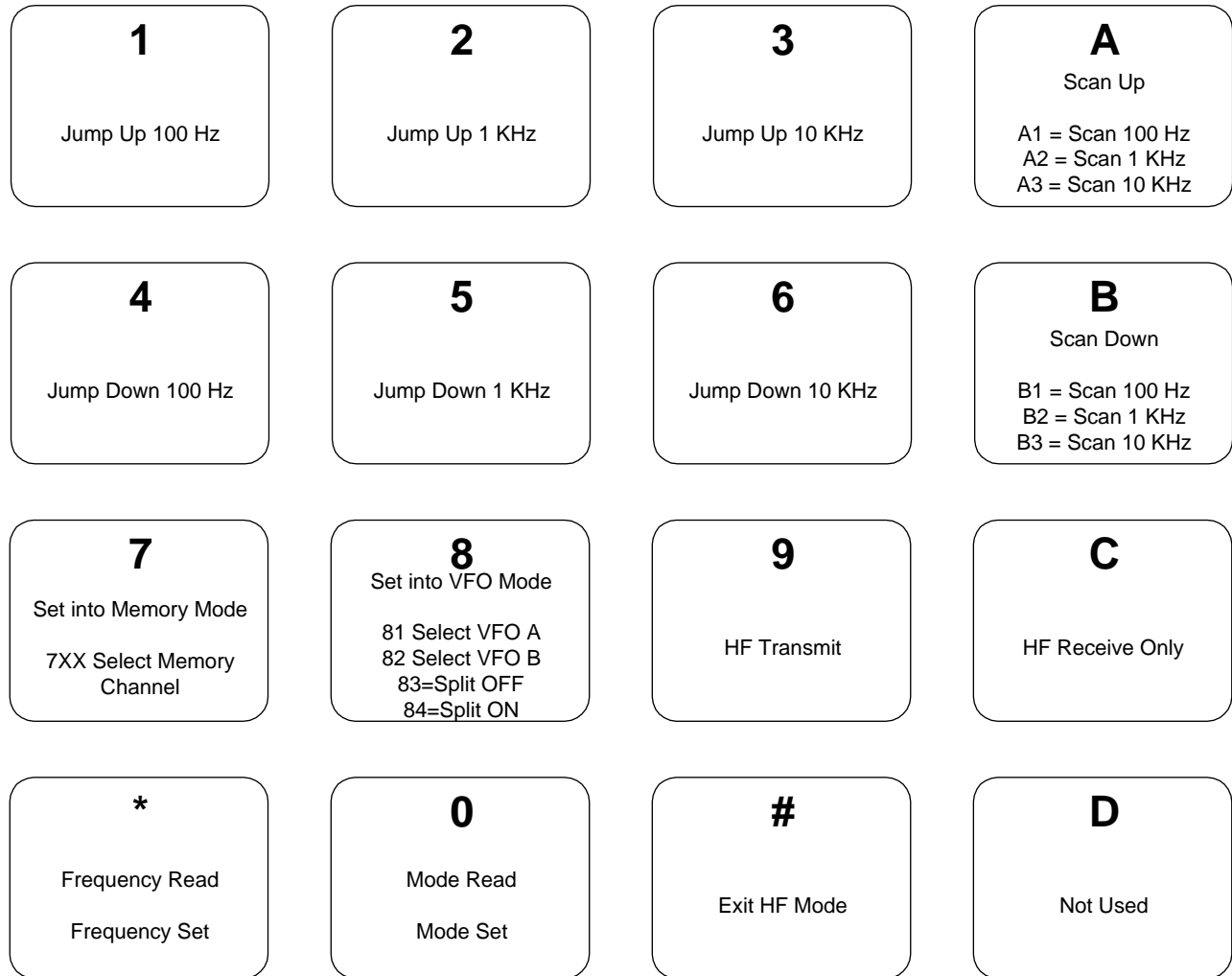


Figure 10-3

### Frequency Read-Set [\*]

To read the frequency displayed in the IC-706 window, key-up and press the [\*]. To load a frequency, key-up and enter [\*MHZ\*KHZ]. EXAMPLE: To load the frequency 14.125 MHz, key-up and enter [\*14\*125].

### Mode Read-Set [0]

To read the mode displayed in the IC-706 window, key-up and press the [0]. To change the mode, key-up and enter: [01]=LSB, [02]=USB, [03]=AM, [04]=FM, [05]=CW.

### Memory Mode Set-Select [7]

Key-up and press [7] to set the IC-706 to memory mode. To select a memory, key-up and enter [7XX]. EXAMPLE: To select memory [25], key-up and enter [725].

### VFO Mode Set-Select Frequency Split [8]

Key-up and press [8] to set the IC-706 to VFO mode. Press [81] for VFO-A and [82] for VFO-B. Key-up and press [83] to set the IC-706 frequency split on and [84] to set the frequency split off.

### HF Transmit [9]

Key-up and press [9] to set the IC-706 transmitter to on. Key-up and press [C] to return to receive only mode.

### **HF Receive Only [C]**

Key-up and press [C] to set the IC-706 to receive only. Key-up and press [9] to return to transmit mode.

### **Exit Quick Command and Remote HF Base Mode [#]**

Key-up and press [#] to exit the HF Transceiver mode.

### **Scan Up [A]**

Key-up and press [A] to scan up in frequency. The IC-706 will scan at the last step rate selected. To change the step rate enter [A1]=100Hz steps, [A2]=1KHz steps, [A3]=10KHz steps.

### **Scan Down [B]**

Key-up and press [B] to scan down in frequency. The IC-706 will scan at the last step rate selected. To change the step rate enter [B1]=100Hz steps, [B2]=1KHz steps, [B3]=10KHz steps.

### **Bump Up [1][2][3]**

To bump up in frequency, key-up and enter [1]=100Hz, [2]=1KHz, [3]=10KHz.

### **Bump Down [4][5][6]**

To bump down in frequency, key-up and enter [4]=100Hz, [5]=1KHz, [6]=10KHz.

## **Zone 9 HF Transceiver Control Channels**

### **1. HF Transceiver Enable**

This is the master HF transceiver switch. This channel must be enabled for the CAT-700B to accept the [560X] command to activate the HF transceiver interface.

### **2. HF Auto Disconnect Enable**

When this channel is enabled, the HF transceiver interface will disconnect automatically after a period of repeater inactivity determined by the [\*616\*] link auto disconnect timer. This timer's default setting is ten minutes.

### **3. CW Identification Enable**

When this channel is enabled, the CAT-700B will ID in CW when the HF Remote transceiver is activated.

### **4. Repeater Hang Time Enable**

When this channel is enabled and the CAT-700B is in the transceiver mode, the repeater's transmitter will remain on for a period of time determined by the [\*604\*] COR to Beep and [\*605\*] Beep to transmitter drop timers.

## **Programming Command**

### **Remote HF Base Control Prefix Number [\*515\*]**

This programming command selects the Remote HF Base control prefix number. This number must precede the commands used to activate the remote HF Base. The default number is [560].

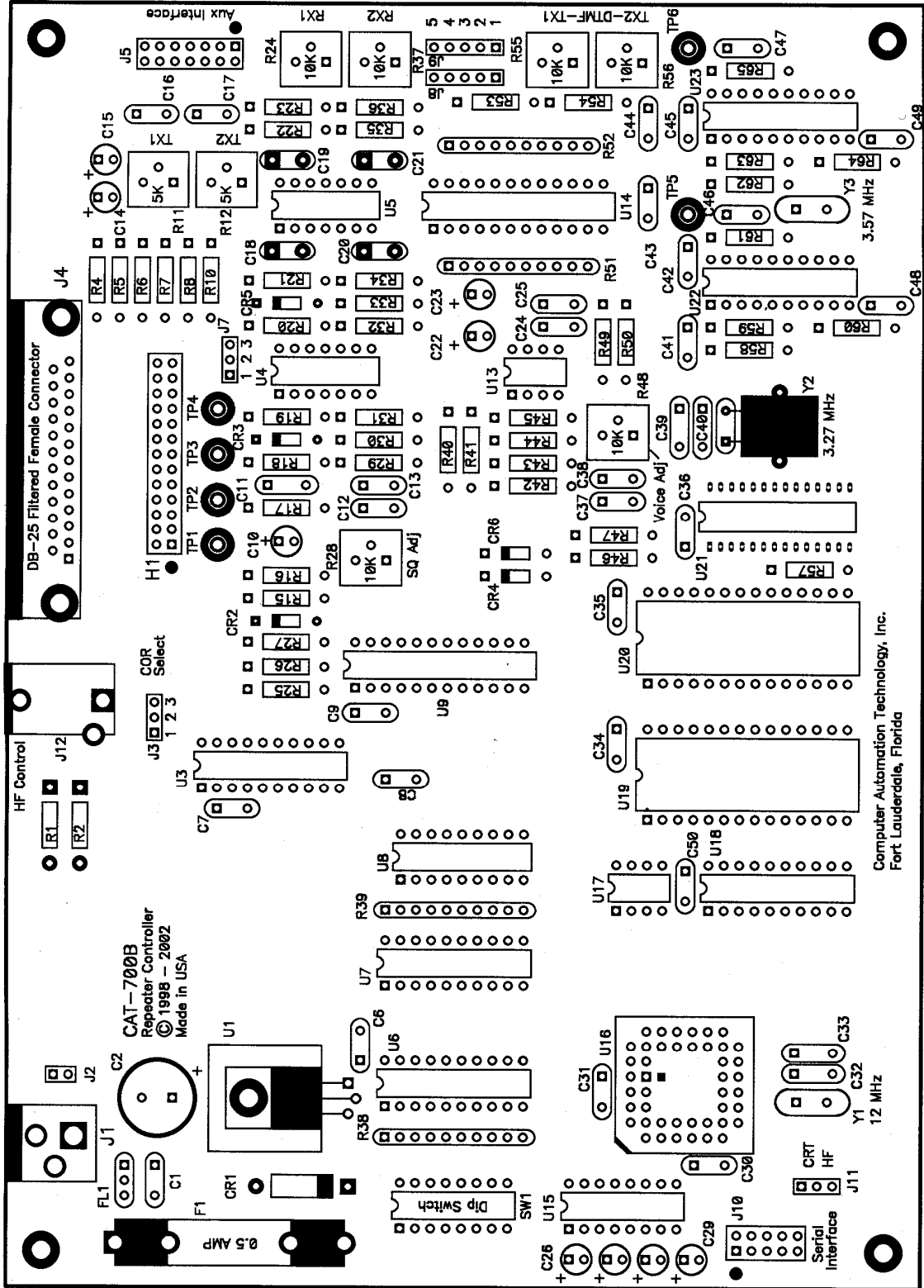
## Chapter 11 - Voice Vocabulary

### CAT-700 Word Listing

Zero	000	<i>C</i>		Freezing	387
One	001	C	270	Frequency	388
Two	002	Call	272	Friday	389
Three	003	Calling	273	From	390
Four	004	Cancel	274	Full	392
Five	005	Cat	275	<i>G</i>	
Six	006	Caution	276	G	410
Seven	007	Change	279	Get	412
Eight	008	Charlie	280	Go	413
Nine	009	Check	281	Golf	414
Ten	010	Clear	283	Good	415
Eleven	011	Clock	284	Green	416
Twelve	012	Closed	285	<i>H</i>	
Thirteen	013	Club	286	H	440
Fourteen	014	Code	287	Ham	443
Fifteen	015	Come	288	Hamfest	444
Sixteen	016	Complete	289	Have	445
Seventeen	017	Completed	290	Hazardous	446
Eighteen	018	Condition	292	Hertz	449
Nineteen	019	Connect	294	High	450
Twenty	020	Contact	295	Hotel	453
Thirty	030	Control	296	Hour	454
Forty	040	<i>D</i>		Hours	455
Fifty	050	D.	310	Hundred	456
Sixty	060	Danger	311	<i>I</i>	
Seventy	070	Data	312	I	470
Eighty	080	Date	313	Ice	471
Ninety	090	Day	314	Icing	472
<i>A</i>		Days	315	Identify	473
A	210	December	316	In	475
A.M.	211	Decrease	317	Increase	476
Above	214	Degree	318	India	477
Adjust	217	Delay	319	Information	478
Advise	218	Delta	320	Ing (suffix)	479
Again	221	Direction	322	Inputs	480
Alert	223	Do	323	Intruder	481
All	224	Down	324	Is	482
Alpha	225	<i>E</i>		It	483
Amateur	228	E	340	<i>J</i>	
An	230	East	341	J	500
And	231	Echo	342	January	501
April	233	Ed (suffix)	343	Juliet	502
Area	235	Emergency	344	July	503
As	236	End	345	June	504
Assistance	237	Enter	346	<i>K</i>	
At	239	Error	348	K	530
Attempt	240	Exit	350	Key	531
Attention	241	<i>F</i>		Keypad	532
August	242	F	370	Kilo	533
<i>B</i>		Failure	372	<i>L</i>	
B	250	Fast	374	L	550
Back	251	February	375	Last	552
Band	252	Feet	376	Left	554
Base	253	File	378	Less than	555
Below	255	For	004	Let	556
Bravo	257	Foxtrot	386	Lima	559
By	260			Link	561

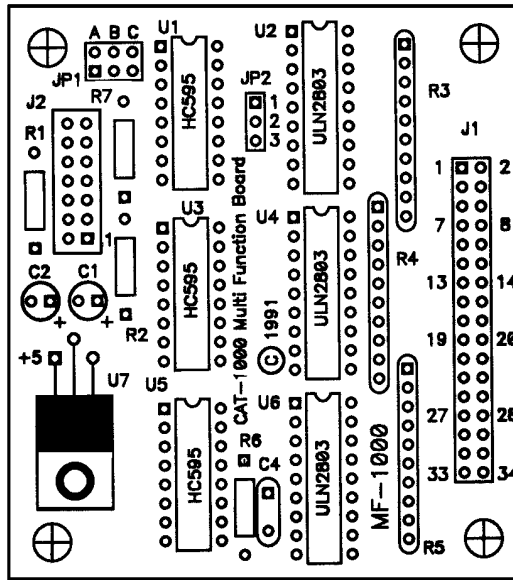
List	562	Plan	688	This	833
Load	563	Please	689	This-is	834
Low	568	Plus	690	Thunderstorms	836
Lower	569	Point	691	Thursday	837
<i>M</i>		Pound	694	Time	838
M	580	Power	695	Timer	839
Machine	581	Preset	697	To	002
Macro	582	Press	698	Today	840
Make	583	<i>Q</i>		Tomorrow	841
Manual	585	Q	720	Tonight	842
Many	586	Quebec	721	Tornado	843
March	587	<i>R</i>		Traffic	845
May	588	R	730	Transmit	846
Meeting	593	Radio	731	Try	848
Mega	594	Rain	733	Tuesday	849
Message	595	Range	735	Turn	850
Meter	596	Ready	737	Type	851
Meters	597	Receive	738	<i>U</i>	
Mike	599	Receiver	739	U	870
Miles	600	Red	740	Uniform	871
Minus	603	Remote	743	Unit	872
Minute	604	Repeat	745	Until	874
Minutes	605	Repeater	746	Up	875
Mobile	606	Reset	747	Use (noun)	876
Modified	607	Right	749	Use (verb)	877
Monday	608	Road	750	<i>V</i>	
Month	609	Roger	751	V	880
More than	610	Romeo	752	Verify	882
Move	611	<i>S</i>		Version	883
<i>N</i>		S	770	Victor	884
N	620	Saturday	772	<i>W</i>	
Near	621	Seconds	774	W	890
Net	623	Send	777	Wait	891
New	624	Sent	778	Warning	892
Next	625	September	779	Watch	893
Night	626	Service	781	Watts	894
No	627	Set	782	Weather	896
Normal	628	Severe	783	Wednesday	897
North	629	Short	784	Week	898
Not	630	Sierra	788	Weekday	899
November	631	Slow	790	Welcome	900
Now	632	Snow	791	West	902
Number	633	South	792	What	903
<i>O</i>		Star	795	Whiskey	904
O	650	Start	796	Will	905
O'clock	651	Stop	797	Wind	906
October	652	Storm	798	With	908
Of	653	Sunday	799	<i>X</i>	
Off	654	System	801	X	920
On	656	S (plural)	802	X-Ray	921
Open	657	<i>T</i>		<i>Y</i>	
Operator	659	T	820	Y	930
Or	660	Tango	821	Yankee	931
Oscar	662	Temperature	824	Year	932
Other	663	Test	826	Yellow	933
Out	664	Than	827	Yes	934
Over	665	Thank-You	828	You	936
<i>P</i>		That	829	Your	937
P	680	The (short E)	830	<i>Z</i>	
P.M.	681	The (long E)	831	Z	950
Papa	682	Then	832	Zed	951

Zero	952	DTMF Digit 4	164
Zone	953	DTMF Digit 5	165
Zulu	954	DTMF Digit 6	166
<b>Pause</b>		DTMF Digit 7	167
Pause 1	960	DTMF Digit 8	168
Pause 2	961	DTMF Digit 9	169
Pause 3	962	DTMF Digit 0	170
Pause 4	963	DTMF Digit *	171
<b>Female</b>		DTMF Digit #	172
Good Morning	980	DTMF Digit A	173
Good Afternoon	981	DTMF Digit B	174
Good Evening	982	DTMF Digit C	175
<b>Time Variables</b>		DTMF Digit D	176
Time of Day	100	<b>DTMF Tones TX #2</b>	
Day of Week	101	DTMF Digit 1	181
Day and Month	102	DTMF Digit 2	182
Salutation	103	DTMF Digit 3	183
<b>User Switch Control</b>		DTMF Digit 4	184
500 mSEC Delay	110	DTMF Digit 5	185
UF #1 OFF	111	DTMF Digit 6	186
UF #1 ON	112	DTMF Digit 7	187
UF #1 MON	113	DTMF Digit 8	188
UF #2 OFF	114	DTMF Digit 9	189
UF #2 ON	115	DTMF Digit 0	190
UF #2 MON	116	DTMF Digit *	191
UF #3 OFF	117	DTMF Digit #	192
UF #3 ON	118	DTMF Digit A	193
UF #3 MON	119	DTMF Digit B	194
UF #4 OFF	120	DTMF Digit C	195
UF #4 ON	121	DTMF Digit D	196
UF #4 MON	122		
<b>DVR Tracks</b>			
DVR Track #1	131		
DVR Track #2	132		
DVR Track #3	133		
DVR Track #4	134		
DVR Track #5	135		
DVR Track #6	136		
DVR Track #7	137		
DVR Track #8	138		
DVR Track #9	139		
DVR Track #10	140		
DVR Track #11	141		
DVR Track #12	142		
DVR Track #13	143		
DVR Track #14	144		
DVR Track #15	145		
DVR Track #16	146		
<b>Courtesy Tones</b>			
Courtesy Tone #1	151		
Courtesy Tone #2	152		
Courtesy Tone #3	153		
Courtesy Tone #4	154		
Courtesy Tone #5	155		
Courtesy Tone #6	156		
Courtesy Tone #7	157		
Courtesy Tone #8	158		
<b>DTMF Tones TX #1</b>			
DTMF Digit 1	161		
DTMF Digit 2	162		
DTMF Digit 3	163		



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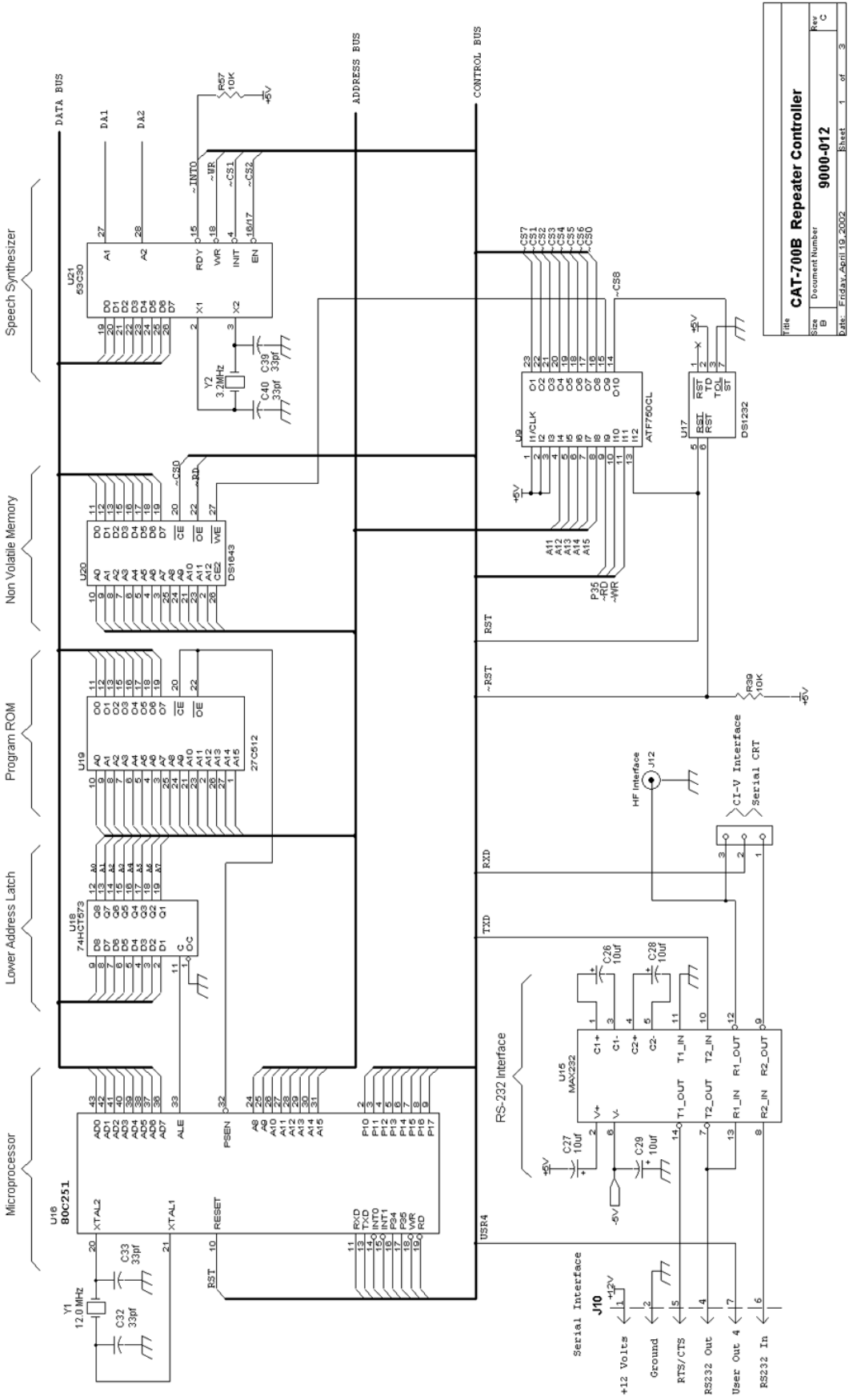




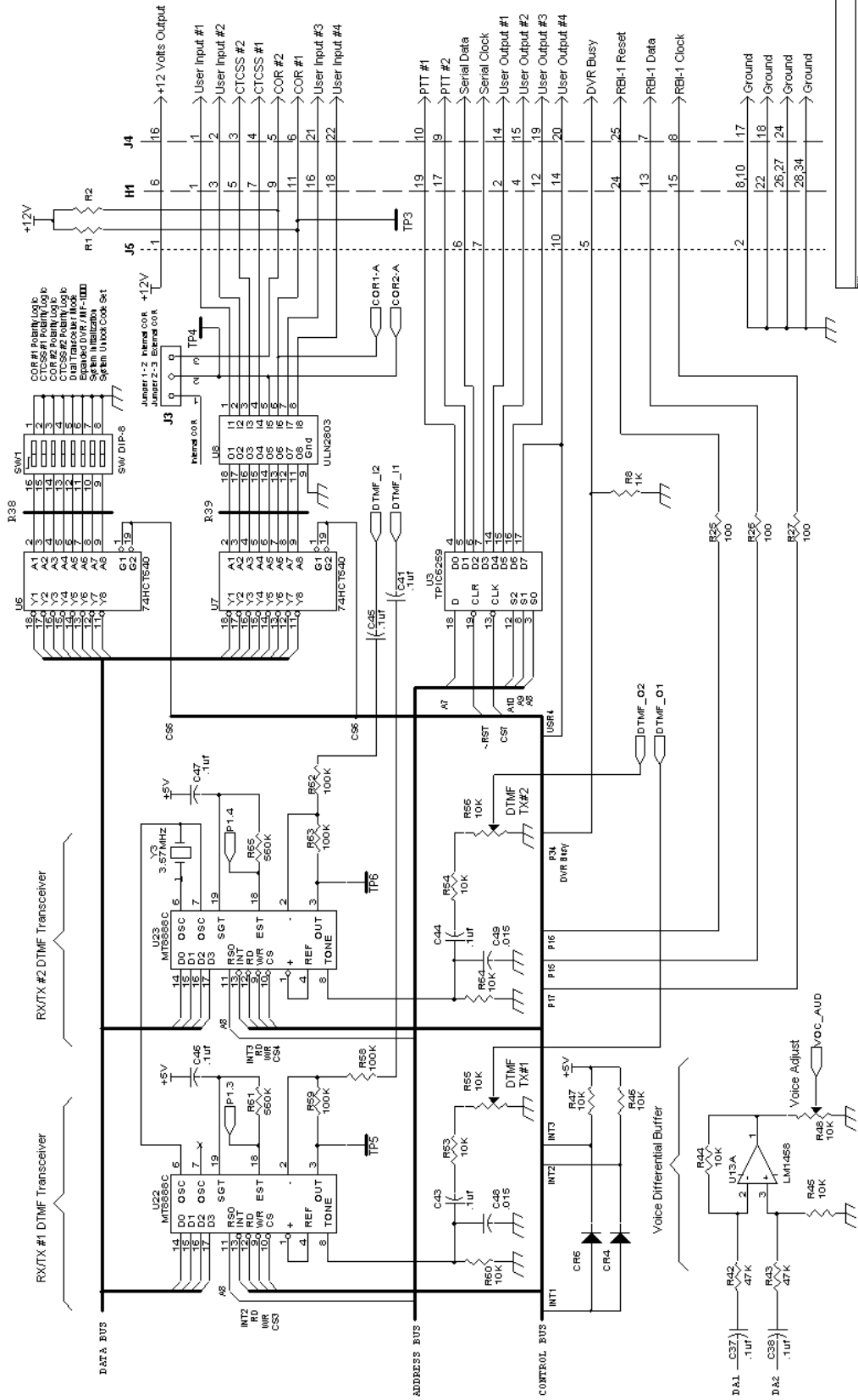
MF-1000 Serial Interface Board

## Chapter 13 - Schematic

13-2	CAT-700B Controller Board	Sheet 1 of 3
13-3	CAT-700B Controller Board	Sheet 2 of 3
13-4	CAT-700B Controller Board	Sheet 3 of 3
13-5	MF-1000 Multi Function Card	Sheet 1 of 1

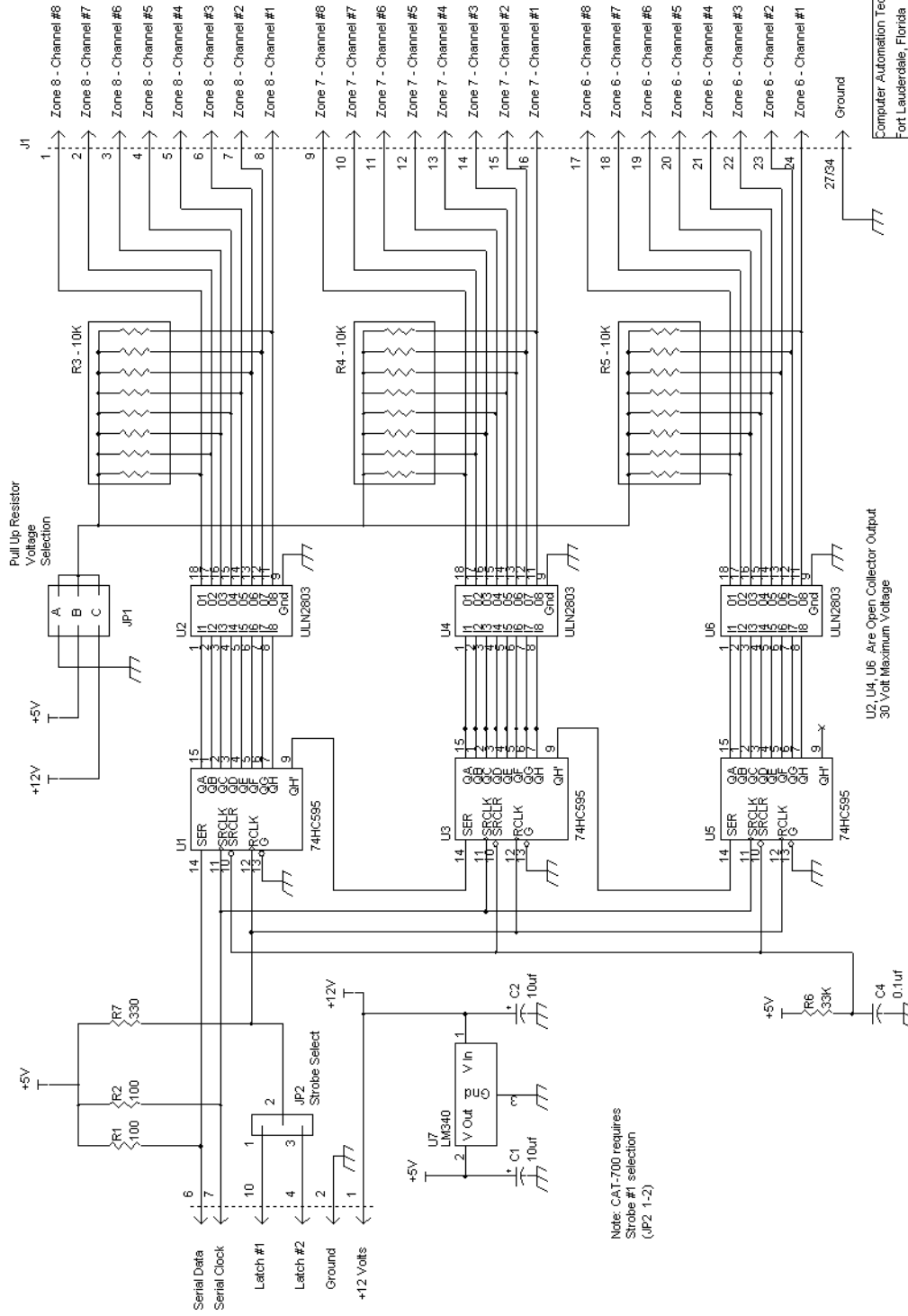


File	<b>CAT-700B Repeater Controller</b>	
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B	Rev	C
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Rev	CAT-700B Repeater Controller	
Size	Doc# CAT700B	
Date	SAMUDRA_AUGUSTOS.2002	Sheet 2 of 3





Note: CAT-700 requires Strobe #1 selection (JP2 1-2)

U2, U4, U5 Are Open Collector Output 30 Volt Maximum Voltage

Computer Automation Technology, Inc.			
Fort Lauderdale, Florida			
File:	MF-1000 Multi Function Board For CAT-700		
Size:	Document Number	Revision	
B:	9000-005A	A	
Print:	Tuesday, April 17, 2001	Sheet	1 of 1

## Chapter 14 - Part List

### CAT-700B Controller Board

1	Capacitor	.001uF 50V	C24
4	Capacitor	.0015uF 50V	C12,C13,C18,C20
3	Capacitor	.015uF 50V	C25,C48,C49
21	Capacitor	0.1uF 50V	C1,C6,C7,C8,C9,C16,C17, C30,C31,C34,C35,C36,C37,C38 C41,C42,C43,C44,C45,C46,C47
2	Capacitor	(Not Used)	C19,C21
1	Capacitor	470pF 50V	C11
12	Capacitor	10uF 16V	C3,C4,C5,C10,C14,C15 C22,C23,C26,C27,C28,C29
1	Capacitor	470uF 25V	C2
4	Capacitor	33pF 50V	C32,C33,C39,C40
1	Connector	25D (F)	J4
1	Connector	3.5mm Phone Jack	J12
1	Connector	(DC Power)	J1
1	Connector	Header 1X2	J2
2	Connector	Header 1X3	J3,J7,J11
2	Connector	Header 1x5	J8,J9
1	Connector	Header 2X5	J10
1	Connector	Header 2x7	J5
1	Connector	Header 2X13	H1
1	Crystal	12.0 MHz	Y1
1	Crystal	3.27 MHz	Y2
1	Crystal	3.58 MHz	Y3
1	Diode	Transorb	CR1
4	Diode	1N4148	CR2,CR3,CR4,CR6
1	Fuse	0.5AMP	F1
1	Filter RF		FL1
1	I.C.	N80C251SB16	U16
1	I.C.	27C512	U19
1	I.C.	74HCT573	U18
2	I.C.	74HCT540	U6,U7
1	I.C.	ATF750CL	U9
1	I.C.	DS1643Y	U20
1	I.C.	DS1232	U17
1	I.C.	TC232CPE	U15
1	I.C.	TPIC6259	U3
1	I.C.	ICL7660	U2
1	I.C.	LM348	U5
1	I.C.	LM1458	U13
1	I.C.	TL084CN	U4
1	I.C.	ULN2804A	U8
2	I.C.	MT8888C	U22,U23
1	I.C.	MAX335	U14
1	I.C.	TSP53C30AN2L	U21

1	I.C.	LM340T-5.0	U1
5	Jumper Plug		P3,P6,P7,P8,P9
3	Resistor	100 5% 1/4W	R10,R40,R41
3	Resistor	620 5% 1/4W	R4,R5,R29
4	Resistor	1K 5% 1/4W	R17,R25,R26,R27
1	Resistor	2.2K 5% 1/4W	R30
15	Resistor	10K 5% 1/4W	R6,R7,R8,R23,R33,R36,R44 R45,R46,R47,R53,R54,R57,R60,R64
2	Resistor	18K 5% 1/4W	R49,R50
3	Resistor	22K 5% 1/4W	R15,R18,R32
3	Resistor	22K 5% 1/4W	R15,R18,R32
2	Resistor	33K 5% 1/4W	R22,R35
2	Resistor	33K 5% 1/4W	R22,R35
7	Resistor	47K 5% 1/4W	R13,R14,R16,R21,R34,R42,R43
5	Resistor	100K 5% 1/4W	R19,R58,R59,R62,R63
2	Resistor	220K 5% 1/4W	R20,R31
2	Resistor	560K 5% 1/4W	R61,R65
2	Resistor	5K Variable	R11,R12
6	Resistor	10K Variable	R24,R28,R37,R48,R55,R56
4	Resistor	10K 10pin	R38,R39,R51,R52
2	Resistor	(Not Used)	R1,R2
1	Switch	Dip-8 Pole	SW1
6	Test Points		TP1,TP2,TP3,TP4,TP5,TP6

#### MF-1000 Multi Function Board

2	Resistor	100 5% 1/4W	R1,R2
3	Resistor	4.7K 10 pin	R3,R4,R5
1	Resistor	33K 5% 1/4W	R6
1	Resistor	330 5% 1/4W	R7
2	Capacitor	10uF 15V	C1,C2
1	Capacitor	0.1uF 50V	C4
3	I.C.	74HC595	U1,U3,U5
3	I.C.	ULN2803A	U2,U4,U6
1	I.C.	7805	U7
1	Header	2X17	J1
1	Header	2x7	J2
1	Header	2X3	JP1
1	Header	1X3	JP2
2	Jumper		
1	Cable	Ribbon 2X7	