

Model Railroad Computer Control

(How I am going to write my Train Program)

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Agenda

- **Philosophy**
- **Hardware requirements**
- **Command control software available**
- **How should I write software**
- **Engine-Commander™ example**
 - Marklin (AC/DC) example
 - NMRA DCC example
- **Shareware software**
 - Compuserve
 - The Commander_{sm} BBS
- **Demo**



Why are you here

- Clinic will focus on writing programs to control your railroad....
 - we will talk about PC's
 - programming languages
 - example programs
- What are your expectations?



Philosophy

- **Computer Controlled**
 - The computer controls the routes of the trains
 - the operator runs his/her layout from the computer
- **Computer Monitored**
 - the computer is a tool of the modeler
 - the computer is used to manage events
 - the computer does not control!



I like to write software, but I want to run trains and use computers monitor the layout and to enhance the fun



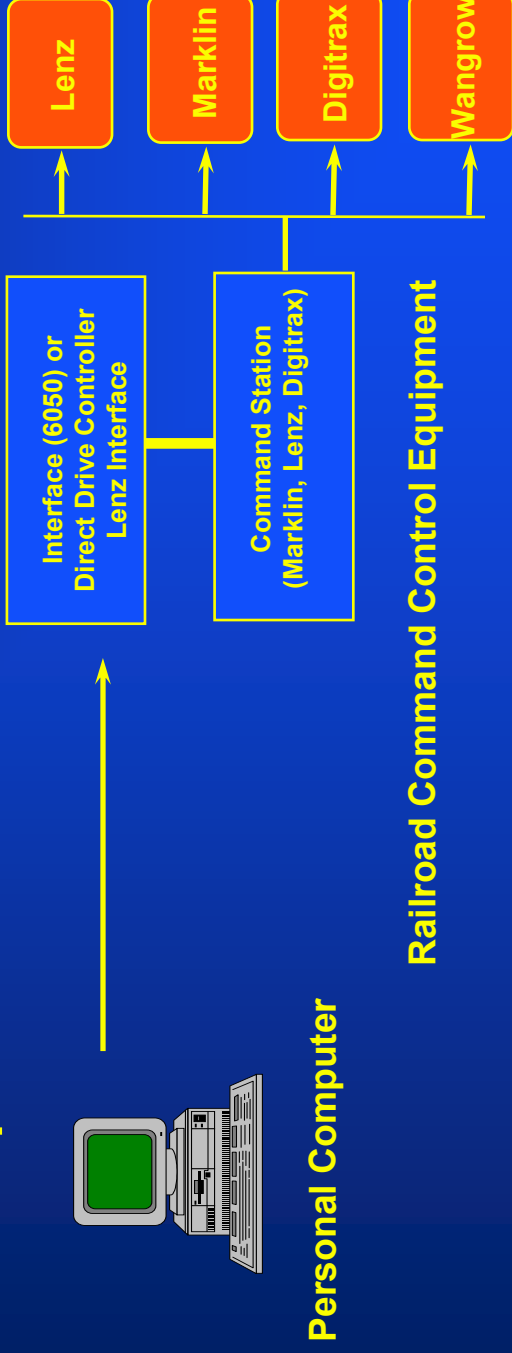
Hardware Requirements

- **What type of PC hardware should you buy?**
 - Intel Pentium (buy the fastest you can get! 120+)
 - Cache memory; get the 512K pipeline burstmode
 - 16 Mbytes of system memory (16 Mbytes preferred)
 - 380 - 540 Mbyte (SCSI) hard disk
 - 3.5" Floppy drive
 - CDROM Drive (SCSI)
 - Sound Blaster Pro (SCSI version)
 - VGA graphics card (with 800 x 600 support)
 - VGA color monitor with SVGA support
 - Must be able to run win-95 or win-NT
- **What you should not buy**
 - 286, 386 or 486 PC's (ROT: must run Win 95)
 - systems that contain less than 8 Mbytes
- **You must have internet access!**



Railroad Requirements

- **Must have NMRA DCC compatible engines**
 - either a Horn, Digitrax, Lenz, Digitrax or Wangrow, or old Marklin DC system
- **Two type of interfaces supported**
 - PC/mac compatible serial interface (9.6K)
 - Direct drive support via command station
 - See <http://>



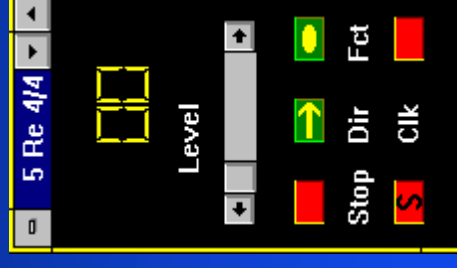
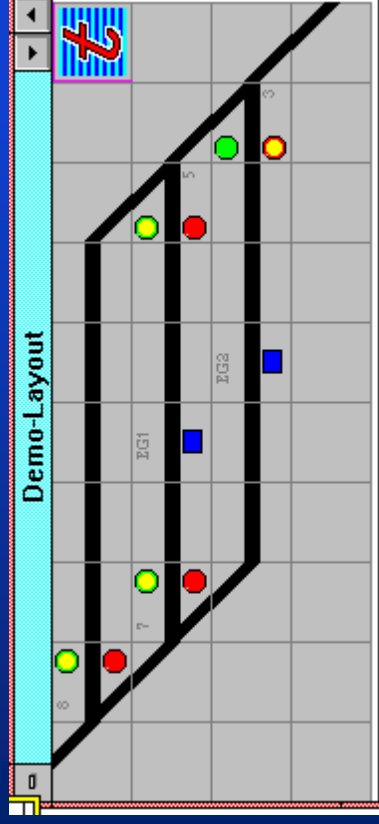
Command Control Software

- **Three classes of products available**
 - **Mac & Apple**
 - **MS-DOS**
 - **Microsoft Windows**
- **MS-DOS examples**
 - **Marklin shareware apps**
 - **Basic program examples**
 - **Digipert/Digiplus II**
- **Microsoft windows**
 - **Engine-Commander**
 - **WinLok**
 - **and soon others as well**



WinLok

- Design to support Marklin Controllers
 - draws from the German railways operation
 - supports visual layout display
 - multiple user throttles
 - integrated acceleration curves
- European design/tradeoffs



Engine-Commander™

- **Built on a modular philosophy**
 - users can add complexity at their own pace
 - simulation interface is include to help other programmers
- **Good user documentation**
 - explains the Marklin, Digitrax, Wangrow and Lenz interface in detail
- **Manual and Sensor control flexibility**
 - logical to physical mapping of engines/switches
 - maintains engine and switch history between sessions



Engine-Commander™ Modes

- **Serial Interfaces supported**
 - Marklin 6050/6023 interfaces on AC and DC boosters
 - Lenz LI-100
 - Digitrax, Wangrow serial Interface
 - NMRA serial interface
- **NMRA controllers**
 - Direct drive support for Marklin boosters
 - Direct drive support for NMRA extended packet format
- **Protocol windows for software development**



Should I write my own programs?

- **Are you ready to**
 - read the protocol specification to the controller
 - write in a computer language
 - spend many hours away from you layout
 - ... have fun programming?
- **What Language do you use?**
 - novice: basic or visual basic
 - experienced: C or Pascal
 - advanced: C++ under windows



**Understand where you want to put your energy
to maximize your fun!**



What is the best way to begin?

- **First understand the protocol and interface**
- **Second follow these rules**
 - keep it simple....
 - design the architecture....
 - build the infrastructure....
- **Best way to begin..**
 - buy the correct PC and the Microsoft tools
 - if you are a novice used Visual Basic
 - if you are advance user, use Visual C++



Remember, Rome was not built in a day!



What is the best way to begin?

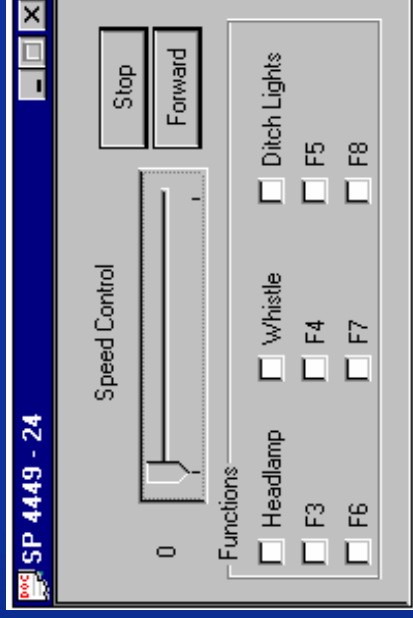
- **Follow these four steps**
 1. **Acquire a 3rd party app for experimentation**
 2. **Design your user interface (use GUI tool)**
 3. **Now implement small features**
 4. **Add functionality as you desire**
- **Lets walk through these four steps...**

Remember, Rome was not built in a day!



Acquire a 3rd party Application

- Do you want to make this or program it..



- Lets look at how you program it



Visual Basic 3 Example



Visual Basic 4 example



Design your GUI Interface

- Visual C++ App builder
- Visual Basic 3.0
 - Sample Applications (VBTerm)
 - drag drop metaphore

Now Implement small features

- Make the engine go!
- Marklin Interface sample
 - Start Command
 - Engine Go command

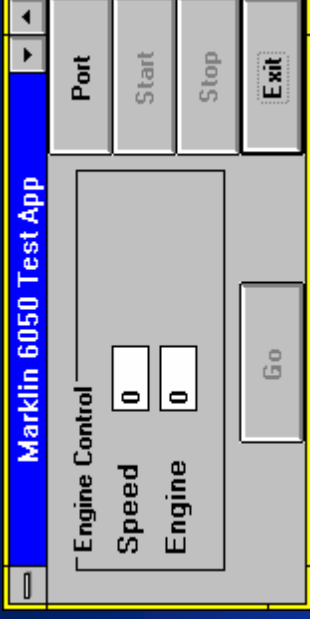
Remember, Rome was not built in a day!



```

// The format of the data packet is
// Format: <engine Address> <direction/Speed>
// Where <Engine Address> is between 1 - 99
// (6050 interface does not transmit address 80 -99)
// <speed/direction> b7 = 0
// b6 = 1
// b5 = Direction 0 for forward, 1 for reverse
// b4 = function set to 1 if on, 0 if off
// b3 - 1 = speed
case ENGINE: {
    BYTE bySpeedDir;
    WORD wEngine;
    LPWORD lpwEng;
    // Get the engine number form the bit sequence
    lpwEng = (LPWORD) (lpSrcData + ENGADDR_PKT); // set the engine peed location
    wEngine = *lpwEng; // get the engine number
    bySpeedDir = lpSrcData[ENGSPPEED_PKT] & 0x0F; // get the speed; 0 - 0xF are speeds
    // Process direction; in this case speed of 0x0F is reverse to the controller
    if (lpSrcData[ENGDIRECT_PKT] bySpeedDir = 0x0F; // set to reverse speed
    // Process function
    if (lpSrcData[ENGFUNC_PKT] bySpeedDir = bySpeedDir | 0x10; // set function on
        else bySpeedDir = bySpeedDir & 0xEF; // set function off (mask to 0)
    lpDstData[0] = bySpeedDir; // Set the speed and engine function
    lpDstData[1] = (BYTE) wEngine; // set the engine address
    iDataSize = 2;}
break;

```



```

Sub cmdGo_Click ()
'--- If the port is opened,
If MSComm1.PortOpen Then
'--- Send the command to the port
MSComm1.Output = Chr$(wEngine) + Chr$(wSpeed)
End If

End Sub

```



Bottom Line.. Have fun

Lets Look at where to get free
software!



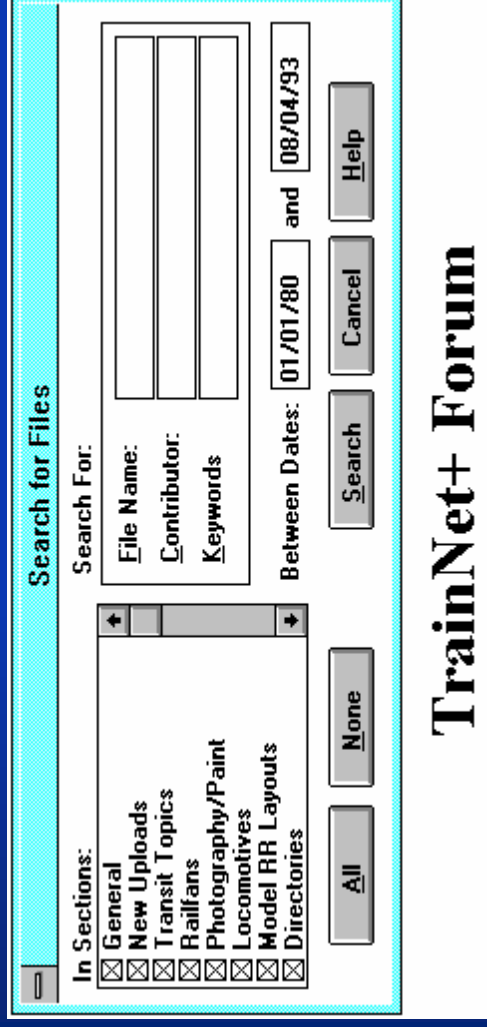
Shareware Software and Support

- **You must get on the internet**
 - a lot of software is free, but it is on the net
 - all support is structured to be downloaded from web pages
- **Lets look at some methods**
 - Compuserver
 - KAM and John_Kabat home pages
 - other web pages
- **Key web page for software...**
 - <http://www.microsoft.com>



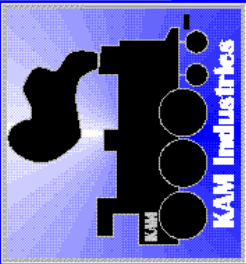
Compuserve


- Monthly usage fee \$8.95
- Train-net forum is where the action is
- On-line conferences, library, message logs



http://kam.rain.com


The Conductor(sm)
File Edit View Go Favorites Help
Address: http://kam.rain.com/

 **KAM Industries**

 Intel Pentium® processor based web server.

The Conductor

Hosted by KAM Industries, your source for DCC compatible model railroad software.

CC:  Watch this space for **Decoder Depot!** and find out everything you wanted to know about DCC decoders!

- What's new at **KAM Industries** and DCC vendor pointers!
- **Engine-Commander(tm) 2.0 RC1** to be available July 13, 1996!
- See **Interface Junction** for the latest in DCC computer interfaces! **NEW**
- About **NMRA DCC** - Digital Command Control for Model Trains.
- **Model Railroad Visitor Bureau** - where to get information on clubs and activities!
- **Purchasing Manager** - great places to buy trains and accessories!
- Links to **Windows-NT internet tools** and **The Windows-NT user group**.
- Statistics on **The Conductor**.
- About **The Conductor**.



http://ourworld.compuserve.com/homepages/John_Kabat/

John Kabat's Susanville, Linda Junction & Key...
File Edit View Go Favorites Help
Address: http://ourworld.compuserve.com/homepages/John_Kabat/

See about our [LOCONET FOR DOS Contest!](#)

NOTICE: May 23, 1996 - Contest Dates have changed! See the [Contest Page](#)

We Have a Winner for April: [David Koch](#) For his [THROTTLE.BAS](#) program. Congratulations Dave!

What's New

- May 29, 1996 - New version of [LOCONTOP](#) - changes expiration date to October, 1996!
- May 23, 1996 - Changed closing dates of contest.
- May 7, 1996 - A new update of [LOCONET1](#) - bug fixes and better COMM and IRQ detection. **UPDATED**
- April 30, 1996 - We are having problems with EMAIL here at my home site - Please use johnk@telxon.com or 74111.567@compuserve.com. Anyone who missed the contest please let me know!
- April 23, 1996 - I have added a [LOCONET for DOS FAQ](#)
- *Find out about the [NEW LOCONET Software Contest!!!!!!!!!! Rules updated March 18, 1995](#)*



Other DCC web pages..

DCC Hardware

<http://www.lenz.com>

<http://www.digitrax.com>

<http://www.wangrow.com>

<http://www.tttrains.com/tttrains/dccdiv.htm>

DCC Software:

<http://kam.rain.com>

[http:// ourworld.compuserve.com/homepages/John_Kabat/](http://ourworld.compuserve.com/homepages/John_Kabat/)

DCC information

<http://www.tttrains.com/dcc/>

<http://www.mcs.net:80/~weyand/nmra/>

<http://www.mcs.net/~dsdawdy/NMRA/dcc.html>

<http://www.tttrains.com/tttrains/>

Questions ?

Now, lets run Trains!

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