

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, MSN, WS-FTPS, and a Start menu. The main workspace is divided into several functional areas:

- Signal Monitoring:** Multiple waterfall plots and spectrograms showing frequency activity across various bands, including 50.280 MHz and 144.140 MHz.
- Frequency Displays:** Digital readouts for transmit and receive frequencies, such as 50.280 000 and 144.140 000.
- Call Log:** A central window titled "General Logging - OK, M3.036" listing call activity with columns for date, call sign, frequency, mode, and name. Key entries include calls from W5ZN, KESRV, K5QE, K0RA, K0TPP, VA3ELE, VA3ELE, VE2DSS, N8RA, K1SIX, WA3GFZ, VE3VEY, W3OFD, K8RTBW, K8TPP, N8JZW, N3ALN, and WA1EAZ.
- Band Activity:** Windows showing detailed band activity for various frequencies, including 144.140 MHz and 144.200 MHz.
- System Status:** A "WS3Z Multi-SDR Controller" window showing status for various SDRs and audio paths.
- Resource Monitor:** A taskbar window showing system performance metrics like CPU usage (67%), memory usage (45%), and disk activity.
- Time Display:** A large digital clock showing 1:08:20 PM on 2017 Feb 24.

Today's topics - Broadly

- Reasons for and goals of station automation
- IF/Transverter Bandswitching
- CAT Control
- Device BandSwitching (PTT, Mic, Receive Audio, CW Key)
- Device Control
- Device Monitoring
- The Future
- Reference:<http://w3sz.com/StationAutomation87.html>

Station Automation

- In the past, a typical VHF/UHF/Microwave station had only manual control of:
 - PTT
 - IF/Transverter Band switching
 - Frequency
 - Mic switching between radios (or used multiple mics)
 - Receive audio switching between radios (or used multiple headphones/speakers)
 - CW key/paddle switching between radios (or used multiple keys/paddles)
 - Antenna azimuth / elevation control
 - RF output power, VSWR monitoring, etc.
- Today we will discuss adding automation for each of these functions

Station Automation

- Why add automation?
 - Because having to switch focus between the logging computer and mechanical switches:
 - Decreases efficiency, potentially decreasing contest score
 - Increases likelihood of errors that reduce contest score or damage equipment (or both)
 - Increases operator fatigue
 - Because automation is necessary for remote operation, where mechanical switches at the remote location cannot be accessed from operator location
- Automation does increase operator efficiency, increase contest score, decrease operator errors, decrease operator fatigue, and permit remote operation

Stages of Station Automation

- 1) None
- 2) Only One of:
 - 1) IF Radio / Transverter Bandswitching
 - 2) CAT Control of Radios via Logger
 - 3) Bandswitching of Mic/PTT/CW Key/Receive Audio
- 3) Two of #2 above
- 4) Three of #2 above
- 5) #4 above plus advanced switching of Mic/PTT/CW Key/Receive Audio
- 6) #5 above plus Azimuth/Elevation Control
- 7) Total Software Control

To any of the above can add:

- Remote Device Control
- Remote or Computerized Device Monitoring

Today's topics – in more detail

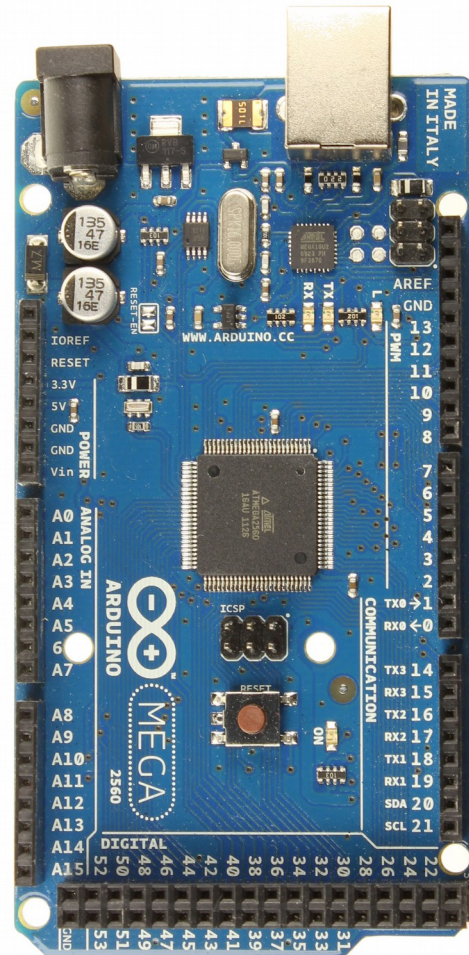
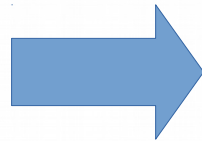
- Reasons for and goals of station automation
- IF/Transverter Bandswitching
 - Binary/LPT devices
 - Radio-based - Flex - I2C devices
 - Radio-based – Elecraft K3
 - USB-Serial devices
 - Introduction to MCUs and SBCs
 - More USB-Serial devices
 - Ethernet devices
- CAT Control
 - N1MM
 - WSJTX
 - Other Software
- Device Bandswitching
 - Microphone
 - Receive Audio
 - PTT
 - CW keying
- Device Control
 - Ethernet Device Control
 - Antenna Azimuth and Elevation (IF TIME)
 - Programmable attenuators for IF Rx and Tx (ONLINE ONLY)
- Device Monitoring
 - RF output power monitoring (IF TIME)
- The Future (ONLINE ONLY)

The Seminar in a Nutshell

Station Automation == Arduino

Inputs:

GPIO Pins
Analog Pins
Serial
Ethernet



Outputs:

GPIO Pins --> Relays
Analog Pins --> PWM
 motor
 control
Serial --> USB-Serial
Ethernet --> Browser
 Database

Station Automation Coding

- **Very Simple:**

Get Some Input

Do Something With It

Produce Some Output

The Seminar in a Nutshell

- Google is Your Friend
- No Matter What You Want to Do:
 - Someone has already done something like it
- Use Google to Get Their Code
 - Read it
 - Understand it
 - Use it
 - Modify it
- Don't Reinvent the Wheel

WHOA, THIS IS RUNNING MS-DOS! IT'S WEIRD HOW NEW TECHNOLOGY TAKES FOREVER TO REACH SOME INDUSTRIES.

YEAH. LIKE HOW WE STILL USE GUNPOWDER FOR FIREWORKS, EVEN THOUGH WE'VE HAD NUCLEAR WEAPONS FOR OVER 70 YEARS.



And I can't believe some places still use fax machines. The electrical signals waste so much time going AROUND the Earth when neutrino beams can go straight through!