INSTRUCTION MANUAL
MODEL 6002
REMOTE CONTROL

P/N 1340089

MANUAL REVISION E

MONROE ELECTRONICS

100 HOUSEL AVE.
LYNDONVILLE NY 14098

716 765 2254
FAX 716 765 9330

6002/9-85/DLP

WARRANTY

Monroe Electronics, Inc. warrants to the Owners, each instrument and sub-assembly manufactured by them to be free from defects in material and workmanship for a period of one year after shipment from the factory. This warranty is applicable to the original purchaser only.

Liability under this warranty is limited to service, adjustment or replacement of defective parts (other than tubes, fuses or batteries) on any instrument or sub-assembly returned to the factory for this purpose, transportation charges prepaid.

This warranty does not apply to instruments or sub-assemblies subjected to abuse, abnormal operating conditions, or unauthorized repair or modification.

Since Monroe Electronics, Inc. has no control over conditions of use, no warranty is made or implied as to the suitablity of our product for the customer's intended use.

THE WARRANTY SET FORTH IN THIS ARTICLE IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES AND REPRESENTATIONS, EXPRESS, IMPLIED OR STATUTORY INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS. Except for obligations expressly undertaken by Monroe Electronics, in this Warranty, Owner hereby waives and releases all rights, claims and remedies with respect to any and all warranties, express, implied or statutory (including without limitation, the implied warranties of merchantability and fitness,) and including but without being limited to any obligation of Monroe Electronics with respect to incidental or consequential damages, or damages for loss of use. No agreement or understanding varying or extending the warranty will be binding upon Monroe Electronics unless in writing signed by a duly authorized representative of Monroe Electronics.

In the event of a breach of the foregoing warranty, the liability of Monroe Electronics shall be limited to repairing or replacing the non-conforming goods and/or defective work, and in accordance with the foregoing, Monroe Electronics shall not be liable for any other damages, either direct or consequential.

TABLE OF CONTENTS

SECTION 1

GENERAL INFORMATION

SCOPE:

The purpose of this manual is to facilitate the installation and operation of the Monroe Electronics Remote Control, Model 6002.

GENERAL DESCRIPTION:

The Model 6002 is a telephone remote control capable of answering telephone calls and giving the calling party control of a number of remote control relays and the ability to interrogate a number of inputs for remote control and status monitoring of unattended sites.

The remote control responds to Touch-Tone® commands that are issued from the calling party's telephone keypad.

The Model 6002 is available in three versions as follows:

Model 6002-6	Remote control with six inputs and six outputs.
Model 6002-6D	Remote control with six inputs and six outputs with local status display of input and output status.
Model 6002-12	Remote control with twelve inputs and twelve outputs.

Plug-in programming jumpers permit the user to select several system options.

®Touch-Tone is a registered service mark of AT & T.

SPECIFICATIONS:

Relay Outputs	Form A rated for 30VDC @ 2.0A resistive 125VAC @ 0.5A (The relay contacts are gold over silver-nickel plated)
Status Input Characteristics	+12V maximum open circuit voltage 1 ma maximum closed circuit current Inputs protected for 20V with respect to circuit common 4.3V minimum open circuit voltage 0.7V maximum closed circuit voltage status inputs are designed to monitor contact closures to circuit common
Status Input Impedance	12K ohms
Ring Frequency Acceptance	16 Hz minimum 63 Hz maximum
Ring Timing Limits	
Ring Burst	0.5 Sec. minimum with 1.0 Sec. interring time
Inter-ring time	9.8 Sec. maximum
DTMF Digit Validation Time	40 mS
DTMF Audio Level Inbound from Telephone Line (at J1)	-10dBm maximum -30dBm minimum with +/- 3 dB adjustment range
Audio Level Outbound to Telephone Line (at J1)	-9dBm maximum adjustable down to -20 dB

Monitor Audio Input	2 V p-p for -9 dBm at telephone line
Operational Range	0 C to +70 C minimum -30 C to +80 C typical
Power Requiement	117VAC 10%, 60Hz, 15W
Physical Dimensions	10 in. H x 8.5 in. W x 2.6 in. D
	25 cm H x 21 cm W x 7 cm D

SECTION 2

INSTALLATION INSTRUCTIONS

MOUNTING:

The remote control is intended for wall mount attachment.

The mounting holes should be located against a solid backing either at a stud or solid, wooden mounting surface.

TELEPHONE CONNECTION:

Notice To Users:

This product meets the registration requirements of the Federal Communications Commission Part 68 and the Canadian Department of Communications CS-03 and approval has been granted for attachment of this device to the telephone network.

In the United States:

Model	3394
FCC Registration Number	AAK99W-67971-VP-E
Ringer Equivalence	1.7B

In Canada:

Model	3394
DOC Certification	552 658 A
Load Number	32B

INFORMATION SUPPLIED TO THE CUSTOMER

IN COMPLIANCE WITH FCC PART 68, CUSTOMER IS ADVISED

EXHIBIT J

68.104 Standard Plugs and Jacks

Connection to the network must be through USOC type jack to be supplied by the telephone company.

68.106 Notification to the Telephone Company

Customers connecting terminal equipment to the telephone network shall, before such connection is made, give notice to the telephone company of the particular line(s) to which such connection is to be made and shall provide to the telephone company the FCC registration number and the ringer equivalance of the registered protective circuitry, notice of final disconnect also given.

68.108 Incident of Harm

Should terminal equipment cause harm to the telephone network, the telephone company shall, where practicable, notify the customer that temporary discontinuance of service may be required; however, where prior notice is not practicable, the telephone company may temporarily disconnect service forthwith, if such action is reasonable in the circumstances. The telephone company shall (1) promptly notify the customer of such temporary discontinuance, (2) afford the customer the opportunity to correct the situation which gave rise to the temporary discontinuance, and (3) inform the customer of his right to bring a complaint to the commission pursuant to the proceedure set out in subpart E of Part 68.

68.110 Changes in Telephone Company Facilities, Equipment, Operations or Procedures

The telephone company may make changes in its communications facilities, equipment, operations or procedures, where such action is reasonably required in the operation of its business and is not inconsistent with the rules and regulations of Part 68. If such changes can be reasonably expected to render any customer's terminal equipment incompatable with the telephone company communications facilities, or require modification or alteration of such terminal equipment, or otherwise materially affect its use or performance, the customer shall be given adequate notice in writing, to allow the customer an opportunity to maintain uninterrupted service.

68.216 Repair of registered terminal equipment and registered protective circuitry shall be accomplished only by the manufacturer or assembler thereof or by their authorized agent... (this applies at any time during and after the warranty period)

68.218 (b) The grantee or its agent shall provide the user of the registered equipment the following:

(1) Instructions concerning installation, operation and repair procedures, where applicable.

(2) Instructions that registered terminal equipment of protective circuitry may not be used with party lines or coin telephone lines.

(3) Instructions that when trouble is experienced the customer shall disconnect the registered equipment from the telephone line to determine if the registered equipment is malfunctioning and that if the registered is malfunctioning, the use of such equipment shall be discontinued until the problem has been corrected.

(4) Instructions that the user must give notice to the telephone company with the requirements of section 68.106.

The customer will be advised by written instructions of any restrictive conditions under which the apparatus must be used. Such restrictions to include such as only with registered apparatus, or only with specific model numbers.

Grantee agrees to supply each purchaser with a copy of Exhibit J. In addition, grantee assumes responsibility for Quality Assurance in that all equipment manufactured continues to comply with Part 68 standards.

Indicated below is the connecting arrangement (jack) to be ordered from the telephone company. Shown is typical and other subpart F, Part 68 jacks are available for specific uses.

U S O C

RJ11C or RJ11W

(As Applicable)

NOTICE: The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an approved method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified jack-plug-cord ensemble (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Existing telecommunications company requirements do not permit their equipment to be connected to customer-provided jacks except where specified by individual telecommunications company tariffs.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made be the user to this equipment, or equipment malfunctions, may give the telecommunications equipment company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metalic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electrical inspection authority or electrician, as appropriate.

Telephone Connection:

The remote control must be connected to the telephone network through standard (USOC) plugs and jacks to be supplied by the telephone company. Please specify USOC jack RJ11C or RJ11W when ordering the necessary connecting arrangement (jack).

A 6-foot long telephone line cord is provided to connect the remote control to the telephone line.

The modular plugs at each end of this cable may be plugged directly into the modular jacks- one end into the modular jack J1 mounted on the main printed circuit board of the remote control and the other end into the jack provided by the telephone company. REFERENCE FIGURE 2-1.

WARNING: Do not connect a dial-up telephone line to the local input jack J1B.

BARRIER STRIP TERMINAL INTERCONNECTIONS:

All barrier strip terminal connections are intended to be dressed down the outside edges of the printed circuit card and exit through the cutouts at the bottom of the cover.

Output Relay Connections:

The remote control relays are arranged into groups of six relays. The Models 6002-6 and 6002-6D have only one group of six relays. The Model 6002-12 has two groups of six relays.

The first, or low group of relays resides on the main circuit board. The second, or high group of relays reside on an expansion circuit board which mounts to the top of the main circuit board.

The relays for the Models 6002-6 and 6002-6D will be referred to as the low group in this text as they coincide with the low group of relays in the Model 6002-12.

The expression "bank" will be used interchangeably with the expression "group" throughout the text of this manual when referring to the inputs and outputs of the remote control.

The connections for the low group of relays are made at TB3 on the left side of the main circuit board as identified in FIGURE 2-1.

FIGURE 2-2 illustrates the terminal assignments for TB3.

The connections for the high group of relays are made at TB5 on the left side of the expansion circuit board as identified in FIGURE 2-3.

FIGURE 2-2 also illustrates the terminal assignments for TB5.

Arc suppression circuitry should be used to optimize the relay contact life when these relays are used to operate solenoids, relays or other inductive loads.

FIGURE 2-4 describes the use of arc suppression techniques.

Status Input Connections:

The connections for the low group of inputs are located at TB2 on the right side of the main circuit board as identified in FIGURE 2-1.

FIGURE 2-5 illustrates the terminal assignments for TB2.

The connections for the high group of inputs are located at TB4 on the right side of the expansion circuit board as identified in FIGURE 2-3.

FIGURE 2-5 also illustrates the terminal assignments for TB4.

Each input provides a signal input terminal with an on-board pull up resistor and a signal return (to circuit common) terminal making the inputs ideal for use with a contact closure.

We recommend that input wiring which is prone to noise pickup (i.e. long wires) be shielded against these effects.

Shielded wire should be employed for these inputs and the shield wires should be terminated at one end only. When the chassis ground connection is not made at terminal 12 of TB1 then the input shields should be terminated at the distant end of the input cable.

FIGURE 2-6 illustrates these shielding techniques.

Monitor Audio Input Connection:

The monitor audio input connections are made to TB1 terminals 10 and 11 as identified in FIGURE 2-1. FIGURE 2-7 illustrates the connections for this input.

Chassis Grounding:

Terminal 12 of TB1 must be connected to green wire ground in order to fully protect the telephone input.

LOCAL AUDIO INPUT CONNECTION:

A self-powered DTMF generator (such as the Model CES 340J) can be connected locally at J2 for testing and local control. FIGURE 2-1 will assist you in locating J2.

This local audio jack will accept a miniature phone plug.

LOCAL INPUT:

A standard telephone can be connected locally at J1B for testing and local control. The LOCAL INPUT JACK provides a DC voltage which is polarized to power a standard telephone.

FIGURE 2-1 will assist you in locating J1B.

WARNING: Do not connect a dial-up telephone line to the local input jack J1B.

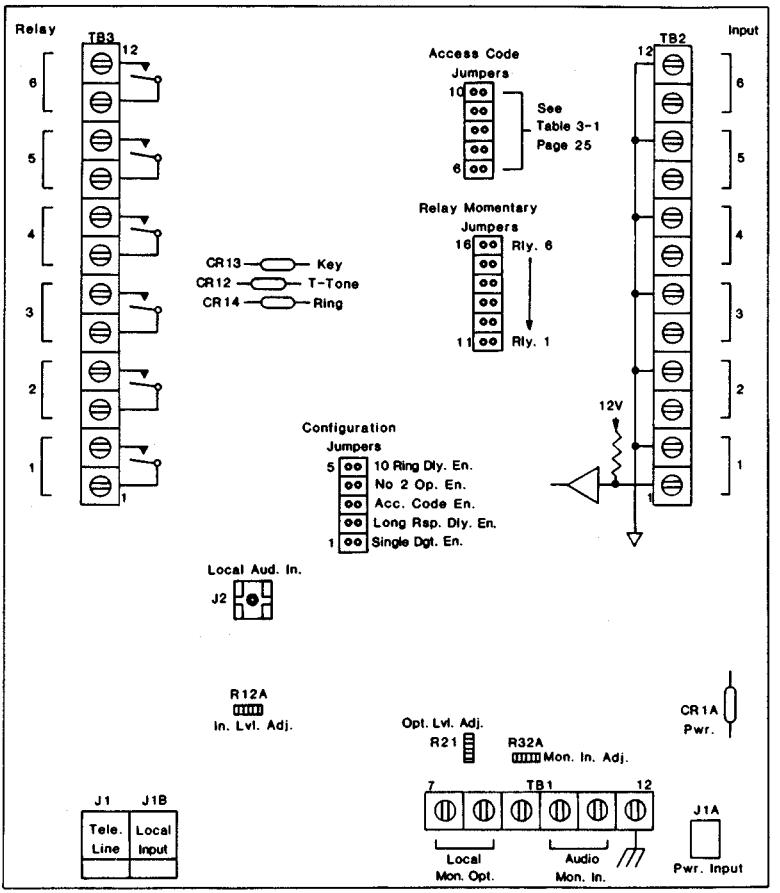
(AUDIO) ADJUSTMENTS:

(Audio) adjustments are discussed in SECTION 5: MAINTENANCE.

POWER CONNECTION:

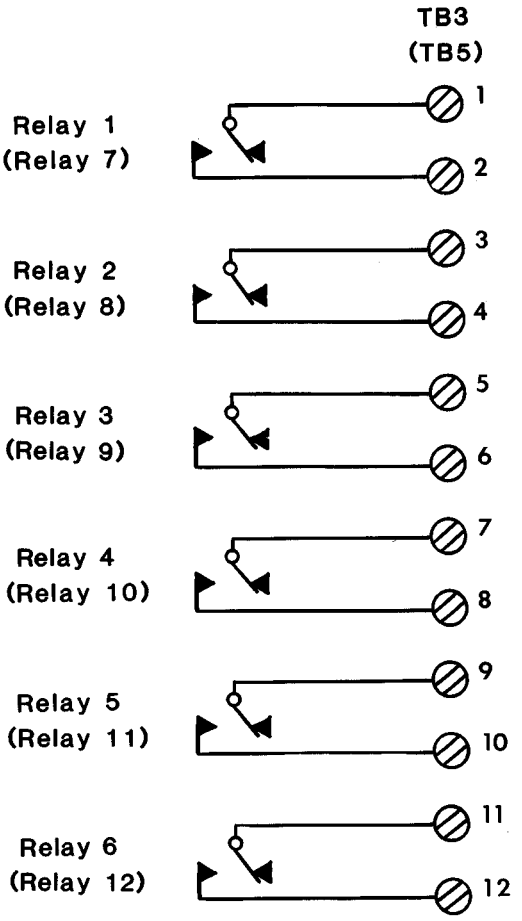
The remote control is provided with a UL/CSA approved transformer module which is used to interface the remote control to the AC power line.

Plug the transformer module into a standard duplex power receptacle and connect the plug at the other end of the transformer module's cord into the jack, J1A which is located on the main printed circuit board. FIGURE 2-1 will assist you in locating J1A.



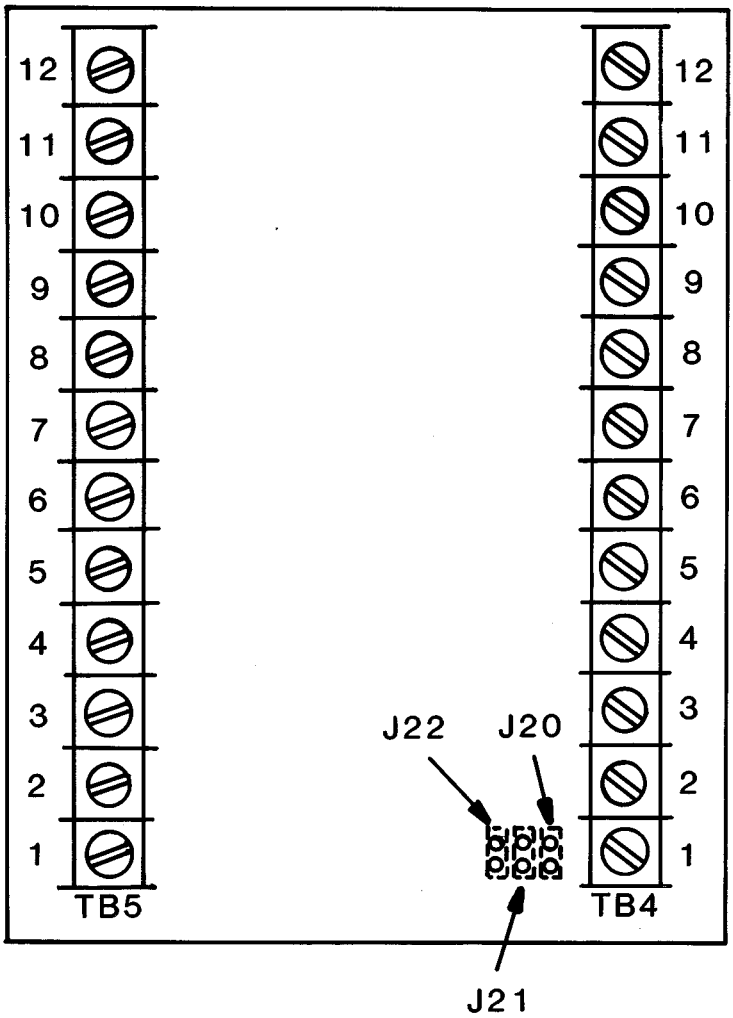
MODEL 3394 MAIN CIRCUIT BAORD ASSEMBLY

FIGURE 2-1



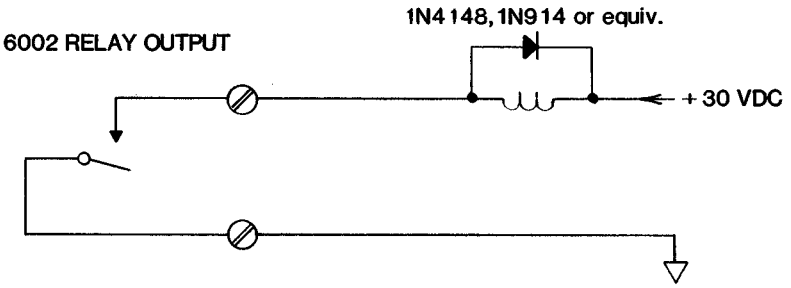
RELAY OUTPUTS

FIGURE 2-2



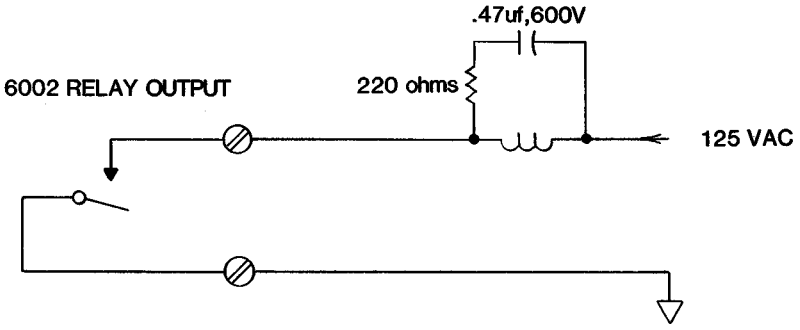
MODEL 3405 UPPER CIRCUIT BOARD ASSEMBLY

FIGURE 2-3



DC RELAYS

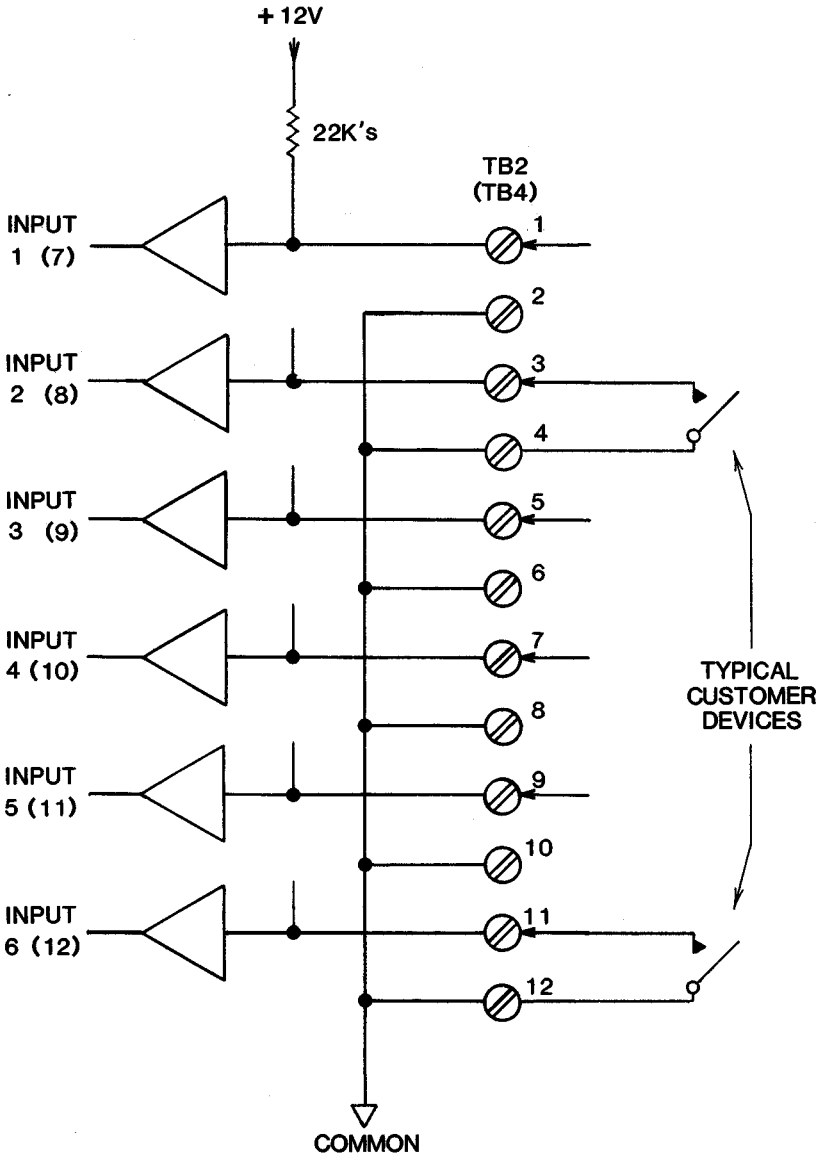
Mount arc suppressors on or as close as possible to the terminals of the device being arc suppressed



AC RELAYS

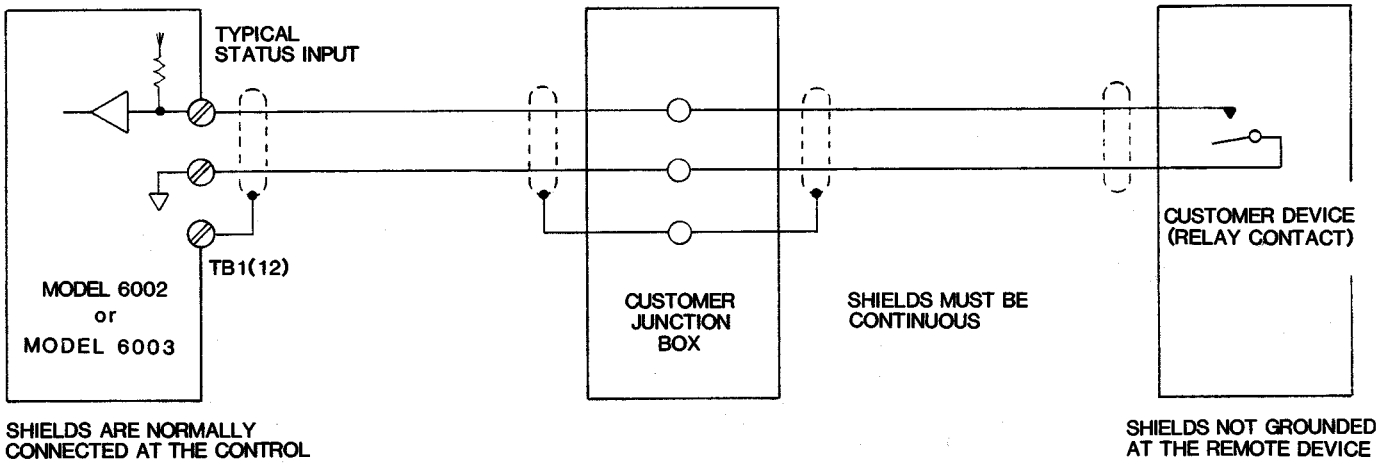
ARC SUPPRESSION TECHNIQUES

FIGURE 2-4



INPUT CONNECTIONS

FIGURE 2-5



INPUT SHIELDING TECHNIQUES

FIGURE 2-6

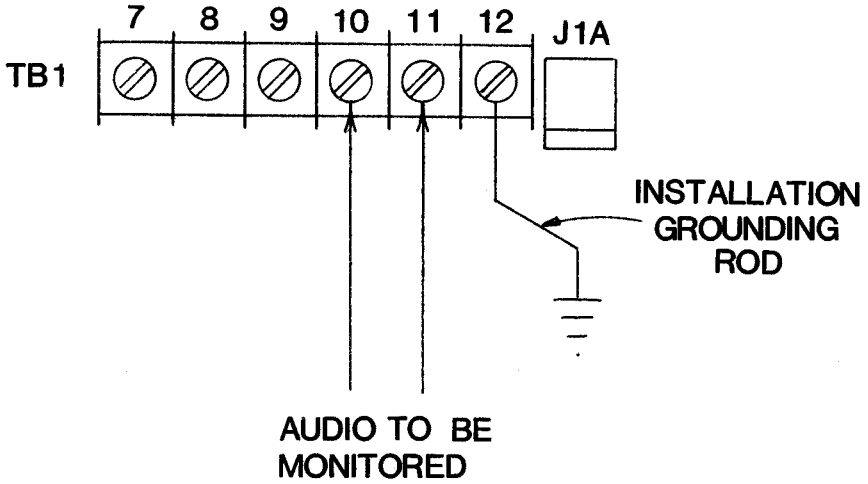
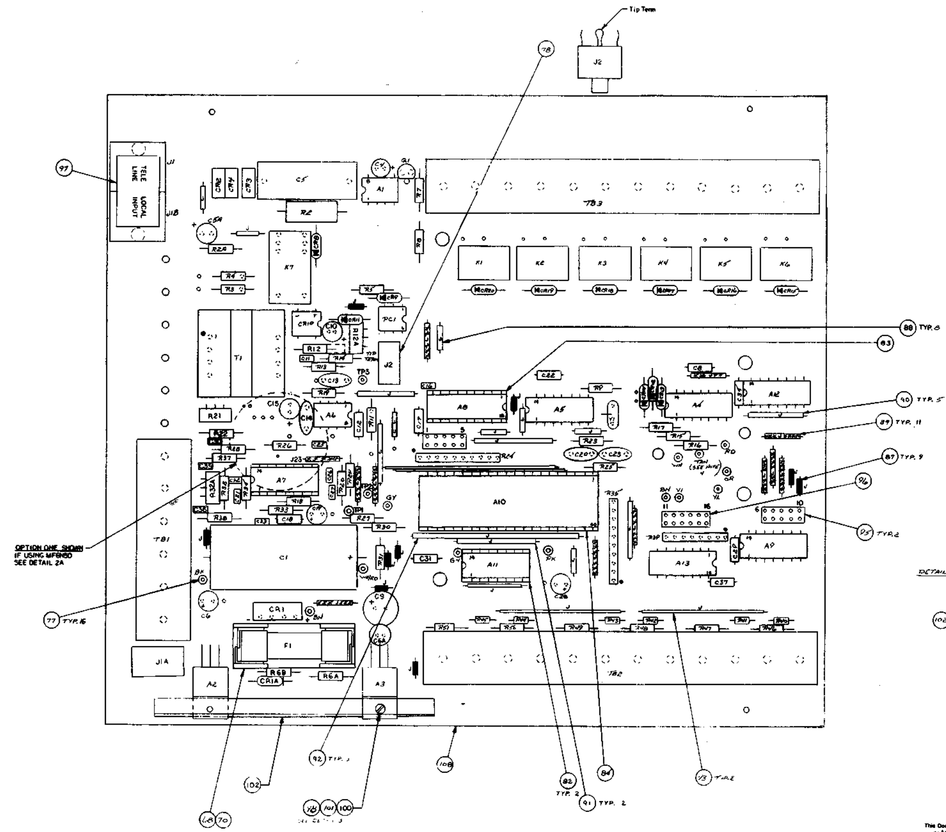


FIGURE 2-7

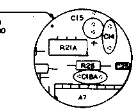
CONNECTIONS FOR TB3

FIGURE 2-7

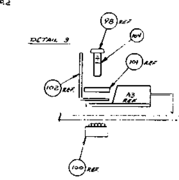
NOTES:
1. SECURE C1-T1 WITH TAK-PAK.
2. A10 TO BE INSTALLED BY TEST
3. A7 3 OPTIONS
OPTION ONE AS SHOWN
TWO DETAIL 2A
THREE SAME AS ONE BUT USING 90212 IN PLACE OF MF6N



DETAIL 2A OPTION TWO
USING MF6N-50(A7), C18A and R21A REMOVE MF6N-100 and J23.



DETAIL 3



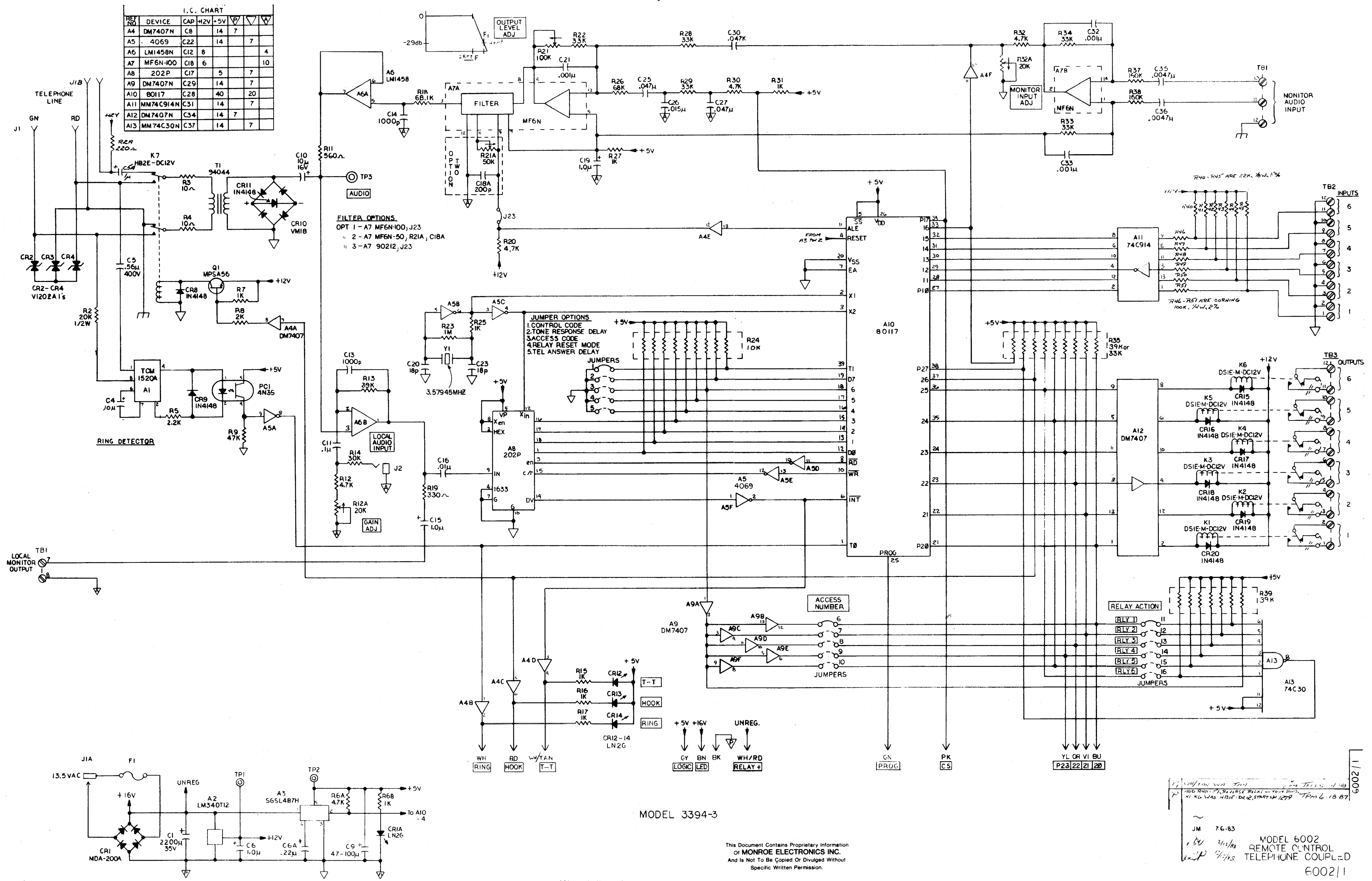
N5	[illegible]	
N4	CLARIFIED [illegible]	JT 6-5-89
N3	UPDATE B/M TO REFLECT ONLY ONE FILTER OPTION	TPM 9-28-88
N2	ADD WIRE COLORS TO TP'S	TPM 8-24-88
N1	[illegible] ADD FUSE HOLDER	JT TPM
N	ADD 890-37 K1-6 WAS [illegible]	TPM 6-19-87
M	REVISED	
L	C4 WAS [illegible]	TPM 11-11-85
K	R12 WAS 13K & R37/38 WAS 330K	TPM
J	REMOVED POWER SUPPLY OPTION TWO	8-5-85
H	R5 WAS TANCON, R25 WAS 10K	JM 4-9-84
G	ADDED DETAIL 3	TPM 10-18-84
F	POWER SUPPLY OPTIONS	7-30-84 JM 7/27/84
E	PER ECO 1178	3/5/84 JM 3/5/84
D	PER ECO 1176 & 1177	JM 1/31/84
C	RELEASED TO PROD.	RTV 12-16-83
PC	ADD 5 AMP PINS, REV. NOTES	SLY 12-7-83
PB	UPDATED	JM 11-30-83
PA	REV. B/M & CR1 WAS VM18	TPM 9-8-83

MODEL 3394-3
ASSY

3394-3/22
SHT. 1 of 10

This Document Contains Proprietary Information of MONROE ELECTRONICS INC. And Is Not To Be Copied Or Divulged Without Specific Written Permission.

REF NO	DEVICE	CAP	+12V	+5V	⏚	▽	▽
A4	DM7407N	C8		14	7		
A5	4069	C22				7	
A6	LM1458N	C12	8				4
A7	MF6N-100	C18	6				10
A8	202P	C17		5		7	
A9	DM7407N	C29		14		7	
A10	80117	C28		40		20	
A11	MM74C914N	C31		14		7	
A12	DM7407N	C34		14	7		
A13	MM74C30N	C37		14		7	



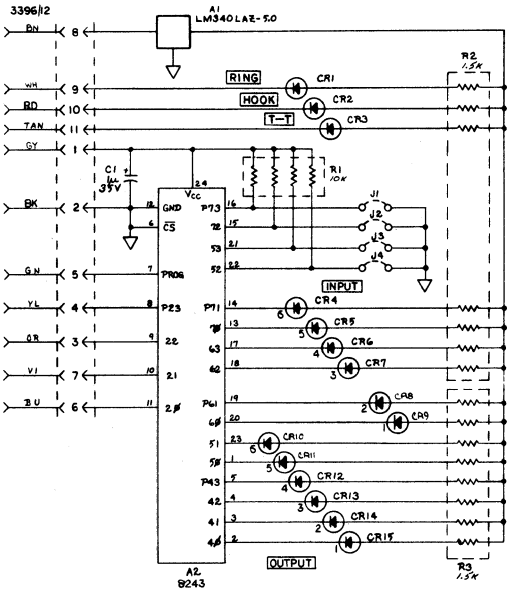
MODEL 3394-3

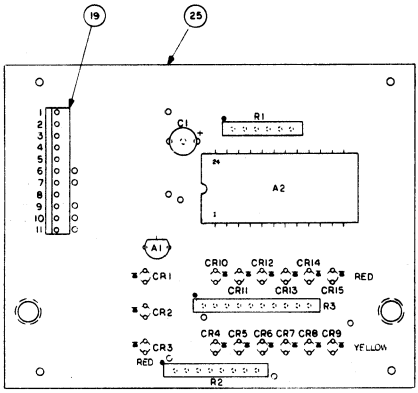
This Document Contains Proprietary Information Of MONROE ELECTRONICS INC. And Is Not To Be Copied Or Divulged Without Specific Written Permission.

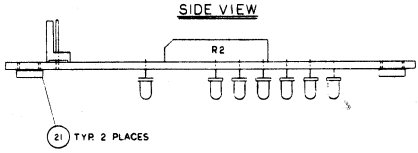
JM 7-6-83

MODEL 6002
REMOTE CONTROL
TELEPHONE COUPLED

6002/1

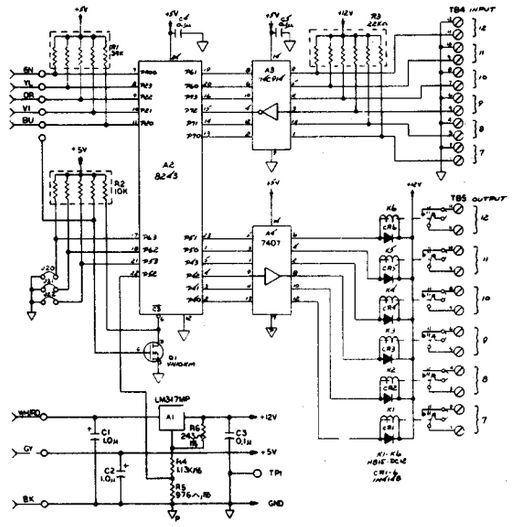




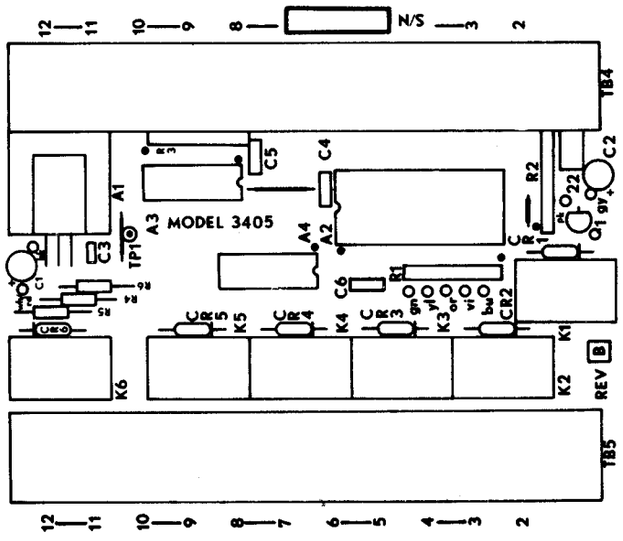


Model 3396

Board Assembly



Model 3405 Schematic (6002-12 only)



Model 3405

Board Assembly

SECTION 3

SELECTION OF USER OPTIONS

Plug-in programming jumpers permit the selection of user options. FIGURES 2-1 and 2-3 will assist you in locating these jumpers.

***** CAUTION *****

HOLD THE METAL BASE OF THE REMOTE CONTROL WHILE INSTALLING JUMPERS TO PREVENT DAMAGE DUE TO STATIC ELECTRICITY DISCHARGE.

JUMPER #1: CONTROL CODE FORMAT:

Jumper #1 programs the remote control to respond to a single or multiple digit control code format.

SPECIFICATION		JUMPER #1
REMOTE CONTROL CODE FORMAT	SINGLE DIGIT	INSTALLED
	MULTIPLE DIGIT	OPEN POSITION

You should familiarize yourself with the material in SECTION 4 where control code formats are discussed in order to determine the format most suitable to your application.

JUMPER #2: TONE RESPONSE DELAY:

Jumper #2 programs the (time) delay between the time when a control code is executed and the time when a tone response is returned to the calling party.

SPECIFICATION		JUMPER #2
TONE RESPONSE DELAY	1 SECOND	INSTALLED
	.2 SECONDS	OPEN POSITION

JUMPER #3: ACCESS CODE:

An access code may be enabled (open position) by using jumper #3. Jumpers #6-#10 determine the two digit access code when jumper #3 is enabled.

These jumpers permit a two digit access code, 01-32, to be required before giving the calling party access to the status and control functions of the remote control.

The access code must be a two digit code. The leading zero for access codes 01-09 must be entered.

If an access code is desired then jumper #3 is not installed and jumpers #6-#10 are installed as required to choose a specific two digit code 01-32. TABLE 3-1 describes the programming for jumpers #6-#10.

If no access code is desired then jumper #3 is installed and all jumpers #6-#10 MUST NOT BE installed.

NOTE: The remote control will not operate properly if these jumpers are not installed as described.

SPECIFICATION		JUMPER #3
ACCESS CODE	NOT REQUIRED	INSTALLED
	REQUIRED	OPEN POSITION

TABLE 3-1

ACCESS CODE PROGRAMMING

ACCESS CODE NUMBER	JUMPER NUMBER				
	6	7	8	9	10
01	X	X	X	X	X
02	-	X	X	X	X
03	X	-	X	X	X
04	-	-	X	X	X
05	X	X	-	X	X
06	-	X	-	X	X
07	X	-	-	X	X
08	-	-	-	X	X
09	X	X	X	-	X
10	-	X	X	-	X
11	X	-	X	-	X
12	-	-	X	-	X
13	X	X	-	-	X
14	-	X	-	-	X
15	X	-	-	-	X
16	-	-	-	-	X
17	X	X	X	X	-
18	-	X	X	X	-
19	X	-	X	X	-
20	-	-	X	X	-
21	X	X	-	X	-
22	-	X	-	X	-
23	X	-	-	X	-
24	-	-	-	X	-
25	X	X	X	-	-
26	-	X	X	-	-
27	X	-	X	-	-
28	-	-	X	-	-
29	X	X	-	-	-
30	-	X	-	-	-
31	X	-	-	-	-
32	-	-	-	-	-

NOTE: "-" indicates an open jumper location
"X" indicates an installed jumper

JUMPER #4: RELAY RESET MODE:

The relay reset mode pertains only to relays that are established for latching operation.

The activation of any output relay will first unlatch any (latched) relay when the relays are in the no-two-operate-at-a-time mode of operation.

The relays designated for latching operation can be latched and unlatched independently of one another when the relays are in the independent reset mode of operation.

Programming for the Models 6002-6 and 6002-6D:

Jumper #4 programs the relay reset action for the Models 6002-6 and 6002-6D.

SPECIFICATION		JUMPER #4
RELAY RESET MODE	NO-TWO-OPERATE	INSTALLED
	INDEPENDENT	OPEN POSITION

Programming for the Model 6002-12:

Jumpers #21 and #20 are used in conjunction with jumper #4 to program the relay reset action for the Model 6002-12.

TABLE 3-2 explains the programming for these jumpers.

TABLE 3-2

RELAY RESET MODE

JUMPER 4	21	20	RELAYS 1-6	RELAYS 7-12
-	X	X	no-2-of-6	no-2-of-6
-	X	-	independent	no-2-of-6
-	-	X	no-2-of-6	independent
-	-	-	independent	independent
X	0	0	no-2-of-12 operate at a time	

NOTE: "-" indicates an open jumper location
"X" indicates an installed jumper
"0" indicates open or installed jumper

JUMPER #5: TELEPHONE ANSWER DELAY:

Jumper #5 programs the number of rings before the remote control will "answer" an incoming telephone call.

NOTE: The rings heard by the calling party are a simulation which may not accurately reflect the actual ring signal which is being delivered to the called telephone line.

SPECIFICATION		JUMPER #1
TELEPHONE ANSWER DELAY	10 RINGS	INSTALLED
	2 RINGS	OPEN POSITION

JUMPERS #6 - #10: ACCESS CODE SELECTION:

SEE JUMPER #3

JUMPERS #11 - #16: RELAY ACTION:

Jumpers #11 - #16 program momentary or latching relay action for relays 1-6. TABLE 3-3 explains the programming for jumpers 11-16. The relay action is also affected by the control code format. The control code formats are described in SECTION 4.

Jumper 22 programs relays 7-12 in the Model 6002-12 for latching or momentary operation.

TABLE 3-3

RELAY ACTION

JUMPER NUMBER	RELAY	OPTION	
		OPEN POSITION	JUMPER INSTALLED
11	1	LATCHING	MOMENTARY
12	2	LATCHING	MOMENTARY
13	3	LATCHING	MOMENTARY
14	4	LATCHING	MOMENTARY
15	5	LATCHING	MOMENTARY
16	6	LATCHING	MOMENTARY
Model 6002-12 Only:			
22	7-12	MOMENTARY	LATCHING

JUMPER 22: RELAY ACTION:

SEE JUMPERS 11-16.

JUMPERS 21 AND 20: RELAY RESET ACTION:

SEE JUMPER 4.

SECTION 4

OPERATION

OPERATION INDICATORS:

Three light emitting diodes on the main circiut board provide the user with system status information. These indicators function as follows:

CR12	VALID TOUCH-TONE® DIGIT
CR13	OFF HOOK
CR14	RING

FIGURE 2-1 will assist you in locating these indicators.

You should note that the valid Touch Tone® digit indicator, CR12, may only blink in response to some remote control commands. This is normal.

OPERATION INDICATORS FOR THE MODEL 6002-6D:

The Model 6002-6D includes a display in the cover for the presentation of system status.

Output indicators, when illuminated, indicate output relays which are energized.

Input indicators, when illuminated, indicate inputs which are shorted to circuit common.

The operation of the T-T, OFF HOOK and RING indicators is the same as the operation of CR12, CR13 and CR14 previously described under OPERATION INDICATORS.

UNATTENDED TELEPHONE LINE ANSWERING:

The remote control will "answer" an incoming telephone call and will send with a response which signals its presence at the remote end of the connection.

This tone response is a series of ten tones if an access code is required and it is a single, 5-second long tone if an access code is not required.

ACCESS CODE OPERATION:

If an access code is required (by jumper programming) then it must be entered at this time.

If an incorrect access code is entered then the remote control will return an error signal to advise the calling party that the entry was not accepted. This error signal is a series of ten tones.

If the correct access code is entered on the first or second attempt then the remote control will respond with a single, 5-second long tone to advise the calling party that he has sent a valid access code and has gained access to the remote control.

The remote control will disconnect itself from the telephone line if the correct access code is not received on the second attempt.

SINGLE DIGIT CONTROL CODE FORMAT:

When the single digit mode of operation has been selected (by jumper programming) the remote control will respond to single digit control codes. Certain two-digit control codes permit additional flexibility in this mode.

Execution of a control code commences as soon as the digit is validated. Execution of a two-digit control code commences as soon as the second digit is validated.

Momentary relay closures are maintained for the duration of the control tone. Software timing assures that the output relays are closed for a minimum of 250 mS whenever a valid remote control codes is detected.

TABLE 4-1 outlines the single digit control code format.

High/Low Group Selection:

*8 and #8 select the high or low group of inputs and outputs for remote control and status monitoring for the 6002-12 only. The low group is selected upon powerup and all remote control and status monitoring commands will effect the low group until *8 is used to switch to the high group. Then all remote control and status monitoring operations will pertain to the high group until #8 is sent to reselect the low group of inputs and outputs.

RELAY CONTROL OPERATIONS WITHIN THE SINGLE DIGIT CONTROL CODE FORMAT:

The relay action is governed by jumper programming and by the control codes. Interactions between the control code format and jumper programming are explained in this part of SECTION 4.

Alternate Action:

This pertains to relays established for latching operation only.

When one of the single digit relay control codes, 1-6, is sent then the respective relay will switch to the opposite state. As such, the relay will latch if it was unlatched before the control code was received or unlatch if it was latched before the control code was received.

Latch/Unlatch Operations:

This pertains to relays established for latching operation only.

When one of the two-digit relay control codes are sent then the first digit will instruct the relay to latch (*) or unlatch (#) and the second digit will identify the particular relay to be operated.

TABLE 4-1

SINGLE DIGIT CONTROL CODE FORMAT

CODE	FUNCTION
1	Operate relay #1
2	Operate relay #2
3	Operate relay #3
4	Operate relay #4
5	Operate relay #5
6	Operate relay #6
7	Command Clear- Clears a partially entered two-digit command
8	Select audio monitor for 15 seconds
9	Send relay output status
0	Send input status
*1 - *6	Operate the relay designated by the second digit
#1 - #6	Unlatch the relay designated by the second digit
*7	Group latch- latch all of the relays 1-6
#7	Group unlatch- unlatch all of the relays 1-6
Model 6002-12 Only:	
#8	Select the low group of relays for control and status
*8	Select the high group of relays for control and status

NOTE: Other combinations will cause error signals to be returned.

Interactions For The Independent Relay Reset Action In The Single Digit Control Code Format:

The group latch relay control code (*7) will not operate as expected if any of the relays are programmed for momentary operation. Under these conditions the group latch command will cause all of the relays to be operated momentarily with all outputs unlatched after the execution of the group latch command.

The group unlatch relay control code (#7) will operate normally on any relays established for latching operations even if one or more of the relays is programmed for momentary operation.

Control codes #1-#6 do nothing for momentary relays but will cause a response tone to be returned to the calling party.

Interactions For The No-2-Operate Relay Reset Action In The Single Digit Control Code Format:

Activation of a relay which is programmed for momentary operation will first reset any latched relay.

The group latch relay control code (*7) is invalid when the no-two-operate-at-a-time relay reset option is selected and an error signal will be returned to the calling party.

MULTIPLE DIGIT REMOTE CONTROL CODE FORMAT:

When the multiple digit mode of operation has been selected (by jumper programming) the remote control will respond to four digit control codes for relay control and two digit control codes for the other functions.

Execution of a control code commences as soon as the last digit is validated with momentary relay closures maintained for the duration of the last digit. The output relay is energized for a minimum of 250 mS when the digits are sent at high speed.

TABLE 4-2 outlines the multiple digit code format.

RELAY CONTROL OPERATIONS WITHIN THE MULTIPLE DIGIT COMMAND FORMAT:

The relay action is governed by jumper programming and by the control codes. Interactions between the control code format and jumper programming are explained in this part of SECTION 4.

Special Momentary:

A special momentary mode of operation is a feature of the multiple digit control code format.

Relays that are established for latching operation may be

operated momentarily if the multiple digit code structure is used and the first digit of the code is a "3" for the low group of relays or a "4" for the high group of relays. See also TABLE 4-2.

TABLE 4-2

MULTIPLE DIGIT CONTROL CODE FORMAT

CODE	FUNCTION
101*-106*	Operate the relay in the lower bank designated by the third digit
101#-106#	Unlatch the relay in the lower bank designated by the third digit (only valid when the latching option is selected for the respective relay)
109*	Lower bank group latch
109#	Lower bank group unlatch
201*-206*	Operate the relay in the upper bank designated by the third digit
201#-206#	Unlatch the relay in the upper bank designated by the third digit (only valid when the latching option is selected for the respective relay)
209*	Upper bank group latch
209#	Upper bank group unlatch
301*-306*	Operate the relay in the lower bank designated by the third digit for the duration of the last digit plus 2 seconds
309*	Operate all of the relays in the lower bank for the duration of the last digit plus 2 seconds
401*-406*	Operate the relay in the upper bank designated by the third

	digit for the duration of the last digit + 2 seconds
409*	Operate all of the relays in the upper bank for the duration of the last digit + 2 seconds
50	Send the relay output status for the lower six relay outputs
51	Send the relay output status for the upper six relay outputs
60	Send the input status for the lower six logic inputs
61	Send the input status for the upper six logic inputs
70	Select the audio monitor cut through for 15 seconds
80	Select 1000 Hz test tone for 15 seconds
9	Not assigned- Error signal returned
0	Not a valid first digit- Error signal returned

NOTE: Codes for operation of upper bank functions pertain to the Model 6002-12 only.

NOTE: Other combinations will cause error signals to be returned.

Interactions For The Independent Relay Reset Action In The Multiple Digit Command Structure:

The group latch relay control codes (109* and 209*) will not operate as expected if any of the relays are programmed for momentary operation. Under these conditions the group latch command will cause all of the relays to be operated momentarily with all outputs unlatched after the execution of the group latch command.

The group unlatch relay control codes (109# and 209#) will operate normally on any relays established for latching operations even if one or more of the relays is programmed for momentary operation.

Control codes 101# - 106# and 201# - 206# do nothing for momentary relays but will cause a response tone to be returned.

Interactions For The No-2-Operate Relay Reset Action In The Multiple Digit Command Structure:

Activation of a relay which is programmed for momentary operation will first reset any latched relay.

The group latch relay control codes (109* and 209*) are invalid when the no-two-operate-at-a-time relay reset option is selected and an error signal will be returned to the calling party.

Interactions For The Special Momentary Control Codes:

When the special momentary control code is used on a latched relay the relay will unlatch after the momentary operation is completed.

STATUS RESPONSES:

All relay control operations are followed by a tone response that advises that a command has been properly received and executed.

The remote control cannot receive a new remote control code when it is returning a tone response.

The tone response reflects the actual state of a relay after the command has been executed. This gives the caller has a positive indication that the operation has left the relay in the desired condition.

All momentary relay operations are followed by a high frequency and then low frequency tone response.

All operations to latch a relay are followed by a high frequency tone response and all operations to unlatch a relay are followed by a low frequency tone response.

The special momentary tone response is different than the tone response for normal momentary relay operations. The special momentary tone response is a high frequency tone for the duration of the relay actuation and then a high frequency tone and a low frequency tone is sent after the relay drops out.

STATUS REQUESTS:

Status request codes can be sent which will cause the remote control to return the condition of the six relays or the condition of the six inputs. TABLE 4-1 specifies the status request codes for the single digit control code format and TABLE 4-2 specifies the status request codes for the multiple digit control code format.

Relay Status Requests:

When a relay status request code (9, 50 or 51) is received the remote control will return a series of six tones to the calling party which indicates the condition of the six output relays. The first tone returned corresponds to relay #1, the second tone returned corresponds to relay #2, etc.

High frequency tones that are returned indicate latched relays and low frequency tones that are returned indicate unlatched relays. Of course, relays programmed for momentary relay action will always cause a low frequency tone to be returned.

Input Status Requests:

When an input status request code (0, 60 or 61) is received then the remote control will return a series of six tones which indicates the condition of the six inputs. The first tone returned to the calling party corresponds to input #1, the second tone returned to the calling party corresponds to input #2, etc.

High frequency tones that are returned indicate inputs which are closed (to circuit common) and low frequency tones that are returned indicate inputs which are open.

ERROR RESPONSES:

The remote control will send an error response when it receives a control code which is not defined according to TABLE 4-1 or TABLE 4-2.

This error response is a series of five quick tones.

SELECTION OF THE AUDIO MONITOR CUT THROUGH:

When the monitor audio cut through code is received the remote control will send a high frequency tone to signal the acceptance of the code and will then complete the monitor audio signal to the telephone line for 15 seconds.

The remote control cannot respond to a new remote control code during the monitor audio cut through operation.

SELECTION OF THE 1 KHZ TEST TONE:

The remote control will return a 1 KHz tone to the telephone line when the 1 KHz test tone code is received.

The remote control cannot respond to a new remote control code during the operation of the 1 KHz test tone.

CALL TERMINATION:

The remote control will automatically disconnect from the telephone line after approximately 35 seconds without Touch-Tone® activity from the calling party.

After 30 seconds without activity the remote control will send a series of warning tones as a signal to the calling party that it intends to disconnect.

The calling party can send a code between the warning tones to keep the remote control on line for an additional 35 seconds.

The remote control will disconnect after it has sent three warning tones if the calling party does not send a code to keep the remote control connected to the telephone line.

LOCAL CONTROL OPERATIONS:

A self powered DTMF generator (such as the CES 340J) can be connected locally at J2 for testing and local control. FIGURE 2-1 will assist you in locating J2.

A standard telephone can be connected locally at J1B for testing and local control. The local input jack provides a DC voltage which is polarized to power a standard telephone.

The remote control will respond to the control codes in the same manner as if they had been received from the telephone line during normal operation.

An access code is not required for local control operations.

SECTION 5

MAINTENANCE

FUSE F1:

The remote control should be returned to the factory for repair in the event that this fuse fails.

Do not attempt to bypass the blown fuse and continue to operate the remote control.

OPERATION OF THE REMOTE CONTROL WITH THE BOARD REMOVED FROM THE BASE:

Make sure that the heat sink for the voltage regulators, A2 and A3, remains in place when the remote control is operated while it is removed from its base.

You will have to secure A2 to the circuit board and heat sink using a 4-40 hex nut (not provided).

(AUDIO) ADJUSTMENTS:

A number of potentiometers permit adjustment of transmitted and received audio signals.

Received Audio Level:

R12A permits the user to adjust the level of the received DTMF remote control tones. This adjustment would be made when the received audio levels are too low or too high to permit reliable decoding of the commands. These conditions exist when transmission line loss is high or the source of the tones is very close.

Transmitted Audio Level:

R21 permits the user to adjust the audio level which is transmitted by the remote control. This potentiometer should be set for the desired audio listening level for the tone responses.

Monitor Audio Level:

R32A permits the user to adjust the audio level for the monitor audio input. This potentiometer should be set for the desired audio listening level at the calling party station.

NOTE: The Transmitted Audio Level adjustment should be made prior to adjustment for the Monitor Audio Level.

SECTION 6

RETURN POLICIES AND PROCEDURES

Factory Repair:
Return authorization is required for factory repair work.
Material being returned to the factory for repair must have as return material authorization number. To obtain a RMA number, call 716-765-2254 and ask for the customer service department.
Material returned to the factory for warranty repair must be accompanied by a copy of a dated invoice or bill of sale which serves as a proof of purchase for the material.

Repairs will be returned promptly. Repairs are normally returned to the customer by UPS within ten working days after they are received by Monroe Electronics, Inc. Return (to the customer) UPS charges will be paid by Monroe Electronics on warranty work. Return (to the customer) UPS charges will be prepaid and added to invoice for out-of -warranty repair work.

Expedited Factory Repair:
All material returned to the factory by air or by an overnight service will be expedited.

Expedited factory repairs will be returned to the customer by the same mode of transportation by which the material was returned to the factory for repair (i.e. material returned to factory by an overnight service will be returned to the customer by an overnight service).

NOTE: Return (to the customer) transportation expenses for expedited factory repairs will always be at the expense of the customer regardless of the warranty status of the equipment.

Factory Repairs to Modified Equipment:
Material returned to the factory for repair which has been modified will be not tested unless the nature and purpose of the modification is understood by us and does not render the equipment untestable at our repair facility.

We will reserve the right to deny service to any modified equipment which is returned to the factory for repair regardless of the warranty status of the equipment.

SECTION 7

MANUAL REVISION

REVISION D:

Update for J1B Jack -
Page 10,18,20,38
Figure 2-1

Correction for output relays-
Figure 2-2

Correction for J20, J22-
Page 26, 27

REVISON E:

RMA addition-
Page 40