

Station Automation

--W3SZ

The screenshot displays a comprehensive radio station automation interface. The top section features a Windows taskbar with icons for Recycle Bin, iTunes, Amazon Music, MMSGW Installer, and WS-FTPS. Below this, several windows are open:

- Signal Monitoring:** Multiple windows showing frequency displays (e.g., 50280.00, 144140.00) and waterfall plots for various bands.
- Call Log:** A window titled "General Logging - OK, M3.03h" showing a list of call logs with columns for date, call sign, frequency, mode, and name.
- Band Activity:** Windows showing "Band Activity" for different frequencies, including a "Band Activity" window for 50280.00 and another for 144140.00.
- System Status:** A "WS3Z Multi-SDR Controller" window showing various system parameters and controls.
- Resource Monitor:** A "Task Manager" window showing system resources like CPU (67% at 4.36 GHz), Memory (4.62 GB at 98%), and Disk I/O.
- Other Tools:** A "Radio Clock" window showing the time as 1:08:20 PM on 2017 Feb 24, and a "Check Log/Master/Talent/Call History/Reverse Lookup" window.

The interface is densely packed with data and controls, typical of a professional radio station automation system.

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

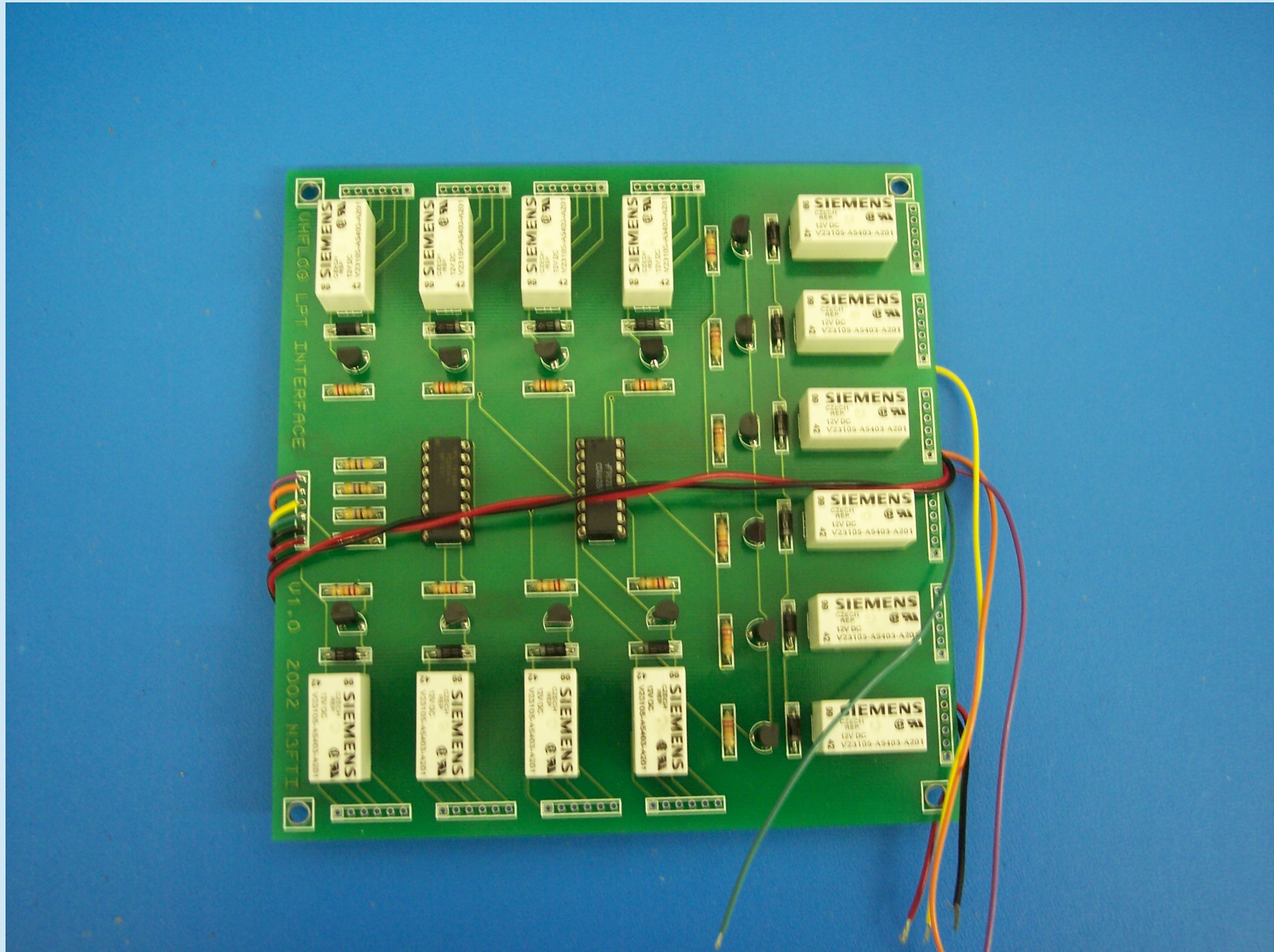
0 = 0V, 1 = 5V

IF/Transverter Band Switching

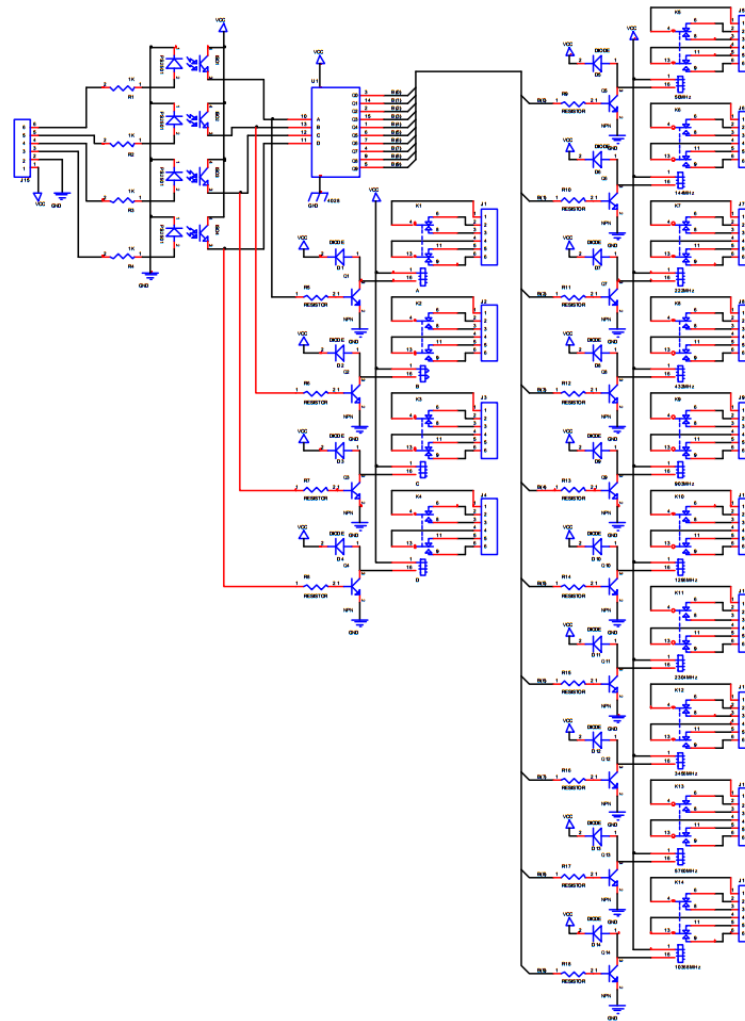
N3FTI Bandswitch

<u>Band (Mhz)</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	
50	0	0	0	0	
144	1	0	0	0	
222	0	1	0	0	1 = High (>2.4v)
432	1	1	0	0	0 = Low (< 2.4v)
903	0	0	1	0	
1296	1	0	1	0	A = LPT Pin 2
2304	0	1	1	0	B = LPT Pin 7
3456	1	1	1	0	C = LPT Pin 8
5760	0	0	0	1	D = LPT Pin 9
10368	1	0	0	1	Common = LPT Pin 18 -25

N3FTI Bandswitch



N3FTI Bandswitch



N3FTI Bandswitch



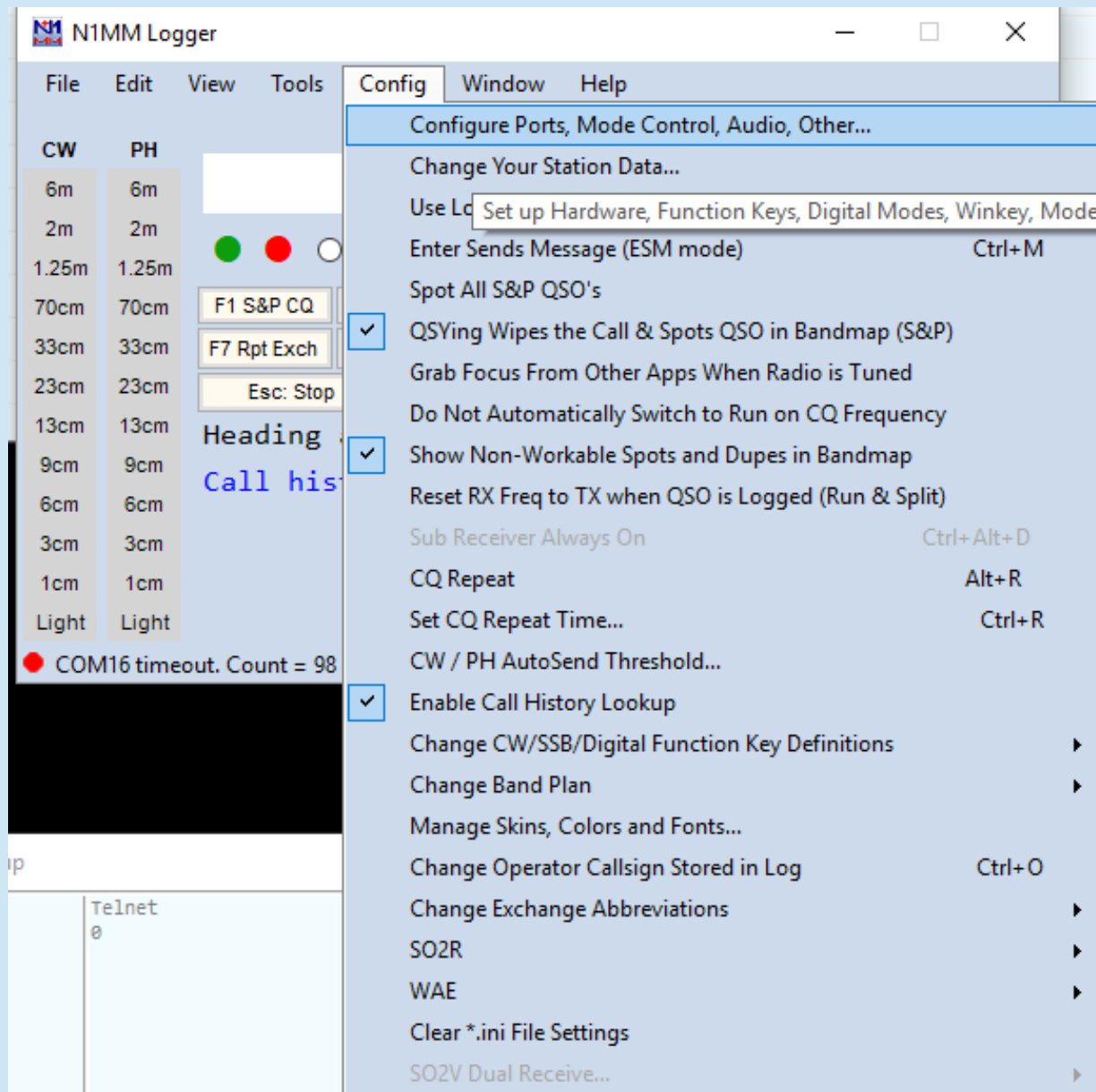
Parallel Port (LPT) Devices

- **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



The screenshot shows the N1MM Logger application window. The 'Config' menu is open, displaying various settings options. A blue arrow points to the 'Configure Ports, Mode Control, Audio, Other...' option at the top of the menu. The main interface includes a menu bar (File, Edit, View, Tools, Config, Window, Help), a frequency band selection table, a heading display, and a log window.

CW	PH
6m	6m
2m	2m
1.25m	1.25m
70cm	70cm
33cm	33cm
23cm	23cm
13cm	13cm
9cm	9cm
6cm	6cm
3cm	3cm
1cm	1cm
Light	Light

COM16 timeout. Count = 98

Heading
Call his

Telnet
0

- Configure Ports, Mode Control, Audio, Other...
- Change Your Station Data...
- Use Local... Set up Hardware, Function Keys, Digital Modes, Winkey, Mode Control...
- Enter Sends Message (ESM mode) Ctrl+M
- Spot All S&P QSO's
- QSYing Wipes the Call & Spots QSO in Bandmap (S&P)
- Grab Focus From Other Apps When Radio is Tuned
- Do Not Automatically Switch to Run on CQ Frequency
- Show Non-Workable Spots and Dupes in Bandmap
- Reset RX Freq to TX when QSO is Logged (Run & Split)
- Sub Receiver Always On Ctrl+Alt+D
- CQ Repeat Alt+R
- Set CQ Repeat Time... Ctrl+R
- CW / PH AutoSend Threshold...
- Enable Call History Lookup
- Change CW/SSB/Digital Function Key Definitions ▶
- Change Band Plan ▶
- Manage Skins, Colors and Fonts...
- Change Operator Callsign Stored in Log Ctrl+O
- Change Exchange Abbreviations ▶
- SO2R ▶
- WAE ▶
- Clear *.ini File Settings
- SO2V Dual Receive... ▶

LPT Devices and N1MM

Configurer

Hardware | Function Keys | Digital Modes | Other | Winkey | Mode Control | Antennas | Score Reporting | Broadcast Data | Audio

Port	Radio	Digi	CW/Other	Details
COM16	TS-2000	<input type="checkbox"/>	<input type="checkbox"/>	Set
COM18	TS-2000	<input type="checkbox"/>	<input type="checkbox"/>	Set
COM11	None	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Set
COM35	None	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Set
None	None	<input type="checkbox"/>	<input type="checkbox"/>	Set
None	None	<input type="checkbox"/>	<input type="checkbox"/>	Set
None	None	<input type="checkbox"/>	<input type="checkbox"/>	Set
None	None	<input type="checkbox"/>	<input type="checkbox"/>	Set
LPT1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Set
LPT2		<input type="checkbox"/>	<input type="checkbox"/>	Set
LPT3		<input type="checkbox"/>	<input type="checkbox"/>	Set

S01V S02V S02R

9600,N,8,1,DTR=Always On,RTS=Always On,Tx=1
9600,N,8,1,DTR=Always On,RTS=Always On,Tx=2
DTR=Always On,RTS=Always Off,Tx=Both
DTR=PTT,RTS=Always Off,Tx=Both

Pin17=CW,Pin16=PTT,Tx=1

LPT1

Pin 17: CW Pin 16: PTT Radio Nr: 1 (Left Window)

PTT Delay (msec): 300

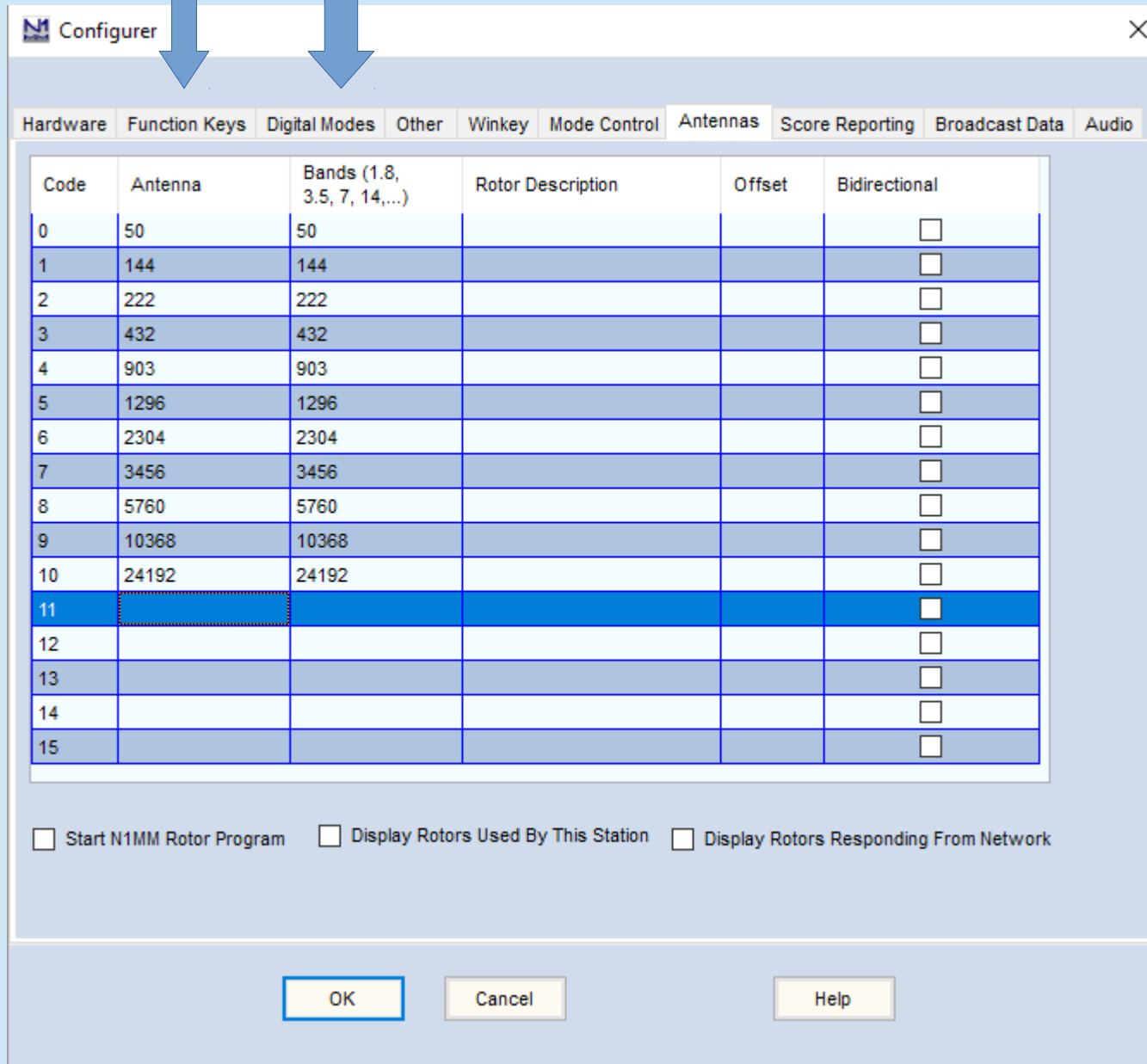
Allow ext interrupts
 DVK

FootSwitch (pin 15): None CW/PTT Port Addr: 378

Note: When DVK is checked, Pin 16 PTT is disabled for the selected Radio(s).

OK Cancel Help

LPT Devices and N1MM



Configurer

Hardware Function Keys Digital Modes Other Winkey Mode Control **Antennas** Score Reporting Broadcast Data Audio

Code	Antenna	Bands (1.8, 3.5, 7, 14,...)	Rotor Description	Offset	Bidirectional
0	50	50			<input type="checkbox"/>
1	144	144			<input type="checkbox"/>
2	222	222			<input type="checkbox"/>
3	432	432			<input type="checkbox"/>
4	903	903			<input type="checkbox"/>
5	1296	1296			<input type="checkbox"/>
6	2304	2304			<input type="checkbox"/>
7	3456	3456			<input type="checkbox"/>
8	5760	5760			<input type="checkbox"/>
9	10368	10368			<input type="checkbox"/>
10	24192	24192			<input type="checkbox"/>
11					<input type="checkbox"/>
12					<input type="checkbox"/>
13					<input type="checkbox"/>
14					<input type="checkbox"/>
15					<input type="checkbox"/>

Start N1MM Rotor Program Display Rotors Used By This Station Display Rotors Responding From Network

OK Cancel Help

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

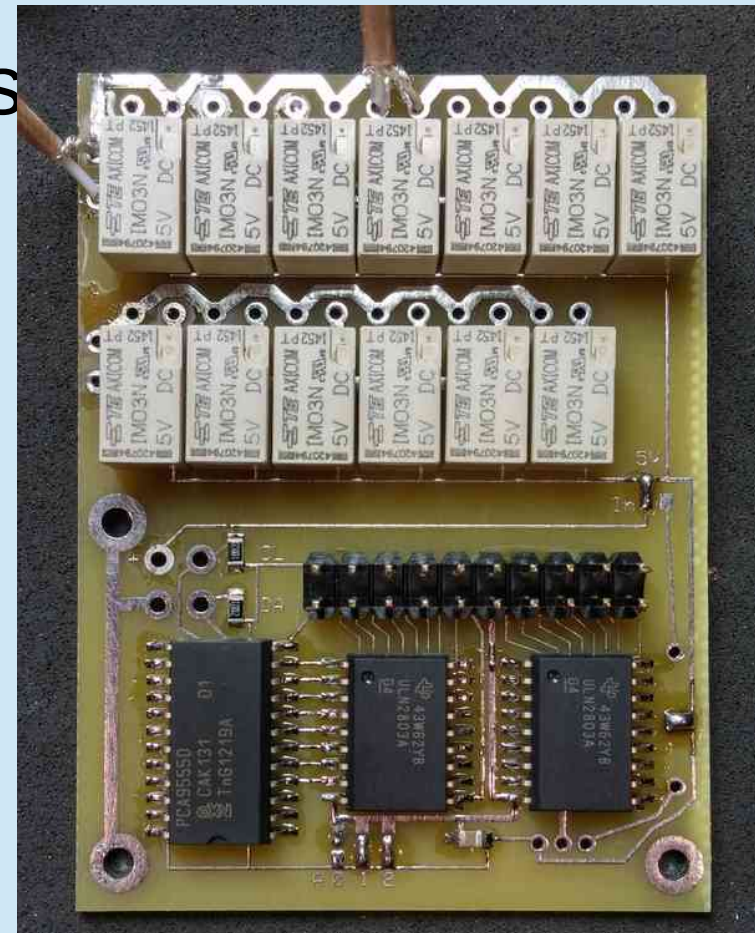
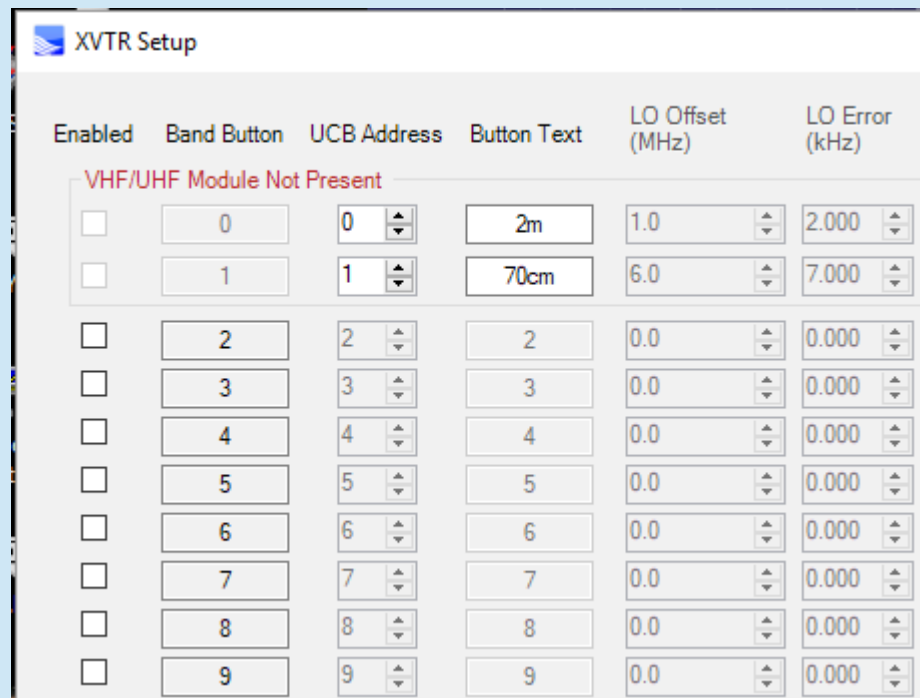
- 1) Band switch in logger -->
- 2) CAT-connected Radio switches bands
Sends band data to device -->
- 3) Device switches bands -->
- 4) RF relay switches bands

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)

<i>ADR</i>	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-->

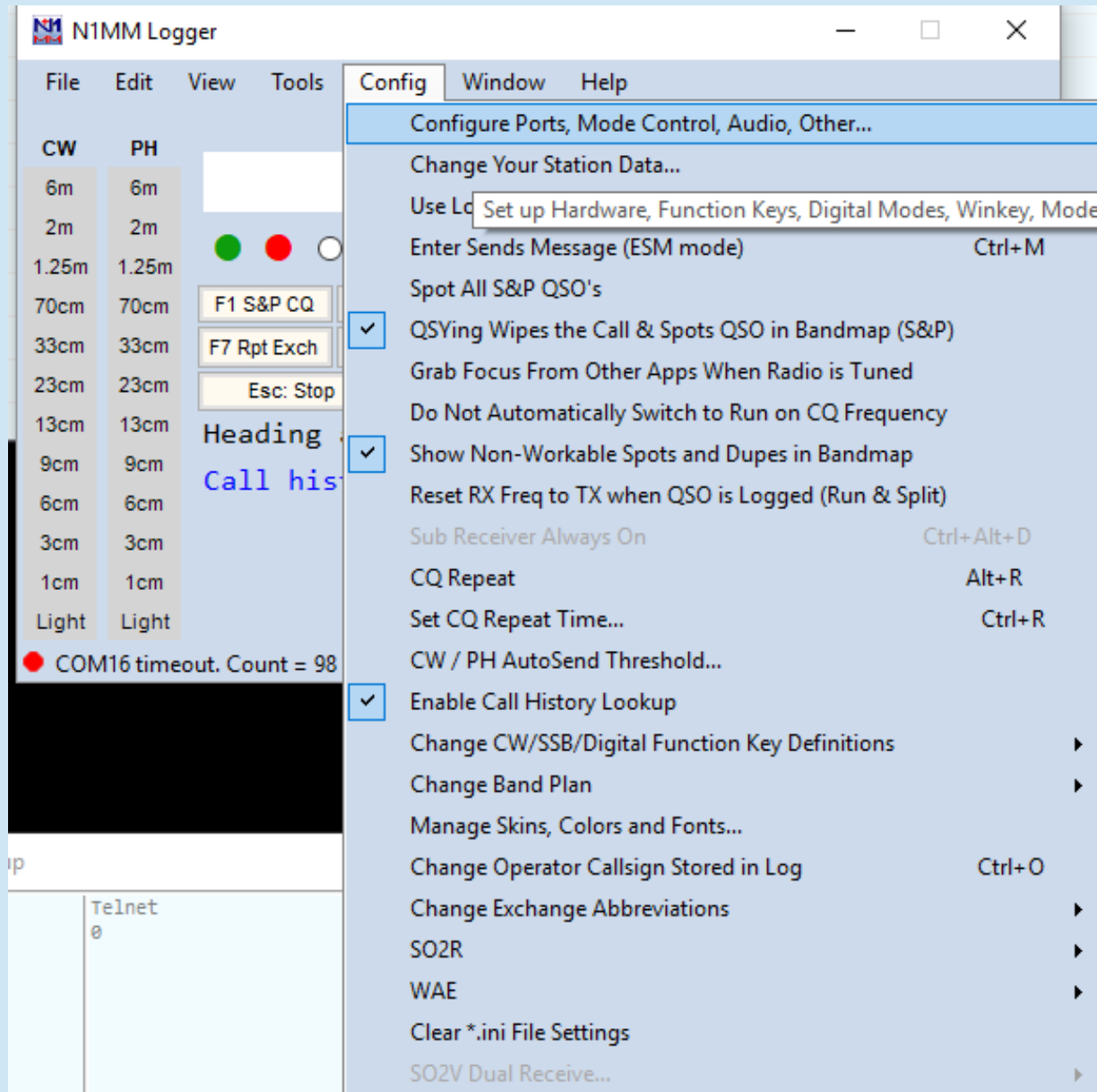
2) Serial or USB-serial device switches bands -->

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



The screenshot shows the N1MM Logger application window. The 'Config' menu is open, displaying various settings. A blue arrow points to the 'Configure Ports, Mode Control, Audio, Other...' option at the top of the menu. The main interface includes a menu bar (File, Edit, View, Tools, Config, Window, Help), a CW/PH frequency table, a heading field, and a status bar showing 'COM16 timeout. Count = 98'. The Config menu items include: Configure Ports, Mode Control, Audio, Other...; Change Your Station Data...; Use Local... (with a tooltip: Set up Hardware, Function Keys, Digital Modes, Winkey, Mode Control); Enter Sends Message (ESM mode) Ctrl+M; Spot All S&P QSO's; QSYing Wipes the Call & Spots QSO in Bandmap (S&P) (checked); Grab Focus From Other Apps When Radio is Tuned; Do Not Automatically Switch to Run on CQ Frequency; Show Non-Workable Spots and Dupes in Bandmap (checked); Reset RX Freq to TX when QSO is Logged (Run & Split); Sub Receiver Always On Ctrl+Alt+D; CQ Repeat Alt+R; Set CQ Repeat Time... Ctrl+R; CW / PH AutoSend Threshold...; Enable Call History Lookup (checked); Change CW/SSB/Digital Function Key Definitions; Change Band Plan; Manage Skins, Colors and Fonts...; Change Operator Callsign Stored in Log Ctrl+O; Change Exchange Abbreviations; SO2R; WAE; Clear *.ini File Settings; SO2V Dual Receive...

CW	PH
6m	6m
2m	2m
1.25m	1.25m
70cm	70cm
33cm	33cm
23cm	23cm
13cm	13cm
9cm	9cm
6cm	6cm
3cm	3cm
1cm	1cm
Light	Light

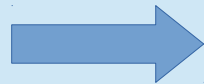
Heading
Call his

COM16 timeout. Count = 98

Telnet
0

IF/Transverter Band Switching Serial Port - N1MM

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

The screenshot shows the 'Configurer' software interface with the 'Hardware' tab selected. A table lists various ports and their configurations. The 'COM20' row is highlighted, and a 'Set' button next to it is active. A 'Com20' dialog box is open, showing detailed settings for the selected port. A blue arrow points from the 'Set' button in the main window to the dialog box.

Port	Radio	Digi	CW/Other	Details
COM16	TS-2000	<input type="checkbox"/>	<input type="checkbox"/>	Set
COM18	TS-2000	<input type="checkbox"/>	<input type="checkbox"/>	Set
COM11	None	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Set
COM35	None	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Set
COM20	None	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Set
None	None	<input type="checkbox"/>	<input type="checkbox"/>	Set
None	None	<input type="checkbox"/>	<input type="checkbox"/>	Set
None	None	<input type="checkbox"/>	<input type="checkbox"/>	Set
LPT1		<input type="checkbox"/>	<input type="checkbox"/>	Set
LPT2		<input type="checkbox"/>	<input type="checkbox"/>	Set
LPT3		<input type="checkbox"/>	<input type="checkbox"/>	Set

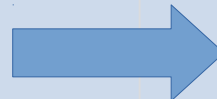
Radio: SO1V SO2V SO2R
9600,N,8,1,DTR=Always On,RTS=Always On,Tx=1
9600,N,8,1,DTR=Always On,RTS=Always On,Tx=2
DTR=Always On,
DTR=PTT,RTS=Al
DTR=Always On,

DTR (pin 4) Always On
RTS (pin 7) Always On
Radio Nr 1
Left Window

Allow ext interrupts
 WinKey
Two Radio Protocol None
FootSwitch (pin 6) None

None
None
OTRSP
MK2R

Help OK Cancel



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

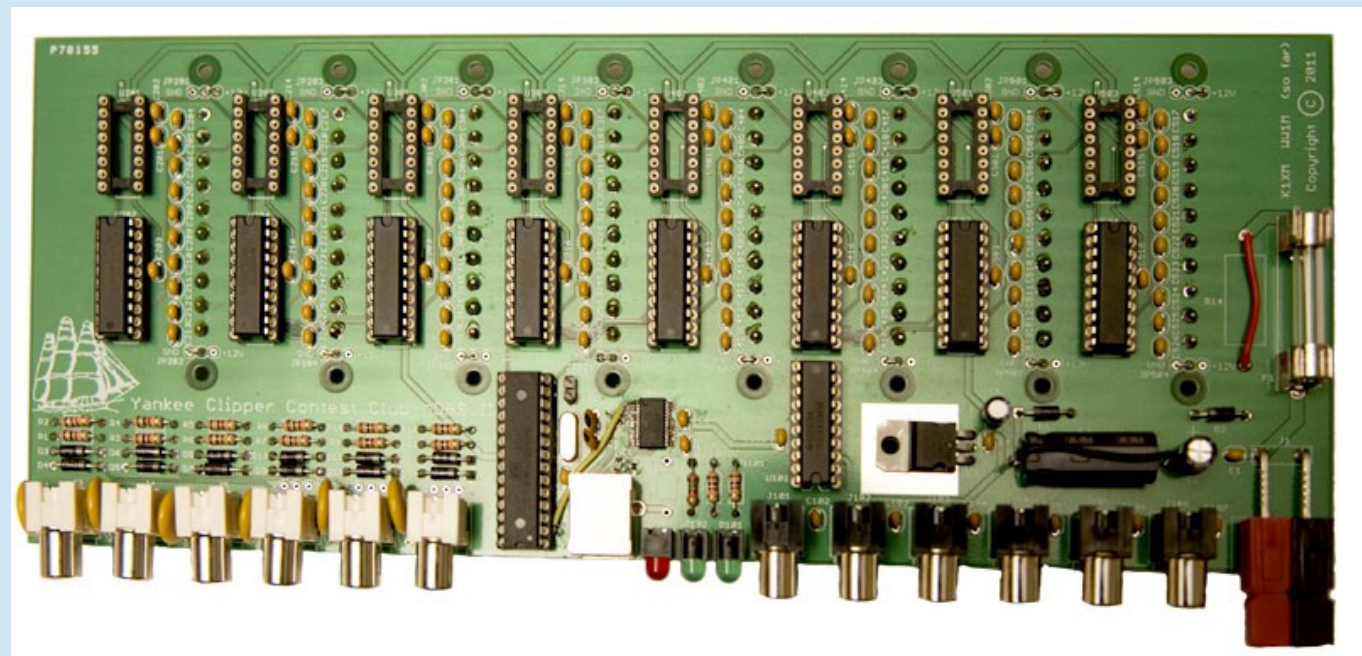
IF/Transverter Band Switching USB-Serial

- **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

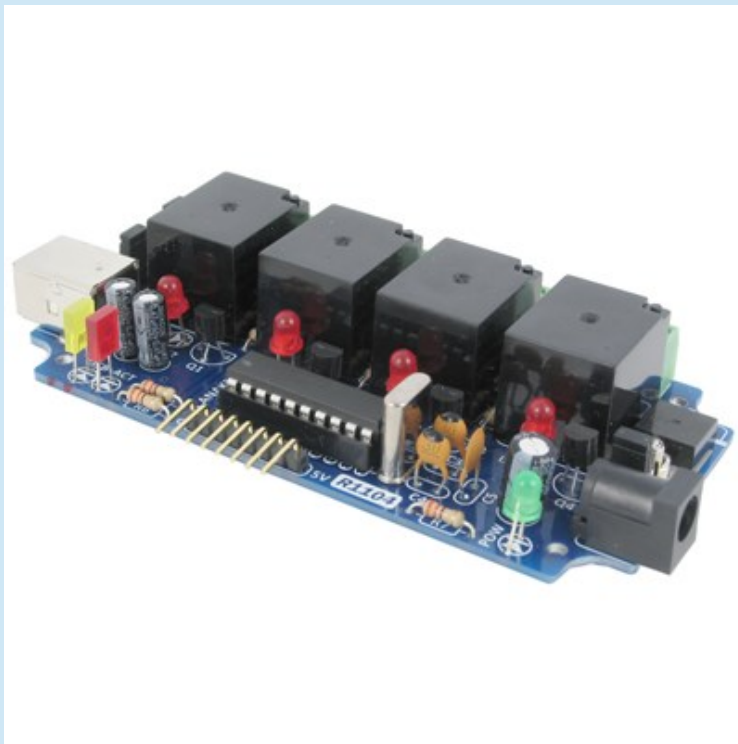


IF/Transverter Band Switching USB-Serial

- **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
```

REMEMBER: WITH GREAT
POWER COMES GREAT
CURRENT SQUARED
TIMES RESISTANCE.



OHM NEVER FORGOT HIS
DYING UNCLE'S ADVICE.