IP Interface

FT 636

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Inhalt

General features

The FT636 IP Interface is used when you want to remotely use a two-way-radio.
By using VoIP (Voice over IP) and RoIP (Radio over IP) practically unlimited distances can be bridged. As the AF-information and the control information are transmitted via IP and Ethernet, every local data network (LAN) and the internet (WAN) can be used for transmission.

Features

- support of up to 2 radio circuits, each with
  - AF In/Out (galvanically isolated), 2-wire or 4-wire
  - PTT output (PTT, potential free)
  - Squelch input (Squelch)
  - 4 digital outputs (channel switching)
- RS232 for
  - programming
  - data transfer
  - poti adjustment
- 5 additional switching inputs
- USB-connector for upload of configuration data
- network connection (Ethernet)
- pilot tone decoder 3300 Hz and filter
- 5-tone decoder
- configuration by web browser (Internet Explorer, Firefox, ...)
- optional FMS/FFSK-decoding and through-connection (UGA-modules)

The FT636 IP Interface is available in two different housings
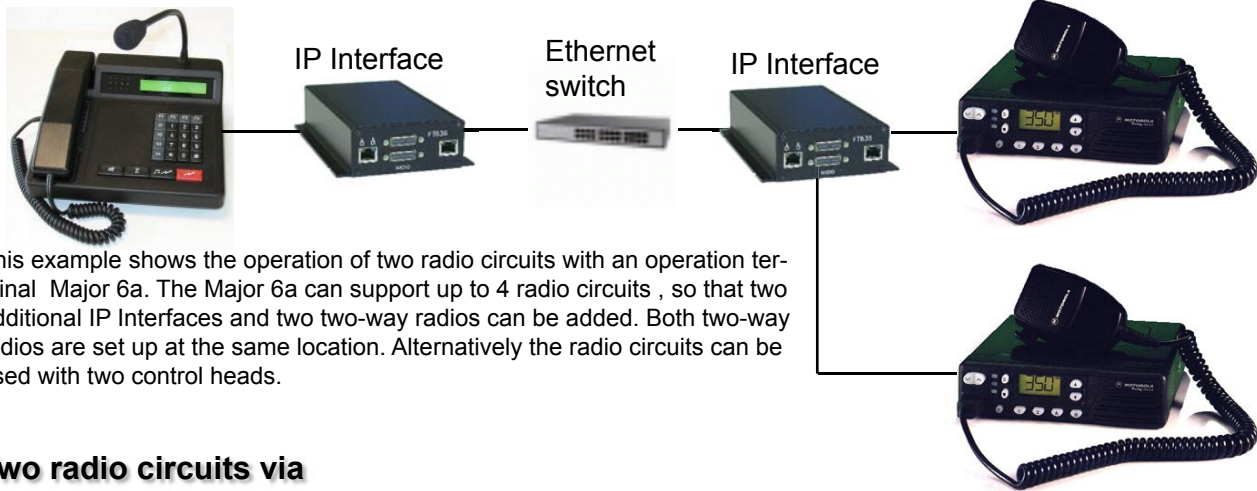

- black flange aluminum housing

- 19 inch plug-in unit

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Examples

Two connection examples via local network (LAN)
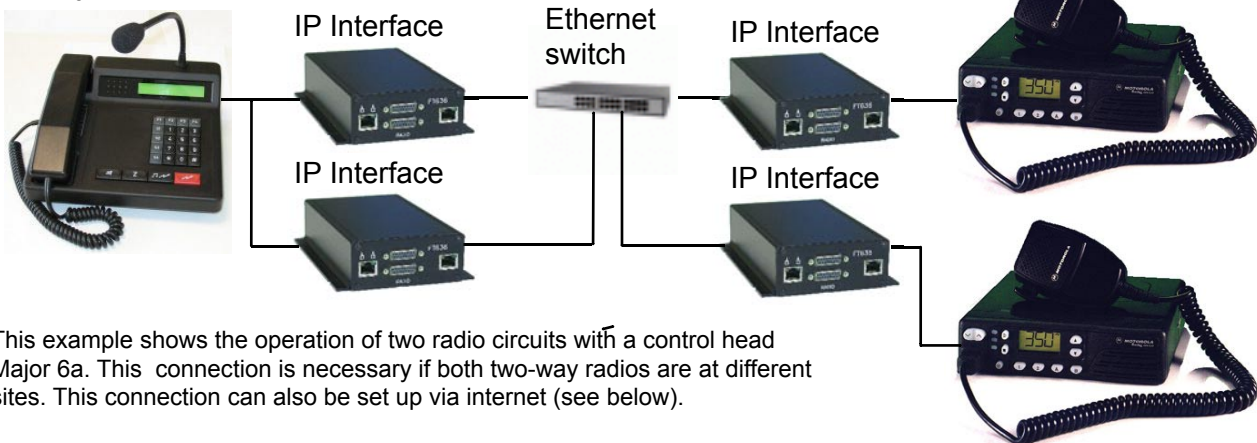
Major 6a

IP Interface   Ethernet switch   IP Interface

This example shows the operation of two radio circuits with an operation terminal Major 6a. The Major 6a can support up to 4 radio circuits , so that two additional IP Interfaces and two two-way radios can be added. Both two-way radios are set up at the same location. Alternatively the radio circuits can be used with two control heads.

Two radio circuits via local network (LAN) to different sites

Major 6a

IP Interface   Ethernet switch   IP Interface

IP Interface   IP Interface

This example shows the operation of two radio circuits with a control head Major 6a. This connection is necessary if both two-way radios are at different sites. This connection can also be set up via internet (see below).

A radio circuit via internet (WAN, DSL)

Major 5a

IP Interface   Internet   IP Interface
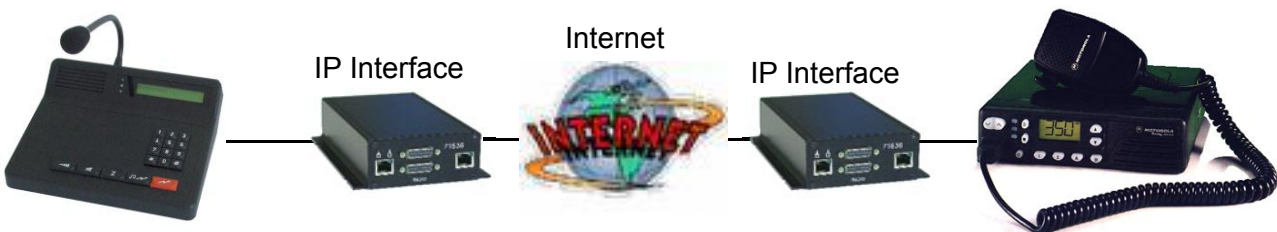
You can also set up two radio circuits via internet. A sufficiently fast DSL connection is necessary.

The following upload-rates are valid if the connection is only used by the IP Interface

       - use of 1 radio circuit: min.   96kBit/s
       - 2 radio circuits: min. 160kBit/s

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All before shown connections can be set up in 2-wire and in-multi-wire-technique. Therefore it is possible to flexibly install the FT636 in existing infrastructures.

Multi-wire-connection of the FT636 IP Interface
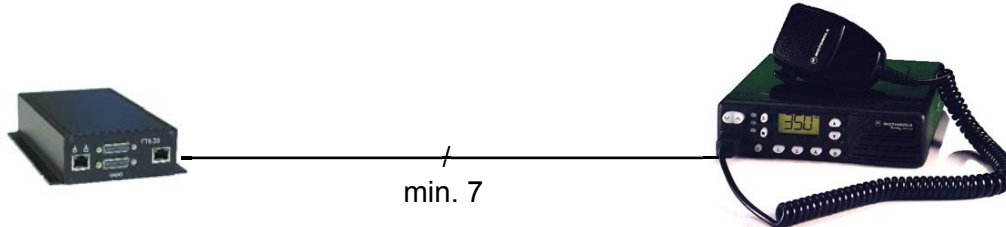
The FT636 IP Interfaces are factory-set to support the multi-wire-technique. For this 7 wires are needed (4 x AF-In/Out, 1 x PTT, 1 x Squelch, 1 x Ground). If channel switching, alerting or signaling are needed, up to 15 more wires are added (15 x switching inputs).

min. 7

2-wire connection of the FT636 IP Interface

To be able to continue using existing 2-wire installations it is possible to reprogram the FT636. When using a 2-wire connection the contacts 4 and 5 of the 15-pin D-sub-connector serve as both in- and output. PTT is transmitted as pilot tone.

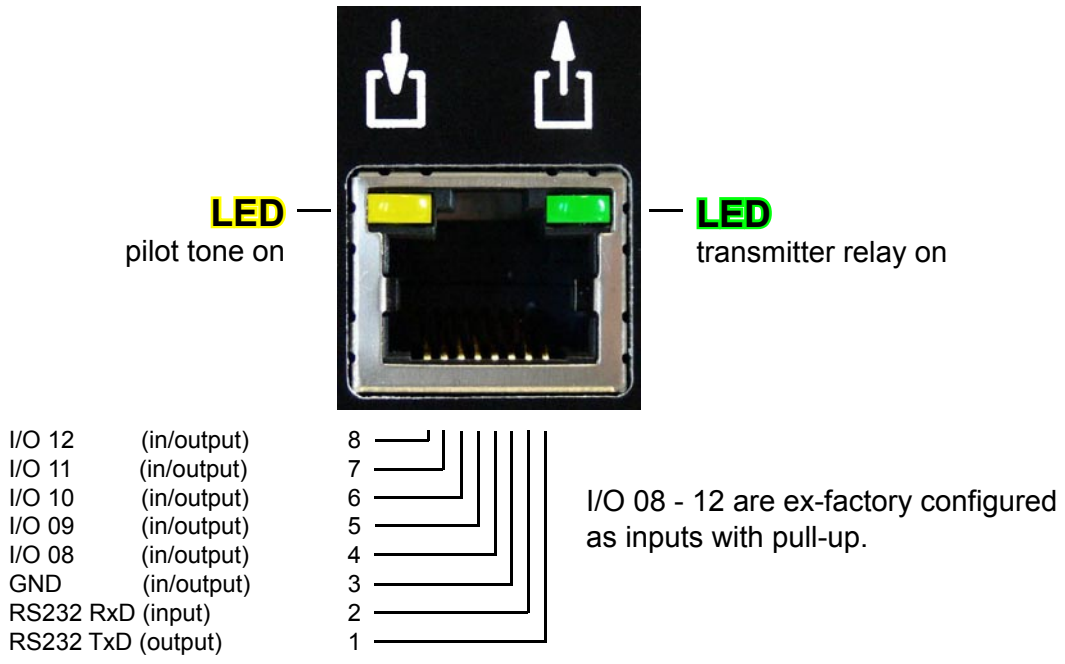FT636   2   FT634   min. 7

Programming the register for 2-wire transmitting

Register	digit	site of the control head	site of the 2-way-radio
152	1	0 - no pilot tone filter	0
152	4	1 - pilot tone 3300 Hz	0 -if no pilot tone, otherwise also 1 (3300 Hz)
153	1	1 - decoder pilot tone	1 - decoder pilot tone
153	2	2 - 2-wire Simplex (4 Duplex)	2 - 2-wire Simplex
153	3	1 - local priority, control head	2 - priority remote location, control head
153	4	2 - AF remote location on, without squelch and PTT	1- local AF on, without squelch and PTT
153	5	1 - local AF on, when PTT on	1 - local AF on, when squelch on
153	6	2 - AF remote location on, when squelch on	2 - AF remote location on, when PTT on
153	7	1 - local AF on, when squelch and PTT on	2 - AF remote location on, when squelch and PTT on

This results in the following register settings:

Register	**Control head site**	**2-way radio site**
152	02510128	02500128
153	12121210	12211220

Connectors

RS232, digital outputs - 8-pole RJ45-"Western" jack

LED
pilot tone on

LED
transmitter relay on

		Pin	
I/O 12	(in/output)	8	
I/O 11	(in/output)	7	
I/O 10	(in/output)	6	
I/O 09	(in/output)	5	
I/O 08	(in/output)	4	
GND	(in/output)	3	
RS232 RxD	(input)	2	
RS232 TxD	(output)	1	

I/O 08 - 12 are ex-factory configured as inputs with pull-up.

Network connection, Ethernet - 8-pole RJ45-"Western" jack

A standard patch cable is used for connection to the network.

ETH

	Pin
TX+	1
TX-	2
RX+	3
RX-	6
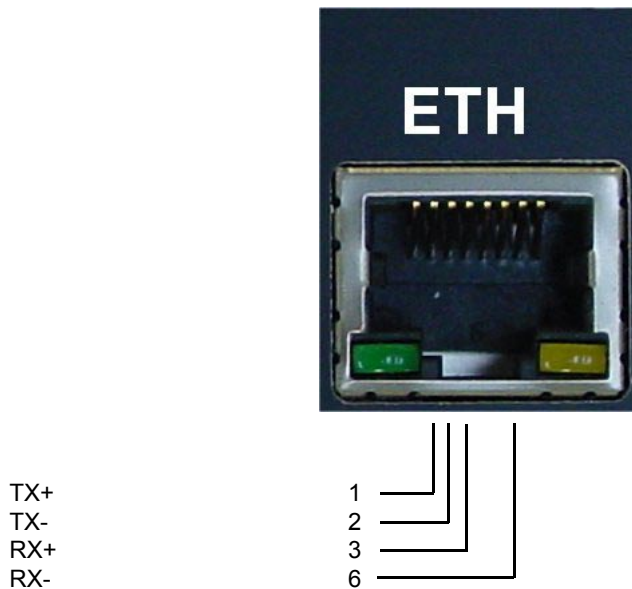
2-wire operation

The illustration on the following page shows the pinout for 4-wire operation of the FT636.
When the FT636 is used in 2-wire operation, the pins 4 and 5 are AF-input and AF-output at the same time. Of course, then the Major has to be programmed for 2-wire operation. The shared in- and outputs of the Major are the pins 7 and 8. These have to be wired to pin 4 and 5 of the FT636. The FT636 IP Interface should then also operate in half-duplex.

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15-pole Sub-D jacks (RADIO 1 and RADIO 2)

IN : + 12 V — 1

OUT: PTT-relay — 2

OUT: PTT-relay — 3

OUT: radio, AF out — 4

OUT: radio, AF out — 5

I/O: I/O 0 (o.C.) / 4 — 6

I/O: I/O 1 (o.C.) / 5 — 7

I/O: GND — 8

9 — IN: + 12 V

10 — IN: squelch

11 — IN: radio, AF in

12 — IN: radio, AF in

13 — I/O: I/O 2 (o.C.) / 6

14 — I/O: I/O 3 (o.C.) / 7

15 — I/O: GND

I/O are ex-factory configured as open collector outputs.

Both jacks have identical pinouts. The bottom connector is for radio circuit 1, the top one for radio circuit 2.
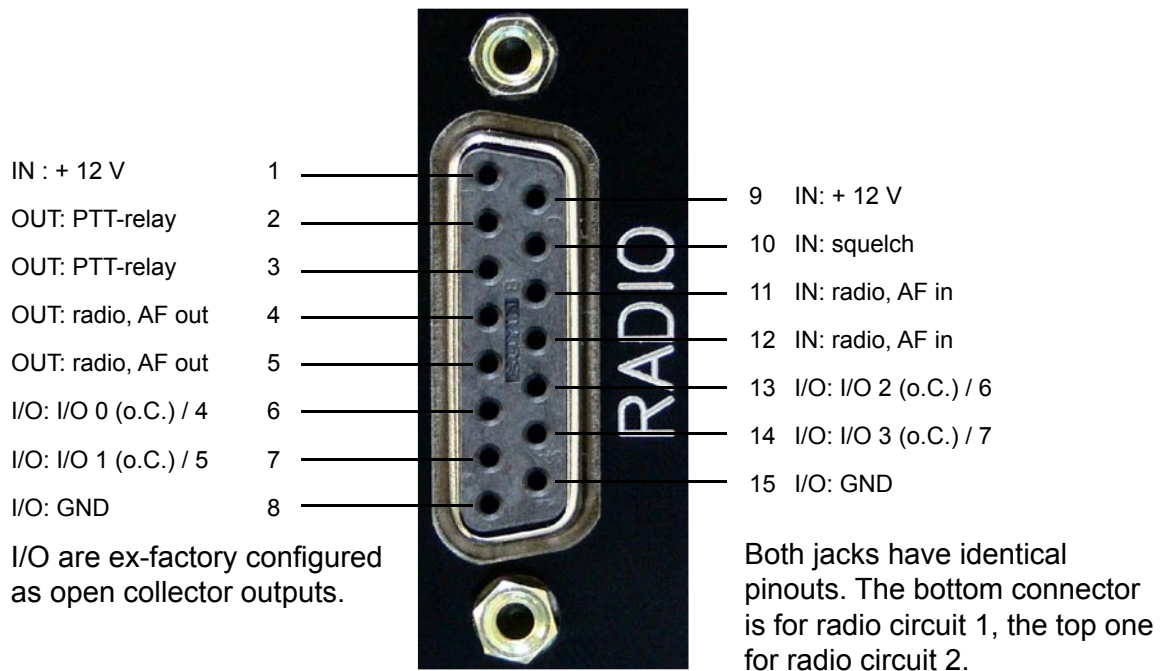
Pinout Major 4a -> FT636 (Standard Cat 5 Patch Cable according to EIA/TIA-T568B-Norm)

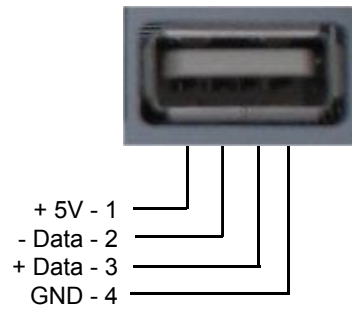| Major 4a	RJ45	Colour	15-pol. Sub-D, male	FT636
Meaning	Pin		Pin	Meaning
AF In, floating	1	white/orange	5	AF Out, floating
AF In, floating	2	orange	4	AF Out, floating
Squelch In	3	white/green	3	PTT Out
GND	4	blue	2 / 8 / 15 connect in plug	GND
V = +12V	5	white/blue	1 / 9 i connect in plug	V = +12V
PTT Out	6	green	10	Squelch In
AF Out, floating	7	white/brown	11	AF In, floating
AF Out, floating	8	brown	12	AF In, floating

Pinout two-way radio -> FT636 (Standard Cat 5 Patch Cable with open end)

PTT low active (GND)

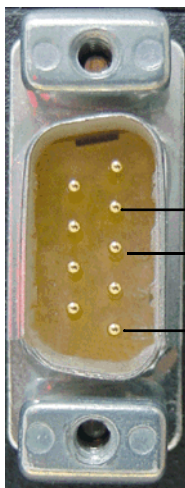| Radio	offenes Ende	Colour	15-pol. Sub-D, male	FT636
Meaning			Pin	Meaning
AF In, floating	-	weiß/orange	5	AF Out, floating
AF In, floating	-	orange	4	AF Out, floating
PTT - In	-	weiß/grün	3	PTT Out
GND	-	blau	2 / 8 / 15 connect in plug	GND
V = +12V	-	weiß/blau	1 / 9 connect in plug	V = +12V
Squelch Out	-	grün	10	Squelch In
AF Out, floating	-	weiß/braun	11	AF In, floating
AF Out, floating	-	braun	12	AF In, floating

For high active PTT (V = +12V), instead of connecting pin 2 to pin 8/15, pin 2 has has to be connected to pin 1/9.

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4-pole USB-A jack

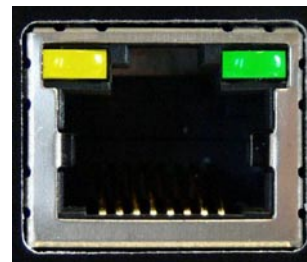+ 5V - 1
- Data - 2
+ Data - 3
GND - 4

RS232-Connection cable

Computer equipped with RS232 9-pole jack

RS232 jack on FT634

2   RxD RS232

3   TxD RS232

5   GND

GND   3
RxD   2
TxD   1

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64-pole bus connector, 19 inch version

Pin	A		C	
1	IN :	+ 12 Volt	IN:	+ 12 Volt
2	IN :	analog 1 (0-7V)	IN:	analog 2 (0-7V)
3	I/O:	I/O 08 (Pull-up 5V)		
4	I/O:	I/O 09 (Pull-up 5V)	IN :	radio, AF in 2
5	I/O:	I/O 10 (Pull-up 5V)	OUT:	radio, AF out 2
6	I/O:	I/O 11 (Pull-up 5V)	OUT:	radio, AF out 2
7	I/O:	I/O 12 (Pull-up 5V)	IN:	radio, AF in 2
8	I/O:	I/O 13 (Pull-up 5V)	OUT:	bus, AF RADIO>BUS
9	I/O:	I/O 14 (Pull-up 5V)		
10	I/O:	I/O 15 (Pull-up 5V)	IN :	radio, AF in 1
11	I/O:	I/O 0 (o.C.)	IN :	radio, AF in 1
12	I/O:	I/O 1 (o.C.)		
13	I/O:	I/O 2 (o.C.)		
14	I/O:	I/O 3 (o.C.)		
15	I/O:	I/O 4 (o.C.)	OUT:	radio, AF out 1
16	I/O:	I/O 5 (o.C.)	OUT:	radio, AF out 1
17	I/O:	I/O 6 (o.C.)	I/O:	I/O 7 (o.C.)
18	IN :	plug-in position config. 1		
19	IN :	plug-in position config. 2		
20	IN :	plug-in position config. 3	IN :	bus, AF BUS>RADIO
21	IN :	plug-in position config. 4		
22	IN :	RXD (RS232_ext)	OUT:	TXD (RS232_ext)
23	I/O:	SDA (I2C)	I/O:	SCL (I2C)
24	OUT:	PTT-relay circuit 1	OUT:	PTT-relay circuit 1
25	OUT:	PTT-relay circuit 2	OUT:	PTT-relay circuit 2
26	IN :	squelch circuit 1	IN:	squelch circuit 2
27				
28				
29				
30				
31			OUT:	+5V
32	I/O:	GND	I/O:	GND

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Configuration

General remarks

The FT636 IP Interface uses TCP/IP via Ethernet for transmitting radio communication and control information. Be sure to note the occuring particularities. First the terms will be explained with an easy example, then some more complex configuration examples will be illustrated.

The easiest configuration is that both involved IP Interfaces are installed in the same network segment of the local network. This means there is only a switch or a hub between both devices, there is no routing (see configuration example 1).

If the two IP Interfaces are the only devices in the network, the settings can be chosen freely. If this is not the case then you have to make sure that no collisions with the configurations in the existing infrastructure will occur.

IMPORTANT: In each TCP/IP network each device is addressed with an individual IP-address. Therefore each IP address can only be assigned once within a distinct network.

IP addresses in networks can be assigned automatically or manually. The FT636 IP Interface only supports the manual assignment of IP addresses.

Because of that the manually assigned addresses in the network have to be identified.

If the IP Interface is installed in a network which supports an automatic assignment of IP addresses, the address pools reserved for the automatic assignment have to be identified before setting up the devices. The person responsible for the network should be able to provide this information. If this is not the case so-called IP scanners (for example Free IP Scan, Advanced IP Scanner, both for Windows, Freeware) can help. These programs can identify the IP addresses in the network, but, of course, only of the devices that are turned on. Because of that the resulting information may not be complete. You can use any of the free addresses to configure the FT636 IP Interface.

These are the preallocations of the most important network settings of a FT636 IP Interface:

local IP address: 192.168.16.191
target IP address: 192.168.16.192
net mask: 255.255.255.0
ports:
  audio/AF   10000, Protocol UDP
  serial/control data   10001, Protocol TCP
  web server   80,   Protocol TCP

The following applies:
The IP addresses have to differ from each other.
Net mask and ports have to be identical for both devices.
This means that in any case at least one of the two IP Interfaces has to be reconfigured and a new IP address has to be assigned.

In the following example one FT636 IP Interface is to keep its IP address, the other one will be assigned the IP address 192.168.16.192.

You need the following:
- a PC
- a switch or a hub with at least three free Ethernet/LAN-connectors

alternatively:

- a PC connected to a network
- two connectors to an existing network

In the second case you have to make sure that no address conflicts with the existing network arise. Therefore the first option, which is easier, is preferable. The PC has to have an IP address beginning with 192.168.16. and the fourth digit can be any number between 1 and 254, but not 191 and 192. The PC´s network mask has to be set at 255.255.255.0 , just like the FT636 IP Interfaces. This IP address can be installed as a second address in addition to an already existing IP-address on the PC.

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You can now connect the first FT636 IP Interface for configuration (power and network).

A web-browser is opened on the PC (Internet Explorer, Firefox, Opera, ...) and the following is entered in the address bar: **http://192.168.16.191**

The configuration page of the FT636 IP Interface appears (see below).

Select „Configuration 0 (TCP/IP)" in the entry field Mode, click „Apply" and then switch to the page „Application".

Change the „local IP address" to 192.168.16.192.

Change the „target IP address" to 192.168.16.191, then click „Apply" .

IMPORTANT: As the address has changed, the browser address line has to be changed to **http://192.168.16.192** in order to complete the configuration.

Now return to the page „System" and select „standard operation" in the entry field „Mode". Now click „Apply" again. The system will start.

Now you can also connect and start the second system (power and network).

This still can be reached via **http://192.168.16.191** and is now set to the mode „standard operation" on the page „System". It will start after clicking „Apply".

You can determine that both IP Interfaces have connected if a terminal (Windows PC with hyperterminal, see below for settings) is connected to the serial interface when starting. Different status messages will appear. If there is a Syslog-Server (for example KIWI Syslog Server, Windows, Freeware) in the network, it will receive the same messages. These can be read along in the logfile.

The devices are now configurated as follows:

	1. FT636 IP Interface	2. FT636 IP Interface
local IP address:	192.168.16.191	192.168.16.192
target IP address:	192.168.16.192	192.168.16.191
net mask:	255.255.255.0	255.255.255.0
ports:		
audio/AF	10000	10000
serial/control data	10001	10001
web server	80	80

The devices are now ready to use in a local network (without routing, one segment). They will make contact at once and a connection is established.

If you want to change the ports, please note the following limitations:

Web Server Port 80 is standard. If you change this port, the port number has to be indicated in the address bar of the browser. If there is an adjustment, to 10025 for example, you have to enter http://192.168.16.191:10025 in the browser.

Do not use a port lower than 1024. That is where the predefined ports of the TCP standard are (well known ports), which are used by other programs/services.

The highest possible port number is 65535.

The settings of the serial interface are:

- 9600 bit/s
- 8 data bits
- no parity
- 1 stop bit
- no handshake

ATTENTION: use a crossover cable

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Preparing the PC for configuration

As mentioned above the FT636 IP Interfaces are configurated with a web browser. It does not matter which operation system (Windows, Linux, Apple Mac ...) is used on the PC. The web browser (Firefox, Internet Explorer, Opera,...) can also be chosen freely.
Only the IP addresses have to be set so that the IP Interface can be addressed. The necessary steps are shown here briefly.

Windows PC
The configuration here is described with a Windows XP PC, but the procedure is the same for Windows 98, ME, 2000 and also Vista.
The network connections are opened by Start->Settings. Double click on the icon LAN-connection to reach the window Status of LAN-connection. Now click on Preferences and select Internet protocol (TCP/IP). Preferences open network settings. It may look like this example.
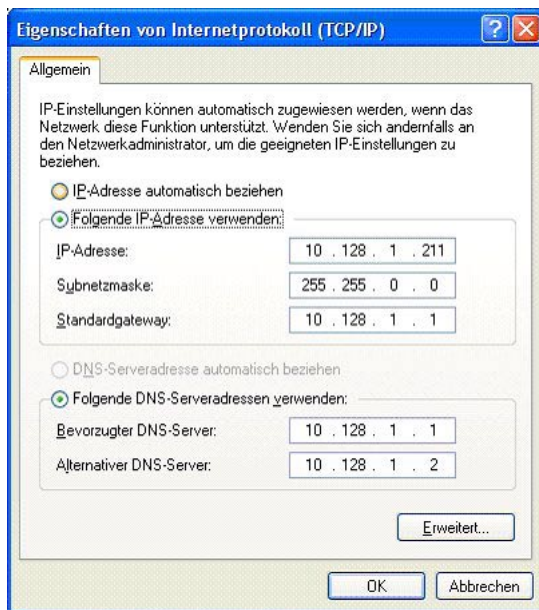
If the PC is not attached to a network, you can directly enter the IP address and the net mask here (f.e. IP address 192.168.16.254, net mask 255.255.255.0). Standardgateway and DNS server addresses stay blank. The next two steps can be omitted.
The components are all connected with a switch or a hub.
If the PC is attached to an existing network, the following steps are necessary.
IMPORTANT: To configure the settings, **automatic IP-address** must not be activated. It must be set to **use following IP address** and a valid network address has to be entered. Of course the figures in the example have to be adjusted to the respective environment.

You can enter a second IP address by clicking on Advanced. Here you now enter the figures which make it possible to connect to the FT636 IP interfaces. In this case you can use the figures of the example.
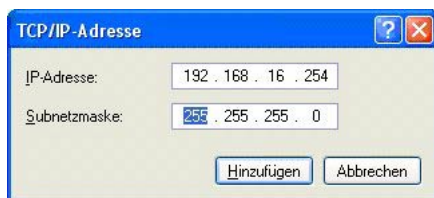
Now two IP addresses are assigned to the PC, so that it is attached to the regular network as well as forming an own network segment with the IP Interfaces.
The components are connected to the existing RJ-45-network jacks.

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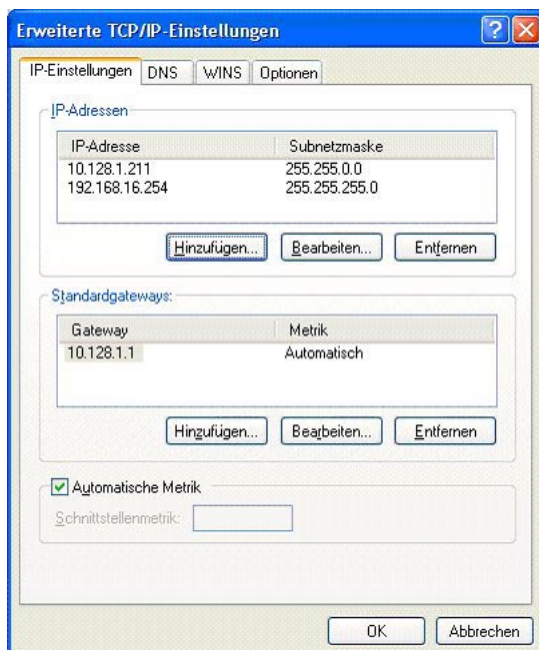
Linux PC
The setting of a Linux PC is basically done in the same way as described in the Windows example.
Of course the windows look different and also differ from Linux version to Linux version (Ubuntu, Debian, Suse, RedHat, ...).

The following also applies here:
If the PC is already attached to a network a second IP address will be assigned.
If the PC operates without being attached to a network, you just choose a suitable setting (f.e. IP address 192.168.16.254, net mask 255.255.255.0, the rest stays blank).
The following example is described for Suse Linux 10.1 but also works similarly for other Linux distributions.
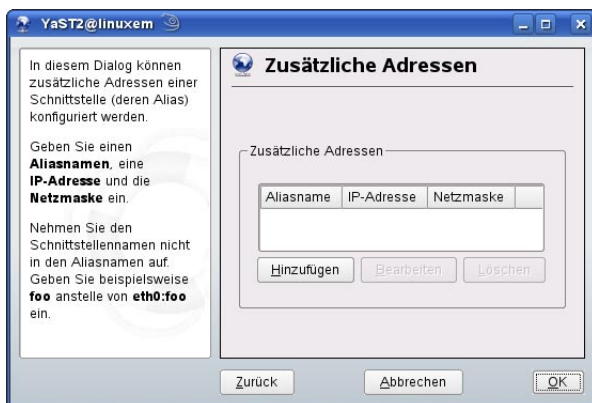The dialogue is opened with Start->System->Yast.
Double click Network devices in the Yast control center, then click on Network interface card.
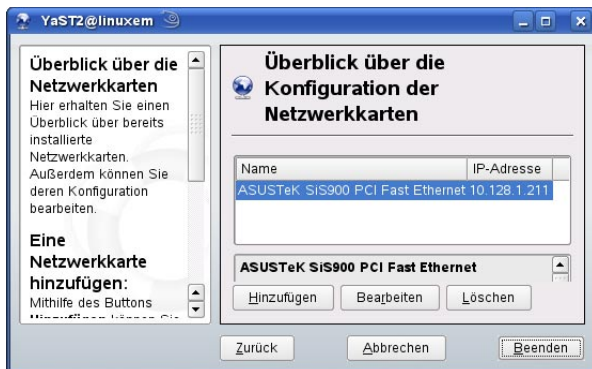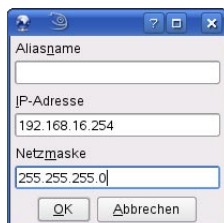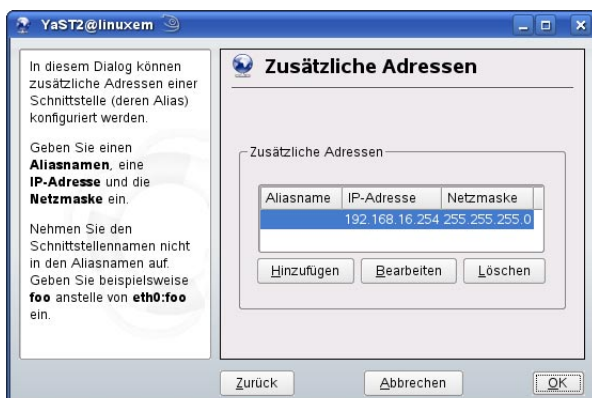
The following window appears:
Check Network interface card and click on Edit, click on Advanced in the new window and select Add IP addresses on the list.

You open the dialogue for entering an additional IP address by clicking on Add.

The new IP address and the network mask is entered here.

Now two IP addresses are assigned to the PC.
Then it connects to the regular network as well as to the network segment of the FT636 IP Interfaces.

Depending on the Linux variant this setting also works with automatic IP address assignment.

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The FT636 IP Interface configuration interface

The configuration of the FT636 is carried out on a website, which is provided by the device. To do this the IP nterface has to be connected to the network and the configuration PC has to be set up as described in the previous paragraph.
A browser is started on the PC and the following address needs to be entered in the address bar:

> http://192.168.16.191

The following FT636 configuration interface appears:.

This page is shown as standard when the configuration interface is newly opened. You can also open this page by clicking the menu item „System".
In the entry field „Mode" you can switch to different modes of operation. They are used for standard operation or for configuration of different settings.

For the first implementing choose the mode „FT636 IPI Configuration 0 (TCP/IP, NF, fticfg0)". Then click on „Apply" to switch to this mode. By clicking on „Apply" the current settings will always be saved and restarted in order to read the setting into the system.
By now clicking on „Apply" you can switch to the page for the TCP/IP settings.

TCP/IP settings

Here the adjustments of the network and for the AF transfer are made.
Like the page shown above, this page also has some help texts on the right which explain the setting options.

This shows the ex factory settings. These settings have to be adjusted to the respective defaults or operating conditions as explained in the following paragraphs.
Here, too, make the respective adjustments and then click on „Apply". The settings are saved and the device restarts.

To save the setting please click „Apply" at the bottom of the page.
The device will then start with the new settings.

COMMUNICATION SETTINGS

Number of radio circuits
One or two radio circuits can be operated simultaneously.
Necessary bandwidth:
One radio circuit: min. 96kBit/s
Two radio circuits: min. 160kBit/s

Jitter Buffer Delay / Max. Audio Buffer
Buffer for buffer storage of the audio information.
From application version 1.35 on the setting **Jitter Buffer Delay** replaces the setting option
Max. Audio Buffer. Not the size of the buffer is configurated but the duration of the buffer storage
of the audio signal, in order to equalize delay variations.

Max. audio buffer (up to application version 1.34)
Default value: 1660Byte

Jitter buffer delay (from application version 1.35 on)
Default value: 250ms

A higher value reduces possibly existing dropouts.
If the network connection is good, values down to about 50ms can be set.
Please note: If the jitter buffer delay time is set at a lower value, the PTT turn on delay needs to be
reduced accordingly (register 155, digits 5-6, 7-8).

AF SETTINGS

A/D PREAMPLIFICATION
Level amplification or level attenuation before the analog digital converter stage.
Default value: -1,5dB

Volume
Volume adjustment after the analog digital converter stage.
Default 95%

NETWORK SETTINGS

IP announcement
If set on „yes", the current IP addresss will be announced by the AF outputs.
Default: „yes"

IP address
Enter the 4 values of the IP address, for example:
„192.168.0.123". It is necessary to always enter an IP address. The IP addresses of a pair of
FT636 have to be different.
Default: „192.168.0.191"

Netmask
Enter the 4 values of the netmask, for example:
„255.255.255.0" for a class C network
Default: „255.255.255.0"

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Gateway IP address
Enter the 4 values for the gateway IP address, for example:
„0.0.0.0" for no gateway
„192.168.0.1" for one gateway in the LAN
Please note: The gateway only has to be entered, if the connection is made via WAN (by a router/ a gateway).
Default: „0.0.0.0"

Primary DNS server
Here you can enter DNS Servers for name resolution (for example www.funktronic.de).
Example: „195.186.1.111"
Default: „0.0.0.0"

Alternative DNS
A further DNS server, if the first cannot be contacted.
Example: „195.186.4.111"
Default: „0.0.0.0"

Port for audio / AF
Port by which the audio/AF data are transmitted.

Port for signaling
Port by which the signaling (PTT, squelch, channel switching, etc..) is transmitted.

Web server port
Port by which the integrated webserver is contacted. If set on „0", the standard HTTP port (80) will be used.

SERIAL INTERFACE 1

Settings for the serial interface.

Baud rate
Transmission rate („300" to „230400" Baud).
Default: „9600"

Data bits
Select „7" or „8" data bits.
Default: „8"

Parity
Selection between „no", „even" or „uneven" parity.
Default: „no"

Stop bits
Select „1" or „2" stop bits.
Default: „1"

Handshake
Select the kind of handshake:
RTS/CTS not used: „no"
RS232/RS422: „Software flow control XON/XOFF)"
Default: „no"

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Potentiometer settings

You can reach the page for potentiometer settings under „Application" by first clicking on the entry field „Mode" on the main page, then click on „FT636 IPI configuration 1 (Potis, ftipcfg1)" and then on „Apply". Here the AF-in- and outputs are adjusted to the connected devices.

The potentiometer values can be entered directly in the fields 1 - 4, or can be modified gradually with the + / - keys. For saving use the keys T and P.

Temporary
The potentiometers are only adjusted, the values are not saved. When restarting the device the saved values will be accepted.
Permanent
The potentiometer values are saved so that they are available again after turning the device off.
Default
Factory presetting. With this key you reset to the ex-factory setting.
Reload page
The potentiometer values are reread and displayed. The page is refreshed.

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Setting of the potentiometers and adjustment instructions

VoIP1, VoIP2, Line1, Line2
These are the AF levels pertaining to the potentiometer values. This page is refreshed every second in order to see how the values change during the setting.
Assignment:
Poti 1 - VoIP 1, signal from network, radio circuit 1
Poti 2 - Line 1, signal from input, radio circuit 1
Poti 3 - VoIP 2, signal from network, radio circuit 2
Poti 4 - Line 2, signal from input, radio circuit 2

Tone generators 1 - 4
The frequences have to be entered with 4 digits, for example:
1500Hz
0500Hz
3000Hz
The generators are turned off with the value 0000.
Enter the desired frequency.

Assignment of the generators
Generator 1: reference level 300mV to AF output radio circuit 1
Generator 2: pilot tone radio circuit 1
Generator 3: reference level 300mV to AF output radio circuit 2
Generator 4: pilot tone radio circuit 2

When turning on the pilot tone the generators 1 and 2 generate a PTT signal at the same time. The carrier of the connected two-way radio is activated as well as the squelch input of the Major. Also the AF outputs are activated, so that the generator signal is directly connected to the outputs.

Adjustment
Input:
Feed the reference level of the two-way radio or the control head in input 1 or 2.
Adjust Poti 2 resp. 4 to the internal reference level of 300mV for line 1 resp. 2.
Output:
Connect the voltage meter to the output 1 resp.2.
Turn on generator 1 resp. 2 at desired frequency. The internal reference level of 300mV is transmitted to the output.
Adjust Poti 1 resp. 3 to the desired output level.

Important (not applicable from application version 1.33 on): Before setting the potentiometers program the registers 153 and 353 from standard value 20001230 to 20033330. After configuration of the potentiometers the standard value is restored.

Important: Always save new potentiometer values with „Temporary" at first and only after having finished the setting save them with „Permanent".

Register settings

Here you can program the registers to configurate different funtions of the device. Registers always have to be entered with 3 digits, the values always with 8 digits. The additional help texts on the right explain the settings.

REGISTER SETTINGS

Description	Register VoIP 1				Register VoIP 2				
AF-Mute	150	03200320	R	S	350	03200320	R	S	?
Pilot Tone Decoder.	152	02500128	R	S	352	02500128	R	S	?
Line	153	20001230	R	S	353	20001230	R	S	?
AF-Squelch-Conf.	154	02604010	R	S	354	02604010	R	S	?
Feed	155	10102030	R	S	355	10102030	R	S	?
Squelch Configuration	156	00050005	R	S	356	00050005	R	S	?
Channel Switching	163	BCD00000	R	S	363	BCD00000	R	S	?
Channel Register	164	10100000	R	S	364	10100000	R	S	?
Channel Blocking Time	165	30100000	R	S	365	30100000	R	S	?
Channel Configuration	166	01000100	R	S	366	01000100	R	S	?
PTT-Configuration	169	00000000	R	S	369	00000000	R	S	?
Decoder Ref. 1	180	01810000	R	S	380	01810000	R	S	?
Decoder Ref. 2	181	01800000	R	S	381	01800000	R	S	?
Encoder Reference	182	07707000	R	S	382	07707000	R	S	?

ft636 (14.10.2013)

Single Tone Decoder	183	10001000	R	S		383	10001000	R	S	?
Switching Inputs	203	DCBCDCBC	R	S		403	DCBCDCBC	R	S	?
Alarm Tone Sequence	204	ABC00000	R	S		404	ABC00000	R	S	?

REGISTER SELECTION

Select Register | RRR | NNNNNNNN | Read | Save | ?

Reload Page

Function RX/TX LED, IP announcement timer
1. digit: 0 = RX/TX LEDs as marked, 1 = RX/TX LEDs switched
2.+3. digit: nn*1s max. AF-interconnection time for IP announcement

AF-mute
1.-2. digit: ca. nn*0,9mV threshold value AF-mute, activate line
3.-4. digit: ca. nn*0,9mV threshold value AF-mute, deactivate line
5.-6. digit: ca. nn*0,9mV threshold value AF-mute, activate VoIP
7.-8. digit: ca. nn*0,9mV threshold value AF-mute, deactivate VoIP

Pilot tone decoder
1. digit: pilot tone decoding, filter and decoder frequency
   0 = no filter
   1 = 3300Hz
   2 = 3000Hz
   3 = 2800Hz
   4 = 3320Hz
   5 = 2982Hz
2. digit: pilot tone decoding, n*5ms long decoding until on
3. digit: pilot tone decoding, n*5ms long decoding until off
4. digit: pilot tone frequency to be decoded, if 1. digit = 0
5.-8. digit: pilot tone decoding, min. level (0-32767) 00128 = 75mV
   *2 = -3dB, /2 = +3dB sensitivity

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Line input configuration
   1. digit   decoder
      0 = off
      1 = PIL
      2 = SQL
      3 = PIL+SQL
      4 = AF-squelch
      5 = PIL+AF
      6 = SQL+AF
      7 = PIL+SQL+AF
   2. digit   operation mode
      0 = 4-wire TX always 600 Ohm
      1 = 4-wire TX high-impedance, only when transmitting 600 Ohm
      2 = 2-wire simplex, always 600 Ohm
      3 = 2-wire simplex high-impedance, only when transmitting 600 Ohm
      4 = 2-wire duplex, always 600 Ohm
      5 = 2-wire duplex, high-impedance, only when transmitting 600 Ohm
   3. digit   priority
      0 = none
      1 = line before VoIP (Line->VoIP vor VoIP->Line)
      2 = VoIP before line (VoIP->Line vor Line->VoIP)
      3 = first come, first served...
   4. digit   AF-through-connection without line, without VoIP
   5. digit   AF-through-connection with line, without VoIP
   6. digit   AF-through-connection without line, with VoIP
   7. digit   AF-through-connection with line, with VoIP
      0 = Line->VoIP off, VoIP->Line off
      1 = Line->VoIP on, VoIP->Line off
      2 = Line->VoIP off, VoIP->Line on
      3 = Line->VoIP on, VoIP->Line on

AF-squelch configuration
   1.-2. digit   n*5ms above threshold value, until SQL detected
   3.-4. digit   ca. nn*1,8mV threshold value, AF detected
   5.-6. digit   n*5ms below threshold value, until SQL undetected
   7.-8. digit   ca. nn*1,8mV threshold value, AF undetected

Advance time register
   1.-2. digit   nn*10ms advance time for tone sequence
   3.-4. digit   nn*10ms follow-up time for tone sequence
   5.-6. digit   nn*10ms PTT turn-on delay time
   7.-8. digit   nn*10ms PTT turn-off delay time

Squelch configuration
   1. digit   squelch input
      0 = active low, pullup on
      1 = active high, pullup off
      2 = free (audio squelch)
      3 = free (phantom)
      4 = active low, pullup off
      5 = active high, pullup on
   2. digit   line filter (bandpass 300 - 3400Hz)
      0 = off
      1 = on
   3.-4. digit   nn*10ms TX off-time after own AF on line
   5.-6. digit   free
   7.-8. digit   nn*10ms TX off-time after own pilot tone on line

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Channel remote switching register

1.-3. digit   digits 1-3 of the channel remote switching tone sequence

Channel register

1. digit   save channel
- 0 = no
- 1 = yes
- 2 = save relay

2.-3. digit   channel 00-99
for version BOS
1. digit   save channel
- 0 = no
- 1 = yes
- 2 = save relay

2.-4. digit   channel 000-999
5. digit   mode of operation
- 0 = simplex operation
- 1 = duplex operation

6. digit   upper / lower sideband
- 0 =lower sideband
- 1 = upper sideband

Blocking duration for TX, RX, and REL

1.-2. digit   nn*10ms before channel switching
3.-4. Stelle   nn*10ms after channel switching

Channel configuration

2. digit   channel switching output
- 0 = none
- 1 = decimal
- 2 = binary-1
- 3 = binary
- 4 = 2xBCD

3. digit   channel switching output
- 0 = normal
- 1 = inverted

4. digit   free (number of channel bits(0-8))
5. digit   channel acknowledgement
- 0 = normal (BCDxy)
- 1 = Major6 (CBDxy)
- 2 = normal mit TX
- 3 = Major6 mit TX

for version BOS
6. digit   type of two-way radio
- 0 = Bosch
- 1 = Ascom
- 2 = AEG/Telefunken

Configuration AF-Delay Voip > Line

For the delay the remaining available RAM is used. This delay can be shorter for later versions or special software versions. The specified maximum delay time may then be shorter.

This delay time is shared by both radio circuits. At first the programmed value for radio circuit 1 is set. Only the remaining RAM is then available for radio circuit 2, so that maybe the programmed time cannot be set.

    1.-4. digit: nnn * 1ms NF Delay Voip > Line
    5.   digit: compression:
        0 = none (max. 125ms)
        1 = A-law (max. 250ms)
        2 = half baud rate (max. 250ms)
        3 = A-law and half baud rate (max. 500ms)

Vox configuration
    1.-2. digit: nn*5ms above threshold value, until PTT on
    3.-4. digit: ca. nn*1,8mV threshold value PTT on
    5.-6. digit: n*5ms below threshold value, until PTT off
    7.-8. digit: ca. nn*1,8mV threshold value PTT off

PTT-configuration
    1.   digit: PTT signaling to line
      0 = programmed pilot tone
    2.-5. digit: pilot tone- or TRC-Guardtone frequency
      1000s, 100s, 10s,1s Hz
    6.   digit: Vox for Voip use for PTT
      yes = 1
      no = 0

Decoder reference 1
    1.-3. digit   nnn*5ms tone duration 1. tone
    4.-5. digit   tone duration all tones

Decoder reference 2
    1.-3. digit   nnn*5ms tone duration from 2nd tone on
    5.   digit   call tone system line 0
      0 = ZVEI
      1 = CCIR
      2 = ZVEI2
      3 = EEA
      4 = ZVEI3

Encoder reference
    1.-2. digit   nn*10ms tone duration 1. tone
    3. digit   n*10ms all other tones
    4.-5. digit   nn*10ms pause time between call id and own id tone sequence

Group-call decoder reference
    1.-2. digit   nnn*100ms min. tone duration single tone decoder
    3.-4. digit   nnn*100ms max. tone duration single tone decoder
        (00, as soon as min. duration is reached)
    5.-6. digit   nn*100ms min. tone duration special tone decoder (tone call 1/2)
    7.-8. digit   nn*100ms max. tone duration special tone decoder (tone call 1/2)
        (00, as soon as min. duration is reached)

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Switching inputs
   1.-4. digit   tone sequence switching inputs digits 1-4
   5.-8. digit   expected acknowledgement

Alarm tone sequence
   1.-4.digit Alarm tone tone sequence, digits 1 - 4
   5. digit   after start transmit tone sequence even without active alarms

Multiplicator for output level
The registers 230-235 indicate the internal amplifying values of the individual sources to the line.
The values are programmed in the registers 231 and 233, when the relay is on AND is to be sent from Voip.
With that the priority (standard: Voip has priority over relay) or a mixing of the AF can be adjusted.

Register 230
   4.-8. digit: multiplicator for output level Voip > Line (0-32768)
             Default: 25560
Register 231
   4.-8. digit: multiplicator for output level Voip > Line (0-32768)
             when relay active default: 25560
Register 232
   4.-8. digit: multiplicator for output level Line > Line (0-32768)
             Default: 25560
Register 233
   4.-8. digit: multiplicator for output level Line > Line (0-32768)
             when AF active V>L Default: 00000
Register 234
   4.-8. digit: multiplicator for output level   Tone > Line (0-32768)
             Default: 08300
Register 235
   4.-8. digit: multiplicator for output level Pilot > Line (0-32768)
             Default: 06400

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I/O configuration

The functions of the in- and outputs are set here. The corresponding registers, which save the programming, are indicated. Always enter the corresponding values 8-digitally. Help texts can again be found on the right side.

System | Applikation | Reboot | Update

FunkTronic FT636 IP Interface - Configuration 2 - I/O Settings (192.168.16.191)

CONFIGURATION OF INPUTS AND OUTPUTS

I/O Configuration	I/O 0 - 7				I/O 8 - 15			
	09	00000000	R	S	09	11111111	R	S

Number	Output				Input			
0	04	11000000	R	S	06	00000000	R	S
					06	00000000	R	S
1	04	11100000	R	S	06	00000000	R	S
					06	00000000	R	S
2	04	11200000	R	S	06	00000000	R	S
					06	00000000	R	S
3	04	11300000	R	S	06	00000000	R	S
					06	00000000	R	S
4	04	12000000	R	S	06	00000000	R	S
					06	00000000	R	S
5	04	12100000	R	S	07	00000000	R	S
					07	00000000	R	S
6	04	12200000	R	S	07	00000000	R	S
					07	00000000	R	S
7	04	12300000	R	S	07	00000000	R	S
					07	00000000	R	S

On this page you can configure the in- and outputs of the FT636.

Output configurates the function of the outputs 0 - 15,
Input configurates the function of the inputs 0 - 15.

Two functions can be assigned to the inputs. One when the input changes from passive to active and one when the input changes from active to passive.
The respective upper entry configures the active switching, the lower entry configures the passive switching.
The keys have the following meaning:

„L" = read
„S" = save

I/O configuration:
   0 = output, state after starting: off
   1 = input
   2 = output, state after starting: on

Outputs

1. digit
   0: no function
   1: channel switching output
   2: VoIP connection state
   3: free
   4: remotely controlled switching output
   5: Output of PTT and SQL
   6 - F: free, no function

Channel switching output
2. digit
   1: VoIP 1
   2: VoIP 2
   4: Control center message (LS version only)
3. digit
   0-F: channel bit
4. digit
   0: normal
   1: inverted

VoIP connection state
2. digit
   1: VoIP 1
   2: VoIP 2
   4: Control center telegram (LS version only)
3. digit
   0-F: connection status bit
4. digit
   0: normal
   1: inverted

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remotely controlled switching output
2. digit
    1: VoIP 1
    2: VoiP 2
    4: Control center telegram (LS version only)
3. digit
    0-F: switching output bit
4. digit
    0: normal
    1: inverted

Output of PTT and SQL
2. digit:
    1: Circuit 1 (SQL 1 or PTT 1)
    2: Circuit 2 (SQL 2 or PTT 2)
    3: Circuit 1 and 2 (logical OR of SQL 1/2 or PTT 1/2)
3. digit:
    0: SQL
    1: PTT
4. digit:
    0: normal
    1: inverted

Inputs

1. digit
    0: no function
    1: switching input FT634
    2: alarm input
    3: free (T11-55)
    4: remotely controlling input
    5 - F: free, no function

Switching input
2. digit
    1: VoIP 1
    2: VoIP 2
    3: both
3. digit
    0-7: input number
4. digit
    0: passive
    1: active

Alarm input
2. digit
    1: VoIP 1
    2: VoIP 2
    3: both
3. digit
    0: emergency power
    1: intrusion
    2: alarm
4. digit
    0: passive
    1: active

remotely controlling input
2. digit
    1: VoIP 1
    2: VoIP 2
    3: both
3. digit
  0-F: input number
4. digit
    0: passive
    1: active

Example: Output of Squelch and PTT signals

Squelch input of Radio 1 is to be output to I/O 2 (ST 2 / Pin 13):
Register 042 = 51000000

PTT output of Radio 1 is to be output to I/O 3 (ST 2 / Pin 14):
Register 043 = 51100000

Beispiel: Schalteingang übertragen / Schaltausgang fernsteuern
Example: Remotely control output by local input

Input 0 (Device A) remotely controls output 11 at the remote location (Device B).
Input 4 (Device A) remotely controls output 12 at the remote location (Device B).

Device A	Gerät B
Register 095, 1xxx1xxx	Register 096, xxx00xxx
Configure I/O 0 and 4 as input	configure I/O 11 and 12 as output
Register 060, 41B10000	Register 051, 41B00000
activity on activation of input 0	control output 11 with remote input 0
Register 061, 41B00000	
activity on deactivation of input 0	
Register 068, 42C10000	Register 052, 42C00000
activity on activation of input 4	control output 12 with remote input 4
Register 068, 42C00000	
activity on deactivation of input 4	

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Standard operation

No adjustments can be made here. An overview of the connection adjustments and of the connection state is displayed here. On the lower part of the left page the incoming UDP packets and the outbound as well as the incoming TCP connection is displayed.

Incoming UDP packets: about 50 per second, they provide the audio information

Incoming TCP connection: the connection is set up by the remote side and can come from any TCP port.

Outbound TCP connection: the connection to the remote side is set up to the configured port (standard 10001).

System	Applikation	Reboot	Update

FunkTronic FT636 IP Interface - Normalbetrieb - Normalbetrieb(192.168.16.191)

NORMALBETRIEB

EINSTELLUNGEN

lokale IP Adresse	192	168	16	191
Ziel IP-Adresse	192	168	16	192
Ziel DNS-Name				
Netzmaske	255	255	255	0
Gateway IP Adresse	0	0	0	0
Primaerer DNS Server	0	0	0	0
Alternativer DNS Server	0	0	0	0

Audio Port	10000
Serial Port	10001
FMS Port	0
Web Server Port	80
Volumen	19
A/D Vorverstaerkung	1
Jitter Buffer Delay	250

|	
UDP-Pakete ankommend:	50 pro Sekunde
TCP-Verbindung ankommend:	Connection established from remote host 192.168.16.192:59343
TCP-Verbindung abgehend:	Connection established to Host: 192.168.16.192, Port: 10001

A functioning connection is shown in this illustration. The TCP connections in both directions are established and 50 UDP (audio) packets per second are coming in.

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Configuration examples

In the local network, in the same network segment

Major 5a control head   Two-way radio

IP Interface   Ethernet   IP Interface
                    switch
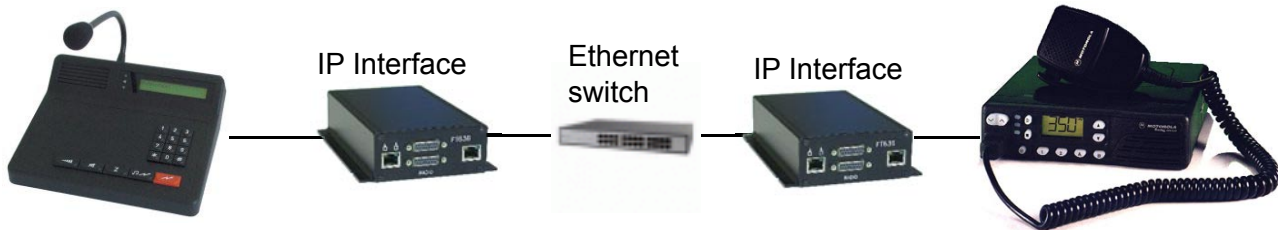
This is the easiest configuration and basically corresponds to the above explained introductory example.

The following specifications are valid for this example:
- The FT636 IP Interfaces are connected to the existing network.
- The network part of the IP address is 172.16 (in this case the first two digits).
- The network mask is 255.255.0.0 (determines the network part of the address).
- The FT 636 IP Interfaces are assigned the following IP addresses:
  1) 172.16.200.101
  2) 172.16.100.201

The steps to configuration:
1. Assign a second IP address to the configuration PC (for example 192,168,16.254,see above).
   IMPORTANT: In any case the first three digits have to be 192.168.16.
2. Connect the IP Interfaces to the network (currentless).
3. Turn on the first IP Interface (supply power).
4. Start a browser on the PC.
5. Enter „http://192.168.16.191" into the address bar of the browser.
6. Choose „Configuration 0" in the field „Mode" on the now appearing web page, click „Apply"
   and switch to the page „Application".
   The page for the network configuration will appear.
7. The following fields have to be changed:
   local IP address: 172.16.200.101
   target IP address   172.16.100.201
   network mask   255.255.0.0
   Click on „Apply".
8. In order to check the settings in the browser enter 172.16.200.101 in the address bar,
   because the IP Interface can now only be contacted under the new address.
9. Proceed with the second IP Interface according to steps 2. - 8.
   IMPORTANT: The differences in the IP addresses have to be observed.
   local IP address: 172.16.100.201
   target IP address   172.16.200.101
   network mask   255.255.0.0
   Click on „Apply".

For this process it does not matter if the FT636 IP Interfaces are configurated at your workstation or if they have already been installed at their operating site. The configuration interface can be reached via the network at any time. Configuration at the workstation is only favorable for the turning on of the devices (at first configurate the first device, then turn on the second).

IMPORTANT: Be sure to attach stickers with the assigned IP addresses on the device.

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In the local network, in different network segments

Major 5a control head
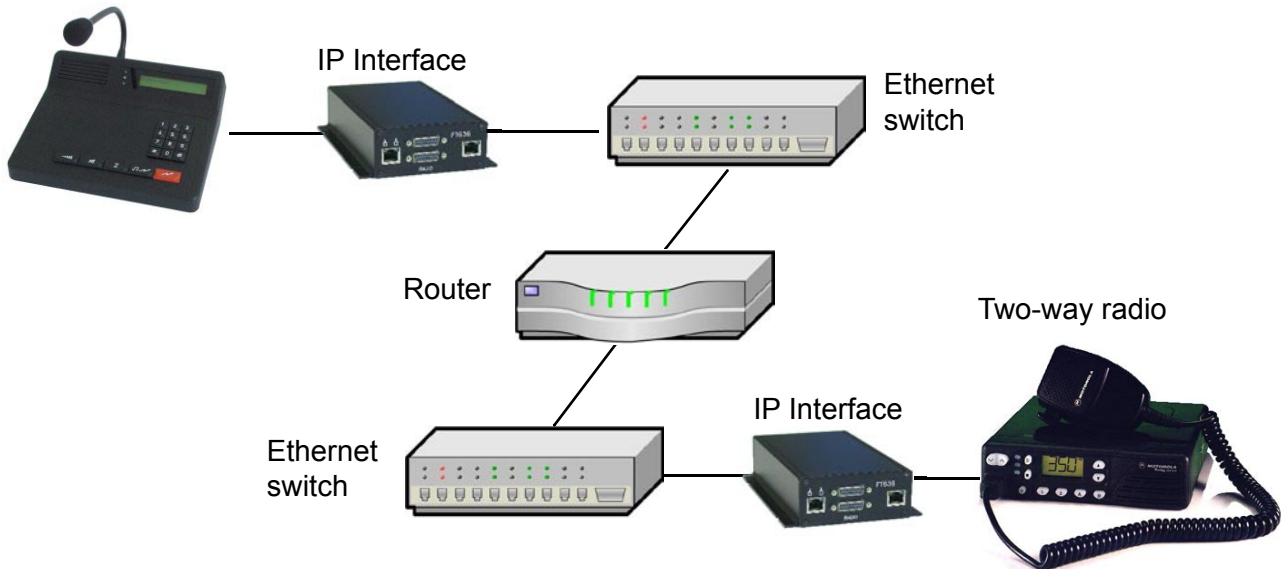
This example shows a configuration where the FT535 IP Interfaces and therefore the control head and the two-way radio are in different segments of the network. The segments are connected by a router. Consequently the network parts of the IP addresses are different in both segments. At first the two IP Interfaces are connected to the same network segment as the configuration PC. The necessary data can be obtained from the network administrator.
Example:

Segment	Segment 1	Segment.2
Net IP-adddress	192.168.255	172.31.
Net mask	255.255.255.0	255.255.0.0
IP Interface	192.168.255.254	172.31.0.254
Router/Gateway	192.168.255.1	172.31.0.1

The steps to the configuration:
1. Assign a second IP address to the configuration PC (for example 192,168,16.254,see above)
    In the example the configuration is to be made in segment 1 (PC and both IP Interfaces)
2. Connect the IP Interfaces to the network (currentless).
3. Switch on the first IP Interface (supply power)
4. Start a browser on the PC
5. Enter „http://192.168.16.191 „ in the address bar of the browser
6. In the now appearing web page choose „configuration 0" in the mode field. Click on „Apply" and switch to the page „Application".
    The page for network configuration will appear.
7. The following fields have to be changed:
        local IP address: 192.168.255.254
        target IP address   172.31.0.254
        network mask   255.255.255.0
        standard gateway   192.168.255.1
    Click on „Apply".
8. To check the settings in the browser enter 192.168.255.254 in the address bar, as the IP Interface can now only be reached under the new address.
9. Proceed with the second IP Interface according to steps 2.- 8.
        local IP address: 172.31.0.254
        target IP address   192.158.255.1
        network mask   255.255.0.0
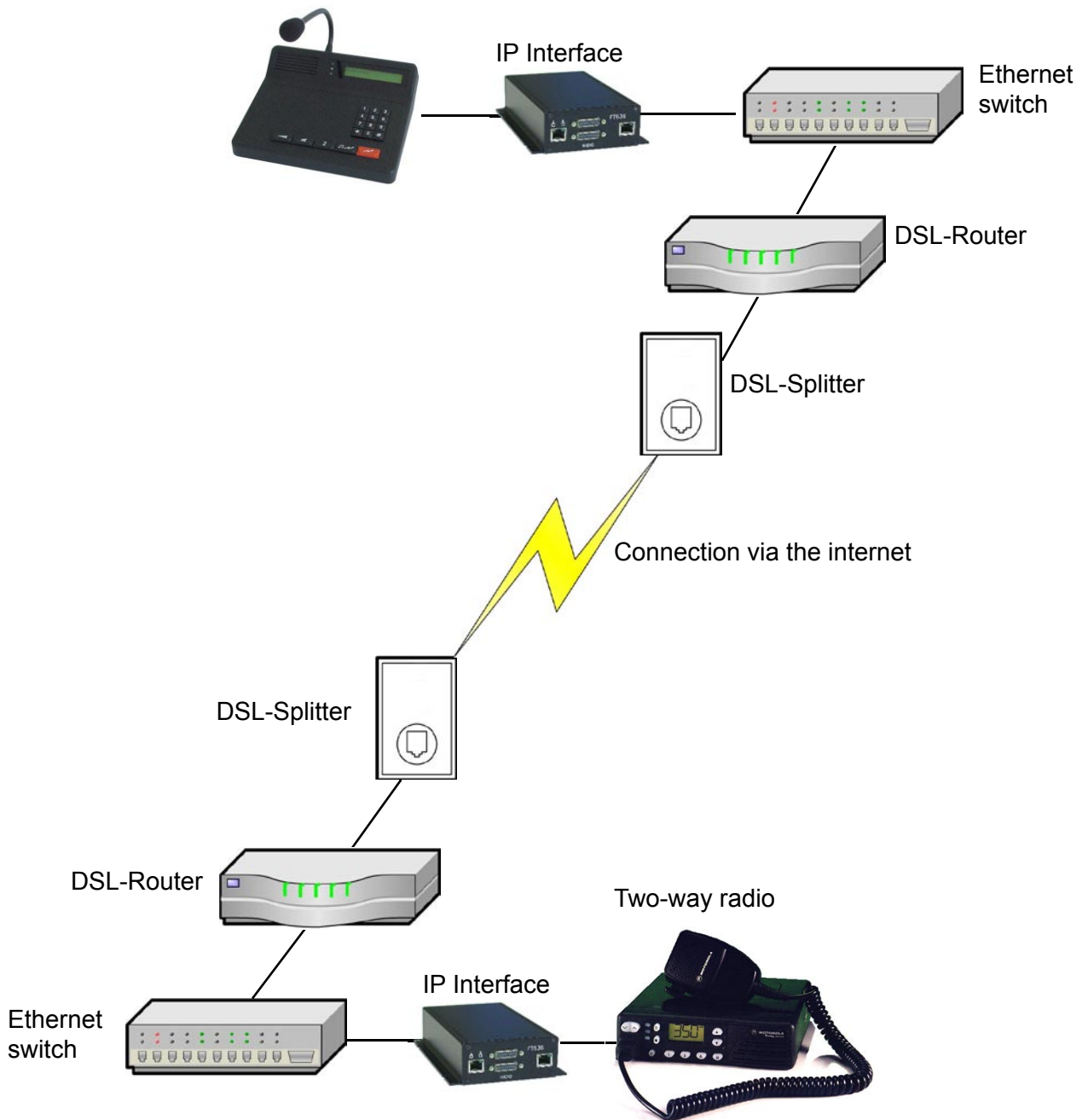   standard gateway   172.31.0.1
    Click on „Apply".
ATTENTION: This IP module now has an IP address from segment 2 and can only be reached via web browser again after being installed in segment 2.

Connection via the internet (DSL)

Major 5a control head

IP Interface

Ethernet switch

DSL-Router

DSL-Splitter

Connection via the internet

DSL-Splitter

DSL-Router

Two-way radio

Ethernet switch

IP Interface

This configuration shows the possible components when connecting with the internet. The ethernet switches may or may not be available according to the requirements of the network. If not available the IP Interfaces will be directly connected with their DSL-router. This should be the standard case in order to ensure that no other devices (PCs) also use the internet connection. Also the connection speed is then completely available for the FT636 IP Interfaces.

The following upload rates are valid when the IP Interface is the only user of the connection.   -
-1-radio circuit: min.   96kBit/s
- 2-radio circuit: min. 160kBit/s

ATTENTION: Most of the time DSL providers only specify the download rate. The connection speed in the upload direction usually is significantly lower (for example: download 1000kBit/sec and upload 128kBit/sec).
ATTENTION: The IP Interfaces only work with a DSL router but not with a DSL modem.
ATTENTION: The FT636 IP Interfaces work either with an IP address set by the DSL provider or with Dyn-DNS with dynamically assigned IP address at the DSL connection.

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In this case the installation is more complex, as you have to take the DSL router into consideration in this configuration.

The router mainly has two functions. One is to set up the connection to the DSL provider. The other function is to receive data from the local IP Interface and to transmit the data via internet to the remote location. Here the reverse happens, the router receives the data from the internet and then has to transfer the data to the IP Interface in its network.

The underlying process is called NAT (Network Address Translation) and the necessary settings will be briefly explained here.

The router has two network connections. One to the local network, the other to the splitter/DSL provider. Each of the connections has on own (different) IP address.

The local IP address is freely selectable and usually is preallocated at 192.168.0.1 (net mask 255.255.255.0). The IP address and net mask to the DSL provider can also be allocated by the provider (set IP address). For example:
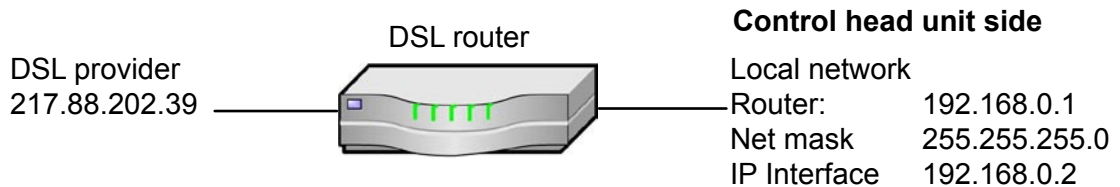
Control head unit side

DSL router

Local network		DSL provider
Router:	192.168.0.1	84.171.31.100
Net mask	255.255.255.0	
IP Interface	192.168.0.2	

DSL router

DSL provider	**Control head unit side**	
217.88.202.39	Local network	
	Router:	192.168.0.1
	Net mask	255.255.255.0
	IP Interface	192.168.0.2
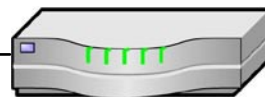
It is noticeable that in both local networks the same IP addresses are assigned internally. This works in this case because the local networks are concealed from the internet by their router. Only the routers but not the local network behind it can be contacted from the internet respectively from the remote location. Nevertheless to be able to reach a device in the local network the ports, which are adjusted in the configuration web interface, are needed.

This means that if the IP Interface of the control head side transmits AF data to the two-way radio side this is done as standard on port 10000. These data are sent to the address 217.88.202.39. This router now has to „know" that the incoming data with the port number 10000 have to be forwarded to the IP Interface with the address 192.168.0.2 in the internal local network.

Reversely this process works the same. The IP Interface of the two-way radio side transmits its AF data to the IP address 84.171.31.100 on port 10000 and the DSL router of the control head unit side forwards the data to the IP Interface with the address 192.168.0.2.

For this to work each of the two routers has to have at least the following entries in its settings under portforwarding/IP masquerading

Port	IP address
10000	192.168.0.2 for protocol UDP or for all protocols
10001	192.168.0.2 for protocol TCP or for all protocols

perhaps also

80	192.168.0.2 for protocol TCP or for all protocols

With the last setting the configuration menu of the remote location can also be contacted.

This means that a PC on, for example, the control head unit side can also configurate the IP Interface of the two-way radio side. But every other PC within the internet also has access to the configuration menu. Therefore it is absolutely necessary to set up a password (on the IP Interface, maybe attach the password to the device, maybe change port, for example 9999).

Configuration of the FT636 IP Interfaces

	control head unit side	two-way radio side
Local IP address	192.168.0.2	192.168.0.2
Target IP address	217.88.202.39	84.171.31.100
Net mask	255.255.255.0	255.255.255.0
Gateway	192.168.0.1	192.168.0.1

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Connection via internet (DSL) with VPN tunnel

This connection basically looks like the variant described in the previous paragraph. But a so called VPN tunnel (Virtual Private Network) is set up via internet. This is the safest connection via internet as it can only be „seen" by the participating devices. However the participating router must support a VPN connection. To simplify matters the routers should be similar devices by the same manufacturer.

Another difference to the previous configuration is that the IP Interfaces can directly access the opposite network. The internet connection is transparently connected through by the VPN routers. The IP Interfaces do not see anything of this connection.

The following illustration shows a configuration with direct connection of the IP Interfaces to the router.

Major 5a control head

IP interface

DSL router with VPN function

DSL splitter

Connection via internet

DSL splitter

Two-way radio

DSL router with VPN function

IP Interface
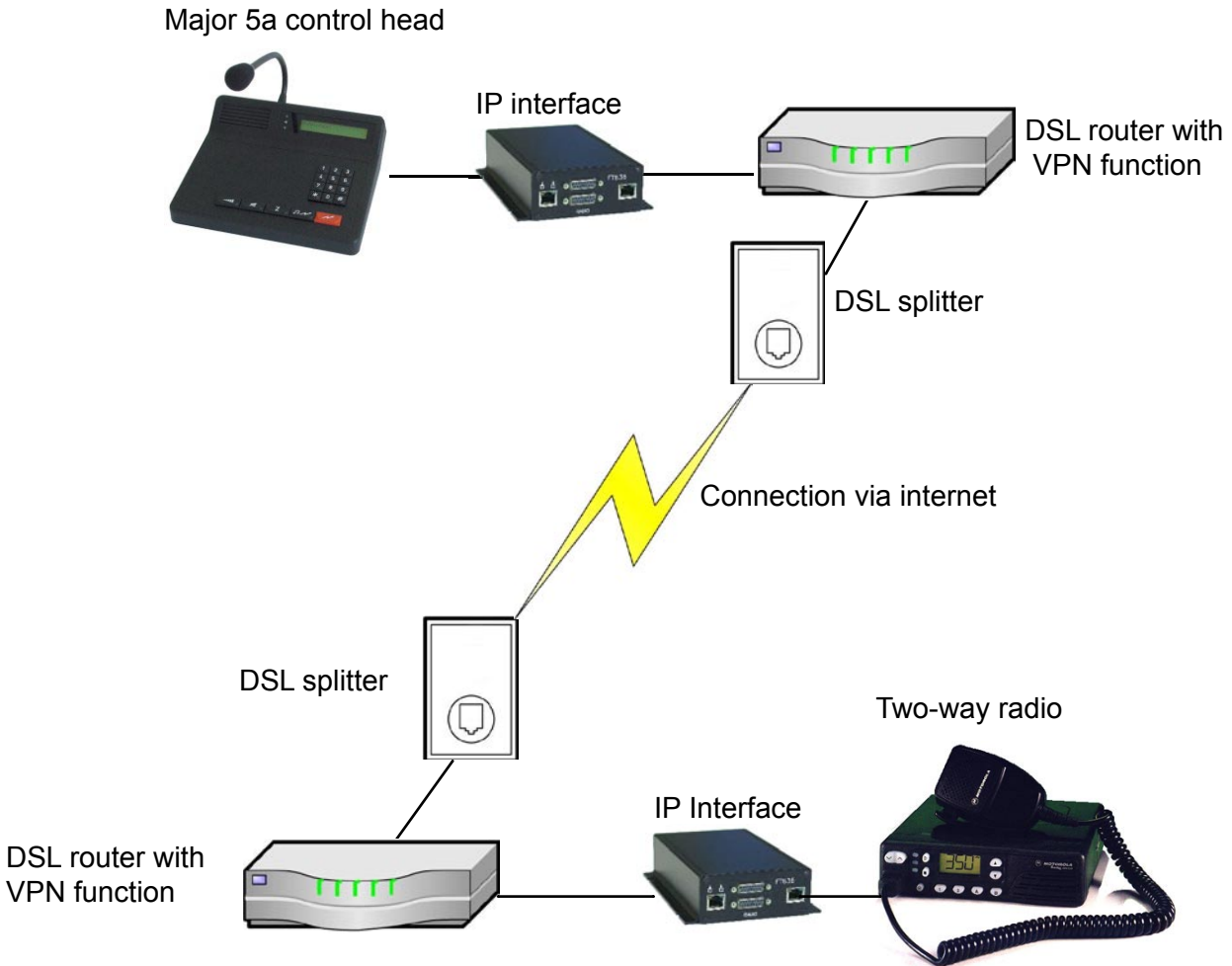
Here the networks on both sides need different IP addresses, they do not see anything of the settings of the internet connection, the routers sort this out among themselves. The IP addresses on the DSL provider side are again alloted by the provider.

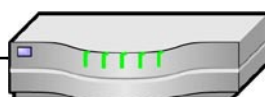A possible configuration could be:

Control head unit side

Local network
Router: 192.168.0.1
Net mask   255.255.255.0
IP Interface 192.168.0.2

DSL router

DSL provider
84.171.31.100

DSL router

DSL provider
217.88.202.39

Two-way radio side

Local network
Router: 192.168.1.1
Net mask   255.255.255.0
IP Interface 192.168.1.2

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The setting of the FT636 IP Interfaces then could be:

	Control head unit side	Two-way radio side
Local IP address	192.168.0.2	192.168.1.2
Target IP address	192.168.1.2	192.168.0.2
Net mask	255.255.255.0	255.255.255.0
Gateway	192.168.0.1	192.168.1.1

It would be too lengthy to explain in detail the router´s configuration of the VPN settings concerning the internet. There are different procedures depending on the manufacturer, although the standardized adjustment possibilities are always the same.
Details can be found in the manuals of the VPN routers.
Depending on the features these VPN routers can use fixed/static as well as dynamic, meaning varying, IP addresses of the DSL provider.
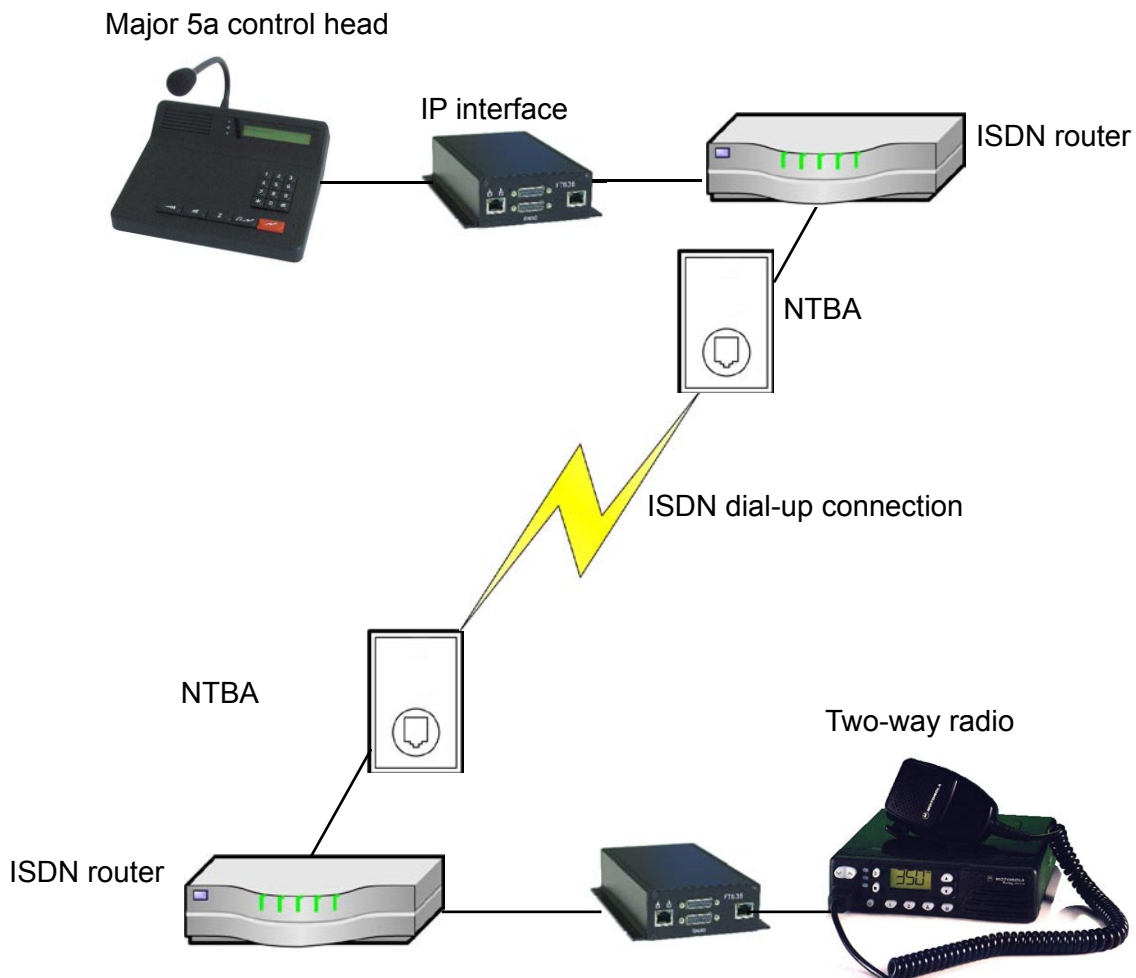**IMPORTANT:** When choosing a router, please make sure that the router is VPN suitable. As mentioned before it is favorable to use similar devices by the same manufacturer.

Connection via ISDN

At locations which have a telephone line (ISDN), but no DSL access, an ISDN router can be used. In this case the remote side can be contacted via an ISDN connection. The DSL routers in the above mentioned example can be replaced by ISDN routers. These build up a dial-up ISDN connection to each other.
A FT636 network interface needs a bandwidth of at least 96kBit/sec, channel bundling is necessary. This means that both channels of an ISDN connection have to be available for the FT636 at the same time and at full bandwidth for a single connection.

Example:I

Major 5a control head

IP interface

ISDN router

NTBA

ISDN dial-up connection

NTBA

Two-way radio

ISDN router

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Technical data

Voltage of operation	12 V
Current demand	ca. 300 mA
Weight	ca. 525 g
Dimensions W x H x D	104 x 44 x 175 mm
Input impedance radio	600 Ohm
Output impedance radio	600 Ohm
Output level radio	-30 ... +3 dBm, ex factory -10 dBm
Input level radio	-22 ... +4 dBm, ex factory -17 dBm
AF transmission	PCM, 8Bit, 64kBit/s, A-Law, G.711

Ordering information

Order no.	Description
636000	FT636 Network Interface
636010	FT636 Network Interface 19"

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Revision remarks

Modifications made are only mentioned in note form in this section. For detailed information please read the corresponding chapters.

30.04.2009	-	New configuration interface
04.05.2009	-	Adjustment instruction complemented
25.05.2009	-	Cable description FT636 <--> Major
02.06.2009	-	Register configuration for 2-wire-connection
14.06.2009	-	Potentiometer configuration complemented (through-connection AF)
26.06.2009	-	Web interface changed to the latest version
30.06.2009	-	Configuration 2-wire-connection inserted
02.07.2009	-	2-wire-connection inserted
30.07.2009	-	Cable allocation Kabelbelgung Major / Radio to FT636 revised
	-	Ports for UDP and TCP exactly specified
20.11.2009	-	Addition page normal standard operation with connection information
	-	Potentiometer adjustment revised
	-	2-wire operation revised
03.11.2010	-	From PIC SW Ver. 1.02 on, Application Version V01.40 03.11.2010
	-	Completion relay operation
	-	Completion IP address
	-	Completion AF-PTT Vol
21.06.2011	-	Additional descriptions to configuration
21.10.2013	-	Examples for controlling the digital I/Os