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**CELLULAR ALARM
TRANSMISSION SYSTEM**

TELGUARD SC

MODELS T-1610, T-1620, T-1630, T-1110 AND T-1210

INSTALLATION AND OPERATING INSTRUCTIONS

COMPANY CONFIDENTIAL

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INTRODUCTION

TELGUARD SC family of cellular alarm transmission systems enable any host control/communicator (C/C) to send its alarm signals over the cellular network to the central station. Most often TELGUARD is used to backup the host C/C's wired Telco line. If the wired line becomes inoperative, TELGUARD's built-in line fault monitor switches the host C/C's path of communication to cellular. In that mode, the C/C dials the same phone number it would have if on the wired line and sends the same alarm message once connected to the central station receiver. TELGUARD can be installed wherever cellular service is available and can transmit alarms to any location where wired phone service exists.

TELGUARD is also used extensively where no Telco service is available for transmitting all alarms exclusively over cellular. Examples of this application include moving vehicles, construction job sites and remote facilities.

Economy Model T-1610M is intended to back up host C/C or to transmit alarms exclusively over cellular where no phone service exists. It is our least expensive version. Economy Model T-1620M has all the capabilities of the T-1610M, plus the automatic self test feature. Economy Model T-1630M has all the capabilities of the T-1620M, plus the ability to receive incoming calls over cellular. This enables down loading to the host C/C when the wired line is inoperative.

Standard Model T-1110M has all the capabilities of the T-1620M, plus the Priority Phone for making/receiving calls over cellular using any standard phone device including computer modems and faxes. Deluxe Model T-1210M is like the T-1110M, plus it also has the CelSwitch feature for automatically switching all premise phones to cellular when the incoming phone line being used by TELGUARD becomes inoperative.

Underwriter's Laboratories Model T-3100UL is also available. It has features similar to T-1110M with installation requirements enabling Underwriters Laboratories Listings.

THIS MANUAL COVERS ALL MODELS EXCEPT THE T-3100UL

Getting Ready

Before attempting to connect TELGUARD to the host C/C, please note the following:

1. Be sure your unit has cellular service activated and that it's transceiver has been NAM programmed. (See Appendix IIA and IIB)
2. Be sure you have all the proper parts before you go to the job site:

- a. Basic TELGUARD unit, with antenna.
- b. Plug in transformer and backup battery.

NOTE: Transformer (16 VAC, 40 VA min) is supplied with all models. Battery (12 VDC, 7.0 AH min) is not supplied with the unit. You must source it separately.

c. Connecting cables

- Cable for connecting the C/C's digital dialer to TELGUARD (Not supplied). Use same cable that is normally used to connect the C/C'S dialer to the RJ31X. It must have a standard 8 pin plug connector on the RJ31X end for plugging into TELGUARD.
- Cable for connecting TELGUARD to RJ31X Jack. Use Jack-to-Jack (J/J) cable supplied.
- Optional cable for connecting butt set to TELGUARD during installation only in order to make voice calls over cellular. Use Jack-to-spade lug (J/SL) cable supplied.

3. Bring something to use at job site to make voice calls over cellular through TELGUARD so that you can verify cellular service and optimize antenna location during installation.

- It is most convenient to use a lineman's butt set to make calls over cellular. Optimal signal strength is then determined by placing the antenna where the most LEDS (up to six) are lighted when using TELGUARD's Signal Strength Indicator feature.
- It is also possible to use a standard (Motorola KS) cellular handset to make calls during installation. Most any Motorola handset will work. Handsets are also available from Adcor.

Cellular handsets also have a signal strength readout on the LCD. This provides an alternate to TELGUARD's Signal Strength Indicators so that the antenna can be easily placed during installation where signal strength is greatest. If you are doing your own NAM programming, a cellular handset is mandatory.

Installation Summary

There are five steps in installing TELGUARD properly. IF YOU DO NOT PROCEED IN THE ORDER AND MANNER PRESCRIBED, YOU MAY NOT COMPLETE THE INSTALLATION IN THE TIME ALLOCATED. These five steps are summarized below and then explained in detail in the remainder of this manual.

1. CONFIRM VOICE COMMUNICATIONS OVER CELLULAR. First you will be confirming that TELGUARD's cellular service is working, and that the cellular signal is strong enough in the exact location where the antenna will be placed. To do this, you will be making voice calls, using either a lineman's butt set or a cellular handset.

This is the most important step in the installation, since it is much easier to verify good cellular activation and signal strength using voice than later when TELGUARD is transmitting digital alarm signals from the C/C. Most installation delays occur due to poor initial antenna placement.

2. TRANSMIT ALARM SIGNALS OVER CELLULAR. Next, you will be connecting the C/C's digital dialer output to TELGUARD and verifying that alarm signals can be reliably sent through TELGUARD over cellular to the central station digital receiver.

Certain C/C's may require special programming to work over cellular. This is the step where such requirements are addressed.

3. CONNECT INCOMING TELCO LINE. Once alarms are being successfully transmitted over cellular by the C/C, you will be ready to connect TELGUARD to the incoming phone line at the RJ31X and then to be sure it properly switches to and from cellular upon Telco line fault.

TELGUARD must be the first device on the incoming phone line in order to prevent TELGUARD from going into Telco Line Fault Condition when a phone device in front of it goes off hook. This is the step where this is checked.

4. CONNECT SUPERVISORY TRIP OUTPUTS. Next you will be ready to hook TELGUARD's supervisory trip outputs to the C/C zone inputs and to be sure they work correctly.

There are several possible trip outs, often more than can be accommodated on the host C/C. Therefore, this is where a decision must be made on which supervisory conditions to report.

5. COMPLETE INSTALLATION. Your last step will be to check default settings, enable automatic self test (if applicable), attach Priority Phone (if applicable), and permanently mount the unit and its antenna.

With this overview of the installation in mind, you should now proceed with the actual installation, following the steps described in the remainder of this manual. Experienced installers following these steps can usually install TELGUARD in new installations in 1-2 hours and in retrofit/existing installations in 3-4 hours.

However, you must first get the host C/C working correctly when transmitting over the incoming Telco line. Do not start installing TELGUARD until the C/C is programmed and operating successfully on the primary phone line through its RJ31X.

If you come to a road block at any step during installation of TELGUARD, call Adcor Technical Services Division immediately before going on to the next step, so that we can help you complete each step in the proper order.

Future Testing and Limitations on Use

TELGUARD is part of an advanced design alarm communication system. It does not offer guaranteed protection against burglary and fire. Any alarm communication system is subject to compromise or failure.

The TELGUARD will not work without power. Devices powered by AC will not work if the AC power supply is off for any reason, however briefly, and at the same time the backup battery is missing, dead or not properly installed.

The cellular service provider's cellular network, needed to transmit alarm signals from a protected premise to a central monitoring station, may be inoperable or temporarily out of service. Cellular telephone networks are also subject to compromise by sophisticated methods of attack.

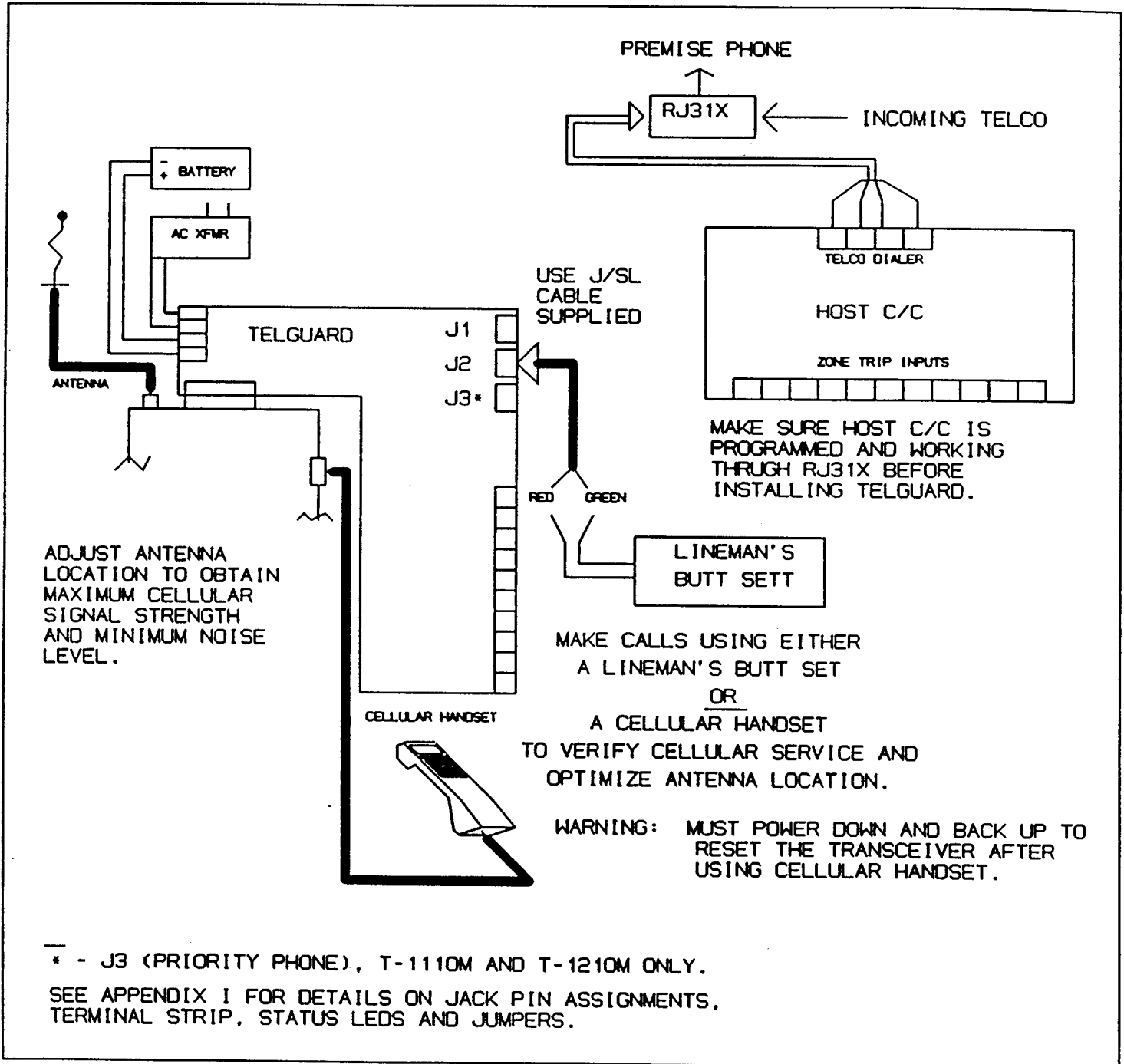
This equipment, like any other electrical device is subject to component failure. Even though this equipment is designed to be long lasting, the electrical components could fail at any time.

Due to these limitations, we recommend that arrangements are made with the user to test the system at least once every three months. Moreover, arrangements should also be made for on site inspection/test by a licensed alarm installer at least once each year.

STEP 1: CONFIRM VOICE COMMUNICATIONS OVER CELLULAR.

First, make sure you can conduct a reasonably noise-free voice conversation over cellular through **TELGUARD** while locating the antenna for maximum signal strength and minimum noise.

In checking this, do not connect the host C/C or incoming Telco line to **TELGUARD**.



Detailed explanation follows.

1. Locate Unit: Pick a spot next to the C/C where you think **TELGUARD** will be mounted and place the unit down temporarily in that spot. Do not mount it permanently now, since it may need to be moved to allow for better antenna placement.
2. Connect and Temporarily Place Antenna: Attach the antenna cable to the transceiver connector at the top left side of the unit and temporarily place the antenna where you think it will ultimately be located. Pick a high, visually secure spot, following the guidelines below.

Tips for Improved Antenna Location

- The higher the antenna the better. So, start in the drop ceiling above the unit and proceed up from there, to the roof if necessary. While the C/C may be located in an equipment room, the **TELGUARD** might need to be located in the ceiling or even higher. (Be sure not to exceed 50 degrees C temperature rating.)
 - Remember, the antenna should be as inconspicuous as possible for greatest visual security. If on roof, plan to place antenna in PVC tubing or in a custom wooden structure.
 - Try to keep antenna away from sources of RF interference, including pumps, compressors, ovens, etc., or where metal objects can shield it or otherwise block the cellular signal.
 - Place the antenna perpendicular to the ground, either right side up or upside down. Do not mount antenna horizontally.
3. Connect Lineman's Butt Set or Cellular Handset: If using a butt set, first connect the alligator clips of butt set to red and green leads of the J/SL cable. Then connect the Jack end of the Jack-to-Spade lug cable supplied into **TELGUARD** Jack 2.

If using a cellular handset, connect it to the transceiver plug on the top right side corner of the transceiver (next to the PCB).

4. Measure Maximum Cellular Signal Strength for Best Antenna Placement. If using butt set, you must put Jumper JP1 "in" to enable the Signal Strength Indicator feature (SSI mode) before power is applied to **TELGUARD**. When power is applied, **TELGUARD** will be in the SSI mode.

If using a cellular handset, leave Jumper JP1 "out" when power is applied.

To apply power, connect TELGUARD AC power transformer to terminals marked "16 VAC" using stranded copper insulated wire following wire gauge and length recommendations below:

<u>Recommended Wire Size</u>	<u>Length Not to Exceed</u>
18 ga	20 ft
16 ga	40 ft
14 ga	60 ft
12 ga	80 ft

Attach battery leads noting polarity.

Now, move the antenna to achieve maximum signal strength. If using butt set, pick the place where the most SSI LEDs (up to six) are lighted. The SSI LEDs are located on the lower left side of the PCB. At least four lighted LEDs are necessary to assure continuous, trouble free operation. Three LEDs are often okay, depending on other factors.

Move antenna slowly and check often. Only a few inches can make a great difference in signal strength.

NOTE: After determining best signal strength location for antenna, put JP1 back in "out" position to reset normal operating mode. TELGUARD will not function with JP1 in the "in" position. If JP1 is inadvertently left "in", TELGUARD will automatically cancel the SSI mode after 30 minutes and return to normal operation. Also, if power is removed and restored, TELGUARD will power up in SSI mode.

If using cellular handset, turn it on by pressing PWR on the keypad and move antenna to place with most dashes on the bottom line ("S" line) of LCD. At least four dashes are necessary to assure continuous, trouble free operation. Three dashes are often OK, depending on other factors.

5. Make Call to Ensure Lowest Noise Level. Now, using either butt set or cellular handset, make a call over cellular to cooperating person at other end.

NOTE: If you are unsuccessful in dialing out, it is probably because the cellular phone number has been improperly activated or the NAM programming is incorrect.

To check this, call the cellular customer service operator in your area by dialing 611 (*611 in some areas). The operator can verify that activation/programming is correct.

Once you have successfully dialed out and have someone on the other end of the line, move the antenna until you find the spot where the noise level is lowest and the voice conversation is strongest. Recheck signal strength after hanging up to be sure you still have at least four lighted LEDs "on" if using TELGUARD's Signal Strength Indicator feature or four dashes on cellular handset. (Remember to power TELGUARD down and back up each time SSI mode is selected. Simply remove JP1 to deselect SSI mode.)

If you can not carry on good voice conversations or can not eliminate noise from the line, you will probably need to move the antenna higher, use a cable extension, or switch to a special antenna, as described below.

Antenna Options

Antenna problems are unlikely unless the premise is located in a fringe cellular coverage area, in a building below ground level, or in a metal structure. However, here are your options:

- Standard Antenna With Longer Cable: TELGUARD's standard antenna comes with 12 feet of cable. If this is not enough cable to allow for optimal antenna location, longer cables can be special ordered from Adcor. These come in 35 foot (Adcor P/N MMA-35M) and 50 foot lengths (Adcor P/N MMA-50M), and include another standard antenna with the necessary connectors. It is not possible to splice cable to the existing standard antenna in field. Extension cable is special, low loss type.
- Directional Antennas. High Gain Directional Antennas are also available from Adcor. These boost signal strength by concentrating power in a single direction, toward the nearest cell. HGDA's come with 35 feet (Adcor P/N HGA-35M) or 50 feet (Adcor P/N HGA-50M) of cable.

6. Remove Lineman's Butt Set/Cellular Handset. If you were using butt set, disconnect the J/SL cable from Jack 2. If using cellular handset to locate antenna, first turn it off (Press PWR) and then unplug it from transceiver.

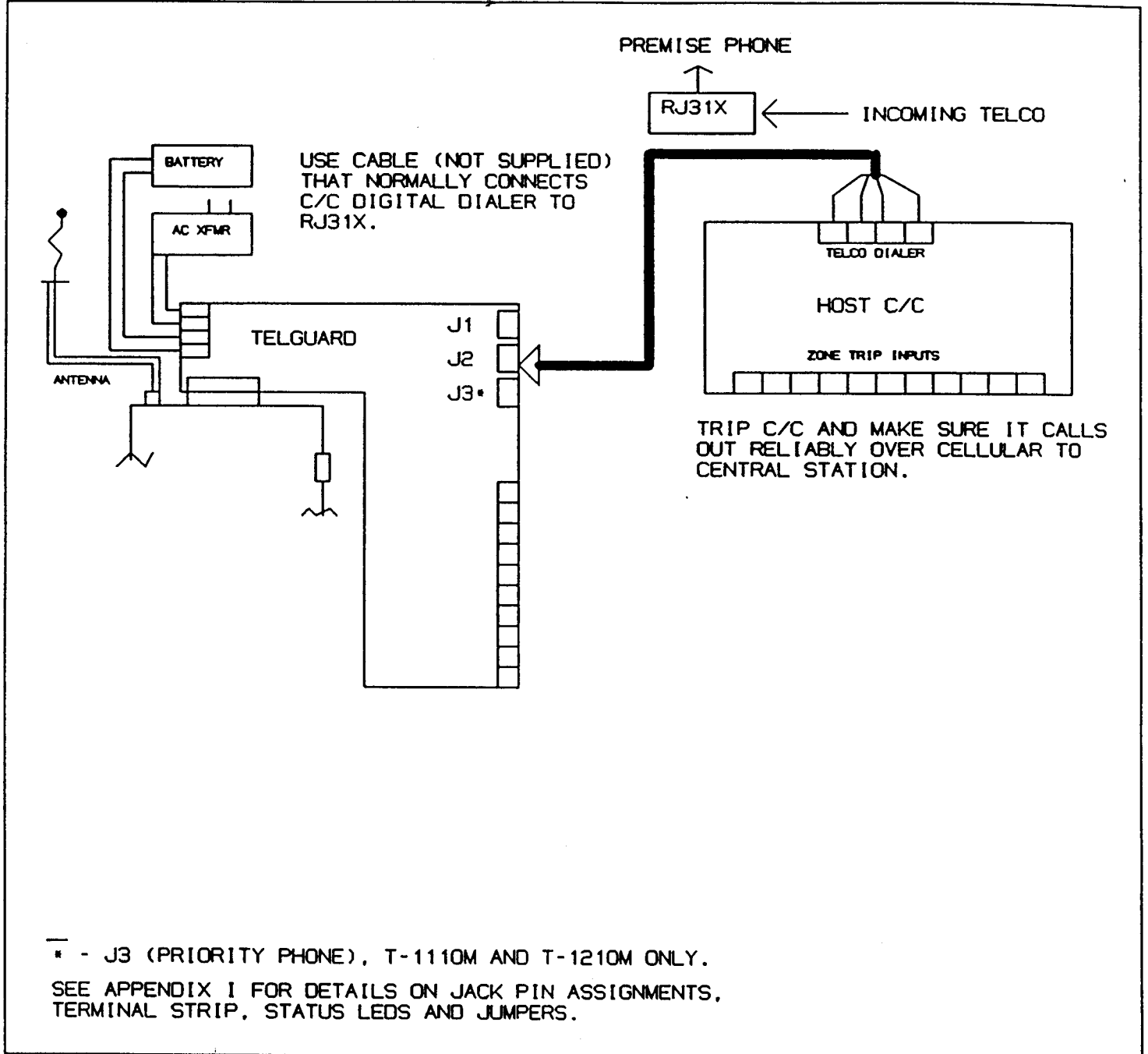
NOTE: After removing cellular handset, TELGUARD must be powered down (disconnect AC power and battery) and then powered back up again to reset the transceiver. TELGUARD will not transmit an alarm while the cellular handset is attached.

7. Move on: Once you have confirmed good voice communications over cellular, move on to STEP 2.

STEP 2: TRANSMIT ALARM SIGNALS OVER CELLULAR.

Confirm that **TELGUARD** enables the C/C to transmit alarm signals over cellular to the central station digital receiver.

In checking this, do not connect the incoming Telco line to **TELGUARD**, or connect **TELGUARD'S** supervisory trip outputs to the C/C zone inputs.



Detailed explanation on next page.

1. Prepare C/C. Be sure the C/C is powered up and programmed so that it will transmit a simple alarm signal* over Telco line through the RJ31X to the central station when not connected to TELGUARD.

2. Connect C/C to TELGUARD Jack 2. Unplug the modular jack end of the C/C-to-RJ31X cable (not supplied) from the RJ31X and plug it into TELGUARD Jack 2.

NOTE: Since no RJ31X cable is connected to TELGUARD Jack 1 at this point in the installation, TELGUARD will be in continuous Line Fault Condition (LFC), thereby causing all C/C transmissions to go out over cellular during testing in this step.

3. Verify Cellular Transmissions: Trip several alarms on the C/C and verify that they were received by the central station. Use lineman's butt set in parallel with the C/C's tip and ring to "listen" to communications between the C/C and central station receiver.

NOTE: Certain C/C's may have a low audio problem receiving a "Handshake" tone from the central station receiver while the butt set is attached. If you encounter this situation, remove the butt set from the C/C's tip and ring and call the central station to verify transmissions.

If you are having problems getting reliable alarm signal transmission, additional adjustments may be necessary.

- A. Certain C/C's, including Radionics, may need to be programmed with longer post dialing delays (See Appendix II-C).
- B. When using with certain C/C's that require especially "noise free" Telco lines, TELGUARD may need to have its audio levels adjusted to match field conditions (See Appendix II-D).

* - Full programming of the C/C including how zone trips will be reported, should be postponed until STEP 4, after you decide how TELGUARD relay trip outputs will be connected to the C/C.

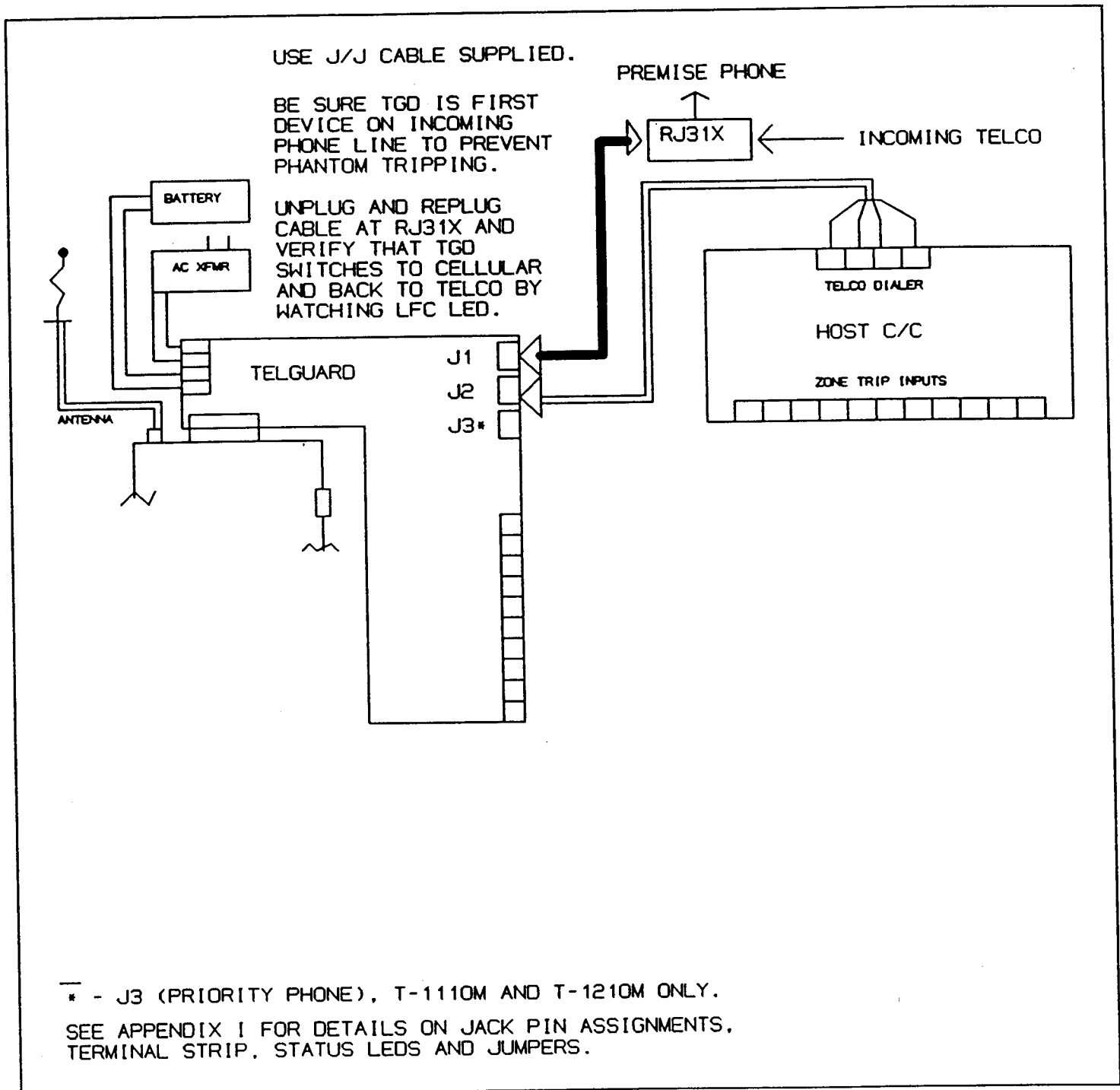
- C. When using C/C's that transmit in high-speed modem formats, cellular signal strength and noise levels must exceed the standards described previously.
- D. When dialing central station phone numbers requiring any extra digits for access (e.g. "9"), special steps must be taken to get the number dialed on cellular. (See Appendix I-E, JP13)

4. Move on: Once you have determined that the C/C can reliably transmit alarm signals over cellular, proceed to STEP 3.

STEP 3. CONNECT INCOMING TELCO LINE

Connect the incoming Telco line to **TELGUARD** and check to be sure that **TELGUARD** identifies a Telco LFC restoral and switches to Telco operation. Also check to be sure there are no other phone devices connected in front of the RJ31X.

During this step, do not connect **TELGUARD** supervisory trip outputs to the C/C.



Detailed explanation on next page.

1. Be Sure TELGUARD Will Be First Device on Incoming Phone Line: TELGUARD monitors current on the incoming phone line as well as voltage to decide when to switch to cellular. Our method is superior to voltage-only line monitors since we recognize an inoperative line more quickly and are much less likely to be purposefully defeated. However, the current measurement approach requires that TELGUARD must be the first device on the Telco line. If not, a line fault condition will be created (we call this a "phantom trip") each time the improperly connected device goes off hook. This happens because TELGUARD's line fault monitor detects the parallel "taps" to the street side of the RJ31X.

A phantom trip causes the C/C to switch to cellular and, if the LFC trip out is connected to trip the C/C, the C/C will call the central station over cellular to report the "Line Fault" (phantom trip). The result is a phone line trouble report even though the incoming line measures good at the RJ31X.

Therefore, look over Exhibit II carefully and be sure that there will be no other phone devices connected to Tip and Ring on the incoming phone line.

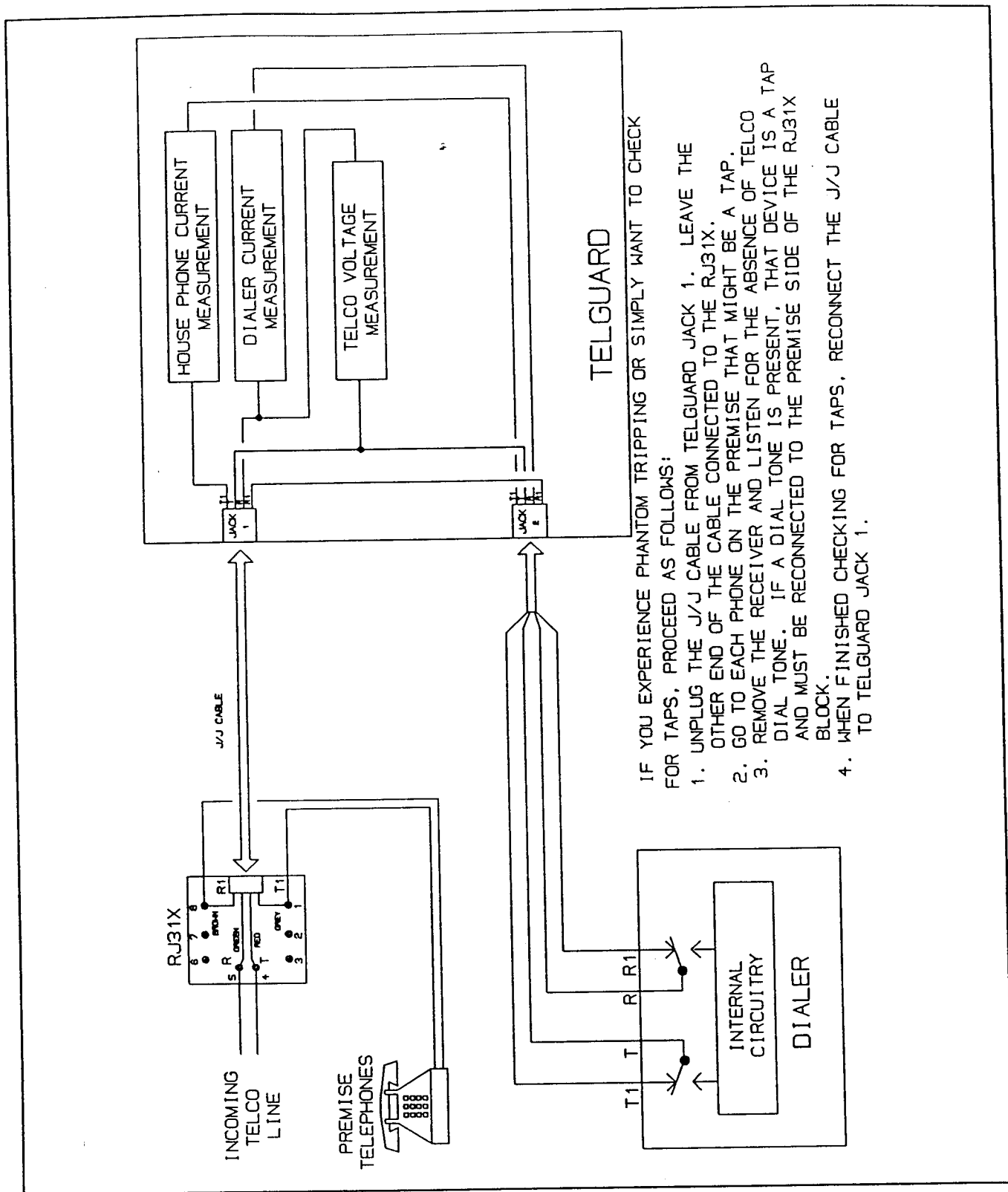
2. Connect RJ31X to TELGUARD Jack 1: Find the modular Jack-to-Jack cable supplied (J/J) and connect one end to TELGUARD Jack 1 and other end to the RJ31X.

If you want the premise phone system that operates on same incoming phone line as TELGUARD to switch to cellular along with the host C/C when the incoming wired phone line becomes inoperative (**CelSwitch feature***), then Jumper JP12 must be "in" to enable this feature.

3. Check Switch to Cellular: Check to be sure LFC LED is not lighted. Then unplug J/J cable at TELGUARD Jack 1 and be sure the LFC LED lites within 3 seconds. Eight seconds after the LFC LED lights, check to be sure TELGUARD switches to cellular by plugging the cable with butt set attached into Jack 2 and listening for dial tone (cellular).
4. Check Switch Back to Telco: Reconnect J/J cable to TELGUARD Jack 1 and be sure the LFC LED extinguishes.
5. Move On: Once you have verified proper Telco line switching and are certain there are no taps, proceed to STEP 4.

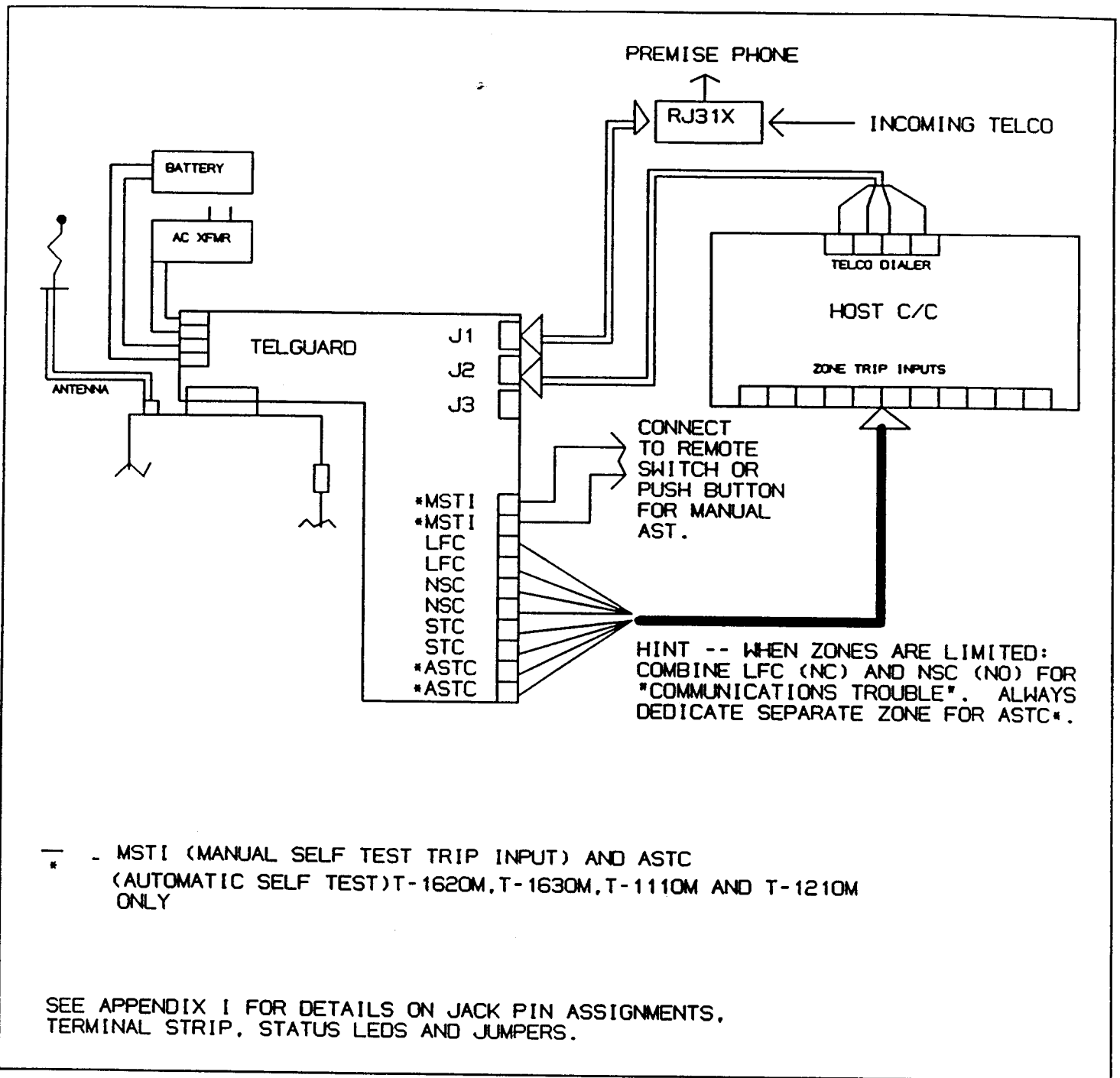
* - Available on T-1210M only.

TELCO SIGNAL PATH THROUGH TELGUARD



STEP 4. CONNECT SUPERVISORY TRIP OUTPUTS

Now you are ready to connect **TELGUARD** supervisory trip outputs from **TELGUARD** Terminal Strip to C/C zone trip inputs and to verify their proper operation.



Detailed explanation on next page.

1. Decide on a Trip Out Strategy - TELGUARD provides the host C/C with several supervisory trip outputs for reporting separate alarm trouble codes to the central station. You must first decide which ones you are going to connect, based in part on the number of zones you have available on the C/C.
 - A. Line Fault Condition (LFC) and No Service Condition (NSC) are essential in order to supervise the two communications channels (Telco and cellular). If only one zone on C/C is available, connect both to it and report "Communications Trouble".

Since LFC is N.C. and NSC is N.O., some C/C's can be programmed to send a separate alarm code for each event, even when both are connected to the same zone on the C/C.
 - B. If additional zones are available, System Trouble Condition (STC) should be reported. This trip output is N.C. and activates if the microprocessor malfunctions, the battery is disconnected or low, or if the transceiver has a failure.
 - C. Automatic Self Test Condition (ASTC)* must have a dedicated zone on the C/C if the automatic self test feature is used. (See Appendix IIIB).
2. Connect Trip Outputs. Once you have decided which trips to use, connect them from TELGUARD terminal strip to the zone input of C/C.
3. Check Trips to C/C. After you have connected trip outs, check to be sure they operate correctly.
 - A. Reprogram C/C to send proper alarm codes when tripped by TELGUARD'S supervisory outputs. Program zone restorals as desired.
 - B. Check proper operation of each connected supervisory output by causing it to trip the C/C and being sure the proper LED illuminates and that the proper trouble code was reported to the central station.

* - T-1620M, T-1630M, T-1110M and T-1210M Only.

- LFC: Disconnect J/J cable at RJ31X. Check to see that the LFC LED lights steadily within 3 seconds indicating the incoming Telco line is disconnected. Thirty seconds* after the LFC LED lights, check to see that the C/C has transmitted the trouble code (over cellular) to the central station. Reconnect J/J cable and check to see that the LFC LED goes off within 3 seconds indicating Telco line restoral. If the C/C is programmed for transmitting restorals, another transmission will be sent to the central station over the Telco line after 30 seconds*.
- NSC: Disconnect the antenna from the TELGUARD unit. Check to see that the NSC LED lights steadily within 3 seconds indicating loss of cellular service. Twenty seconds** after the NSC LED lights, check to see that the C/C has transmitted the trouble code over the Telco line. Reconnect the antenna and check to see that the NSC LED goes off within 3 seconds indicating cellular service restoral. If the C/C is programmed for transmitting restorals, another transmission will be sent to the central station over the Telco line after 20 seconds.**
- STC: Disconnect the battery and after 60 seconds check to see that STC LED lights steadily indicating that the battery is missing. Check to see that the C/C has transmitted the trouble code (over Telco) to the central station. Reconnect the battery and check to see that the STC LED goes off, indicating the missing battery condition has been restored. If the C/C is programmed for transmitting restorals, another transmission will be sent to the central station over the Telco line.

* - Factory default is 30 seconds. Adjustable for 60 seconds delay on all models. See Appendix III-A for other delay settings.

** - Factory default is 20 seconds. Jumper selectable for immediate trip. See Appendix I-E.

NOTE: In addition to supervising a missing battery condition, System Trouble Condition (STC) also supervises Low Battery Condition, microprocessor operation and transceiver operation. When battery voltage drops to 11.0 VDC, and AC power is missing, the LBC LED and STC LED light steadily and the STC trip output occurs. After AC power is restored and battery voltage increases to 11.5 VDC, the LBC LED and STC LED will go off and the STC trip output will restore.

- **ASTC:** See Appendix III-B for a complete description for enabling the automatic self-test feature.

4. **Move On:** When you are sure that C/C is reporting supervisory trips correctly to the central station, move on to STEP 5.

STEP 5. COMPLETE INSTALLATION

Last step is to handle loose ends.

1. **Check Settings.** Be sure the factory default settings for telephone line monitoring and switching parameters are what you want. See Appendix III-A for possible settings.
2. **Enable the Automatic Self Test (If appropriate).*** Factory default setting for AST is "disabled". If you want to use this feature, you must set it up. See Appendix IIIB.
3. **Attach Priority Phone(If used).**** Any dial up device that operates over a standard hardwired phone line, including computer modems, will operate over cellular when plugged into Priority Phone, Jack 3. Calls into the device require that TELGUARD'S cellular phone number be dialed.

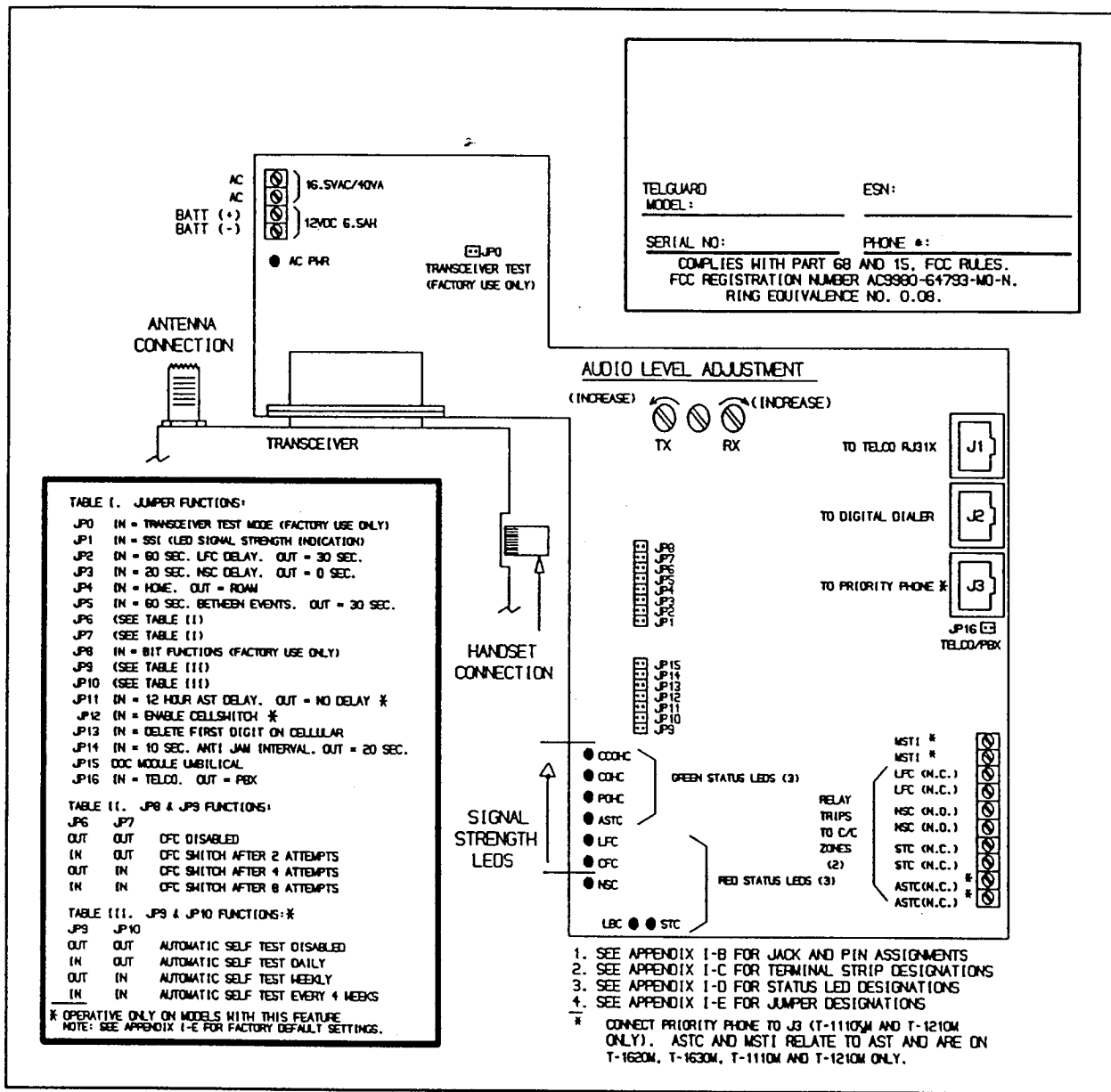
NOTE: Cellular transmissions through Jack 3 will be terminated when the host C/C has an alarm to report.

4. **Adjust Jumper for CelSwitch Operation (T-1210M Only).** Jumper JP12 must be "in" to enable the CelSwitch feature. When Jumper JP12 is in the "out" position, the CelSwitch feature for backing up premise phones and the alarm system is disabled and TELGUARD Model T-1210M will back up the host alarm system only.
5. Permanently mount TELGUARD chassis and antenna.

* - T-1620M, T-1630M, T-1110M and T-1210M only.

** - T-1110M and T-1210M only.

APPENDIX I-A **WIRING DIAGRAM**



APPENDIX I-B
JACK AND PIN ASSIGNMENTS

Jack Designation	Connects To	Pin Assignments	Function	Status LED Reference
JACK 1 TELCO RJ31X	Incoming Telco RJ31X.	1 Grey T1 4 Red T(Tip) 5 Green R(Ring) 8 Brown R1	Connects Telco line to TELGUARD and provides output for premise phone connection at RJ31X.	COHC LED On when premise phone is off hook in cellular mode. POHC LED On when premise phone is off hook in Telco mode.
JACK 2 DIGITAL DIALER	Digital dialer output of host control/communicator.	1 Grey T1 4 Red R(Ring) 5 Green T(Tip) 8 Brown R1	Connects digital dialer's Telco output through unit.	CCOHC LED On when C/C is off hook.
JACK 3 PRIORITY PHONE (T-1110M & T-1210M only)	Any phone device that would work on standard Telco line.	4 Red T(Tip) 5 Green R(Ring)	Enables voice/data communications over cellular regardless of state of incoming Telco line.*	None

* - If the Priority Phone is in use and **TELGUARD** switches the C/C to cellular mode, the Priority Phone is disabled until the C/C completes the call.

APPENDIX I-C
TERMINAL STRIP

Terminal Strip Designation	Definition	Connects To	Function	Status LED Reference
MSTI*	Manual Self Test Trip Input	Remote switch or push button (N.O.)	Allows user to manually initiate automatic self test.	ASTC LED ON when test initiated.
MSTI*	Manual Self Test Trip Input			
LFC	Line Fault Condition (N.C.)	Trip zone inputs on host C/C	Enables transmission of Telco Line Fault Code. Trip 30/60 sec after LFC LED ON.**	LFC LED ON 3 sec after Telco line fault detected.
LFC	Line Fault Condition (N.C.)			
NSC	No Service Condition (N.O.)		Enables transmission of No Service Condition Code. Trip 0/20 sec after NSC LED ON.	NSC LED ON 3 sec after no cellular service detected.
NSC	No Service Condition (N.O.)			
STC	System Trouble Condition (N.C.)		Enables Transmission of System Trouble Code. Trip immediately after STC LED ON.	STC LED ON when system trouble occurs.
STC	System Trouble Condition (N.C.)			
ASTC*	Automatic Self Test Condition (N.C.)		Enables transmission of Self Test Trip Condition. Code. Trip after successful switch to cellular.	ASTC LED ON during auto self test.
ASTC*	Automatic Self Test Condition (N.C.)			

* - T-1620M, T-1630M, T-1110M and T-1210M only.

** - Switch to cellular occurs 11 seconds after LFC detected.

APPENDIX I-D
STATUS LEDS

LED Designation	Definition	ON WHEN	OFF WHEN	Trip Output Reference
AC PWR (Green)	AC Power Condition	AC Power ON.	AC Power OFF.	None
CCOHC (Green)	Control Communicator Off Hook Condition	C/C goes off hook to initiate dialing.	C/C goes back on hook.	None
COHC (Green)	Cellular Off Hook Condition	When Priority Phone, premise phone or dialer goes off hook in cellular mode.	When device goes back on hook.	None
POHC (Green)	Premise Phone Off Hook Condition	When premise phone goes off hook in Telco Mode.	When premise phone goes back on hook.	None
ASTC* (Green)	Self Test In Progress Condition	At beginning of test. (upon automatic or manual initiation)	At end of test (when switches back to Telco after cellular transmission).	ASTC Terminal Strip
LFC (Red)	Telco Line Fault Condition	3 sec after Telco line fault detected.**	3 sec after Telco line restores.	LFC Terminal Strip
CFC (Red)	Communications Failure Condition	When switches to cellular due to communications failure on Telco line.	At end of successful transmission or at end of selected number of attempts	None
NSC (Red)	No Cellular Service Condition	3 sec after contact with cellular network is lost or antenna is disconnected.	3 sec after restoral of same condition.	NSC Terminal Strip

* - T-1620M, T-1630M, T-1110M and T-1210M Only.

** - Momentary flash of LFC LED is normal during Telco use. Switch to cellular occurs 11 seconds after LFC detected.

Continued Next Page

LED Designation	Definition	ON WHEN	OFF WHEN	Trip Output Reference
LBC (Red)	Low Battery Condition	Battery drops below 11.0V.	Battery charged above 11.5V.	STC Terminal Strip
STC (Red)	System Trouble Condition	-60 sec after battery missing or disconnected or immediately when Battery drops below 11.0V. -Microprocessor malfunctions. -Transceiver malfunctions.	Restoral of same conditions.	STC Terminal Strip

APPENDIX I-E
JUMPERS

FEATURE	JUMPER	FUNCTION		JUMPER POSITION	
				IN	OUT
TRANSCEIVER TEST MODE	JP0	Enables entry into test mode of transceiver. (Factory use only)		Test Mode	Normal*
SIGNAL STRENGTH INDICATION	JP1	Uses six LEDs to indicate cellular signal strength.		SSI Mode	Normal*
LFC DELAY	JP2	3 sec after a Telco Line Fault Condition occurs, the LFC trip output is selectable for a 30 sec or 60 sec delay. (C/C is switched to cellular 11 seconds after fault occurs).		60 sec	30 sec*
NSC Delay	JP3	3 sec after a No Cellular Service Condition occurs, the NSC trip output is selectable for a 0 sec or 20 sec delay.		20 sec*	0 sec
CELLULAR SERVICE AREA PREFERENCE	JP4	Allows cellular calls to roam if unit is outside home cellular service area.		Home	Roam*
COMMS FAILURE	JP5	Select time between dialer attempts. Off Hook time or On Hook time cannot exceed selected time in order for Comms Fail to count dialer attempt.		60 sec	30 sec*
	JP6 & JP7	Select number of unsuccessful attempts before switch to cellular.**	Disabled 2 attempts 4 attempts* 8 attempts	JP6 OUT IN OUT* IN	JP7 OUT OUT IN* IN
BIT	JP8	Built in test provides microprocessor driven test routines for production testing. (Factory use only)		BIT	Normal*
AUTO SELF TEST (Not Available On T-1610M)	JP9 & JP10	Select time interval between automatic tests	Disabled* Daily Weekly Monthly	JP9 OUT* IN OUT IN	JP10 OUT* OUT IN IN
	JP11	Select delay for initial auto self test.		12 hour delay	No delay*

Continued Next Page

FEATURE	JUMPER	FUNCTION	JUMPER POSITION	
			IN	OUT
CELSWITCH (T-1210M Only)	JP12	Automatically switches all premise phones to cellular when the incoming phone line being used by TELGUARD becomes inoperative.	Premise phone and alarm backup	Alarm* <i>only backup</i>
DELETE FIRST DIGIT DIALED	JP13	If the host C/C is programmed to dial a "9" or other prefix in order to get a second dial tone before reporting an alarm over the Telco line and the Telco line is cut, the C/C will dial the same number thru TELGUARD over cellular. This jumper allows the first digit dialed (prefix) to be deleted so that the call can be processed correctly on cellular.	Delete first digit dialed on cellular	Normal*
ANTI-JAM INTERVAL	JP14	Incoming cellular calls will be terminated within the selectable 10 sec or 20 sec interval if the control communicator dials out.***	10 sec*	20 sec
DOC MODULE UMBILICAL	JP15	Not currently used.		Normal*
TELCO/PBX	JP16	PBX's and other proprietary phone systems sometimes operate at lower voltages than the standard Telco line, creating the possibility of an LFC during normal operation. The "PBX" jumper selection is available to lower the LFC threshold voltage, yet still maintain the two trip delay detect time options.	Telco*	PBX

* - **Factory default settings.**

** - The **TELGUARD** considers an unsuccessful dialer attempt to mean the dialer has gone off hook, then on hook, then off hook again. Each condition of Off Hook, On Hook, Off Hook must occur within the selected time interval of 30 seconds or 60 seconds. This means that if the dialer, after hanging up, seizes the phone line again within the selected time interval, the **TELGUARD** will count that as an unsuccessful attempt. This can occur even during normal operation when the host control/communicator is successfully transmitting multiple alarms with rapid, successive calls.

***- T-1610M and T-1620M do not have cellular call in (ring-down) capability.

APPENDIX II-A

OBTAINING CELLULAR SERVICE

In order to operate your **TELGUARD** unit, an account must be set up with a cellular carrier ("CC") in your local area.* Adcor can completely arrange for your cellular service or can simply assist you and/or your customer in this process. Most often, the process involves the installer, end user, CC and the factory prior to shipping the **TELGUARD**.

Here are the steps we take when setting up cellular service.

1. Select cellular carrier

We consider:

- strength of cellular signal at installation site
- cost of the service
- our relationship with the carrier

2. Set up an account for billing

- CC is provided with credit information on the party who will be responsible for paying the bill. This information is usually obtained for us by the alarm installing company.

3. Obtain phone number

- CC will contact us and ask for an Electronic Serial Number "ESN". This is found on the cellular transceiver. They will then give us the cellular phone number they have assigned to the account.

4. Program Transceiver

- Most often we will program the cellular phone number and other information into **TELGUARD's** transceiver before we ship it. This is called NAM programming. (There is usually a small service charge.)
- However, NAM programming can be done in the field with the aid of a cellular handset separately available from Adcor or elsewhere.

*- It is not possible to use an existing cellular number, say on your car phone, with your **TELGUARD** unit. A new number must be obtained. This new number can be billed to the same account as other numbers.

APPENDIX II-B

TRANSCEIVER NAM PROGRAMMING

Transceivers must be programmed with their assigned cellular phone number, system ID number and other related parameters in order to transmit in the field. This is called "NAM PROGRAMMING" and is usually done before shipment. Sometimes our customers do their own programming in the field, hence these instructions.

The method for programming the Motorola KS transceiver in the TELGUARD requires using a standard Motorola KS cellular handset. This handset also features a signal strength indicator which can be used to optimize antenna location as well as to program.

NOTE: The best handset to use is a KS type, available from Adcor. However, most any Motorola handset will work. Please note that some older model Motorola handsets must first be put in the "Programming Mode" by taking special steps. If you have difficulty following the programming instructions below with your handset, call us for instructions on how to put it in Programming Mode.

Handsets are connected for programming as shown in Exhibit I. Once the handset is connected to the transceiver, proceed to program as follows:

1. Apply power to the TELGUARD by first connecting the battery and then plugging in the transformer.
2. Turn the handset on by pressing PWR and enter the following sequence.

Press "FCN" + "0" + "000000" + "000000" + "RCL"

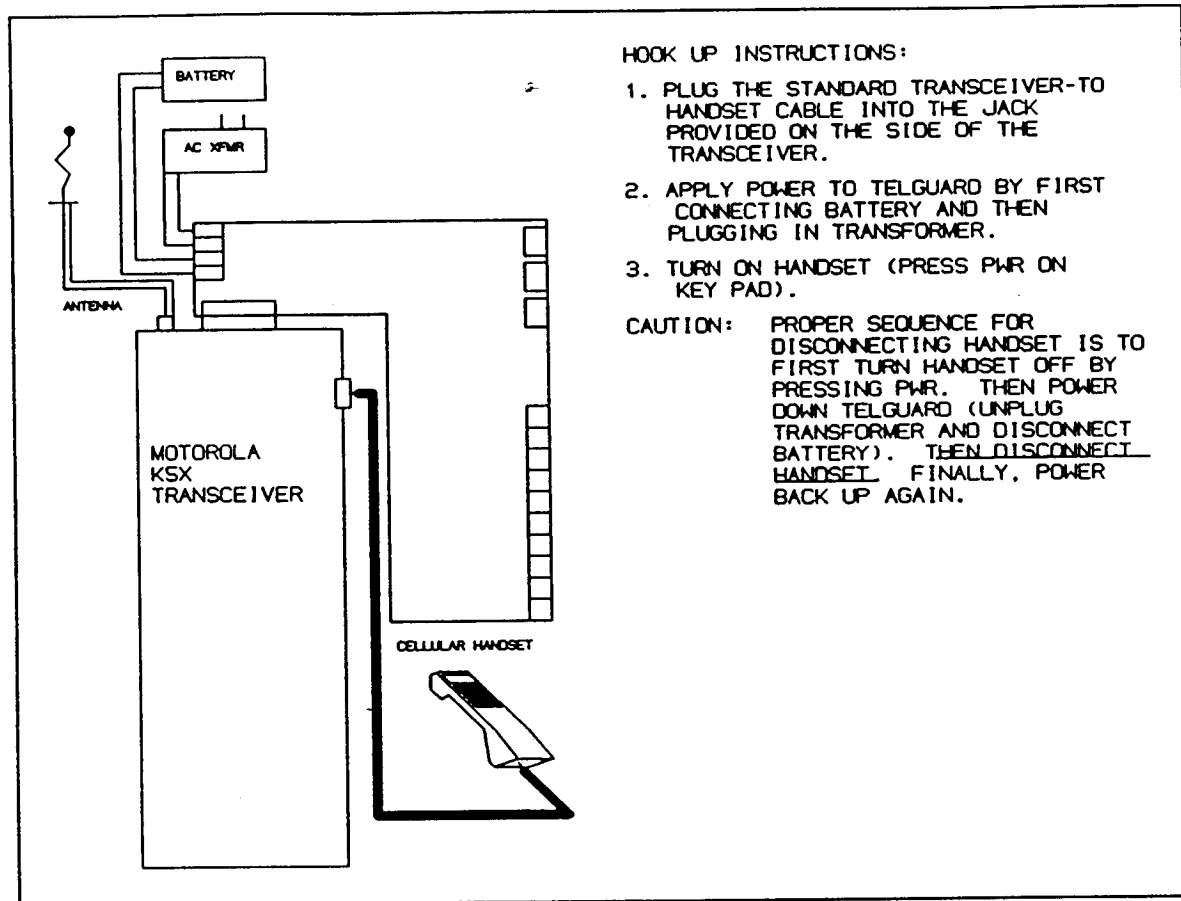
OR

"(FCN)000000000000(RCL)"

NOTE: If a digit is entered incorrectly during programming, press "CLR" and try again. The parameters programmed can be checked by simply scrolling through the main menu using the "*" key. Any mistake can be corrected by retyping the correct number/code.

There are eleven programming positions indicated 01 through 11 on the handset LCD. The positions preceded by "N" (as in "N-01") in the following instructions must be custom programmed with unique data supplied by the cellular carrier for each unit. These positions are left blank when TELGUARD is shipped unprogrammed.

EXHIBIT I



The other positions, indicated with "D" (as in "D-04, etc.) are for selecting operating parameters and are factory default programmed by Adcor on all units. As you program the "N" positions, also check to be sure the "D" positions are pre-programmed as indicated below. Be sure that you do not alter the factory default programming.

N-01: System Identification Number (SID)

Press "*". The handset will display the previously entered SID number. If the unit was not previously programmed, "00000" will be displayed. **Enter the 5 digit SID number** obtained from the cellular carrier. If the number is incorrect, press "CLR" and re-enter the number. Press "*" to save the entered data. The handset will now display "02".

N-02: Cellular Area Code

Press "*". The handset will display the previously entered Cellular Area Code. If the transceiver was not previously programmed, "111" will be displayed. **Enter the 3 digit Cellular Area Code** which is the first part of the Mobile Identification Number (MIN) obtained from the cellular carrier. Check the number to insure it was entered correctly and if incorrect, press "CLR" and re-enter the number. Press "*" to save the entered data. The handset will display "03".

N-03: Cellular Phone Number

Press "*". The handset will display the previously entered Cellular Phone Number. If the transceiver was not previously programmed, "111-0111" will be displayed. **Enter the 7 digit Cellular Phone Number** obtained from the cellular carrier. Check the number to insure it was entered correctly and if incorrect, press "CLR" and re-enter the number. Press "*" to save the entered data. The handset will display "04".

D-04: Station Class Mark (SCM)

Press "*". The handset should display "08", the SCM programmed at the factory. If not "08", press "CLR" and re-enter "08". Press "*" to save the entered data. The handset will display "05".

D-05: Access Overload Class (AOC)

Press "*". The handset should display "15", the AOC entered at the factory. Check the number to insure it was entered correctly and if incorrect, press "CLR" and re-enter the number. Press "*" to save the entered data. The handset will now display "06".

N-06: Group ID Mark (GIM)

Press "*". The handset will display the previously entered GIM number or "00" if not previously programmed. Enter the 2 digit GIM number obtained from the cellular carrier. Check the number to insure it was entered correctly and if incorrect, press "CLR" and re-enter the number. Press "*" to save the entered data. The handset will now display "07".

D-07: Security Code

Press "*". The handset should display "000000", which is the factory default Security Code. If incorrect, press "CLR" and re-enter the number. Press "*" to save the entered data. The handset will now display "08".

D-08: Unlock Code

Press "*". The handset should display "123", which is the factory default Unlock Code. If incorrect, press "CLR" and re-enter the number. Press "*" to save the entered data. The handset will now display "09".

NOTE: Be sure to use the factory defaults in D-07 and D-08. If you change these, the unit may not be accessible for programming later in the field.

N-09: Initial Paging Channel (IPCH)

Press "*". The handset will display the previously entered IPCH or "0334" if not previously programmed. Enter the 4 digit IPCH obtained from the cellular carrier (Use "0333" if "A" carrier or "0334" if "B" carrier). Check to insure it was entered correctly and if incorrect, press "CLR" and re-enter the number. Press "*" to save the entered data. The handset will now display the "10".

D-10: Other Options

Press "*" and the handset should display "010100", the factory default Option Code. If incorrect, press "CLR" and re-enter the number. Press "*" to save the entered data. The handset will now display "11".

The following is the description of each of the six digits entered. Each digit represents a different option where "1" is enabled and "0" is disabled.

<u>Digit (Factory default)</u>	<u>Description (ON-1, OFF-0)</u>
First (0)	Internal Speaker - must be enabled if external speaker is used with the cellular phone.
Second (1)	Local Use Option
Third (0)	Min. Mark Option
Fourth (1)	Auto Recall
Fifth (0)	Second Telephone Number - for dual NAM phones.
Sixth (0)	Space Diversity Reception - one or two antennas.

D-11: More Options

Press "*" and the handset should display "1101" the factory default More Options Code. If incorrect, press "CLR" and re-enter the number. Press "*" to save the entered data. The handset will display "01".

<u>Digit (Factory Default)</u>	<u>Description (ON -1, OFF-0)</u>
First (1)	Motorola Enhanced Scan - Provides improved performance in areas where multiple signaling channels are present.
Second (1)	Long Tone DTMF - Increases the duration of DTMF tones, enabling some low-tier telephone equipment to be accessed via a cellular telephone.
Third (0)	Transportable Internal Ringer/Speaker Routes audio to the accessory speaker.
Fourth (1)	Eight Hour Timeout - Telephone feature to ensure that batteries will not be completely drained, if telephone is inadvertently left on. 1 = Disabled.

The programming of the transceiver NAM is now complete. Press "SND" to save the programming information in the transceiver's NAM and exit the programming mode.

Set Roaming Characteristics:

Upon exiting program mode, Press "RCL", and page through selections by pressing "*".

If "A" Carrier is being used, set display to Std. "Ab"

If "B" Carrier is being used, set display to Std. "bA"

Press "RCL" when desired choice appears in display.

CAUTION: Be sure to turn off the Motorola KS handset before disconnecting the battery and transformer to power down unit. If not, the NAM programming information will be left at factory default.

Once the handset has been turned off and the battery and the transformer disconnected, the handset can be disconnected from the transceiver. Then the unit can be powered up again.

NOTE: Cellular phone number can be recalled out of memory without going into programming mode by pressing RCL, #.

APPENDIX II-C

PROGRAMMING POST DIALING DELAYS FOR OPERATION WITH CERTAIN HOST C/C'S

In some installations, dialing over cellular takes so long that host control/communicator hangs up before it gets an acknowledgement from the receiver.

To correct for this situation, a "post dialing delay" (i.e., the time between when the last digit of the phone number is dialed and when the host C/C hangs up after waiting as long as it can for the receiver's handshake tone) must be added to the host C/C's digital dialer. However, care must be taken, since when the delay is set just right for calls over cellular, a problem may then arise when dialing over Telco if the Telco call makes a connection too quickly. Therefore, "Tuning" of delays is the most reliable way to determine the optimum intervals needed.

The Radionics D8112 is one C/C that often needs these delays in order to successfully communicate on cellular. That panel is easily programmed for post dialing delays by the use of "C" or "D" characters in phone numbers. "C" provides 3 seconds and "D" provides 7 seconds of delay. Programming memory location 7 is provided for telephone number dialing prefixes and location 8 for phone numbers. Location 7 can hold up to 8 digits and 8 can hold 7. So in an example where the number to be dialed is 1-800-555-1212, enter into location 7:

180055

and into location 8 enter:

51212DC

for 10 seconds of delay.

After a delay interval is programmed, trip the C/C for a test call to the receiver. Add delays until it stays on line long enough to complete a call on cellular, then add 3 seconds of margin time, but don't overdo it. With excessive delay, the C/C will still be in the dialing mode when the receiver answers on Telco facilities and calls will be lost. Therefore, once the C/C works on cellular, test it on Telco several times to verify that it works there also.

APPENDIX II-D

ADJUSTING TELGUARD AUDIO LEVELS FOR OPERATION WITH CERTAIN HOST C/C'S

In some installations the noise level when operating on cellular is too high for effective communications of certain C/C's when used with TELGUARD as shipped from the factory.

Determining if you need audio level adjustments:

1. Verify that the C/C works over the Telco land line by calling the monitoring center to see if they got the transmission over Telco.
2. Disconnect the Telco line from Jack 1 on the TELGUARD. In 30 seconds the TELGUARD should switch to cellular. Trip the C/C having it dial out over cellular. Monitor the transmission if possible on both ends, and determine if the audio levels are at a level that is roughly equal to the Telco line.
3. To accommodate for variables between C/C's and cellular relay equipment, audio adjustments are provided to set up the circuit over cellular. Refer to Appendix I-A to locate the potentiometers. Turning the receive (RX) potentiometer counterclockwise will increase receive audio level. Turning the transmit (TX) potentiometer clockwise will increase transmit audio level.
4. If you are unsuccessful in achieving reliable communications, call Telular-Adcor Technical Services Division. We will ask you to reprogram your C/C to report to our receiver, so we can monitor the transmission with line level meters and assist you in adjusting the audio levels.

APPENDIX III-A

SELECTING TELEPHONE LINE MONITORING AND SWITCHING PARAMETERS

TELGUARD has a number of installer options for matching its Telco line monitoring sensitivity and switching functions to the installation environment. In each case, a "factory default" setting has been selected before shipment that is appropriate for most applications. However, special circumstances may require other settings as noted.

1. Nominal line fault trip output delay time: Three seconds after a Line Fault Condition (LFC) is detected (i.e., When voltage less than 35V(17 volts when in PBX Mode) and current less than 7 ma +/- 3 ma), the delay time counter is initiated and the LFC LED is lighted. If the fault condition continues to the end of the delay time (30 sec - Standard Trip; 60 sec - Slow Trip), a Telco LFC trip output occurs. If not, the detect counter is reset.

Eleven seconds after a line fault condition is detected, TELGUARD switches to cellular regardless of the 30/60 sec delay setting.

<u>Type</u>	<u>Time</u>	<u>Delay</u>	<u>How Set</u>	<u>Purpose</u>
Regular Trip*	30 sec		Jumper JP2 Out	Normal position. Good balance between fast response and preventing phantom trips.
Slow Trip	60 sec		Jumper JP2 In	For areas where Telco outages are common.

* - Factory default position

2. PBX Jumper: Some PBX's and other proprietary systems operate at a much lower voltage than normal Telco. Therefore, TELGUARD may recognize an LFC during normal operation.

In such cases, the "PBX mode" can be enabled by placing jumper JP16 located above the terminal strip in the "OUT" position. This lowers the line fault threshold voltage to 17 volts from the standard 35 volts, yet maintains the regular line fault delay times.

NOTE: After removing the PBX Jumper always check to see if the LFC delay time is as set (30 or 60 seconds). If the system voltage is actually standard and the jumper is removed, the LFC delay time will be unusually long, since the voltage must bleed down to the 17 volt threshold.

The factory default mode is Telco. That is jumper JP16 is "in".

3. Communications Failure Trip: As an additional level of security, **TELGUARD** can switch the host C/C's digital dialer to cellular, even when the incoming Telco line is technically good (i.e., when voltage and current are within specification) if the dialer is not able to reach its receiver after a preset number of attempts.

The factory default setting is to switch after four unsuccessful attempts, with 30 seconds allowed for dialer Off Hook time and 30 seconds allowed for dialer On Hook.

If adjustments to the factory settings are necessary in the field, the number of unsuccessful attempts before switching and the time allowed for dialer Off Hook or dialer On Hook may be selected using jumpers as follows:

Number of Unsuccessful Attempts Before Switching	Jumper	
	JP6	JP7
Disabled	OUT	OUT
2	IN	OUT
4*	OUT*	IN*
8	IN	IN
Max Time Allowed for dialer Off Hook or dialer On Hook**	JP5	
30 sec*	OUT*	
60 sec	IN	

* - Factory default

** - The **TELGUARD** considers an unsuccessful dialer attempt to mean the dialer has gone off hook, then on hook, then off hook again. Each condition of off hook, on hook, off hook must occur within the selected time interval of 30 seconds or 60 seconds. This means that if the dialer, after hanging up, seizes the phone line again within the selected time interval, the **TELGUARD** will count that as an unsuccessful attempt. This can occur even during normal operation when the host control/communicator is successfully transmitting multiple alarms with rapid, successive calls.

APPENDIX III-B

ENABLING THE AUTOMATIC SELF TEST FEATURE (Not available on T-1610M)

For higher security use, the automatic Self-Test Feature can be used to periodically determine if **TELGUARD** and its host C/C are functioning properly.

1. Decide whether or not you want to use the automatic self test feature. *Factory default is disabled (Jumpers JP9 and JP10 are "out")*. If you want to use this feature, then proceed.
2. Select the time interval between test reports using the jumpers as follows:

<u>Time Interval</u>	<u>Jumper</u>	
	<u>JP9</u>	<u>JP10</u>
<i>Disabled*</i>	<i>OUT*</i>	<i>OUT*</i>
24 hrs (daily)	IN	OUT
168 hrs (weekly)	OUT	IN
672 hrs (monthly)	IN	IN

3. Decide when you want the test time interval sequence initiated and set Jumper JP11.

<u>First Test</u>	<u>JP11 Setting</u>
<i>Immediate upon power up*</i>	<i>OUT*</i>
12 hrs delay after power up	IN

In addition, tests can be initiated manually at any time desired. To utilize this feature, attach a remote push button or toggle switch to terminals MSTI and MSTI. In this mode, test will be activated regardless of settings of Jumpers JP9, JP10 and JP11.

The sequence following activation of AST is: Disconnect incoming Telco line, disconnect AC power, switch to cellular, trip host C/C, transmit test code to central station, switch back to Telco, reconnect AC power. The test takes about 3 minutes.

* - Factory default

APPENDIX IV

DETAILED SPECIFICATIONS

1. DIALER-TO-CELLULAR INTERFACE ELECTRONICS: The patented integrated interface by Telular, Inc. allows Telco devices, including digital dialers, to dial into the cellular network.
 - Line voltage = 50 vdc into standard telephone device when on-hook.
 - Dial tone = precision 330 Hz + 440 Hz @-13 dbm +/- 2 dbm.
 - 11 digits dial out capability.
 - Ringer equivalent = 5.0A; Mode = Loop start only.
 - Protected by U.S. Patents = 4,658,096; 4,737,975; 4,775,997; 4,922,517.
2. POWER
 - Power Supply
 - Max full charge DC voltage = 13.8V +/- .01V.
 - Max ripple = 30 MV.
 - Max voltage drop at max current = 1%.
 - Battery - At least one each 7.0 amp hour, 12V, lead acid. Not supplied.
 - Transformer Supplied all models - 16.5 VAC, 40 VA, UL, plug-in
 - Operating Without AC Power: Stand By Mode (Lose AC; no activity; then at end of standby time, switch to cellular and make one call to report STC) = 16 hrs.
Continuous Mode (Lose AC and Telco; switch immediately to cellular; report LFC; talk continuously over Priority Phone; then, at end of standby time, make one call over cellular to report STC.) = 4 hrs.
3. TRANSCEIVER: The Motorola KSX transceiver, custom-made exclusively for Telular-Adcor with superior audio level response for enhanced performance in locations with weak signal strength, transmits and receives on the cellular network.
 - Frequency range = 824.040 - 848.970 Mhz Tx;
870.030 - 889.980 Mhz Rx.
 - Power output = 3 watts (max allowable).

- Standard Antenna = Magnetic Mount, 5/8 wave. 825-896 MHZ. Gain: 3 db. One section 14-1/2" tall mast with 12 feet of cable. Optional cable lengths of 35 ft. or 50 ft. are also available.
- Optional Antenna - High Gain Directional Antenna (Gain: 9db) with 35 or 50 feet of cable. Mini-UHF plug is included.

4. **PHYSICAL:**

- Size = 12.0"H x 12.0"W x 4.0"D.
- Shipping weight = 16 lbs with transformer only.
- FCC registration = AC9980-64793-MO-N. Ringer equivalence 0.0B.
- Operating Environment = minus 10 deg C to plus 50 deg C; 0 - 90% humidity (non-condensing).

5. **WARRANTY:**

- Telular-Adcor will repair or replace (our option) inoperative units for up to two years from date of shipment. Excludes damage due to lightning or installer error. Unauthorized modifications void this warranty. Not responsible for incidental or consequential damages. Liability limited to price of unit.

This is the exclusive warranty and no other warranties will be honored, whether expressed or implied.

PARTS LIST

<u>Part Number</u>	<u>Description</u>
T-1600M	Economy Model TELGUARD . Transmits alarms over cellular when Telco line becomes inoperative or unavailable.
T-1620M	Economy Model TELGUARD . Same as T-1610M, plus automatic self test.
T-1630M	Economy Model TELGUARD . Same as T-1620M, plus ability to receive incoming calls for downloading host alarm system over cellular.
T-1110M	Standard Model TELGUARD . Same as T-1620M plus <i>Priority Phone</i> feature for direct cellular communications.
T-1210M	Deluxe Model TELGUARD . Same as T-1110M plus <i>CelSwitch</i> feature for switching premise phones to cellular.
T-3100UL	Similar to T-1110M, but UL Listed for Grade A use in residential and commercial burglary installations and as the second "phone line" (cellular) in commercial fire applications.
KS-1	Motorola cellular handset. Required if NAM programming in field. May also be used for checking signal strength and making calls during installation.
FNP	Factory NAM programming of transceiver.
MMA-35M	Regular Antenna with additional 35 feet low loss cable.
MMA-50M	Regular Antenna with additional 50 feet low loss cable.
HGA-35M	High Gain Directional Antenna Kit with 35 feet of low loss cable.
HGA-50M	High Gain Directional Antenna Kit with 50 feet low loss cable.
CS-1	CelChecker . Allows signal strength to be checked at job site before quoting.
BMR-1250	Battery. 12V, 7.0 AH
TMR-1250	Transformer. 16.5V, 40VA

ACCESSORIES FOR MODEL T-3100UL

- PTM-15 Priority Phone Timeout Module. Required for all UL Listings when using *Priority Phone* feature. Limits use of *Priority Phone* to 15 min. when AC power is out to ensure sufficient battery standby time.
- APC-31 Attack Resistant, Heavy-Duty Enclosure. Required for UL1635 (commercial burglary) Listing.
- DBA-10 Attenuator Assembly. Must be used during installation of Model T-3100UL to ensure adequate cellular signal.