CONNECT SYSTEMS INCORPORATED

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FLEX SERIES UNIVERSAL CONTROLLER

VOICE ALARM SYSTEM

User's Instruction Manual

Made in U.S.A.

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GENERAL DESCRIPTION

The FLEX Series Universal Controller SIMPLEX VOICE ALARM SYSTEM by Connect Systems Inc. is an economical controller capable of repeating transmitting a voice message when an alarm is received. To accommodate the many programmable features, the system allows the user to program the system via a telephone plugged in the back of the unit, through the telephone line, over the air, or through a computer.

Powerful built in standard features make the FLEX Series Universal Controller VOICE ALARM SYSTEM the best deal going in VOICE ALARM SYSTEMS today.

THE CONNECTIONS

RX AUDIO For the products detecting CTCSS, DCS, or LTR, or products that use the internal squelch, the RX AUDIO must be connected to the discriminator of the radio. For all other products the RX AUDIO can be connected to the discriminator, high side of the volume control, or the speaker.

TX AUDIO For products that generate CTCSS, DCS, or LTR, the TX AUDIO must be connected directly to the modulator of the transmitter. For LTR and DCS, the modulator must be true FM. For CTCSS the modulator can be phase modulated or FM modulated. For all other applications, connections to the high side of the microphone is acceptable.

It should be noted that in most communication controllers there is a separate line for voice audio and a separate line for the CTCSS, DCS, or LTR signals. This is because to combine the two the controller has to have a limiter on the voice line to prevent over modulation and other undesirable side effects. The Flex Series Controllers has a built in limiter thereby not requiring separate lines.

PTT The PTT normally hooks to the PTT of the transmitter. If you are using a Hand Held with the PTT sharing a common connection with the transmit audio, then attach a resistor with a value between 2.4K and 4.7K from the PTT to the TX Audio and attach the TX audio line to the center conductor of the microphone cable. In most product that use the PTT, the AUX relay can also be used as a PTT connection. This has the advantage of allowing positive keying or other situations where the normal open collector PTT does not work.

COS Connect to a point that has a good voltage swing when the squelch is opened/closed. The best point to connect is to the collector of the transistor that controls the busy light (if the receiver has one). Otherwise you may connect to the squelch control voltage. The minimum voltage for the COS is about .4 volts and the Maximum voltage is the supply voltage.

Some radios have that point coming out the back of the radio. It sometimes goes under the name of squelch detect, sq det, or COR. In some case a pull up or pull down resistor is necessary.

The polarity and other parameters associated with the COS is contained within the programming parameters

described later. It should be noted that in most cases, the COS can be replaced with the internal squelch.

SENSE This point is used as an auxiliary input for specialized purposes in certain products. As an example, this input may be used to detect the presence of a CTCSS/DCS signal in an LTR system. The minimum voltage for the sense input is about .4 volts and the Maximum voltage is the supply voltage.

The polarity and other parameters associated with the SENSE is contained within the programming parameters if used.

AUX RELAY These two points connects to the center contact and normally open contact of the relay. The use if any depends upon the product.

+12 VDC Connect to a source of 12 volts to 15 volts DC. The Flex Series Controllers are reverse polarity protected, so a polarity mistake will not damage the product. Connect the return lead to ground. The two grounds in the system are connected to each other.

ADJUSTMENTS

P1 HYB BAL The Hybrid Balance control is used to null out the mobile return audio in full duplex mode. The alignment must take place on one of the phone lines the Flex Series controller will be serving. (This alignment can not be done at the shop prior to delivery to the site.)

Have a mobile place a call through the Flex Series Controller. The party answering the called phone should leave the phone off hook during the alignment procedure.

Monitor the transmitter output with a service monitor or connect an oscilloscope to the "TX OUTPUT" terminal on the rear of the Flex Series Controller. Place all four Dip switches in the off position.

Have the mobile simultaneously press digits 3 and 6 on his touch tone keypad. This will result in the transmission of a single 1477 Hz tone.

Adjust the "HYB BAL" Potentiometer to produce the least audio output. Try all possible dip position combinations and null each time. The combination which gives the minimum output is the correct position to use.

Changes made within the telephone company or rerouting of telephone lines could occasionally require re-adjustment of the hybrid.

P2 Not Used

P3 Tel Vox Used for detection of call progress tones and sensitivity to voice in Vox operated applications. Turning the pot clockwise increases its sensitivity.

P4 Preamp The preamp control is used to match the audio level from your receiver to the Flex Series controller. To adjust, a signal containing 100 Hz CTCSS with about 600 Hz deviation should be applied to the receiver. Adjust the preamp control until a level of 3 volts peak to peak is observed at test point 6. If an oscilloscope is not available, read 1 volt RMS using a VOM.

P5 RX VOX Used in VOX mode only. Sets RX audio triggering sensitivity. Should be fully clockwise in VOX

simplex applications. Reduce setting when used through repeaters if land line cannot respond to mobile during hang time due to noise or tone on the repeater carrier.

P6 AUDIO OUT Adjust the maximum level going to the transmitter. When turned fully clockwise, an output voltage of about five volts peak to peak is obtained. In most case the output level can also be set in the programming mode.

P7 CONTRAST Sets the contrast of the LCD. Adjust to what is most pleasing to the individual.

P8 SQUELCH Advance clockwise to a point just beyond where the front panel display "Rx" message disappears. Not all products will display the Rx message.

JUMPER STRAP OPTIONS

JP1 **Line In Use Detector.** When inserted, enables line in use detection. That allows the system to detect if another phone in parallel with the controller is off hook. Will only work with a phone system where the nominal on hook voltage is about 48 volts.

JP2 **Preamp Gain.** With no jumper installed, gain is 100. With the jumper connected to the bottom two pins, the gain is about 10 with a .0047 uF capacitor giving 3 db cutoff of xxx Hz. With the jumper connect to the two pins, the gain is about 10 with a .047 uF capacitor giving a 3 db cutoff of xxx Hz.

JP3 TO BE DETERMINED
JP4 TO BE DETERMINED
JP5 TO BE DETERMINED
JP6 TO BE DETERMINED
JP7 TO BE DETERMINED
JP8 TO BE DETERMINED
JP9 TO BE DETERMINED
JP10 TO BE DETERMINED

JP11 NOT USED
JP12 NOT USED
JP13 NOT USED
JP14 NOT USED

JP15 The terminating resistor when used for RS485 communication. Only use once per system.

JP16 When inserted, allows the TX Audio output to be DC coupled.

PROGRAMMING INFORMATION

This section on programming shows the different programming fields that are available across the many different FLEX SERIES UNIVERSAL CONTROLLER product lines. Not all these fields will be used in a particular product.

This paging terminal can be programmed four different ways... Locally, remotely over the air, remotely from any touch tone phone, or through a computer.

Local Programming: Simply plug any DTMF telephone set into the rear panel RJ-11 jack labeled "PROG". This allows the telephone keypad to act as a programming keyboard. The front panel display will show either the keystrokes or the results of the keystrokes.

DTMF Over the Air Programming: The paging terminal can be programmed over the air from any DTMF equipped radio. A DTMF sequence is transponded in response to each command you enter and is used to display the results of your programming on our CD-2 or a special version of the Flex Series Controller.

Remote Dial Up Telephone Programming: Occasionally the paging terminal will be located out of radio range and over the air programming will not be possible. Simply dial up the paging terminal to do the programming. You can perform all the programming functions remotely that you can do locally. If the programming sequence is accepted, a DTMF sequence is transponded in response to each command you enter and is used to display the results on a special version of the Flex Series Controller. If the command entered is invalid, three beeps will be generated to tell the user a mistake has been made.

Computer Programming: This self contained program operating in the windows environment will allow the user to easily make changes to the characteristics of the paging terminal. This program is not expected to be released till something next year. This programming can be accomplished by using a laptop or other computer and plugging into the front panel plug or by attaching a modem into the back panel plug. If a modem is used, the unit can be programmed remotely.

To Enter and Exit Programming Mode: To enter the programming mode, you must enter the programming mode access code. The access code consist of six digits plus two leading pound "##" characters and a trailing pound character. The factory default programming access code is 123456. The programming access code is always six digits in length. Therefore the code to get into the programming mode is ##123456#. This code will be valid until you have changed the Programming Mode Access Code in the GLOBAL programming area.

When programming is completed, send ##### to exit the programming mode. If you forget, the Paging terminal is designed is designed to self exit a few minutes after the last DTMF command.

Command Syntax: When programming, you will enter a programming sequence such as *0000#03#1#. All commands start with a "*" and end with a "#". There may be one or more additional "#" to act as a delimiter between fields.

Leading zeros: Data fields require that you enter the precise number of digits specified. Numbers that have fewer digits than the field requires can use leading zeros.

Resetting your position: If you are distracted or have a lapse and forget where you are in the middle of a command sequence, simply send * three times (***) and start the sequence over again.

Displaying the field: All the fields can be displayed by the command *nnnn#nn*. The data followed by the # key is replaced by a single star. If system is being programmed by a telephone plugged into the back of the unit, the system will display the results on the internal LCD display. If the system is being programmed remotely by DTMF over the radio, then the DTMF string representing the field will be sent back over the radio. If the system is being programmed remotely by DTMF over the telephone, then the DTMF string representing the field will be sent back over the telephone. If the system is being programmed by a computer, then the results will be sent back over the RS232 connector located in the from and the back of the unit.

Different Areas: The programming of the system can be broken up into different areas. The first area which all products have is called the “Global Programming Area”. Depending on the product, different areas may be used such as the “Speed Calling Area” or the “Speed Dialing Area.” The details will be described below.

Gang Programming: Certain areas will allow gang programming. This is to allow an entire set of users to be programmed at once with the same value instead of having to set everybody individually. As an example, gang programming allows all CTCSS users to be turned on or be turned off. The details will be discussed in the various programming areas described below.

DIFFERENT PROGRAMMING AREAS

GLOBAL PROGRAMMING AREA

The global programming area is used to program parameters that is common to the entire product. All Global Programming commands start with *0000#. An example is *0000#01#J#

CTCSS PROGRAMMING AREA

The CTCSS programming area is used to program parameters where the CTCSS tone is of importance. As an example, the command *1067#04#1# is used to turn on user with a tone of 67 hertz.

The general form of this area is *1nnn#... where the 1 indicates the area is CTCSS and the nnn corresponds to a valid CTCSS number. If the nnn has a value of 999, then gang programming is used and the 51 different CTCSS users will have the same value programmed.

As an example, if you want to turn off all the CTCSS users, use the command *1999#04#0#. The 1 indicates it’s a CTCSS field, the 999 indicates it’s a gang programming command, the 04 indicates its an enable/disable user field, and the 0 indicates the user should be disabled.

DCS PROGRAMMING AREA

The DCS programming area is used to program parameters where the DCS code is of importance. As an example, the command *2023#04#1# is used to turn on user with a code of 023.

The general form of this area is *2nnn#... where the 2 indicates the area is DCS and the nnn corresponds to a valid DCS number. If the nnn has a value of 999, then gang programming is used and the 112 different DCS users will have the same value programmed.

As an example, if you want to turn off all the DCS users, use the command *2999#04#0#. The 2 indicates it’s a DCS field, the 999 indicates it’s a gang programming command, the 04 indicates its an enable/disable user field, and the 0 indicates the user should be disabled.

LTR PROGRAMMING AREA

The LTR programming area is used to program parameters where the LTR ID number and repeater number is of importance. As an example, the command *3015#246#04#1# is used to turn on user with a repeater number of 15 and a ID number of 246.

The general form of this area is *30nn#iii#... where the 30 indicates the area is LTR and the nn corresponds to a valid repeater number and iii is the ID number.

A valid repeater number has to be between 01 and 20 and a valid ID number has to be between 001 and 250. Leading zeros must be used for the repeater number and optionally for the ID number.

If the iii has a value of 999, then gang programming is used and the 250 different ID numbers for the repeater selected will have the same value programmed.

SPEED DIAL NUMBER AREA

The speed dial number area is used to program parameters relating to speed dialing. As an example, the speed dial number. In a normal phone patch operation, only the speed dial number is used. However, if wide area networking is desirable, then other parameters may be necessary.

The general form of this area is *40nn#... where the 40 indicates the area is speed dialing and the nn corresponds to the speed dial number position in memory. As an example, 4000 would indicate the first speed dial number position and 4010 would indicate the eleventh speed dial number position. If the 40nn is replaced by 4999, then gang programming is used and all 100 different speed dial number positions will have the same value programmed.

SPEED CALL NUMBER AREA

The speed call number area is used to program parameters relating to paging. Typically, the only parameter in the speed call number is the paging number. This allows a user to enter a number from 000 to 999 and the paging corresponding to that user will be generated. See pager number fields below for a more detailed description.

The general form of this area is *50nn#... where the 50 indicates the area is speed call and the nn corresponds to the speed call number position. As an example, 5000 would indicate the first speed call number position and 5010 would indicate the eleventh speed call number position. If the 50nn is replaced by 5999, then gang programming is used and all 100 different speed call number positions will have the same value programmed.

PUSH TO CONNECT USERS AREA

The push to connect users area is used to automatically connect different sites in a wide area network. This will be able to be used in conventional as well as LTR controllers.

The general form of this area is *60nn#... where the 60 indicate the area is for push to connect users and the nn corresponds to the push to connect users position. As an example, 6000 would

indicate the first push to connect users position and 6010 would indicate the eleventh push to connect users position. If the 60nn is replaced by 6999, then gang programming is used and all 100 different push to connect users positions will have the same value programmed.

VOICE PROMPT AREA

The voice prompt area is used to enter a voice message. This area is active in all products but not all products use the voice prompt capability.

For recording, the format used is *7000#n#0#. The value n corresponds to one of the eight voice memory locations whose maximum record time is as follows:

N	Maximum Record Time
0	9 seconds
1	9 seconds
2	9 seconds
3	9 seconds
4	9 seconds
5	25 seconds
6	25 seconds
7	25 seconds

The total record time for this product is two minutes.

To play back, use the command *7000#n*

When recording, the system will stop recording either when the maximum time has expired of the user enters any DTMF key.

PROGRAMMING FIELDS THAT HAVE TWO POSSIBILITIES

If the field is in the form of *nnnn#nn#J# such as the TELCO PROGRAMMING field which is *0000#01#J#, then the user must enter the value of 0 or 1 for the field. Any other number will be rejected. In most cases, J = 0 means disable the function and J = 1 means enable the function.

PROGRAMMING FIELDS THAT REQUIRE A STRING OF NUMBERS

If the field is in the form of *nnnn#nn#N..NN# sucb as the PROGRAMMING MODE ACCESS CODE field which is *0000#05#NNNNNN#, then the user must enter in a number for each of the characters. Some fields require all the numbers to be entered and some fields may only require one or more characters to be entered.

PROGRAMMING FIELDS THAT REQUIRE A VALUE

If the field is in the form of *nnnn#nn#MMM# such as the TURN ON DELAY field which is *0000#08#MM# or the DTMF TELCO LEVEL field which is *0000#11#MMM#, then the user must enter anywhere from one to three characters, depending on the field and the value must be in the range specified. Some fields allow a range of values and also the value of zero. There is no need for leading zeros.

PROGRAMMING FIELDS THAT EXPECT AN LTR USER

If the field is in the form of *nnnn#nn#RRIII#, then the system is expecting a valid LTR number. The first two digits is the repeater number and must be between 01 and 20. The next three digits is the ID number and must be between 001 and 250. Leading zeros must be entered.

PROGRAMMING FIELDS THAT EXPECT A PAGER NUMBER

When applicable, this system supports two tone, five six tone, CTCSS, DCS, LTR, and DTMF paging. A paging field is a variable length numeric field where the first three characters is the user paging number, the next four characters are the CTCSS/DCS number if used, and the rest of the characters are the paging format as shown below:

UUU CCCC 0 R	CTCSS/DCS	Signaling only
UUU CCCC 5 R	CTCSS/DCS	Signaling + one way voice
UUU CCCC 1 GT GT	TWO TONE	Signaling only
UUU CCCC 6 GT GT	TWO TONE	Signaling + one way voice
UUU CCCC 2 TTT	FIVE/SIX TONE	Signaling only
UUU CCCC 7 TTT	FIVE/SIX TONE	Signaling + one way voice
UUU CCCC 3 D...D	DTMF	Signaling only
UUU CCCC 8 D...D	DTMF	Signaling + one way voice
UUU 0000 4 RR III	LTR	Signaling only
UUU 0000 9 RR III	LTR	Signaling + one way voice

UUU can be any three digit number between 000 and 999 and is the number the user will enter when they want to page someone.

CCCC is the CTCSS or DCS number. If the number is a CTCSS number, then the first digit is a 1 and the next three numbers are any valid CTCSS number shown in a table below. If the number is a DCS, then the first digit is a 2 and the next three numbers are any valid DCS number shown in a table below. If the value is 0000, then the CTCSS/DCS tone is not used.

The next digit is between 0 and 9 and represents the type of paging format to be used as shown in the table above.

PROGRAMMING FIELDS THAT EXPECT A TELEPHONE NUMBER

If the field is in the form of *nnnn#nn#tt...t#, then the system is expecting a telephone number. Telephone numbers can have the following numbers and symbols:

0	5	*	D
1	6	#	W
2	7	A	+
3	8	B	(
4	9	C	)

The “W” key is used for wait for dial tone. The “+” key is used for delay 3 seconds, and the “(“ and “)” keys are used to delimit the telephone number to make it easier to read and has no effect on the dialing.

If you use a standard telephone keypad, the numbers and symbols are derived as follows:

0	press the 0 key
1	press the 1 key
2	press the 2 key
3	press the 3 key
4	press the 4 key
5	press the 5 key
6	press the 6 key
7	press the 7 key
8	press the 8 key
9	press the 9 key
*	press the 1 key for at least 3 seconds
#	press the 2 key for at least 3 seconds
A	press the 3 key for at least 3 seconds
B	press the 4 key for at least 3 seconds
C	press the 5 key for at least 3 seconds
D	press the 6 key for at least 3 seconds
W	press the 7 key for at least 3 seconds
+	press the 8 key for at least 3 seconds
(	press the 9 key for at least 3 seconds
)	press the 0 key for at least 3 seconds

If you have a keypad with the letters A – D, then those keys will generate A – D no matter how long or how short you hold down the key. The keys “*” and “#” will act for as control functions no matter how long or short you hold down the keys.

A- D will generate DTMF tones A – D.

PROGRAMMING FIELDS THAT REQUIRE AN ALPHNUMERIC STRING

Certain fields such as fields that require the user to enter in CWID characters or names require letters and numbers. Being that the telephone has only 10 numbers, a method has to be used to accommodate all the letters, special characters, and numbers with only ten numeric keys. This is accomplished by pressing two numeric keys for each letter. As the user enters the second key, the display will show the equivalent letter, special character, or number. The table to accomplish this is shown below.

CHAR	VALUE	CHAR	VALUE	CHAR	VALUE	CHAR	VALUE
A	00	Z	25	y	50	-	75
B	01	a	26	z	51	+	76
C	02	b	27	0	52	=	77
D	03	c	28	1	53	{	78
E	04	d	29	2	54	}	79
F	05	e	30	3	55	[	80
G	06	f	31	4	56	]	81
H	07	g	32	5	57	|	82
I	08	h	33	6	58	;	83
J	09	i	34	7	59	:	84
K	10	j	35	8	60	<	85
L	11	k	36	9	61	>	86
M	12	l	37	`	62	,	87
N	13	m	38	~	63	.	88
O	14	n	39	!	64	?	89
P	14	o	40	@	65	/	90
Q	16	p	41	#	66	sp	91
R	17	q	42	$	67	sp	92
S	18	r	43	%	68	sp	93
T	19	s	44	^	69	sp	94
U	20	t	45	&	70	sp	95
V	21	u	46	*	71	sp	96
W	22	v	47	(	72	sp	97
X	23	w	48	)	73	sp	98
Y	24	x	49	_	74	sp	99

Certain field require the user to enter a CTCSS or DCS number. The allowable values for that type of field is shows below.

CTCSS ALLOWABLE ENTRIES		
630	114	179
670	118	183
694	123	186
719	127	189
744	131	192
770	136	196
797	141	199
825	146	203
854	151	206
885	156	210
915	159	218
948	162	225
974	165	229
100	167	233
103	171	241
107	173	250
110	177	254

DCS ALLOWABLE ENTRIES							
006	051	132	214	266	365	464	627
007	053	134	223	271	371	465	631
015	054	141	225	274	411	466	632
017	065	143	226	306	412	503	654
021	071	145	243	311	413	506	662
023	072	152	244	315	423	516	664
025	073	155	245	325	431	523	703
026	074	156	246	331	432	526	712
031	114	162	251	332	445	532	723
032	115	165	252	343	446	546	731
036	116	172	255	346	452	565	732
043	122	174	261	351	454	606	734
047	125	205	263	356	455	612	743
050	131	212	265	364	462	624	754

SETTING EVERTHING BACK TO FACTORY DEFAULT

If for some reason it is necessary to set the system back to factory default, plug a telephone into the programming jack in the back of the unit and enter the command "**123456**. If the system is enabled to accept programming command from other sources such as over the radio, this command is valid from those sources too. You cannot disable the factory reset from working over the local programming jack.

GLOBAL PARAMETERS

TO PROGRAM | V **TO DISPLAY** | V

Programming Parameters

TELCO PROGRAMMING ***0000#01#J#** ***0000#01***
J = 0 = Disabled J = 1 = Enabled Default = 1
When enabled, the controller will allow a person to call in via the telephone and program the various parameters. If disabled, the phone line will never answer.

RADIO PROGRAMMING ***0000#02#J#** ***0000#02***
J = 0 = Disabled J = 1 = Enabled Default = 1
When enabled, the controller will allow the parameters to be programmed by radio. If disabled, the controller will ignore any attempt to program the parameters via radio.

PHONE PROGRAMMING ***0000#03#J#** ***0000#03***
J = 0 = Disabled J = 1 = Enabled Default = 1
When enabled, the controller will allow the parameters to be programmed by a telephone plugged into the programming port in the back of the controller. If disabled, the controller will ignore any attempt to program the parameters via a telephone plugged into the back of the controller.

COMPUTER PROGRAMMING ***0000#04#J#** ***0000#04***
J = 0 = Disabled J = 1 = Enabled Default = 1
When enabled, the controller will allow the parameters to be programmed by a telephone plugged into the programming port in the back of the controller. If disabled, the controller will ignore any attempt to program the parameters via a telephone plugged into the back of the controller.

PROGRAMMING MODE ACCESS CODE ***0000#05#NNNNNN#** ***0000#05***
NNNNNN = 000000 - 999999 Default 123456
Code must be precisely six digits. This code is used to enter the programming mode from all sources.

Voice Alarm Parameters

NUMBER OF INPUTS ***0000#06#M#** ***0000#06***
M = 1 - 2 Default = 1
If set to a 1, only the SENSE input is used. If set for a two, both the SENSE input and the COS input is used.

VOICE MSG FOR SENSE ALARM ***0000#07#M#** ***0000#07***

M = 1 - 7 Default = 1
This is the voice message number in case of an alarm on the sense input.

VOICE MSG FOR COS ALARM *0000#08#M# *0000#08*
M = 1 - 7 Default = 2
This is the voice message number in case of an alarm on the COS input.

VOICE MSG FOR SENSE RESTORE *0000#09#M# *0000#09*
M = 1 - 7 Default = 3
This is the voice message number in case of a restore on the sense input.

VOICE MSG FOR COS RESTORE *0000#10#M# *0000#10*
M = 1 - 7 Default = 4
This is the voice message number in case of a restore on the COS input.

REPEAT ON SENSE ALARM *0000#11#M *0000#11*
M = 1 - 9 DEFAULT = 1
This is the number of times the voice message will be sent in case there is no sense restore.

REPEAT ON COS ALARM *0000#12#M *0000#12*
M = 1 - 9 DEFAULT = 1
This is the number of times the voice message will be sent in case there is no COS restore.

REPEAT ON SENSE RESTORE *0000#13#M *0000#13*
M = 0,1 - 9 DEFAULT = 1
This is the number of times the voice message will be sent in case there is no additional sense alarm. If value of zero, restore function is disabled.

REPEAT ON COS RESTORE *0000#14#M# *0000#14*
M = 0,1 - 9 DEFAULT = 1
This is the number of times the voice message will be sent in case there is no additional COS alarm. If value of zero, restore function is disabled.

MESSAGE REPEAT INTERVAL *0000#15#MM# *0000#15*
MM = 1 - 99 in minute intervals DEFAULT = 20
This is the interval between voice messages for each alarm.

INTERALARM INTERVAL *0000#16#MM# *0000#16*
MM = 1 - 99 in second intervals DEFAULT = 5
This is the interval between types of messages. As an example, assume the sense and the COS alarm occurs about at the same time. The message repeat interval is set to 10 minutes and the interalarm interval is set to 5 seconds.

The first alarm will be sent immediately and the second alarm will be sent five seconds later. However the two alarms will not be repeated for 10 minutes.

Transmitter parameters

TURN ON DELAY ***0000#17#MM#** ***0000#17***
MM = 0 - 99 IN 10 mS increments Default = 10
This is the time the transmitter will be on before the message is retransmitted. This is to allow the transmitter to warm up so the first part of the message is not lost.

TURN OFF DELAY ***0000#18#MM#** ***0000#18***
MM = 0 - 99 in 10 mS increments Default = 99
This is the time the transmitter will be left on after the message is sent. This is to prevent squelch tail noise to be injected immediately after the end of the message.

TURN AROUND DELAY ***0000#19#MM#** ***0000#19***
MM = 0 - 99 in 100 mS increments Default = 20
This is the time from the end of a DTMF decode to the time the transmitter will be turned on. This is to allow the originating radio to stop transmitting before it receives either a message or a DTMF transmission.

Level Control

DTMF TELCO LEVEL ***0000#20#MMM#** ***0000#20***
MMM = 0 - 255 Default = 255
This is the level the DTMF will be transmitted over the telephone line. Used for remote programming.

DTMF RADIO LEVEL ***0000#21#MMM#** ***0000#21***
MMM = 0 - 255 Default = 50
This is the level the DTMF will be transmitted over the radio. Used for remote programming.

VOICE PREAMP GAIN ***0000#22#M#** ***0000#22***
M = 0 - 3 Default = 1
This is the preamp gain that will be used before the output from the voice chip is converted to a digital signal. The gain is per the chart below. If the gain on the receive had not been set properly, this can be used to adjust the level remotely.

N = 0: preamp gain = .5
N = 1: preamp gain = 1.0
N = 2: preamp gain = 2.0
N = 3: preamp gain = 4.0

RX PREAMP GAIN ***0000#23#M#** ***0000#23***

M = 0 - 3 Default = 1

This is the preamp gain that will be used to read the data from the radio. This affects how loud the signal will be on the voice chip before its recorded. The gain is per the chart below. If the gain on the RX Preamp had not been set properly, this can be used to adjust the level remotely

VOICE TRANSMIT LEVEL ***0000#24#MMM#** ***0000#24***

MMM = 10 - 255 Default = 255

This is the level the voice will be transmitted over the radio. If the gain on the transmit audio had not been set properly, this can be used to adjust the level remotely.

BEEP RADIO LEVEL ***0000#25#MMM#** ***0000#25***

MMM = 0 - 255 Default = 50

This is the level annunciating beeps will be heard over the radio.

BEEP TELCO LEVEL ***0000#26#MMM#** ***0000#26***

MMM = 0 - 255 Default = 50

This is the level annunciating beeps will be heard over the telephone.

Sense Parameters

SENSE ACQUISTION TIME ***0000#27#MM#** ***0000#27***

MM = 1 - 99 in 100 millisecond increments Default = 1

This parameter is the time sense must be valid before the system will consider the signal is valid. This is to prevent noise from trigger the system

SENSE RELEASE TIME ***0000#28#MM#** ***0000#28***

MM = 1 - 99 in 100 millisecond increments Default = 1

This parameter is the time sense must be invalid before the system will consider the signal no longer valid. This is to prevent noise from triggering the system.

SENSE POLARITY SELECT ***0000#29#J#** ***0000#29***

J = 1 = positive, J = 0 = negative Default = 1

If set for a positive voltage, then any voltage above the sense Trigger Voltage will set sense true. If set for a negative voltage, then any voltage below the sense trigger voltage will set sense true. There is a one half volt hysterises built in.

SENSE TRIGGER VOLTAGE ***0000#30#MMM#** ***0000#30***

MMM = 0 - 255 Default = 128

This is the trigger point that will cause the sense to be active. The trigger voltage is given by the formula:

$$12 \times NNN/256$$

Therefor a value of 128 will correspond to a trigger voltage of 12 x 128/256 or a value of 6 volts.

COS PARAMETERS

COS ACQUISTION TIME ***0000#31#MM#** ***0000#31***
MM = 1 - 99 in 100 millisecond increments Default = 1
This parameter is the time COS must be valid before the system will consider the signal is valid. This is to prevent noise from trigger the system

COS RELEASE TIME ***0000#32#MM#** ***0000#32***
MM = 1 - 99 in 100 millisecond increments Default = 1
This parameter is the time COS must be invalid before the system will consider the signal no longer valid. This is to prevent noise from triggering the system.

COS POLARITY SELECT ***0000#33#J#** ***0000#33***
J = 1 = positive, J = 0 = negative Default = 1
If set for a positive voltage, then any voltage above the COS Trigger Voltage will set COS true. If set for a negative voltage, then any voltage below the COS trigger voltage will set COS true. There is a one half volt hysterises built in.

COS TRIGGER VOLTAGE ***0000#34#MMM#** ***0000#34***
MMM = 0 - 255 Default = 128
This is the trigger point that will cause the COS to be active. The trigger voltage is given by the formula:

12 x MMM/256

Therefor a value of 128 will correspond to a trigger voltage of 12 x 128/256 or a value of 6 volts.

BUSY CHANNEL INHIBIT ***0000#35#J#** ***0000#35***
J = 0 - 1 Default = 0
If the busy channel inhibit is set to a 1, then the system will not transmit the voice message until the channel has not been busy for at least five seconds. The system gets the status of the channel only from the internal squelch which means the system to use this feature must have the audio input connected directly to the discriminator of the radio.

VOICE ALARM OPERATION

The user prerecords the different messages in the system. When an alarm occurs as defined as an active sense or COS input, a voice alarm will be generated and transmitted over the radio. When the sense or COS input goes to the inactive state, another voice message will be generated and transmitted over the radio.

The message will be repeated over fixed intervals defined by the user and repeated the number of times as defined by the user. When the system goes from an alarm state to a restore state, the alarm voice message will stop from being repeated again. If the system is transmitting the restore message and the alarm occurs again, the system will stop sending additional restore messages. In either case the system will send at least one alarm message if there is an alarm and one restore message if there is a restore.

The system is defined so the minimum time between alarm or restore messages of the same type is at least one minute. There is no such restriction on the time between messages of different types.

GENERAL CIRCUIT DESCRIPTION

Telephone Interface

Telephone call comes in Telco Jack J1. If the voltage exceeds about 250 volts, the two varistors, V1 and V2 will conduct and blow the two fuses F1 and F2. This protects against lightning and other high voltage transients on the telephone line.

If the systems gets a ringing voltage, the optoisolator Q1 will conduct and the output RD1 will present a square wave at the microprocessor whose frequency is the same as the incoming ringing frequency. The microprocessor will determine if it's a valid ringing signal. The optoisolator Q2 determines if the voltage on the telephone is about 48 volts. If it is the signal LB1 will be grounded. If the voltage goes below about 48 volts that point will be high.

When the telephone line is connected and the relay is pulled in, then the two optoisolaters Q3 and Q4 will indicate the presence of loop current and the direction of the current. This circuit allows the system to determine if the phone line has been hung up by a momentary loss of loop current of a reversal of the loop current.

The hybrid transformers T1 and T2 along with the balancing network allows the system to separate the receive and transmit audio. This is only necessary in a full duplex phone patch.

Receive Telephone Audio

The output of T1 is presented to U1D where the Op-Amp provides an anti-aliasing filter to the Voice storage chip U17 and the DTMF decoder U3. The receive telephone audio passes to the Analog to Digital Converter on the microprocessor as the signal AD-TELCO and to the circuitry surrounding U1A where the function of Telephone Vox is implemented.

Transmit Telephone Audio

The output of the Digital to Analog Converter from the microprocessor (DA_TELCO) is passed to U19 which forms a five pole low pass filter. This circuitry is needed properly reconstruct the data coming from the microprocessor. U1B provides gain before being outputed to the telephone line.

Voice Storage Chip

The voice storage chip is used to store up to two minutes of voice from either the telephone, programming port, or the radio.

The connection from the radio to the voice storage chip is not direct. To acomplish this task, the unit digitizes the voice from the radio and then outputs it to the telephone. If the telephone line relay is not pulled in or the system is not connected to the telphone line, then the hybrid is not balanced and the audio to the telephone output will be reflected back to the telephone audio input where it then has a clear path to the voice storage chip.

Telephone DTMF Decoder

The audio from the telephone is decoded by the DTMF decoder U3. When pin 15 on the DTMF decoder chip is high, it signals to the microprocessor pin that data is waiting where it is then read.

Radio Receive Audio

U5A provides a low pass filter used to get rid of high frequency garbage from the radio. U5B provides the de-emphasis network. The audio from U5B goes to the RX-VOX, DTMF decoder, zero crossing detector, and the 6 pole high pass filter consisting of U10A, U10B, and U10D. The output of the filter is used to remove subaudible CTCSS,DCS, or LTR tones from the radio before being presented to the microprocessors A/D converter.

The receive audio also goes to U13A-U13D, U18A and U18B which is a squelch detector. The squelch detector is used to determine the presence of squelch noise from the radio receiver.

Radio Transmit Audio

The output of the microprocessors D/A converter is reconstructed by U20, a five pole low pass filter. U4C is used to get rid of any high frequency clock noise from the audio and U4D is used to amplify the results before being presented as transmit audio.

Squelch Detector

U13A and U13B act as a four pole high pass filter to remove any low frequency signals below about 11KHz. U13 act as a gain stage where it is then detected by U13D. R110 and C92 act as a smoothing filter where it is then presented to the microprocessor via U18B

Zero Crossing Detector

U6D and U6C act as a four pole low pass filter designed to pass only the CTCSS, DCS or LTR subaudible signals. U6A and U6B along with the transistors act as a zero crossing detector where it is then presented as a digital signal to the microprocessor.

COS Detector

U4B acts as a buffer between the outside world and the A/D converter on the microprocessor. The logic within the microprocessor determines if the COS should be derived from the COS detector or the Squelch detector.

Push To Talk
Transistor Q9 acts as a buffer between the microprocessor and the outside world. D14 is used to protect the circuit against any transients.

Sense Detector
U4A acts as a buffer between the outside world and the A/D converter on the microprocessor. The logic within the microprocessor determines the function of that signal.

EEPROM
The EEPROM is used for parameter storage and occasionally certain real time data. The part is read and written to by the IIC port on the microprocessor.

Computer Interface
U12 converts the RS232 levels to levels compatible with the first UART internal to the microprocessor.

External Network
U16 converts the levels from the second UART built into the microprocessor to the appropriate levels compatible with RS485 communications. This can be used to tie multiple flex series controller together.

LCD Interface
The microprocessor talks to the LCD controller via a four bit interface.

Aux Relay
The microprocessor can turn on and off the auxiliary relay by means of a control pin attached to R93.

JTAG Interface
The microprocessor can be reprogrammed via a JTAG interface. This allows the user to change the characteristic of the controller by means of software available on our web site.

Power Supply
The power supply generates 12 volts, 5 volts, and 3.3 volts from a 12 volt or greater power source.

LIMITED WARRANTY

Connect Systems Inc. (CSI) hereby warrants our products to be free from defective workmanship for a period of one year and defective parts for a period of one year from date of sale to the initial end user. This warranty applies only to the original consumer/end user purchaser of each FLEX SERIES CONTROLLER. During the first year of warranty, CSI will repair any of its products at no charge providing the defective unit is shipped prepaid and service is performed by CSI. Conventional prevailing labor and shipping charges will apply following the end of the first year. CSI, at its sole discretion, will replace defective parts on an exchange basis for the first year of ownership by the original purchaser. All shipping cost are the responsibility of the customer.

What is not covered by this limited warranty:

This warranty shall not apply, if, in our judgment the defects are caused by misuse, lightning strikes, customer modification, water damage, negligent use, improper installation, overloads caused by external voltage fluctuations, use of unregulated power supply, damage caused by transit or handling or an abusive treatment not in accordance with ordinary product use or the product serial number has bee removed, altered, or defaced. **Specific Exclusion:** This warranty specifically excludes lightning protection devices (MOVs and phone line fuses) and transistors in the PTT (Push to Talk) circuitry. These components can only fail from external abuse.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, STATEMENTS OR REPRESENTATIONS, AND UNLESS STATED HEREIN, ALL SUCH WARRANTIES, STATEMENTS OR REPRESENTATIONS MADE BY ANY OTHER PERSON OR FIRM ARE VOID. ALL IMPLIED WARRATIES IN CONNECTION WITH THE SALE OF THIS EQUIPMENT, INCLUDING THE WARRANTY OF MERCHANTABILITY, SHALL BE OF THE SAME DURATION AS THE WARRANTY PERIOD STATED ABOVE. SOME STATES DO NOT ALLOW LIMITATIONS OF HOW LONG AN IMPLIED WARRANTY LAST, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. IN THE EVENT OF PRODUCT FAILURE WHICH PROVES TO BE CAUSED BY A DEFECT IN WORKMANSHIP OF MATERIALS, YOUR SOLE REMEDY SHALL BE THE REPAIR OF THE DEFECT BY CSI OR ITS APPOINTED REPAIR STATION AS STATION AS STATED IN THIS WARRANTY, AND UNDER NO CIRCUMSTANCES SHALL CSI BE LIABLE FOR ANY LOSS OR DAMAGE, DIRECT, INCIDENTAL, OR CONSEQUENTIAL, ARISING OUT OF THE USE, OR INABILTY TO USE, THIS PRODUCT. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APLLY TO YOU.

If your new CSI product shall ever fail, contact Connect Systems Inc. Customer Service Dept. for repair and warranty information at (805) 642-7184

Note: Connect Systems Inc. reserves the right to render a modest service charge when returned units are found to be free of parts or workmanship defect(s) (i.e. operating to factory specification) within the first year of warranty. Such units will be returned freight collect to the sender, including the appropriate service charge.

APPENDIX A

FCC NOTICE TO USERS

1. This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference which may cause undesirable operation.

2. This equipment generates and uses radio frequency energy and if not installed and used properly, i.e. in strict accordance with the service manual, may cause interference to radio or television reception. It has been tested and found to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a residential installation.

3 If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

   a. Reorient the receiving antenna.

   b. Relocate the equipment with respect to the receiver.

   c. Move the equipment away from the receiver.

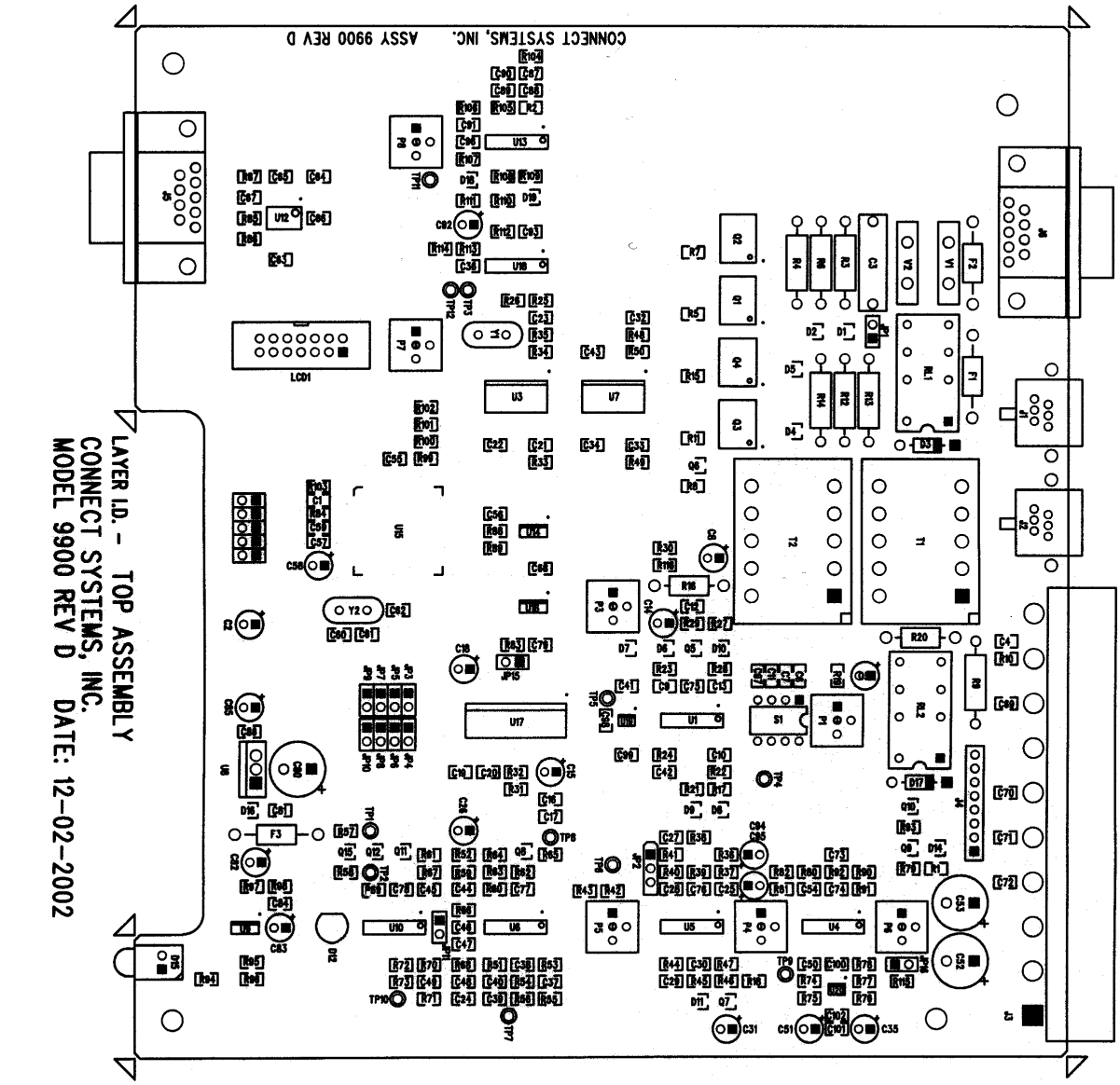
   d. Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.

   e. Ensure that card mounting screws, attachment connector screws, and ground wires are tightly secured.

   f. If cables not offered by this company are used with this equipment, it is suggested that you use shielded, grounded cables with in line filters, if necessary.

   g. If necessary consult your dealer service representative for additional suggestions.

4 The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.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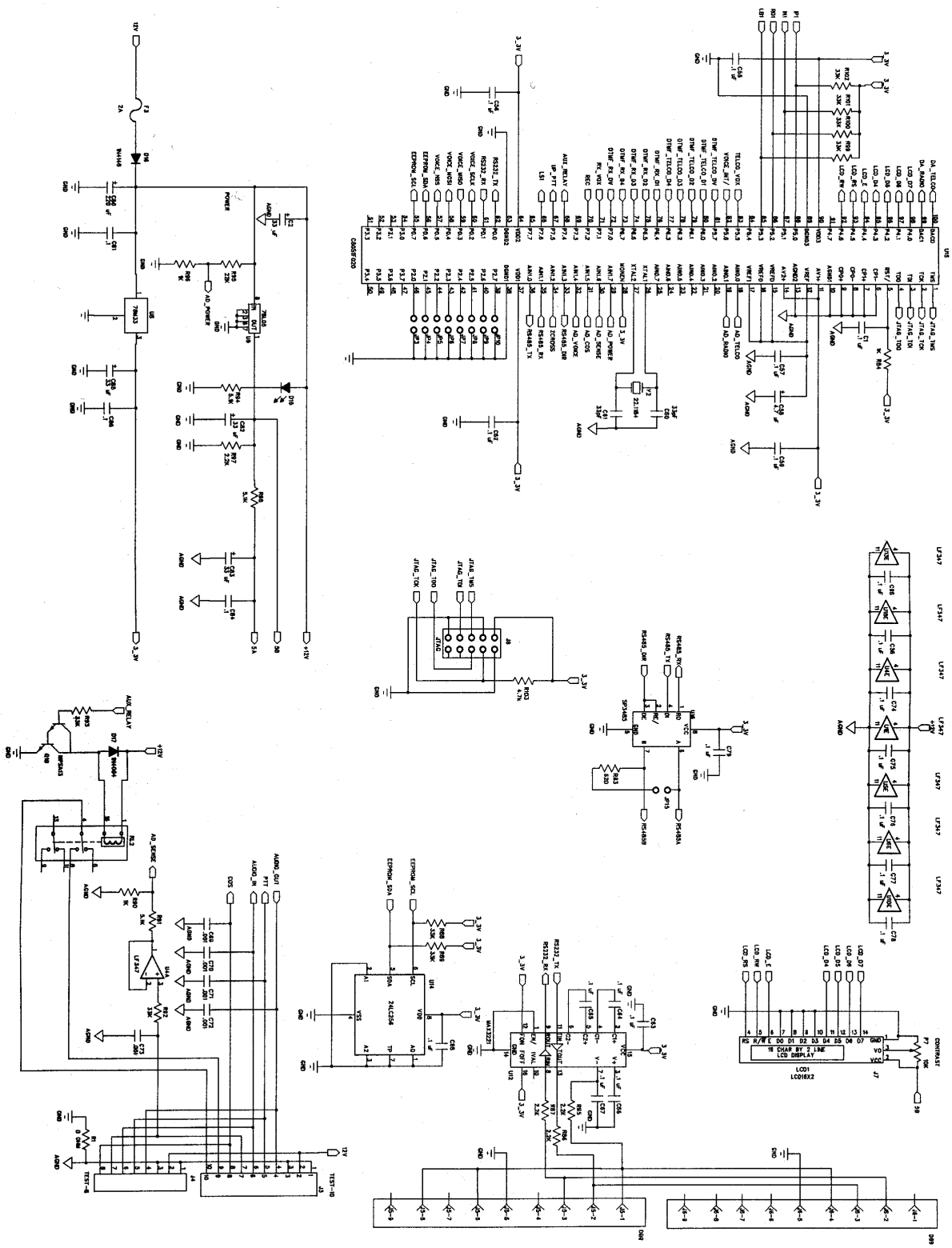

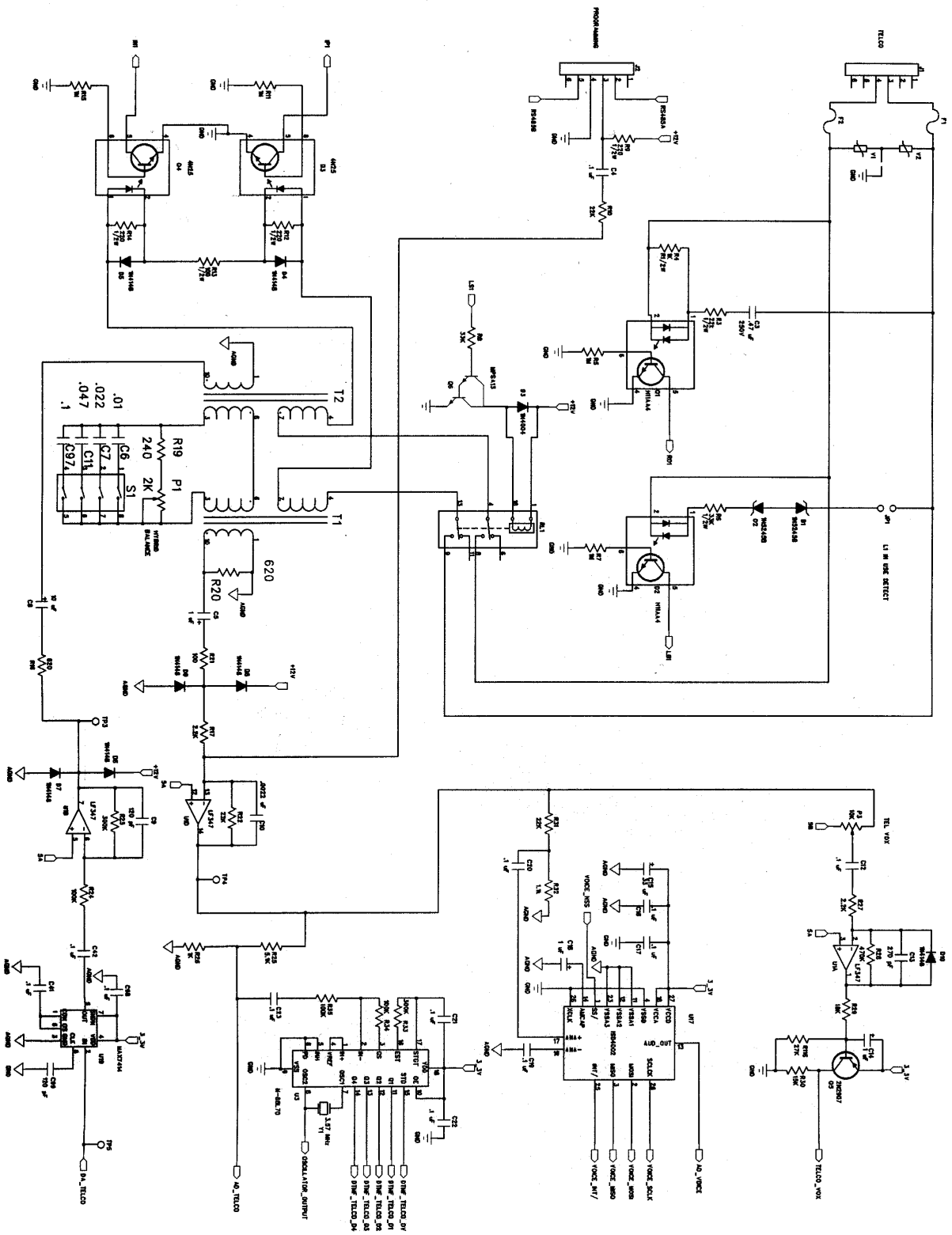
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MAX7444
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L12 TEL HOOK
L13 TEL RING
L14 TEL LINE
L15 TEL GND
L16 TEL +12V
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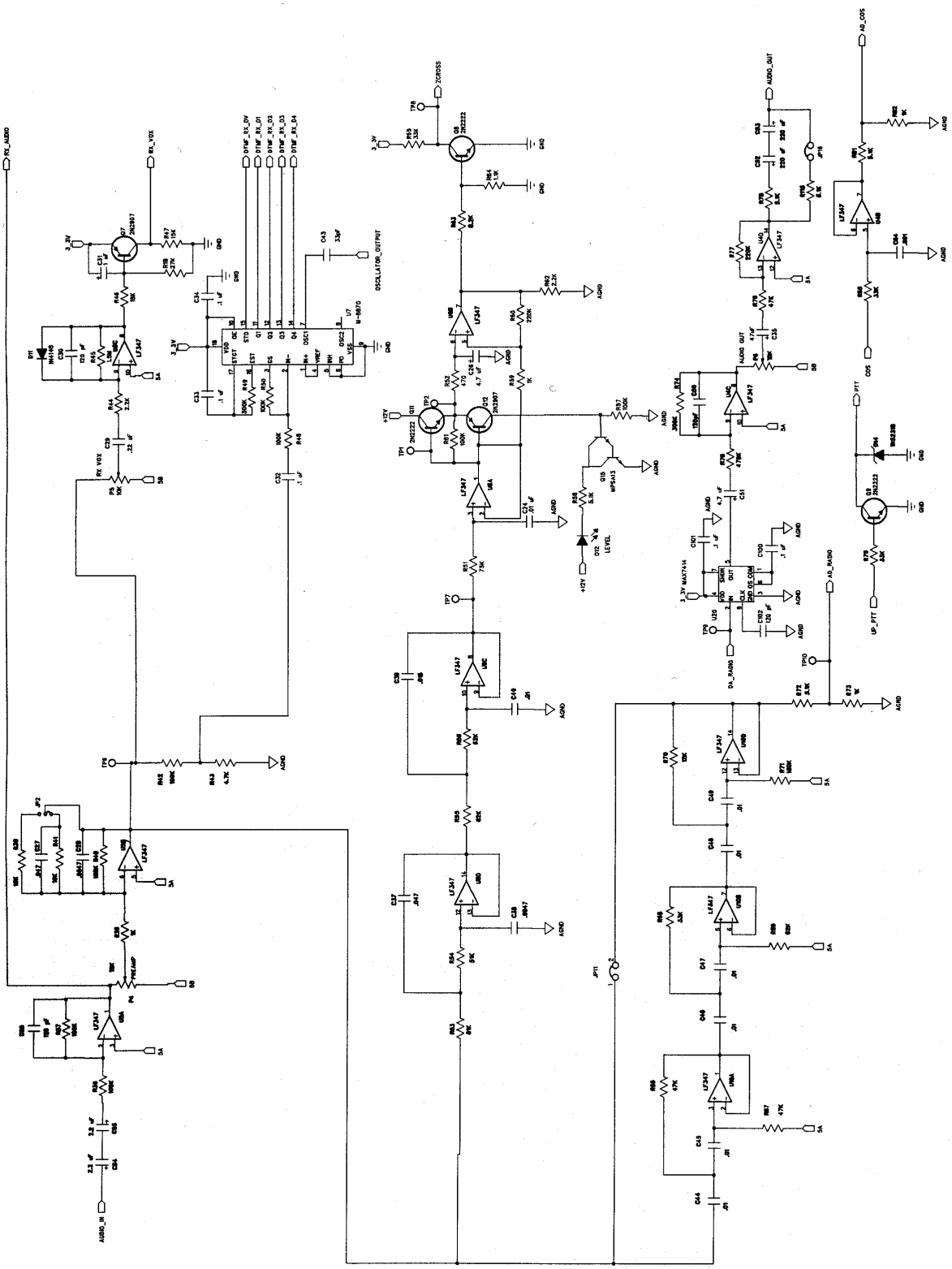

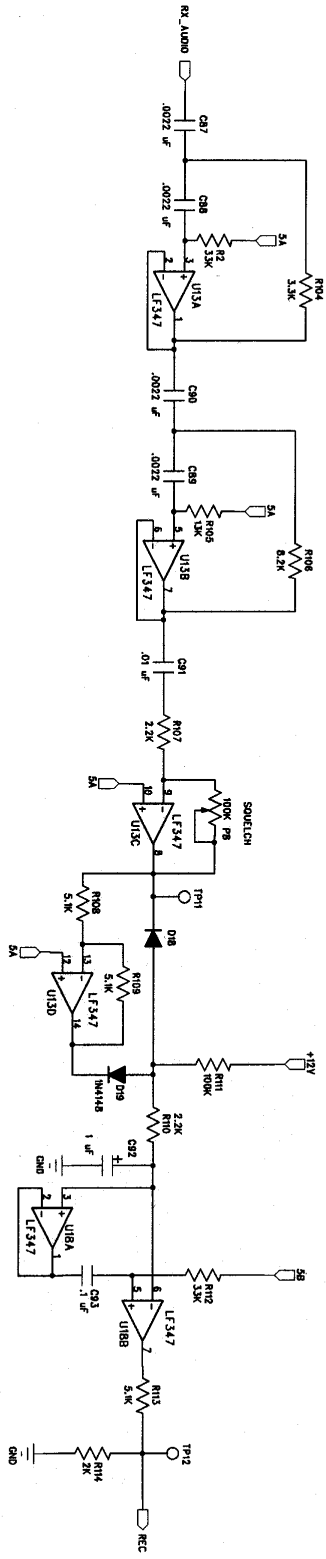
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CONNECT SYSTEMS INC. 1802 EASTMAN AVE #116 VENTURA, CA. 93003	PARTS LIST PCBA, MODEL 9900 SHEET 1 OF 7	REV C

ITEM	QTY UNIT	QTY ISSUED	DESCRIPTION	REF DESIGNATION
1	1		P.C.B., MODEL 9900	MODEL 9900
2				
3	3		CAP, SMD 0805, 33 pF 08055A330JAT2A	C60,C61,C43
4	6		CAP, SMD 0805, 120 pF 08055A121JAT2A	C9,C25,C30,C50,
5				C99,C102
6	1		CAP, SMD 0805, 270 pF 08055A271JAT2A	C13
7				
8	6		CAP, SMD 0805, .001 uF 008055C102JAT2A	C54,C69,C70,C71,
9				C72,C73
10	5		CAP, SMD 0805, .0022 uF 08055C222JAT2A	C10,C87,C88,C89,
11				C90
12	2		CAP, SMD 0805, .0047 uF 08055C472JAT2A	C28,C38
13	10		CAP, SMD 0805, .01 uF 08055C103JAT2A	C6,C24,C40,C44,
14				C45,C46,C47,C48,
15				C49,C91
16				
17	1		CAP, SMD 0805, .015 uF 08055C153JAT2A	C39
18	1		CAP, SMD 0805, .022 uF 08055C223JAT2A	C7
19	3		CAP, SMD 0805, .047 uF 08055C473JAT2A	C11,C27,C37
20				
21				
22				
23				
24				

CONNECT SYSTEMS INC. 1802 EASTMAN AVE #116 VENTURA, CA. 93003	PARTS LIST PCBA, MODEL 9900 SHEET 2 OF 7	REV C

ITEM	QTY UNIT	QTY ISSUED	DESCRIPTION	REF DESIGNATION
25	42		CAP, SMD 0805, .1 uF 08055C104KAT2A	C1,C4,C12,C16,
26				C17,C19,C20,C21,
27				C22,C23,C32,C33,
28				C34,C36,C41,C42,
29				C55,C56,C57,C59,
30				C62,C63,C64,C65,
31				C66,C67,C68,C74,
32				C75,C76,C77,C78,
33				C79,C81,C84,C86,
34				C93,C96,C97,C98,
35				C100,C101
36				
37	1		CAP, SMD 0805, .22 uF 08053C224KAT2A	C29
38	1		CAP, .47 uF, 250V, EF2474-NO	C3
39	5		CAP, 1 uF, 50V, ELECT, 50TWSS1	C5,C14,C18,C31,
40				C92
41				
42	2		CAP, 2.2 uF, 50V, ELECT, 50TWSS2R2	C94,C95
43	3		CAP, 4.7 uF, 50V, ELECT, 50TWSS4R7	C26,C51,C58
44	1		CAP, 10 uF, 50V, ELECT, 50TWSS10	C8
45	5		CAP, 33 uF, 25V, ELECT, 25TWSS33	C2,C15,C82,C83,
46				C85
47				
48	1		CAP, 47 uF, 35V, ELECT, 35TWSS47	C35

CONNECT SYSTEMS INC. 1802 EASTMAN AVE #116 VENTURA, CA. 93003	PARTS LIST PCBA, MODEL 9900 SHEET 3 OF 7	REV C

ITEM	QTY UNIT	QTY ISSUED	DESCRIPTION	REF DESIGNATION
49	3		CAP, 220 uF, 35V, ELECT, 35TWSS220	C52,C53,C80
50				
51	2		CONNECTOR, RJ11, 6 POS, 66011-002	J1-J2
52	1		CONNECTOR, 10 POS BARR BLK 70810C	J3
53	1		CONNECTOR, 8P HDR, LONG PIN, 22-03-2082	J4
54	1		CONNECTOR, DB9P, RT ANG, DE9P318,104942	J6
55	1		CONNECTOR, DP9S, RT ANG, DE9S318,104951	J5
56				
57	1		CONNECTOR, 2 x 5,FAN-10SGS	JTAG
58	2		HEADER, 2 x 4 PIN TDB-08SGS	JP3-JP10
59	1		HEADER, 14 PIN, 2X7, 10-88-1141	LCD
60	4		CONNECTOR, 2 PIN HEADER, TD-2SG	JP1,JP11,JP15,
61				JP16
62	1		CONNECTOR, 3 PIN HEADER, TD-3SG	JP2
63	3		CONNECTOR, SHORTING BLOCK, DM-2GM-0	JP1,JP15,JP16
64	2		DIODE, 1N5245B,ZENER, 15V, CMBZ5245B	D1-D2
65	2		DIODE, 1N4004	D3,D17
66	11		DIODE, 1N4148, MMBD4148	D4,D5,D6,D7,D8,
67				D9,D10,D11,D16,
68				D18,D19
69	1		DIODE, 1N5231B,ZENER, 5.1V, CMBZ5231B	D14
70	1		LED ASSY, RED, LL64233R, LTL-523-11	D15
71	1		LED, RED, SMALL, 35BL504	D12
72				

CONNECT SYSTEMS INC. 1802 EASTMAN AVE #116 VENTURA, CA. 93003	PARTS LIST PCBA, MODEL 9900 SHEET 4 OF 7	REV C

ITEM	QTY UNIT	QTY ISSUED	DESCRIPTION	REF DESIGNATION
73	2		FUSE, 255.250	F1,F2
74	1		FUSE, 2 AMP, 473.002	F3
75	2		I.C. H11AA4.S, OPTOISOLATOR	Q1,Q2
76	2		I.C. 4N25.S-M, OPTOISOLATOR	Q3,Q4
77	7		I.C. LF347M, QUAD OP AMP	U1,U4,U5,U6,U10,
78				U13,U18
79				
80	2		I.C. M-88L70-01S, DTMF DECODER	U3,U7
81	1		I.C. uA78M33CKC, 3.3 V REGULATOR	U8
82	1		I.C. LM78L05ACM, 5.0 V REGULATOR	U9
83				
84				
85	1		I.C. MAX3221CAE, RS232 INTERFACE	U12
86	1		I.C. 24LC256I/SN, 256K IIC EEPROM	U14
87	1		I.C. C8051F124, MICROPROCESSOR	U15
88	1		I.C. SP3485CN, RS485 TRANCEIVER	U16
89				
90	1		I.C. ISD4002-120S, VOICE RECORDER	U17
91	2		I.C. MAX7413CUA, 5th ORDER BESSEL FLTR	U19,U20
92				
93	1		POT, 2K, 3386P-1-202	P1
94	5		POT, 10K, 3386P-1-103	P3,P4,P5,P6,P7
95	1		POT, 100K, 3386P-1-104	P8
96				

CONNECT SYSTEMS INC. 1802 EASTMAN AVE #116 VENTURA, CA. 93003	PARTS LIST PCBA, MODEL 9900 SHEET 5 OF 7	REV A

ITEM	QTY UNIT	QTY ISSUED	DESCRIPTION	REF DESIGNATION
97	2		RELAY, G5V-2-DC12	RLY1,RLY2
98				
99	1		RESISTOR, 1/2 W, 100, CARBON FILM	R13
100	3		RESISTOR, 1/2 W, 220, CARBON FILM	R9,R12,R14
101	1		RESISTOR, 1/2 W, 1K, CARBON FILM	R4
102	1		RESISTOR, 1/2 W, 22K, CARBON FILM	R3
103	1		RESISTOR, 1/2 W, 33K, CARBON FILM	R6
104	2		RESISTOR, 1/4 W, 620, CARBON FILM	R16,R20
105	1		RESISTOR, SMD 0805, 0	R1
106	1		RESISTOR, SMD 0805, 100	R21
107	1		RESISTOR, SMD 0805, 240	R19
108	1		RESISTOR, SMD 0805, 470	R52
109	1		RESISTOR, SMD 0805, 620	R83
110				
111	8		RESISTOR, SMD 0805, 1K	R26,R39,R59,R73,
112				R82,R84,R90,R96,
113	2		RESISTOR, SMD 0805, 1.1K	R32,R64
114	1		RESISTOR, SMD 0805, 2K	R114
115	10		RESISTOR, SMD 0805, 2.2K	R17,R27,R44,R62
116				R85,R86,R87,R97,
117				R107,R110
118	1		RESISTOR, SMD 0805, 3.3K	R104
119	2		RESISTOR, SMD 0805, 4.7K	R43,R103
120				

CONNECT SYSTEMS INC. 1802 EASTMAN AVE #116 VENTURA, CA. 93003	PARTS LIST PCBA, MODEL 9900 SHEET 6 OF 7	REV A

ITEM	QTY UNIT	QTY ISSUED	DESCRIPTION	REF DESIGNATION
121	12		RESISTOR, SMD 0805, 5.1K	R25,R58,R72,R78,
122				R81,R91,R94,R98,
123				R108,R109,R113,
124				R115
125	2		RESISTOR, SMD 0805, 8.2K	R63,R106
126	2		RESISTOR, SMD 0805, 10K	R38,R41
127	1		RESISTOR, SMD 0805, 12K	R70
128	1		RESISTOR, SMD 0805, 13K	R105
129	2		RESISTOR, SMD 0805, 15K	R30,R47
130	2		RESISTOR, SMD 0805, 18K	R29,R46
131	4		RESISTOR, SMD 0805, 22K	R10,R22,R31,R95
132	2		RESISTOR, SMD 0805, 27K	R18,R116
133	15		RESISTOR, SMD 0805, 33K	R2,R8,R65,R68,
134				R79,R80,R88,R89,
135				R92,R93,R99,
136				R100,R101,R102,
137				R112
138	3		RESISTOR, SMD 0805, 47K	R66,R67,R76
139	2		RESISTOR, SMD 0805, 51K	R53,R54
140	3		RESISTOR, SMD 0805, 62K	R55,R56,R69
141	1		RESISTOR, SMD 0805, 75K	R51
142	11		RESISTOR, SMD 0805, 100K	R24,R34,R35,R37,
143				R40,R42,R48,R50,
144				R57,R61,R111

CONNECT SYSTEMS INC. 1802 EASTMAN AVE #116 VENTURA, CA. 93003	PARTS LIST PCBA, MODEL 9900 SHEET 7 OF 7	REV A

ITEM	QTY UNIT	QTY ISSUED	DESCRIPTION	REF DESIGNATION
145	1		RESISTOR, SMD 0805, 150K	R36
146	1		RESISTOR, SMD 0805, 180K	R71
147	2		RESISTOR, SMD 0805, 220K	R60,R77
148	4		RESISTOR, SMD 0805, 300K	R23,R33,R49,R74
149	2		RESISTOR, SMD 0805, 470K	R28,R75
150	4		RESISTOR, SMD 0805, 1M	R5,R7,R11,R15
151	1		RESISTOR, SMD 0805, 1.5M	R45
152				
153	1		SWITCH, 4 POSITION DIP, CTS-206-4	S1
154	2		TRANSFORMER, 671-1898	T1,T2
155				
156	3		TRANSISTOR, MMBT2907A/MMBT2907A-LT1	Q5,Q7,Q12
157	3		TRANSISTOR, MMBTA13/MMBTA13-LT1	Q6,Q10,Q15
158	3		TRANSISTOR, MMBT2222A/PMBT2222A	Q8,Q9,Q11
159				
160	2		VARISTOR, V250LA20, MOV, 250V	V1,V2
161				
162	1		XTAL, 3.58 MHz, KD0048FCB	Y1
163	1		XTAL, 22.1184 MHz, FOX 221	Y2
164				
165	1		LABOR, ASSEMBLY, 9900 PCB	
166				
167				
168				

Version 1.00

Original Manual

Version 1.01 of Manual and 1.3 of Software

Added feature where the restore function for both the sense and the COS can be disabled. Changes affect Parameter 13 and Parameter 14.