



EZMaster



What's EZMaster?

EZMaster is an USB Device that interfaces your PC with several devices in your shack, and aim to replace all the interfaces between devices such as antenna switching, radios, filters, CW Keyers, Voice Keyers and more.

EZMaster include a lot of feature needed in computerized shack.

1. USB Slave Device, with Windows 98/ME/2K/XP, MacOS a Linux Drives.
2. RS232 / Parallel ports for compatibility with Software that use these ports.
3. RTS/DTR line managing for both USB and RS232 ports.
4. Parallel port data management, Radio A/B, CW, PTT, Band-Data, DVK Play, DVK Stop.
5. CW Keyer, Winkey K1EL serial device that allow forgetting all CW hesitation problems.
6. Hi Quality Voice Keyer with 7 memories with a max of 75 sec of recorded messages.
7. Two Radio interface at TTL level ready to drive ICOM / YAESU / Kenwood Equipments.
8. Audio Interface for Computer connection, with stereo option, for any audio digital mode.
9. FSK interface from PC to Radio, including abilities to work with DTR line.
10. SO2R capabilities, with Mic, Headphones, CW, FSK / AFSK switch between two Radio.
11. SO2R two simultaneous Headphones, with Audio split in both phones
12. Four independent PTT lines, with user defined delays times that allow creating a PTT sequence to ensure that i.e. the amplifier is always closed before radio PTT is closed.
13. Two Matrix Port with 32 configurable line available for driving Antennas / Filters switch.
14. Front Panel high quality tactile membrane keyboard.
15. External 32 Keys Keypad. (Optional)
16. Internal 32 relay card that allows to carry 1 A on each of the 32 Matrix Port line. (Optional)
17. Extensive RF shield aluminum case.
18. Two power supply source (USB / External Power Supply).

Why EZMaster?

EZMaster project was born more that two years ago, where needs to be competitive in Contest convinced us that the keys of the game were to have an automatic and safe station, and after had worked wit several homemade box, we had started to develop this idea, an all-in-one black box with all the dreamed function. Another main goal were to have a USB device that could be used with last PC generation. After a while the project became more complex, but affordable, and we are proud to present it to you.



EZMaster

Who we are?

HamRadiosolutions TradeMark is owned by Fabio Schettino I4UFH, that with a support of external contractor (even more avid contester !), had started this business almost one year ago, with [EZMaster](#) project as main goal. More project and interface will coming soon, with some innovative ideas. We are committed to provide best hardware solutions for Ham community, focused into Contesting and shack automation area.

Why we want talking with you?

Well, the main idea was to had a complete compatibility with the software available on the market/shareware/freeware, but looking at the future adding USB capabilities (last PC's and laptop generation are only USB ready peripherals), and smart functions. [EZMaster](#) can be controlled with a set of SIMPLE command, keeping free the developer from the hassle of IRQ's, Serial Port, Parallel Port and operating system troubleshoot, mainly with CW hesitation. To leave compatibility we had developed the device with legacy port connection, and works as usual interface with application even for DOS or Windows, but leaving an open door to the developers that would gain access at the advanced feature of the smart side of [EZMaster](#). The device use an USB port that install a Virtual COM port on the PC, allowing access directly as a COM port with your usual communication library, without need to learn more.

Why Support [EZMaster](#)?

We think that support [EZMaster](#) could be a benefits for the developer :

1. Adding features that could not be never before available.
2. No more hassle with CW interfaces.
3. Attracting new user for your application.
4. Better Customer Satisfaction.
5. Be competitive in another OS (example : DOS application can be executed in a Windows task)
6. Focusing on the program problems, leaving from the interface problems.
7. Adding more value to your products / services.
8. Easy to support.
9. Why Not ?



EZMaster Block Diagram

EZ Master Block Diagram 2003



Standard Mode

The Standard Mode has the basic functions that allow [EZMaster](#) to be compatible with most of the Software application. Due the limitation of the Parallel/Serial standard, the functions available are the follows:

Parallel Port Command:

Serial Port :

Play Voice Keyer
Band Map Data
Radio A/B
PTT Line
CW Line

PTT Line
CW Line
Radio Control

Standard Parallel DVK Configuration

LPT Pin 3	LPT Pin 4	LPT Pin 5	LPT Pin 6	Function
0	0	0	1	Play # 4
0	0	1	0	Play # 3
0	1	0	0	Play # 2
1	0	0	0	Play # 1

Standard Parallel BandData Configuration

LPT Pin 2 A	LPT Pin 7 B	LPT Pin 8 C	LPT Pin 9 D	Band Set #1	BMap A Pin
0	0	0	0	Not Used	0000000000000000
0	0	0	1	160m	0100000000000000
0	0	1	0	80m	0010000000000000
0	0	1	1	40m	0001000000000000
0	1	0	0	30m	0000100000000000
0	1	0	1	20m	0000010000000000
0	1	1	0	17m	0000001000000000
0	1	1	1	15m	0000000100000000
1	0	0	0	12m	0000000010000000
1	0	0	1	10m	0000000001000000
1	0	1	0	6m	0000000000100000
1	0	1	1	144 Mhz	0000000000010000
1	1	0	0	222 Mhz	0000000000001000
1	1	0	1	430 Mhz	0000000000000100
1	1	1	0	900 Mhz	0000000000000010
1	1	1	1	1.2 Ghz	0000000000000001

LPT Pin 2 pulse is acknowledged as DVK STOP regardless the previous status, in this way the STOP can be used also if BANDMAP is used, because [EZMaster](#) recognized the pulse, (the transition from one state to other and back), not only the positive transition from 0 to 1 .

The Matrix A follows the previous table setting the Pin according with the decoded data sended. In this mode there a direct relationship between the Parallel and the decoded Matrix A output. Each Matrix A Pin is SET to 1 according to the BCD value settled into the Parallel port.

Each output pin can drive a Relay with a max sink current of 150mA for all the 32 ports, these means that at least 32 relays with an average of 5mA each can be driven simultaneously. In Standard Mode only one relay at time is excited.



Extended Mode

The Extended Mode overcomes the Standard Mode limitation of the Parallel/Serial standard, adding some programmable function that allows the user and the software developer to gain access at the power of EZMaster. The input connection is the always the same that the standard mode:

Parallel Port Command:

Play Voice Keyer
Band Map Data
Radio A/B
PTT Line
CW Line

Serial Port :

PTT Line
CW Line
Radio Control

In the Extended Mode the user can define a so-called "ANTENNA Profiles" where can be SET more that one Matrix A output port. Each Profile can be assigned at any BCD data coming from the parallel port. In this way a complex Antenna system can be easy selected and configured. An RF Antenna Switch can be controlled in a full automatic way, sharing antennas for both radios in a SO2R configuration.

The Extended mode enable also a smart way to managing the Voice Keyer messages through the Parallel Port. As showed in the table below all the 16 combination of the 4 pin of the parallel port are recognized, so all the seven EZMaster messages can be played and recorded including also a STOP command for both function. This configuration always retain a backward compatibility due the fact that the play command are configured as in standard mode, with only one pin of four pulsed.

Extended Parallel BandData Configuration

LPT Pin 2 A	LPT Pin 7 B	LPT Pin 8 C	LPT Pin 9 D	Band Set #1	Profile
0	0	0	0	Not Used	#01
0	0	0	1	160m	#02
0	0	1	0	80m	#03
0	0	1	1	40m	#04
0	1	0	0	30m	#05
0	1	0	1	20m	#06
0	1	1	0	17m	#07
0	1	1	1	15m	#08
1	0	0	0	12m	#09
1	0	0	1	10m	#10
1	0	1	0	6m	#11
1	0	1	1	144 Mhz	#12
1	1	0	0	222 Mhz	#13
1	1	0	1	430 Mhz	#14
1	1	1	0	900 Mhz	#15
1	1	1	1	1.2 Ghz	#16

Extended BandData Profile Example

Profile #	Description	BMAP A Pin
#01	Antenna Disabled	0000000000000000
#02	Loop at 200 feet	1000000000000000
#03	4 Vertical phased	0111100000000000
#04	Yagi EU + Dipole	0000001100000000
#05	No Antenna	0000000000000000
#06	3 x 5 el Yagi phased F12	0000000011100000
#07	Dipole	0000000000001000
#08	3 x 5 el Yagi phased F12	0000000011100000
#09	2 el homebrew	0000000000001000
#10	2 of 3 x 5 el Yagi phased	0000000011000000
#11	No Antenna	0000000000000000
#12	No Antenna	0000000000000000
#13	No Antenna	0000000000000000
#14	No Antenna	0000000000000000
#15	No Antenna	0000000000000000
#16	No Antenna	0000000000000000

Extended Parallel DVK Configuration

LPT Pin 3	LPT Pin 4	LPT Pin 5	LPT Pin 6	Function
0	0	0	0	Not Used
0	0	0	1	Play # 4
0	0	1	0	Play # 3
0	0	1	1	Rec # 7
0	1	0	0	Play # 2
0	1	0	1	Play # 5
0	1	1	0	Play # 6
0	1	1	1	Play # 7
1	0	0	0	Play # 1
1	0	0	1	Rec # 4
1	0	1	0	Rec # 3
1	0	1	1	Rec # 1
1	1	0	0	Rec # 2
1	1	0	1	Rec # 5
1	1	1	0	Rec # 6
1	1	1	1	Stop



Advanced Mode

The Advanced Mode overcome all the limitation of communication ways through the Software and all the external device, the USB/Serial connection and the command mode interface allow the software developer to use all the neat features of EZMaster without any hassle and forgetting all the port configuration messes. The unique command mode interface allow to control any output of EZMaster with a simple command, built-in CW keyer, and macro commands allow anyone to develop code in a easy way reducing the time to support this device at only few hours of works.

In this mode EZMaster can be used in an hybrid way leaving your CW key trough LPT or USB/COM port, trying to reduce the startup time to support EZMaster without needs to code the Winkey side, (always suggested !)

The command mode interface has a simple syntax, each command is execute immediately, excluding WinKey command that are only routed to WinKey and managed directly under WinKey commands (www.k1el.com). The command can have parameters and can wait for answer, most of the command are without answer and execute immediately.

Advanced Mode Profile

Advanced Mode Profile allows the user to full configure and define the status of each 32 Band Map Output. These 32 output line are grouped into 3 blocks, 10 lines for Matrix Port A, 10 lines for Matrix Port B and 12 lines that are shared between the two ports.

They are logically assigned as 10 lines for external devices for Radio A, and 10 lines for Radio B on two different DB25 connectors, that include also the 12 shared lines, but the user can free configure them for his personal needs regardless the connectors.

The ideas of profiles is that for each band, each radio in RX or TX mode the 32 port can be configured setting Low/High each output line. In particular one of the difference between EZMaster and the standard Parallel BandMap Output is that you can select directly any output without any external diode wire to for a matrix antenna /filter switch configuration, the data are available separately simultaneously on both port, so antenna that are connected to Port B, normally associated to Radio B, are connected also when Radio A is selected, in this way the user can share antennas, can select filter for both Output / Radio separately. The last features is that the configuration can be enabled for both Radio in RX AND TX mode, these allow to selected an RX antenna system and another for TX, typically RX with Beverage and TX with Vertical, or TX with a splitter power and receive only in one direction or at least defining a sequence of RX antennas that cover 360°. The device is so flexible that the software developer and user can apply his fantasy looking for new setup.

Advanced Mode Command

Follow a brief description of the command available, parameters are omitted.

Admin Command		
INITIALIZE	<00>	Initialize EZMaster with the default value.
RESET	<01>	Generate an Hardware reset.
MODE	<02>	Set the EZMaster Operation Mode.
EN_DISPLAY_DATE	<03>	Enable Clock Time Display.
SET_DATE	<04>	Set the Date/Time.
VERSION	<05>	Read firmware release version.
EN_KEYPAD	<06>	Enable External Keypad.
READCFG	<07>	Read EZMaster Configuration.
WRITECFG	<08>	Write EZMaster Configuration.
PTT Command		
PTTA	<10>	Set/Reset the PTT A line output.
PTTB	<11>	Set/Reset the PTT B line output.
PTTAD	<12>	Set/Reset the PTT A Delayed line output.
PTTBD	<13>	Set/Reset the PTT B Delayed line output.
PTTDelay	<14>	Set the delay time between the assert of PTTx and PTTxD lines
PTT	<15>	Set/Reset the PTT line output of the selected Radio (A/B).
RADIO Command		
RADIO	<20>	Select Active Radio A/B.
DVK Command		
DVK	<30>	Play / Rec the selected message.
DVKSTOP	<31>	Stop any DVK action.
DVK_EXT	<32>	Assign a DVK Message # to each of 4 value of the Parallel Port Data.
MATRIX Command		
MATRIX	<40>	Set the Matrix Port pin in RX and TX with the profile parameter.
MATRIX_PIN	<41>	Set/Reset each single Pin of the selected Port.
MATRIX_DELAY	<42>	Set the delay time between the Matrix Set and the PTT line settling.
MATRIX_PULSE	<43>	Set/Reset Pulse Mode.
MATRIX_PULSE_LEN	<44>	Set the length of the pulse.
MATRIX_EXT	<45>	Set the Matrix A Profile to each of 16 value of the Parallel Port BCD Data.
MATRIX_BTW_DLY	<46>	Set lead time between Pulse.
MATRIX_EX_MODE	<47>	Set Extended LPT / Matrix
SPEAKER Command		
SPEAKER_RADIO	<50>	Select Headphones, regardless the CMD_RADIO setting.
SPEAKER_SPLIT	<51>	Enable / disable Headphones split
SPEAKER_REVERSE	<52>	Reverse the Headphones speakers.
SPEAKER_MODE	<53>	Set/Reset the Automatic Headphones Mode.
SPEAKER_DELAY	<54>	Set delay time between the PTT cmd and headphone switch.
SERIAL PORT Command		
SET_COM_PORT	<60>	Set parameters for the COM Port . Default values are :9600,8,N,1.
SET_RS232_PORT	<61>	Set the parameters for the RS232 Port . Default values are :9600,8,N,1.
SET_RADIOA_PORT	<62>	Set the parameters for the RADIOA Port . Default values are :9600,8,N,1.
SET_RADIOB_PORT	<63>	Set the parameters for the RADIOB Port . Default values are :9600,8,N,1.
ROUTE_RADIO	<64>	Set routing between Serial Ports.
SETTING Command		
EN_BOTH_PTT	<70>	Set/Reset flag to close both PTTA & PTTB regardless the PTT Command.
EN_USB_PTT	<71>	Enable/Disable PTT command from USB RTS line.
EN_AUX_PTT	<72>	Enable/Disable PTT command from AUX RTS line.
EN_LPT_PTT	<73>	Enable/Disable PTT command from LPT Port.
EN_WINKEY_PTT	<74>	Enable/Disable PTT command from Winkey.
EN_LPTAB	<76>	Enable/Disable A/B command from LPT Port.
EN_BMAP	<77>	Enable/Disable accepting BandMap data from the Parallel Port.
EN_STDDVK	<78>	Enable/Disable accepting DVK command from the Parallel Port.
EN_DTRCW	<79>	Enable/Disable accepting CW from the USB/AUX DTR.
EN_FSKCW	<80>	Enable/Disable accepting FSK from the USB/AUX DTR.
EN_WINKEY	<81>	Enable/Disable Winkey Keyer.
EN_USB_AUX	<82>	Select CW source, USB-DTR or AUX-DTR.



In-Field Test

EZMaster Project has almost more than six months of field test, it's been tested with several Applications even DOS and Windows, with several CW/SSB/RTTY QSO in different configurations. Starting from CQWW PH 2003, where first prototypes were available, it has been used with a full control interface.

There are several notes regarding some applications, that will be described later, more improvements and ideas, but we can claim a 100% compatibility with the software available on the Log/Contest world.

Parallel Port

Parallel port is the best managed port from various applications. Anyone with some tricks under Windows can access this port without trouble. PTT / CW / Radio A-B are the most and best used lines.

Concerning DVK line, these 4 lines are not used in the best way, 4 lines means 16 different combinations, and using them only to play an external DVK are really misused. We have added in Extended Mode the way to recognize all the 16 combinations, trying to squeeze the most from these lines.

Concerning Pin 2 that some applications use as Stop DVK line, we have verified that few applications use it, another simply cannot stop the message even BandData feature is disabled. **EZMaster** allows to acknowledge the transition on pin 2, from low to high or high to low, allowing a sharing with BandData on the LPT Port.

COM Port

All software tested works well with COM port (connected to the AUX port) even sharing radio control on them. One of the assumptions that some applications do is that if the Radio port is not shared with PTT-RTS / CW-DTR then the RTS-DTR lines go up (normally to supply external radio interface). **EZMaster** controls each input line so can disable these settings that are recognized as PTT or CW.

RTTY Port

EZMaster allows RTTY user to connect a PC COM port to the AUX input allowing FSK through the TDX line, but when you need to control the radio you need a second serial port. Only one RTTY software allows to select the output pin on the COM port, allowing to move FSK data from TXD to DTR line, in this way you can share FSK and Radio Control on one port. This feature is also available through the USB port, so in this way FSK with radio control can be done also with legacy less PC.

USB Port

Has mentioned before the **EZMaster** USB port can be accessed as normal COM port through the Virtual COM driver. In Standard & Extended Mode we experienced no difficulties using this port for radio control, and some difficulties with some applications for CW sending. Timing problems are evident with speeds more than 50WPM, at lower speeds some applications work better than another, probably due to the development languages, better API or background duties. We have noticed that in a W2K XP environments CW is sent better than 98/ME, and also a lower CPU usage and a very low number of background services help to improve performance and reduce CW hesitation and stutter. In Advanced Mode using the Internal WinKey Keyer all these problems go out.