

ON THE DARK SIDE OF SEQUENCING

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ON THE DARK SIDE OF SEQUENCING

- **EVERYONE IS TOLD “YOU MUST HAVE A SEQUENCER”.**
- **BUT NO ONE TELLS THEM WHY or HOW TO HOOK THEM UP WITH THEIR RIG.**
- **WE NEED A GENERAL SOLUTION THAT WORKS WITH :**
 - **ANY RIG**
 - **ANY PREAMP & POWER AMP**
 - **AND NO SPECIAL EXPENSIVE BOXES!**

Why Do We Need a Sequencer?

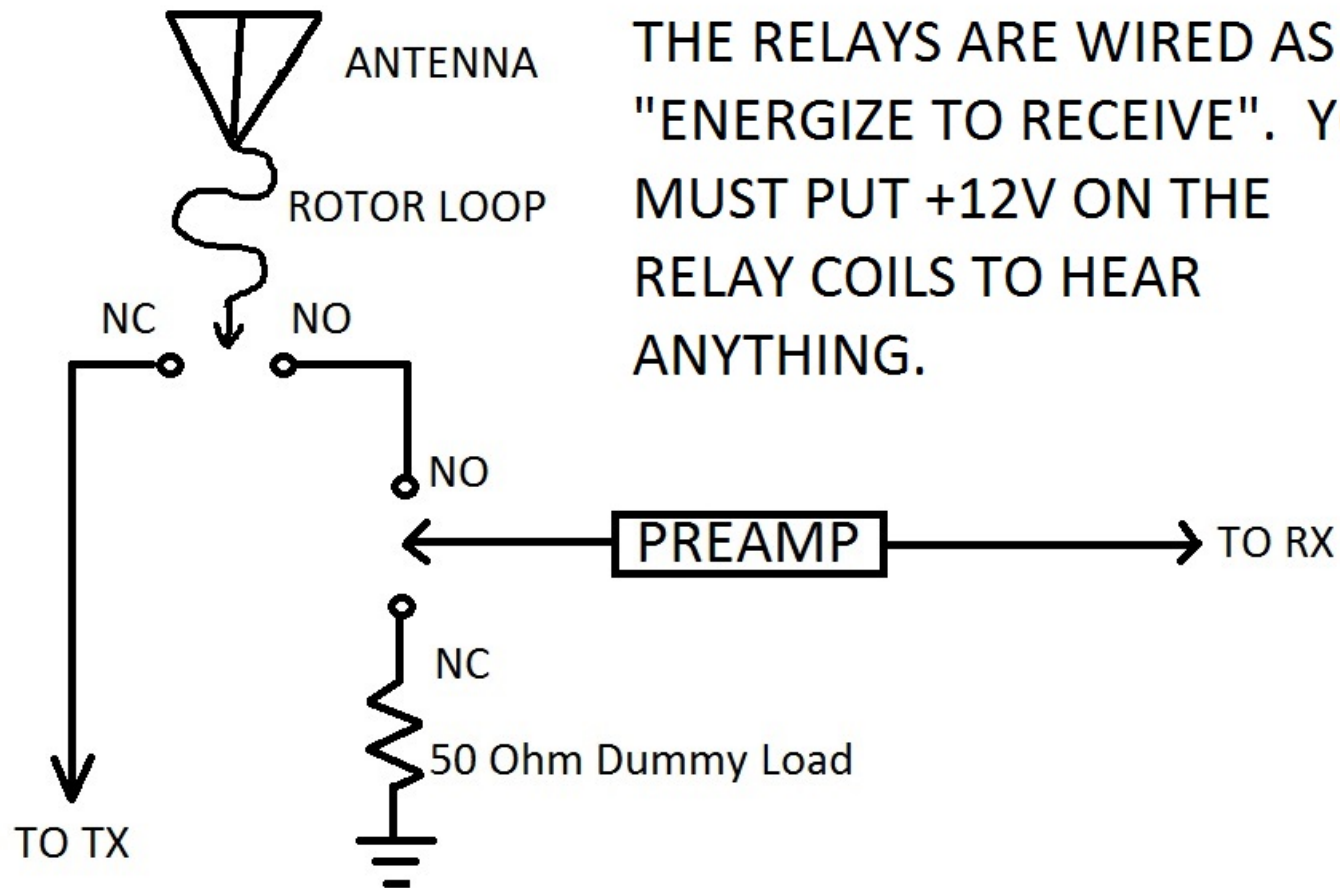
- **THE OBVIOUS ANSWER IS TO MAKE THINGS HAPPEN IN THE RIGHT ORDER / SEQUENCE !**
- **IN ORDER TO PROTECT THE PREAMP, POWER AMPLIFIER, ANTENNA RELAYS AND TRANSCEIVER FROM DAMAGE**
- **WHAT THINGS NEED TO HAPPEN?**

Things That Need To Happen In The Right Order

- **SWITCH THE CHANGEOVER RELAYS FROM RX to TX**
- **SWITCH THE POWER AMP FROM STANDBY to TX**
- **SWITCH THE TRANSVERTER AND RIG FROM RX to TX**
- **ALLOW THE SYSTEM TO MAKE RF POWER**

Typical Connection Of Changeover Relays

- **MAIN T/R RELAYS MUST HANDLE FULL TX POWER**



Sequencer Example using DEMI Sequencer

- Other Models Are Similar In Function

REAR PANEL-RESTING STATE

4
○

3
○

2
○

1
○
+12V OUT

○
PTT-L

○
N/C

○
N/C

○
N/C

○

○
PTT-H

○
AUX

○
+12 IN

ALL CONNECTORS ARE RCA JACKS

Sequencer Example using DEMI Sequencer

REAR PANEL-KEYED STATE

4
○

3
○

2
○

1
○
N/C

○
PTT-L

○
GND

○
GND

○
GND

○

○
PTT-H

○
AUX

○
+12 IN

ALL CONNECTORS ARE RCA JACKS

A Few Factoids About RF Relays

- **RF RELAYS TAKE TIME TO SWITCH OVER--THIS CAN BE 20ms TO 60ms OR MORE!**
- **RF RELAY CONTACTS BOUNCE WHEN THEY SWITCH**
- **IF THERE IS RF POWER PRESENT WHEN THE CONTACTS BOUNCE, THERE WILL BE AN ARC WHICH OVER TIME WILL DESTROY THE CONTACTS**
- **SO PROPER SEQUENCING WILL SAVE YOUR RELAYS AS WELL AS YOU PREAMPS, AND POWER AMPS**

If You Have A Transverter

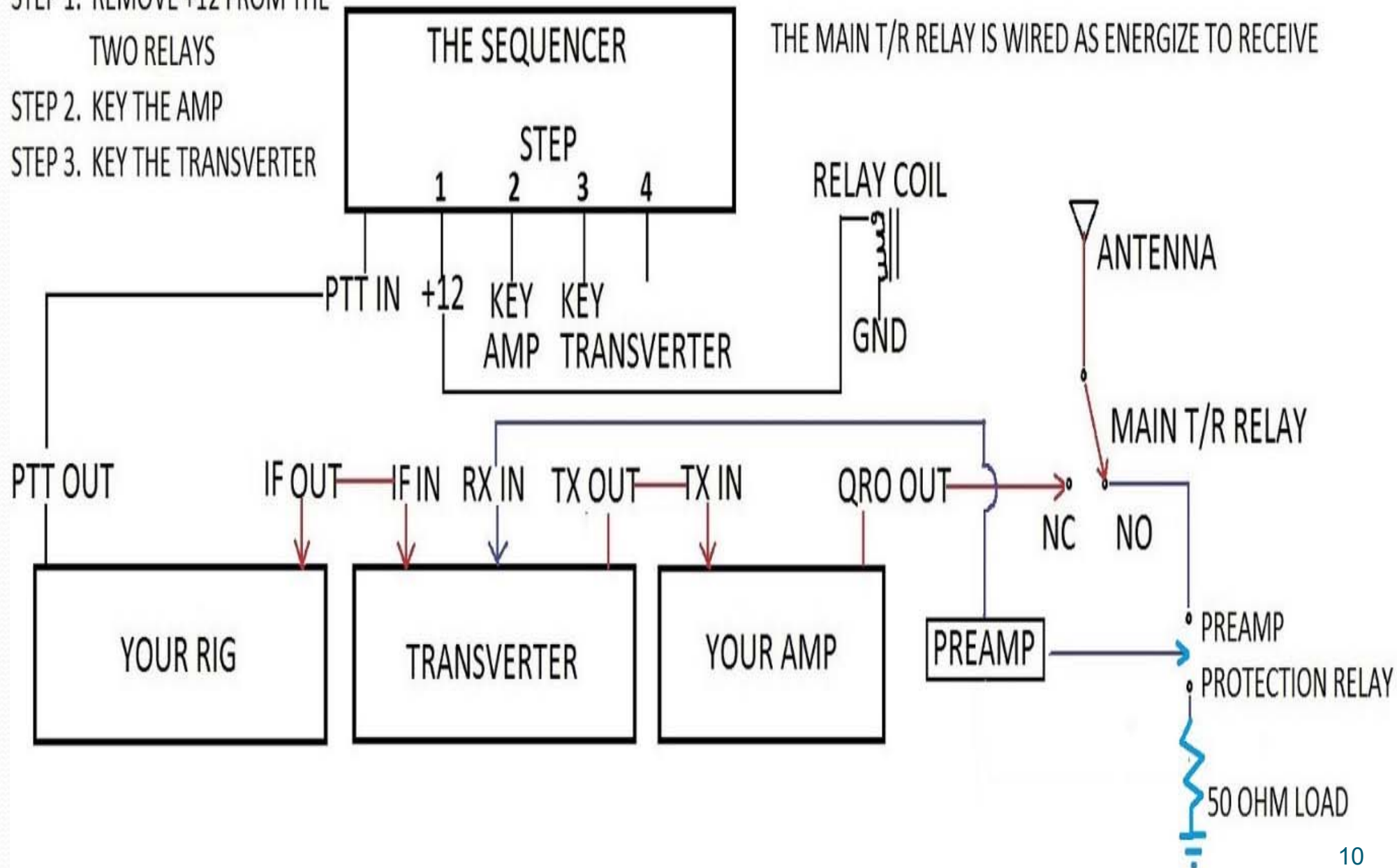
- **THIS IS ACTUALLY THE EASIEST CASE TO HANDLE**
- **THERE ARE A LOAD OF CONNECTIONS, BUT THEY ARE LOGICAL AND STRAIGHTFORWARD**
- **THE MOST IMPORTANT THING IS THAT THE SYSTEM CANNOT MAKE ANY RF POWER UNTIL THE PROPER TIME**

If You Have A Transverter

STEP 1. REMOVE +12 FROM THE TWO RELAYS

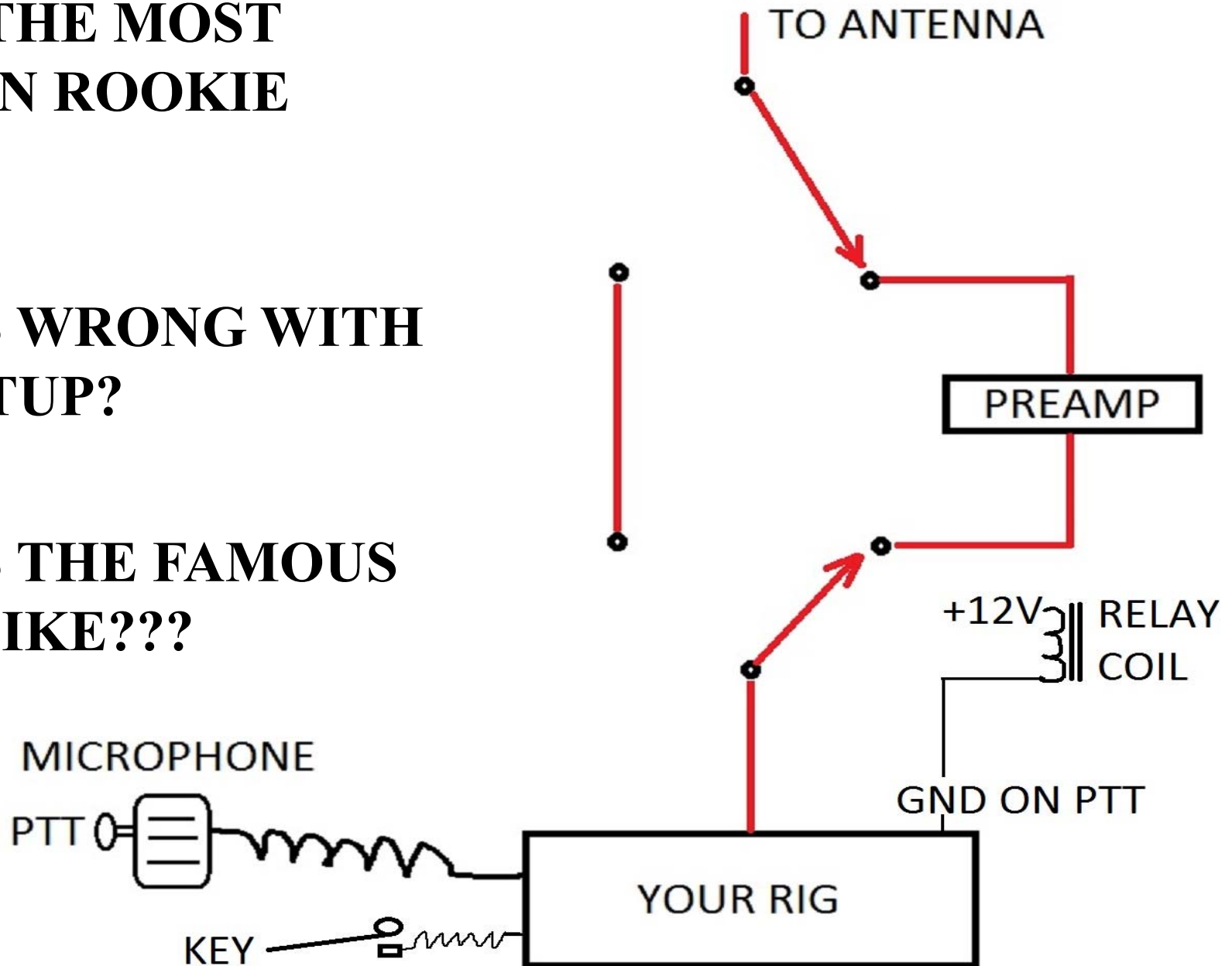
STEP 2. KEY THE AMP

STEP 3. KEY THE TRANSVERTER



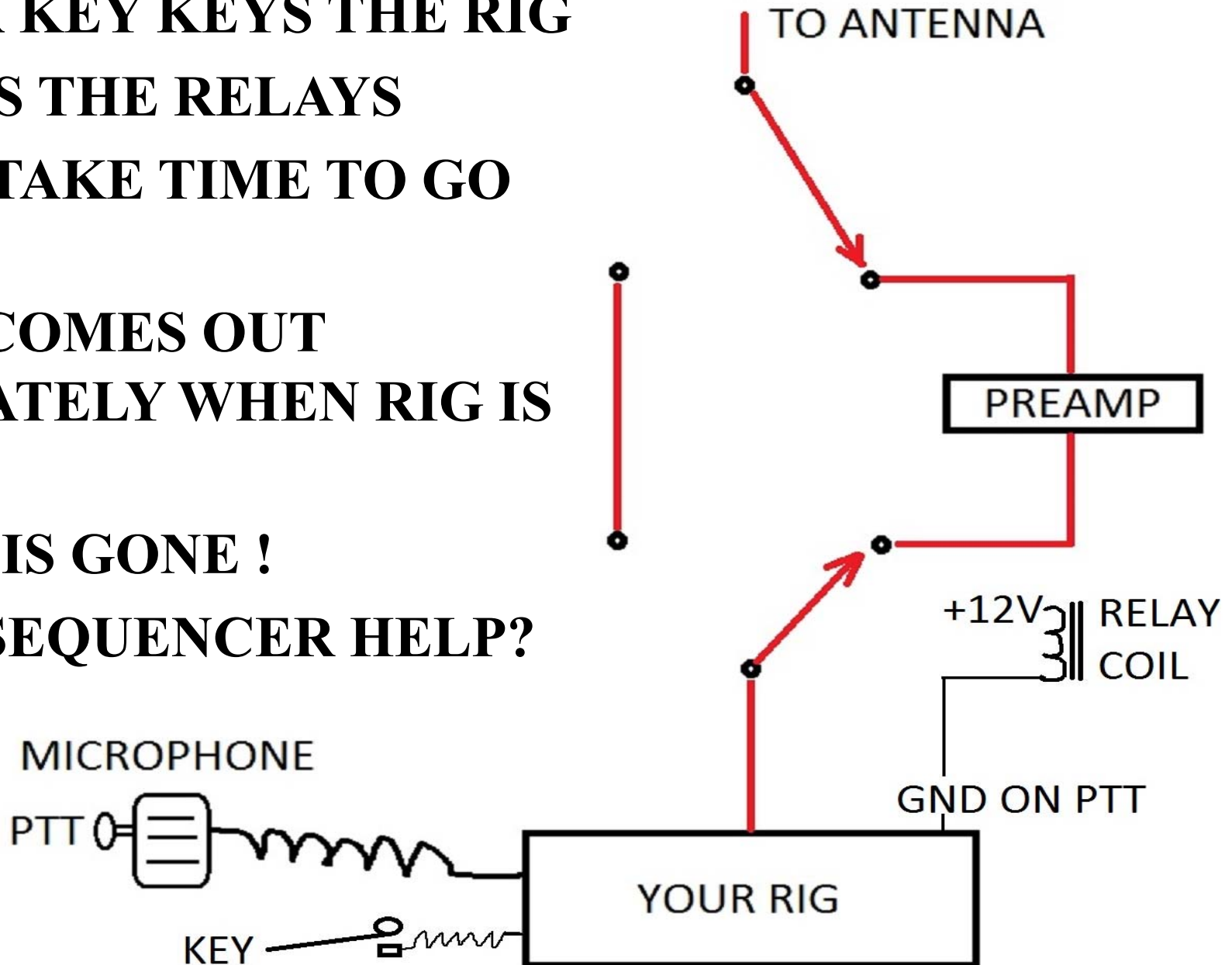
Several Things That Do Not Work

- THIS IS THE MOST COMMON ROOKIE SETUP
- WHAT IS WRONG WITH THIS SETUP?
- WHAT IS THE FAMOUS ICOM SPIKE???



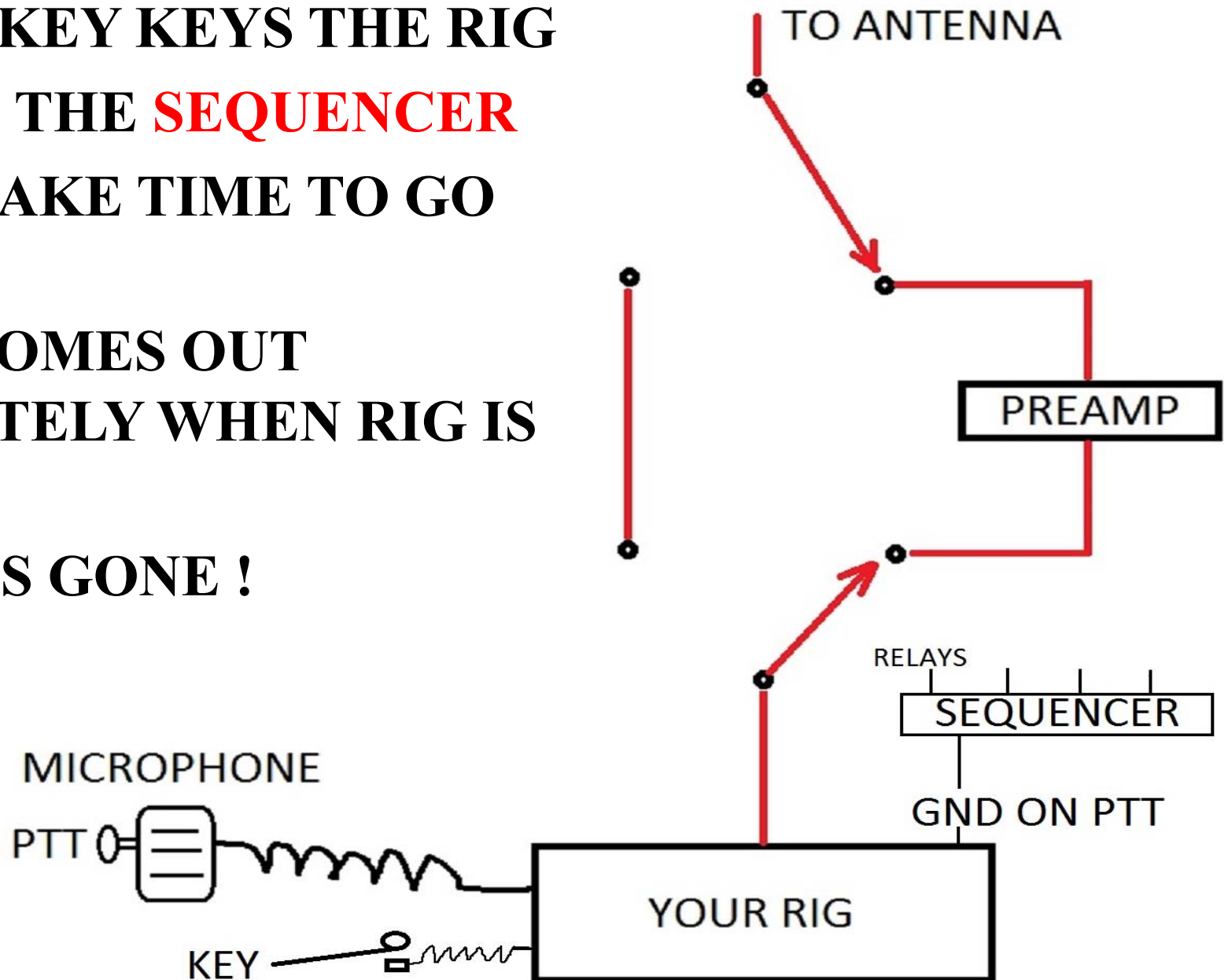
Several Things That Do Not Work

- MIKE OR KEY KEYS THE RIG
- RIG KEYS THE RELAYS
- RELAYS TAKE TIME TO GO TO TX
- POWER COMES OUT IMMEDIATELY WHEN RIG IS KEYED
- PREAMP IS GONE !
- WILL A SEQUENCER HELP?



Several Things That Do Not Work

- MIKE OR KEY KEYS THE RIG
- RIG KEYS THE **SEQUENCER**
- RELAYS TAKE TIME TO GO TO TX
- POWER COMES OUT IMMEDIATELY WHEN RIG IS KEYED
- **PREAMP IS GONE !**



The General Rule That Works

- **UNLESS YOU HAVE A TRANSVERTER, THE RIG CANNOT KEY THE SEQUENCER**
- **WHAT YOU WANT IS FOR THE SEQUENCER TO KEY THE RIG AS THE LAST STEP**
- **THIS IS HARDER TO DO THAN ONE MIGHT THINK!**

Want The Sequencer To Key The Rig As The Last Step!

- **WE MUST NOT ALLOW THE PTT TO OCCUR FROM ANY PLACE OTHER THAN THE SEQUENCER**
- **WE HAVE TO INTERCEPT ANY PTT SIGNAL THAT COMES FROM ANOTHER SOURCE & REROUTE IT TO KEY THE SEQUENCER.**
- **THAT WAY ONLY THE SEQUENCER KEYS THE RIG!**

WHERE CAN PTT SIGNALS COME FROM?

- **VOX ON SSB**
- **CW KEY IN “BREAK IN” OR “SEMI-BREAK” IN CW**
- **PTT BUTTON ON THE MICROPHONE**
- **COMPUTER SOFTWARE KEYING RIG**
 - **(THIS COULD BE WSJT, WSJT-X, PSK-31, ETC.)**
- **THE TRANSMIT BUTTON ON THE RIG FRONT PANEL**

Vox Is Evil...Turn It Off!!!

AND DON'T ALLOW GEORGE TO CONVINCING YOU OTHERWISE!!

- **CONNECT A FOOTSWITCH TO PTT-L ON THE SEQUENCER. THIS WILL START THE SEQUENCER RUNNING WHENEVER YOU STEP ON THE “FOOTFEED”**
- **AT STEP 3, THE SEQUENCER WILL KEY THE RIG, BUT THE RF RELAYS WILL BE SAFELY SWITCHED AND THE PREAMP & POWER AMP WILL BE PROPERLY PROTECTED**
- **SEVERAL COMPANIES MAKE QUALITY FOOTSWITCHES**
 - **HEIL IS ONE, BUT THERE ARE OTHERS**

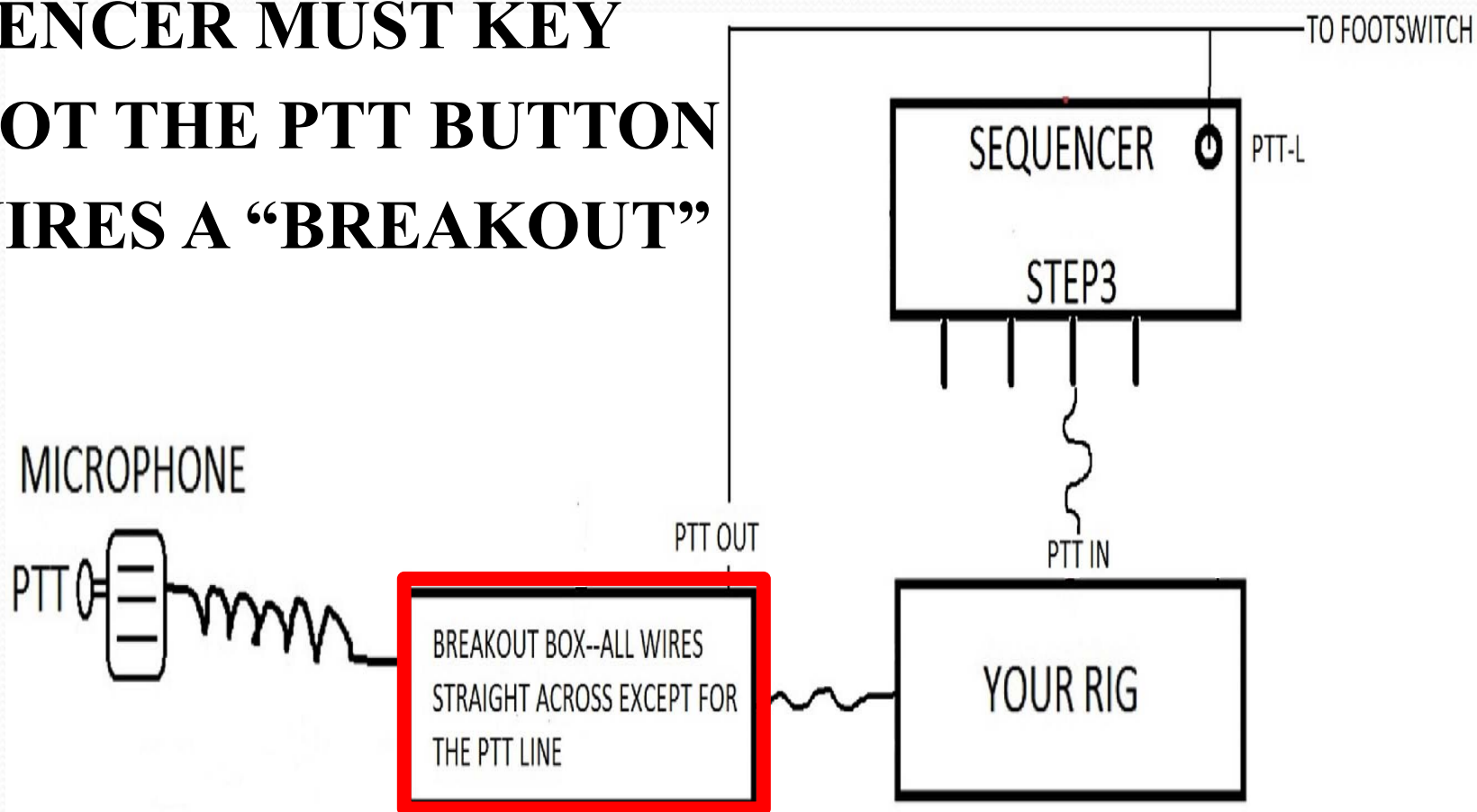
You Must Not Allow CW Break-In Or Semi-Break-In

TURN THEM OFF !!.....WHY??

- **BECAUSE THE RIG IS BEING KEYED BY THE CW KEY AND NOT BY THE SEQUENCER**
- **PUT THE RIG ON CW, PUSH THE FOOTSWITCH AND SEND ALL THE CW THAT YOU WANT**
- **THE SEQUENCER WILL KEY THE RIG AT STEP 3, BUT THE RF RELAY WILL ALL BE SAFELY SWITCHED AND YOUR PREAMP & POWER AMP WILL LIVE FOR ANOTHER DAY**

The Microphone PTT Button is a Bit More Difficult to Intercept !

- WE MUST INTERCEPT THE PTT AND REROUTE IT TO THE SEQUENCER
- SEQUENCER MUST KEY RIG NOT THE PTT BUTTON
- REQUIRES A “BREAKOUT” BOX

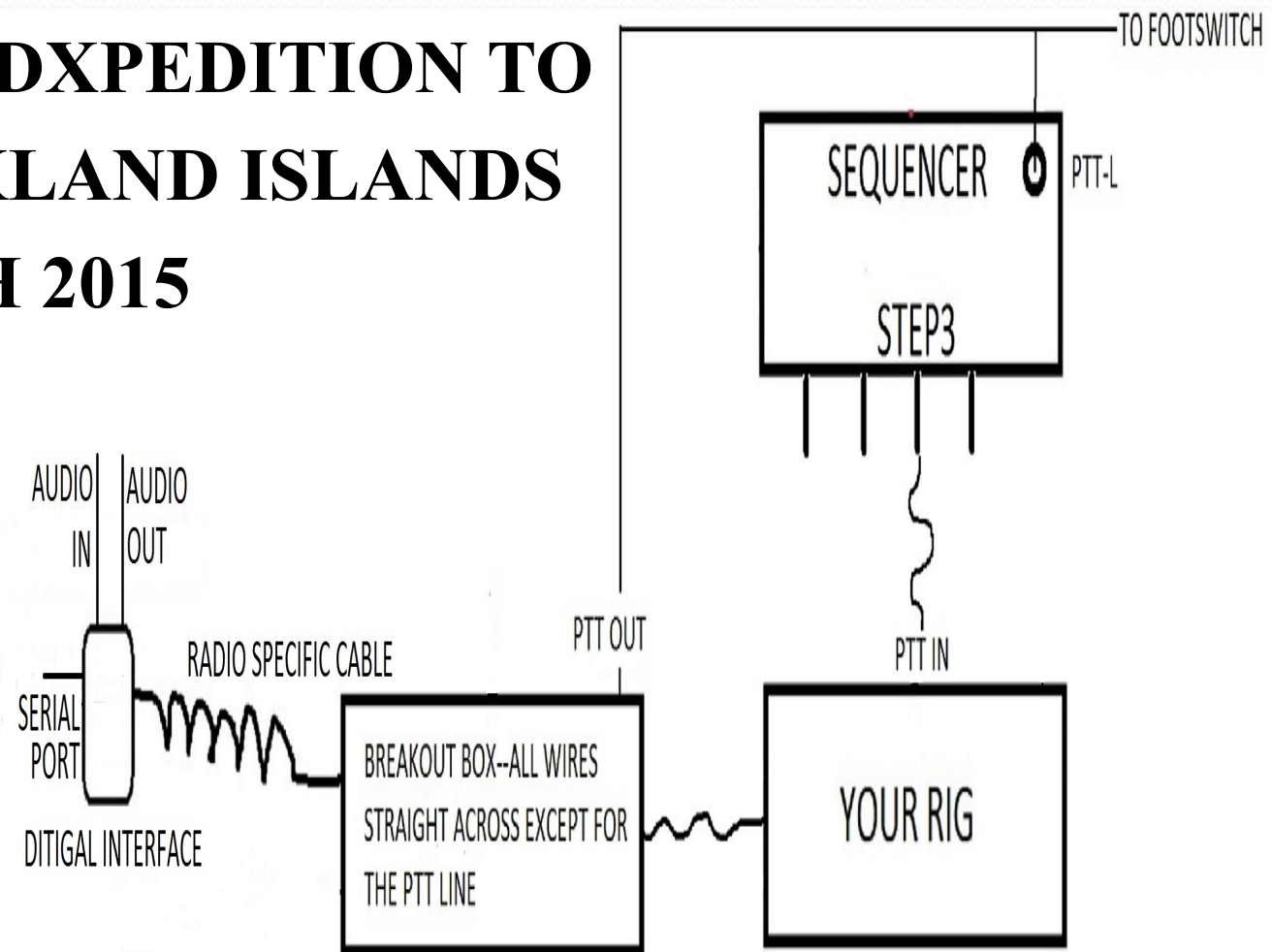


Computer Keying Your Rig?

- **THIS REQUIRES ANOTHER BREAKOUT BOX**
- **USUALLY THE COMPUTER IS CONNECTED TO A DIGITAL INTERFACE WHICH IS CONNECTED TO THE RIG BY A RIG SPECIFIC CABLE**
- **THE IDEA HERE IS TO USE BREAKOUT BOX TO BREAK SIGNAL THAT KEYS YOUR RIG & SEND IT OFF TO THE SEQUENCER.**
- **RADIO SPECIFIC CABLE MAKES IT EASIER**
 - **PUT JACK ON BREAKOUT BOX SAME AS ON RADIO**
 - **PLUG THE DIGITAL INTERFACE INTO THAT**
 - **THEN PUT A CABLE WITH SAME CONNECTOR FROM BREAKOUT BOX TO RADIO**

Computer Keying Your Rig? Cont'd

- NOW RE-ROUTE THE “KEY THE RIG” LINE TO PTT-L ON THE SEQUENCER
- THIS IS WHAT WE DID FOR OUR DXPEDITION TO THE FALKLAND ISLANDS IN MARCH 2015



What About the Transmit Button on the Radio?

- **ABANDON HOPE ALL YE WHO PRESS THIS BUTTON !**
- **RF POWER COMES OUT IMMEDIATELY !**
- **SINCE THERE IS NO WAY TO INTERCEPT THIS SIGNAL INSIDE THE RADIO..PREAMP IS GONE !**
- **DON'T DO THIS !!**

On the Dark Side of Sequencing Summary

- **I HAVE NOT COVERED EVERY POSSIBLE SOLUTION**
- **MY GOAL WAS TO FIND SOLUTIONS THAT WORK FOR EVERY RIG AND EVERY PREAMP/ POWER AMP.**
- **THESE SOLUTIONS ARE SIMPLE AND ABSOLUTELY RELIABLE.**
- **QUESTIONS??**
- **THANKS & 73**
- **MARSHALL K5QE**