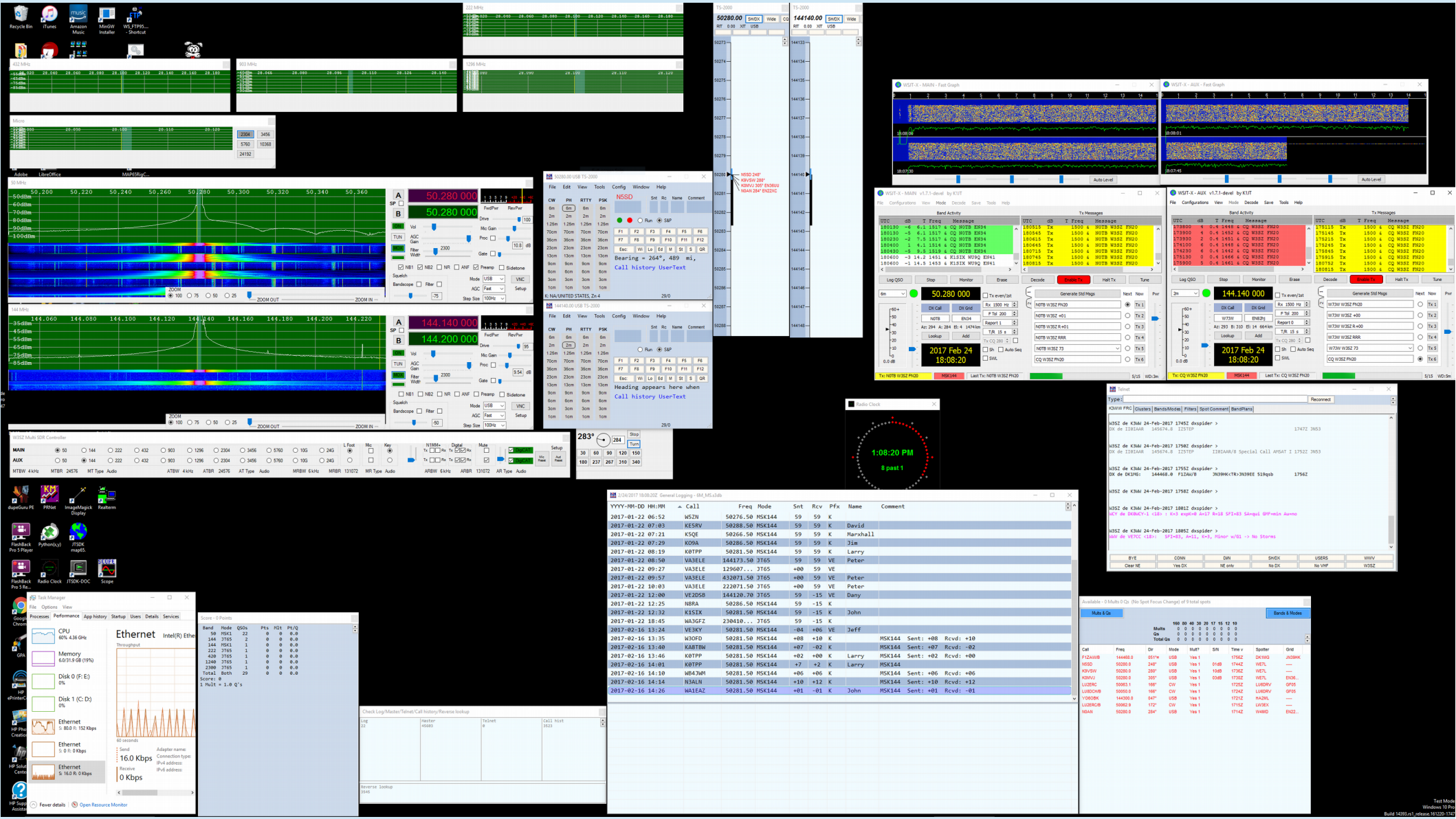
Station Automation

--W3SZ



IF / Transverter Band Switching

- Bandswitching must be done many, many times during a VHF/UHF/Microwave contest
- If this is not automated, each bandswitching event is an opportunity for an operator error to occur, and also takes the operator's focus away from where it should be, which is with the logging program
- Bandswitching during a VHF/UHF/Microwave contest is fundamentally different from bandswitching during an HF contest:
  - in VHF/UHF/Microwave contesting the IF radio likely stays on the 28 MHz band and bandswitching involves switching connections between the IF radio and multiple transverters
  - in HF contesting each bandswitch results in a radio bandchange.
  - Thus, HF bandswitching can be done simply with CAT control, but VHF/UHF/Microwave bandswitching cannot be done with CAT control alone.

IF / Transverter Band Switching

- LPT (Parallel Port)
- Radio-Based
  - Depends on CAT Control of Radio for Automation
- Serial / USB Serial
- Ethernet

IF / Transverter Bandswitching Parallel Port (LPT Devices)

1) Logging program switches bands →
2) LPT Device switches bands →
3) RF relay switches bands

- Couldn’t be simpler!

IF/Transverter Band Switching LPT (Parallel Port) devices

- TOP TEN Devices LPT band switching

  Use binary encoding
  - A = LPT Pin 2
  - B = LPT Pin 7
  - C = LPT Pin 8
  - D = LPT Pin 9

D	C	B	A	Logic Value	Active Output
0	0	0	0	0	AUX0
0	0	0	1	1	160M
0	0	1	0	2	80M
0	0	1	1	3	40M
0	1	0	0	4	30M
0	1	0	1	5	20M
0	1	1	0	6	17M
0	1	1	1	7	15M
1	0	0	0	8	12M
1	0	0	1	9	10M
1	0	1	0	A	6M
1	0	1	1	B	2M
1	1	0	0	C	440
1	1	0	1	D	AUX13
1	1	1	0	E	Unavailable
1	1	1	1	F	Unavailable

0 = 0V, 1 = 5V

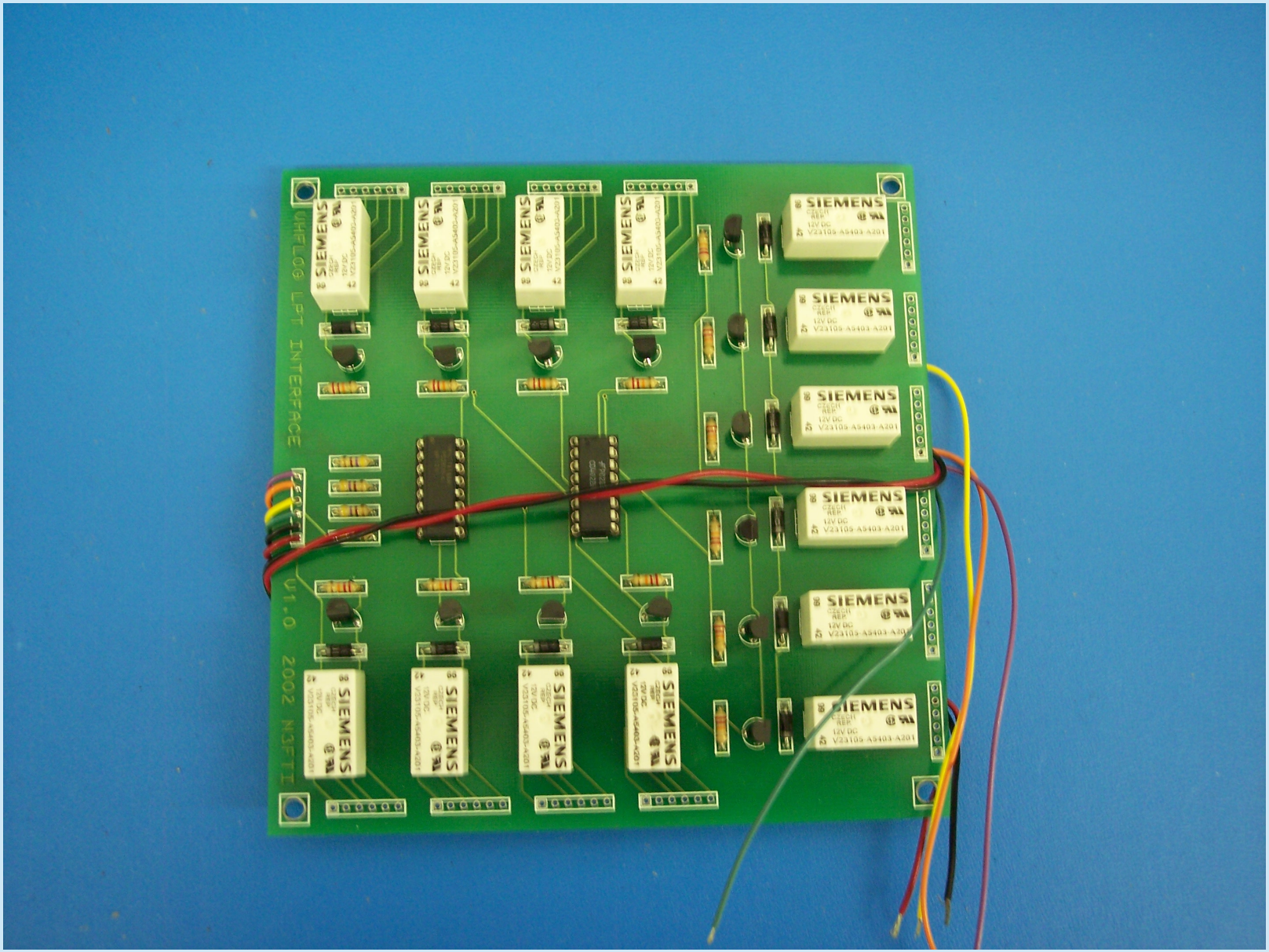
IF/Transverter Band Switching
N3FTI Bandswitch

Band (Mhz)	A	B	C	D
50	0	0	0	0
144	1	0	0	0
222	0	1	0	0
432	1	1	0	0
903	0	0	1	0
1296	1	0	1	0
2304	0	1	1	0
3456	1	1	1	0
5760	0	0	0	1
10368	1	0	0	1

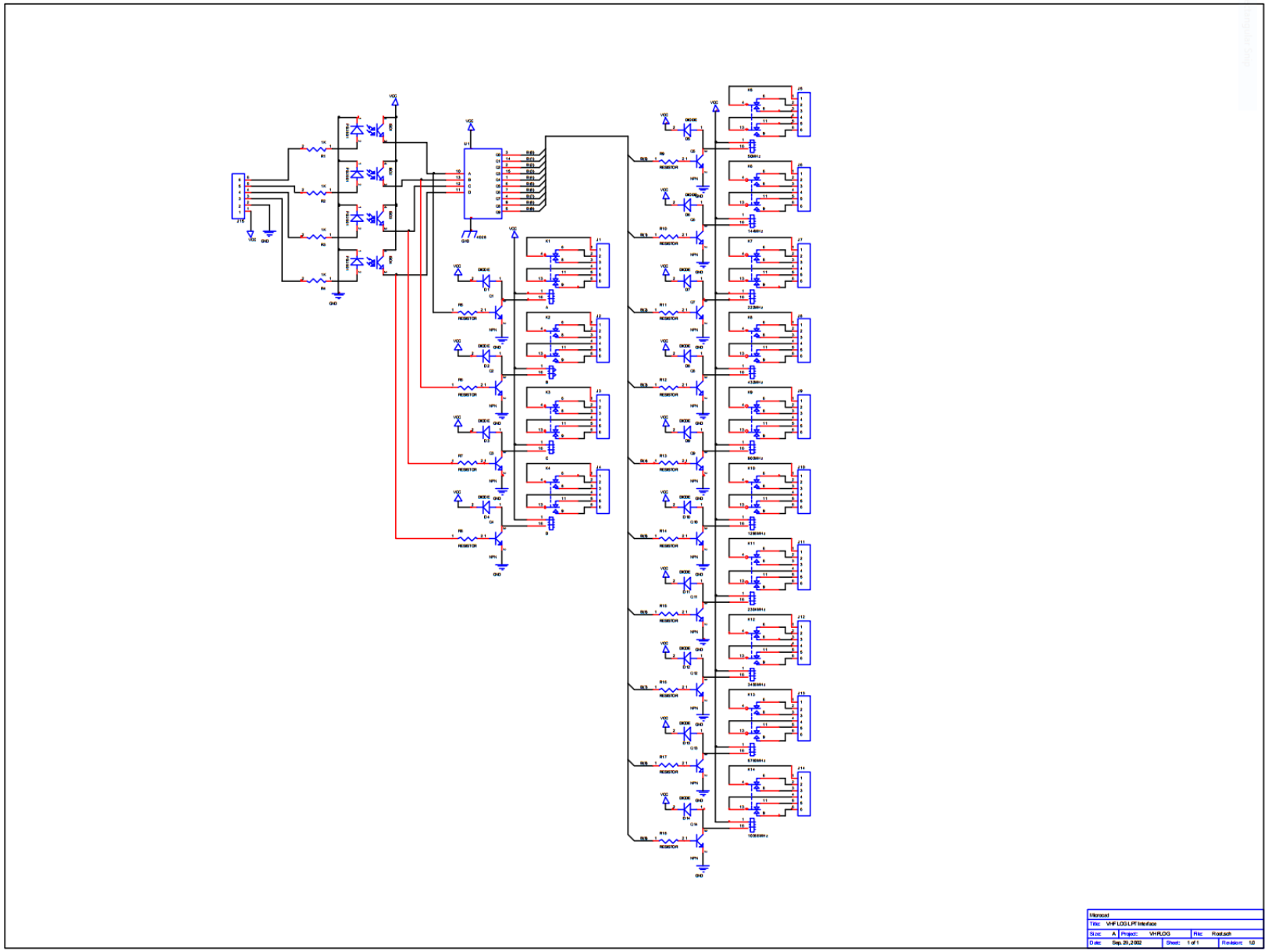
1 = High (>2.4v)
0 = Low (< 2.4v)

A = LPT Pin 2
B = LPT Pin 7
C = LPT Pin 8
D = LPT Pin 9
Common = LPT Pin 18 -25

N3FTI Bandswitch



N3FTI Bandswitch



N3FTI Bandswitch

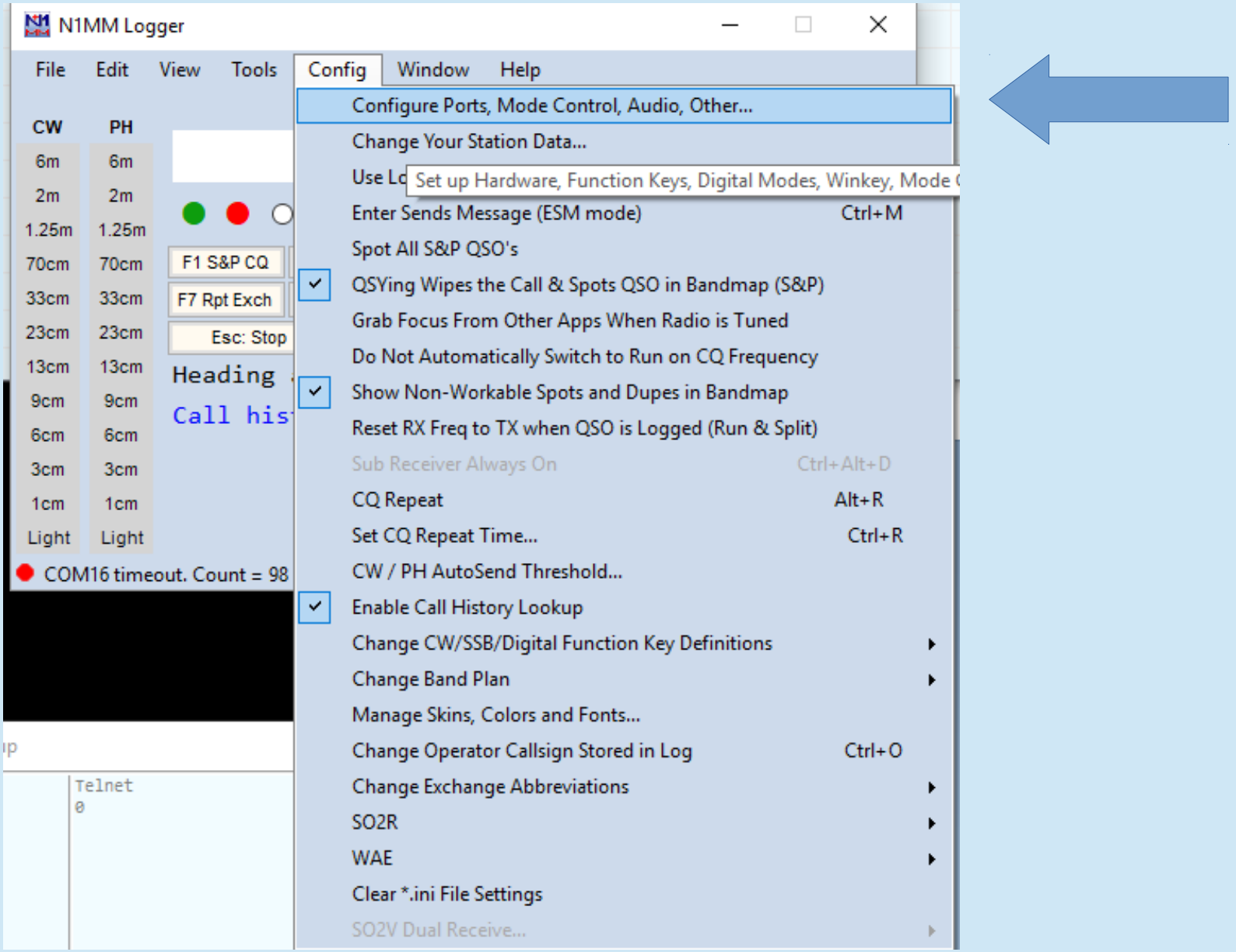
Parallel Port (LPT) Devices

- **TOP TEN Devices Band Aide**
  - LPT/logging program
  - Direct from Yaesu/Icom/Elecraft K3
  - **Two sets of 11 relay outputs**
- **N3FTI VHF Log Interface**
  - LPT/Logging program
  - Direct from Yaesu/Icom/Elecraft K3
  - **Internally uses binary → decimal converter, so only 10 band outputs (DPDT relays)**
- **MicroHAM Ten Switch**
  - LPT/Logging program
  - Direct from Yaesu/Icom/Elecraft K3
  - **10 band outputs**
- **K8ISK (W8ZN) MOASU**
  - LPT/Logging program
  - Direct from Yaesu/Icom/Elecraft K3
  - **Handles separate 28 MHz and 144 MHz IFs**
  - **12 band outputs**
- **Unified Microsystems BCD-14**
  - LPT/Logging program
  - Direct from Yaesu/Icom/Elecraft K3
  - **14 band outputs**

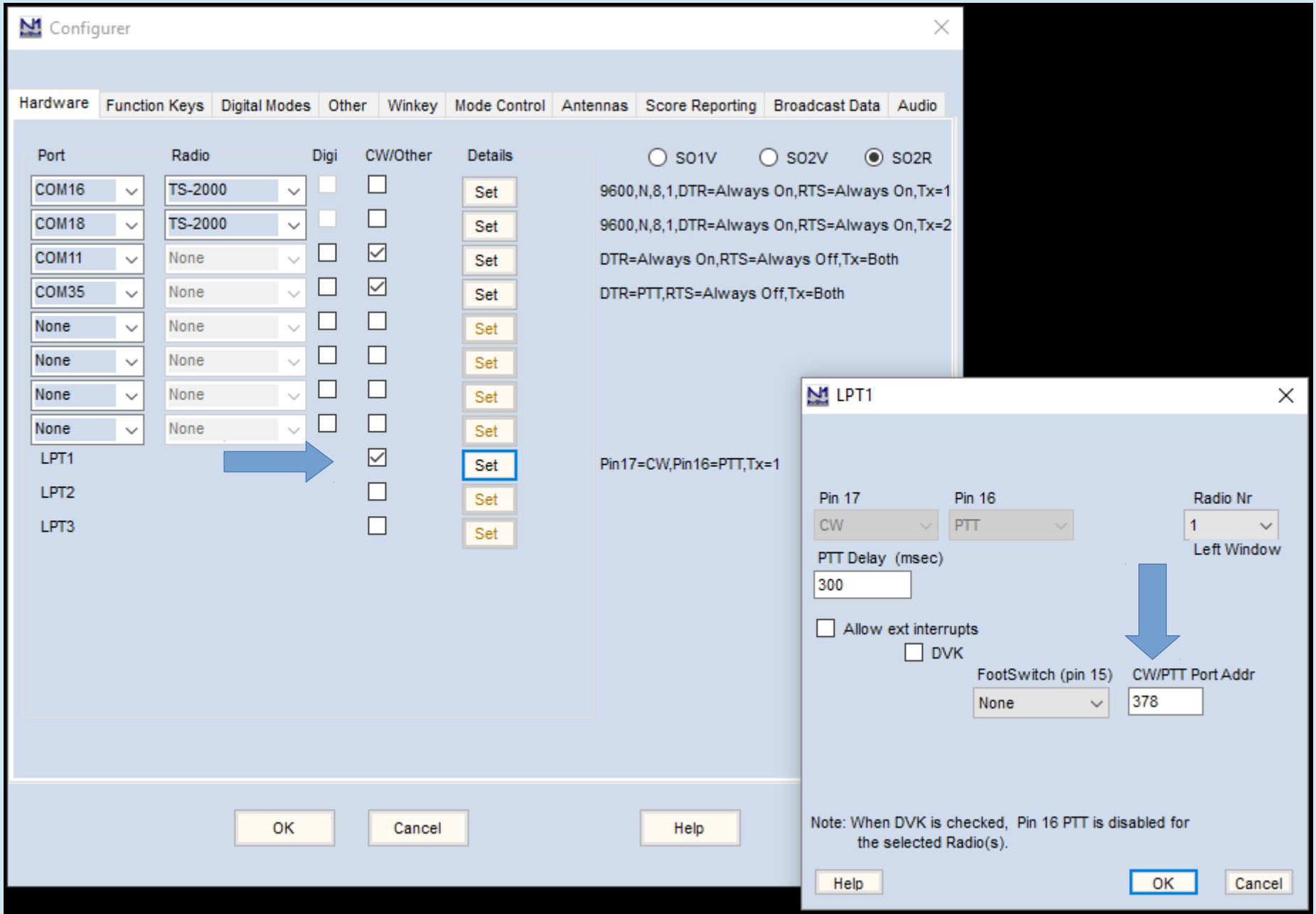
Parallel Port (LPT Devices)

- Some Logging programs that can be used to perform band switching with LPT devices:
  - N1MM
  - VHFLOG
  - WriteLog
  - RoverLog
- When you switch bands in the logging program, the device switches the IF radio connection to the proper transverter by activating appropriate RF relay

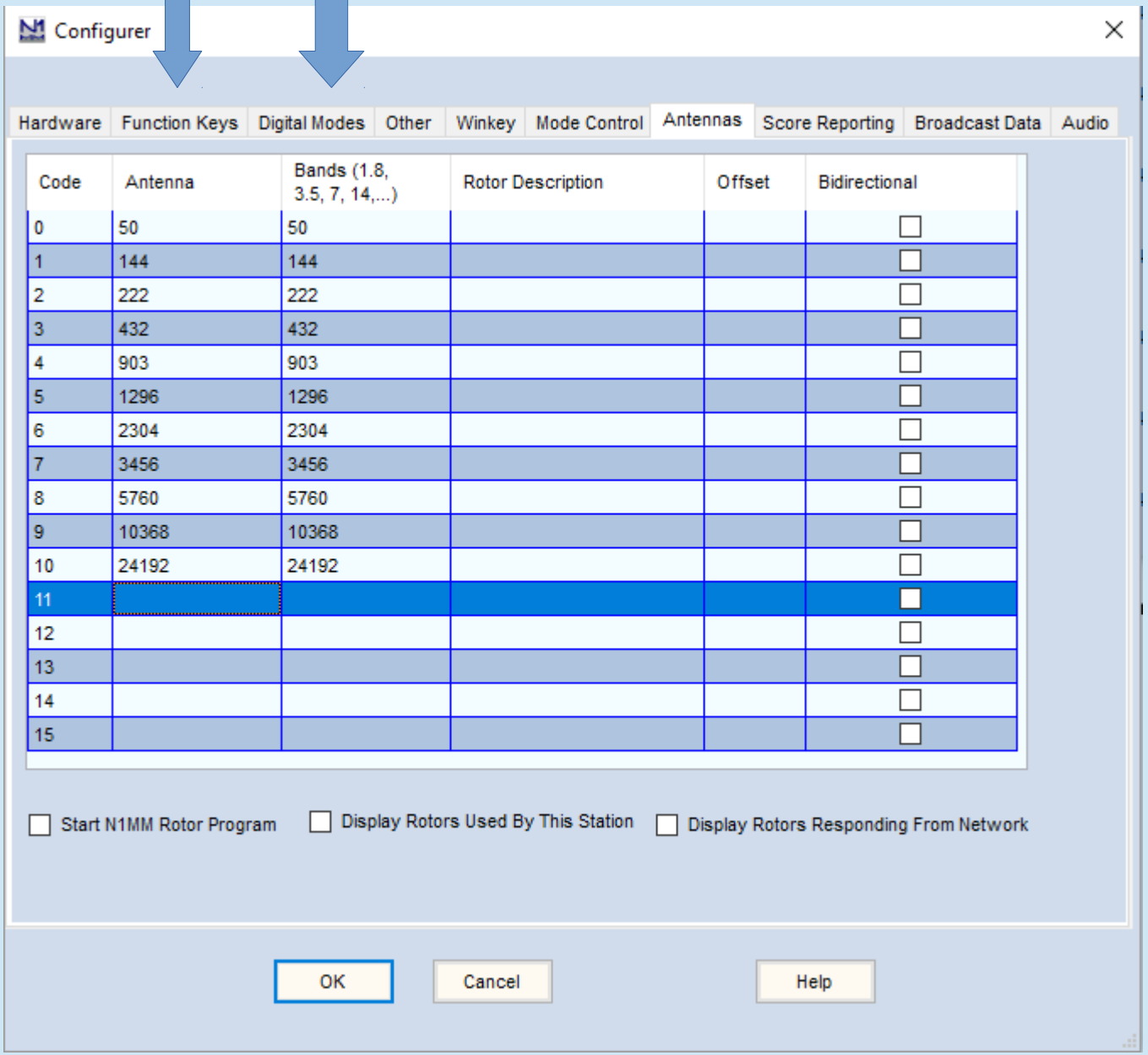
LPT Devices and N1MM



LPT Devices and N1MM



LPT Devices and N1MM



LPT Devices and WriteLog

- Use W5XD Multi+ Keyer
  - No longer in production
  - Easy to duplicate! I have made several and have PCB files if you want
  - “Official” documents at:
  - https://writelog.com/support2/w5xd-multikeyer

IF / Transverter Bandswitching Radio-Based

1) Band switch in logger -->
2) CAT-connected Radio switches bands

    Sends band data to device -->

3) Device switches bands -->
4) RF relay switches bands

Radio-Based IF/Transverter Bandswitching - I2C Flex 1500, 3000, 5000

1) Band switch in logger -->

2) CAT-connected Flex running PowerSDR switches bands

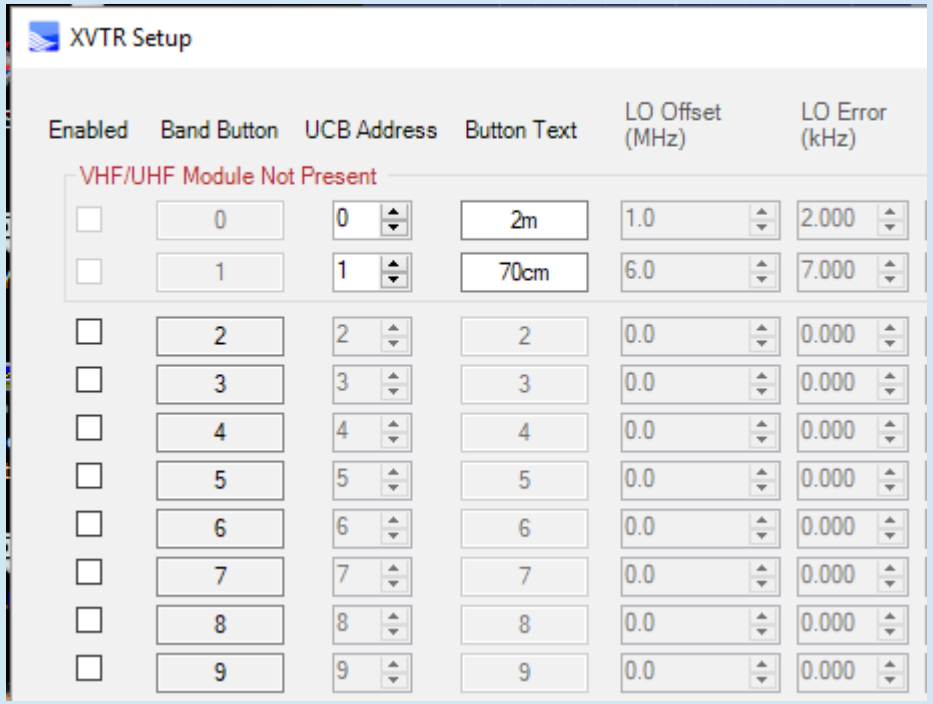
    Sends I2C band data to I2C device -->

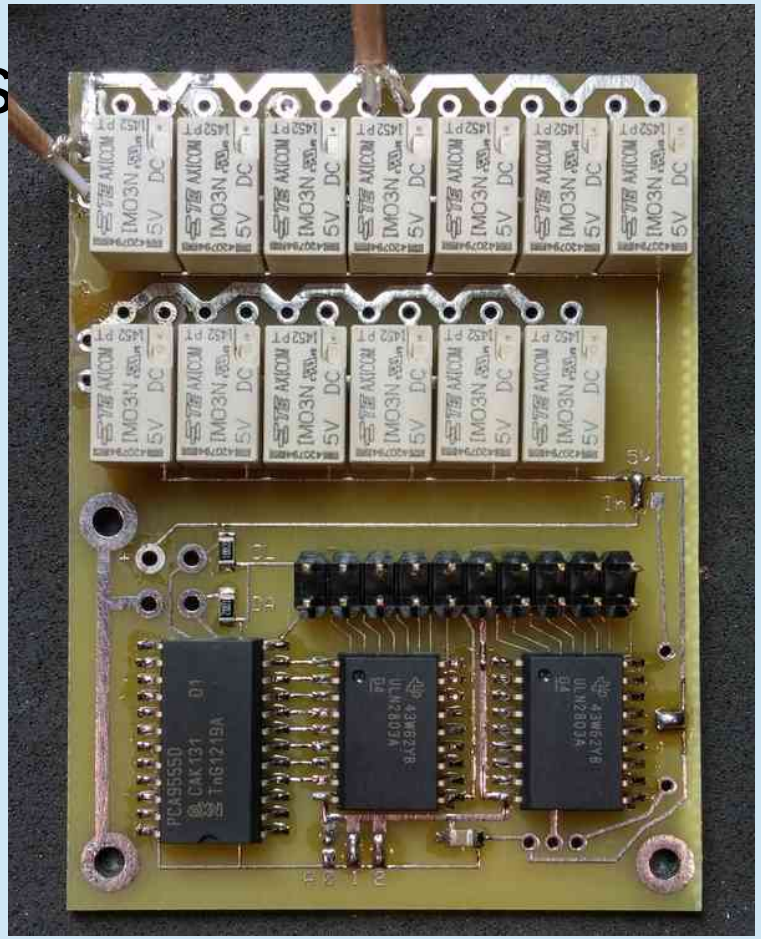
3) I2C device switches bands -->

4) RF relay switches bands

IF/Transverter Bandswitching - I2C Flex 1500, 3000,5000

- PowerSDR provides I2C control
- Phil K3TUF has Flex Wire board that handles I2C signals
  - http://k3tuf.com/I2C.html





Radio-Based IF/Transverter Bandswitching Elecraft K3

1) Band switch in logger -->
2) CAT-connected K3 switches bands and sends binary band data to binary device-->
3) Binary device switches bands -->
4) RF relay switches bands

IF/Transverter Bandswitching Elecraft K3

- K3 has 9 transverter bands, so can bandswitch up to 9 transverter bands using the AUXBUS output on the rear panel of the K3
  - Because 50 MHz does not require a transverter, K3 can control up to 10 bands beginning at 50 MHz, including 6 Meters (which is encoded as 0-0-0-0)

ADR	**BAND3**	**BAND2**	**BAND1**	**BAND0**
TRN1	0	0	0	1
TRN2	0	0	1	0
TRN3	0	0	1	1
TRN4	0	1	0	0
TRN5	0	1	0	1
TRN6	0	1	1	0
TRN7	0	1	1	1
TRN8	1	0	0	0
TRN9	1	0	0	1

IF/Transverter Band Switching
Non-Radio-Based (Non-CAT)
Serial Port

1) Logging program switches bands

    Sends serial or USB-serial band data to serial or USB-serial device-->

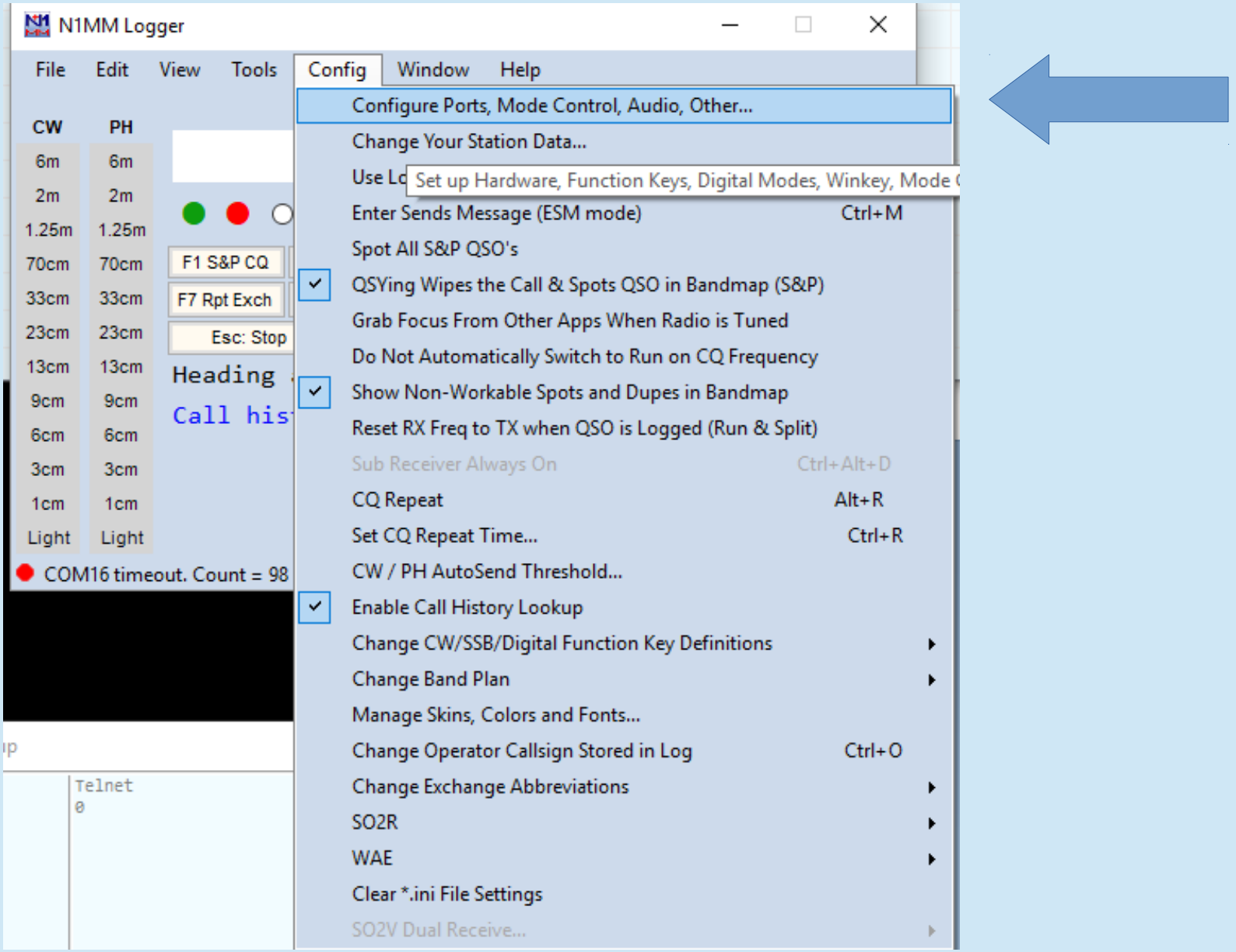
2) Serial or USB-serial device switches bands -->

3) RF relay switches bands

IF/Transverter Band Switching Serial / USB-Serial

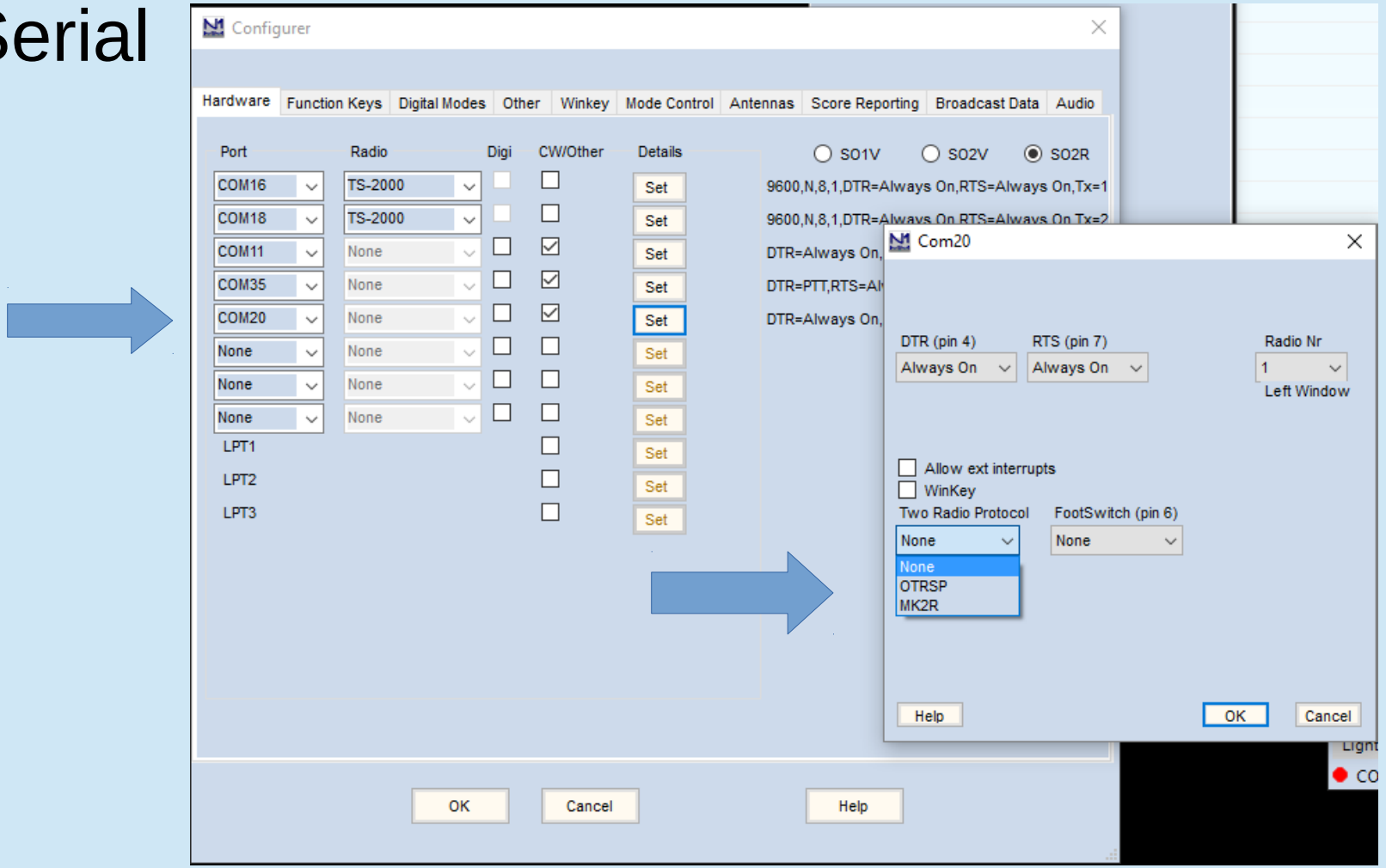
- **N1MM, WriteLog, DXLabs** support USB-serial-port bandswitching of:
  - **microHAM MK2R-compatible** devices
  - **OTRSP (Open Two Radio Switching Protocol)-compatible** devices (e.g. **YCCC SO2RBox**)
    - https://k1xm.org/OTRSP/index.html
    - https://k1xm.org/SO2R/index.html
      - contact Dennis, W1UE, at so2rbox@verizon.net

IF/Transverter Band Switching Serial Port - N1MM



IF/Transverter Band Switching Serial Port - N1MM

- Uses microHAM MK2R-compatible or OTRSP-compatible device or YCCC MOAS II (all USB-Serial



IF/Transverter Band Switching Serial Port

- MicroHAM has SUPERB instructions for setup of MK2R/MK2R+ with N1MM, WriteLog and DXLog in their downloads section
- In MK2R+ Device Router program, set binary pins 6-9 and 10-13 on ACC tab to “Controlled by microHAM control protocol”
- Define binary code for each band in N1MM using Configuration “Antennas” tab, as previously shown
  - www.microham.com/Downloads/MK2R_N1MM_Logger+_Setup.pdf
  - http://www.microham.com/Downloads/MK2R_WriteLog_USB_Setup.pdf
  - www.microham.com/Downloads/MK2R_DXLab_Setup.pdf

IF/Transverter Band Switching USB-Serial

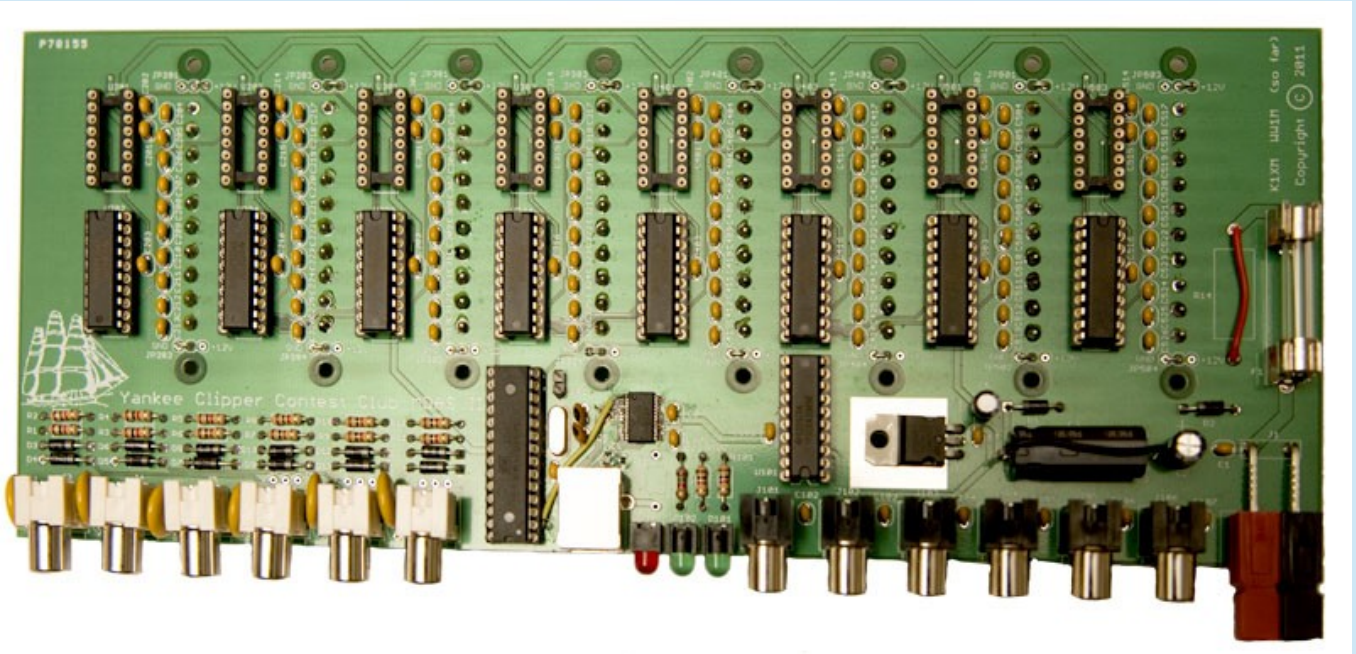
- **N1MM, WriteLog, and Win-Test** support **YCCC MOAS II**

IF/Transverter Band Switching – USB Serial YCCC MOAS II

- Works with N1MM, WriteLog, Win-Test
- Extremely flexible, controls up to 64 relays
- Recognizes frequencies up to 2 THz
- https://k1xm.org/Antenna_Switch/MOAS_II/index.html

Contact:

W1UE



IF/Transverter Band Switching USB-Serial

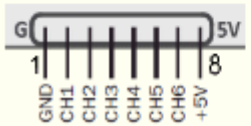
- **VHFLog** can use external hardware to bandswitch via a USB-serial port

IF/Transverter Band Switching - USB-Serial

- VHFLog works with CanaKit UK1104 USB I/O Controller
  - www.canakit.com/usb-relay-controller-with-6-channel-i-o-dev-09669.html
  - VHFLog communicates with CanaKit via USB-serial port
  - CanaKit outputs 4 binary channels that can be used to control N3FTI or other LPT bandswitch

The 4 BCD channels and data latch CH5 connections:

-	BCD	LPT pin	
CH1	A	2	lsb
CH2	B	7	
CH3	C	8	
CH4	D	9	msb
CH5	Latch	see note 1	
GND	Ground	18	



IF/Transverter Band Switching USB-Serial

- **RoverLog** also provides serial port bandswitching with external hardware
  - Need an ini file entry for each band like:
  - RoverLog Ini Editor >> Rig Setup >> 50 1 0 50.125 exec serout COM21: \\\\.\\COM21 9600 50
  - Add serout.bat to RoverLog .exe directory with 3 lines:

```
@echo off

mode %1 baud=%3 parity=n data=8 stop=1 to=on dtr=off rts=off> nul

echo %4> %2
```

iPad 10:51 PM 100%
Comics
Ohm