FTM-100D: FM / C4FM

DL5MCC
01.10.2017

FTM-100D

Technische Daten

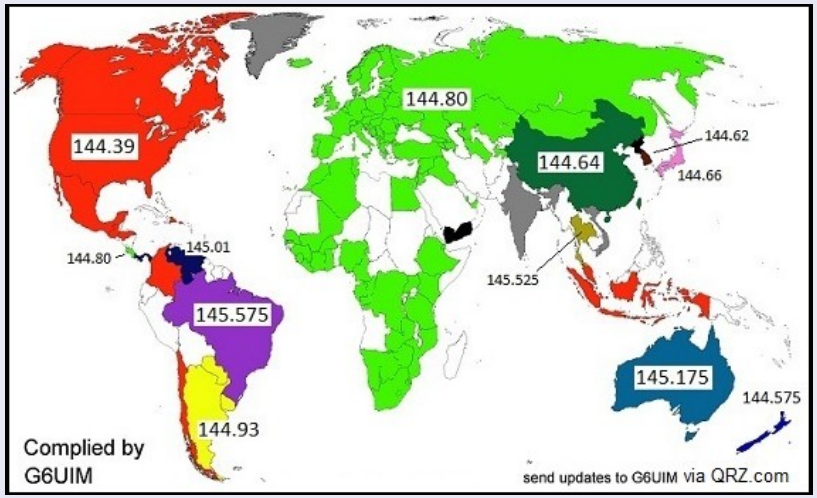
- Technical Specification
  - 50 W/ 20 W/ 5 W PWR
  - **C4FM**/FM Digital 12.5 kHz BW
  - V/D, Voice FR, Data FR Mode and Analog FM
  - AMS (Automatic Mode Select)
  - GPS Receiver
  - DSQ (Digital Squelch Code) Signaling Feature
  - 1200 bps / 9600 bps **APRS**
  - Receive for 108 - 999.99 MHz
  - 1004 Memory Channels
  - 3 different Range-Scans per VFO (A/B)

- Frequency Ranges:
  RX 108 - 137 MHz (Air Band)
  137 - 174 MHz (144MHz HAM)
  174 - 400 MHz
  400 - 480 MHz (430MHz HAM)
  480 - 999.99 MHz
  TX 144 - 146 MHz und
  430 - 440 MHz

APRS-Receiver

APRS

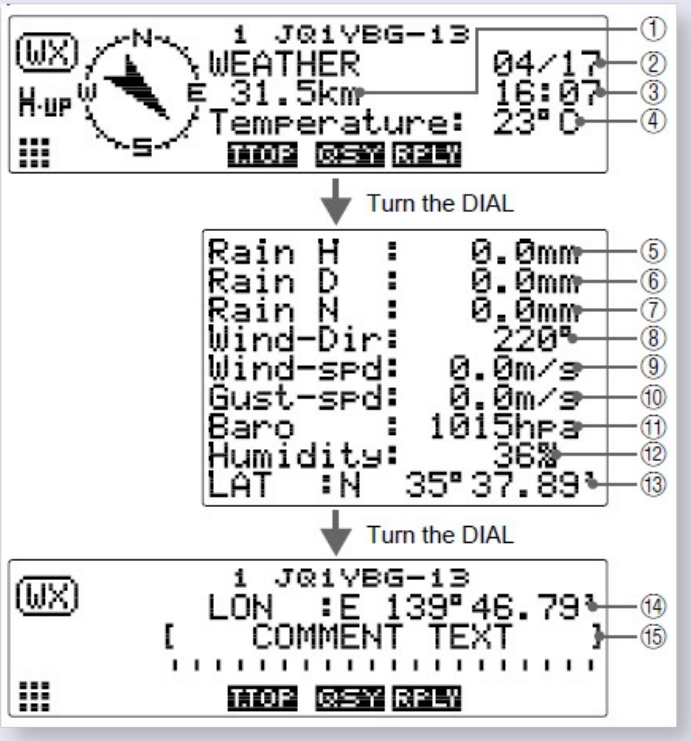
APRS is a digital communications information channel for Ham radio. As a single national channel (see map at right), it gives the mobile ham a place to monitor in any area, at any time to capture what is happening in ham radio in the surrounding area.
Announcements, Bulletins, Messages, Alerts, Weather, and of course a map of all this activity including objects, frequencies, satellites, nets, meetings, Hamfests, etc.



The APRS network has grown to most countries with strong Amateur Radio populations.

APRS - FTM-100 Display

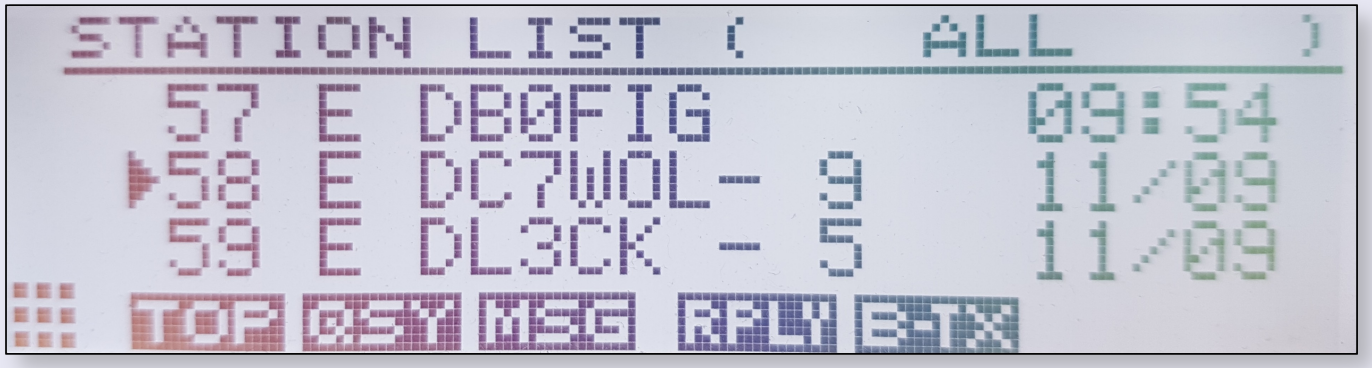
WX:



Display		Explanation
E	Mic-E	This is displayed when the beacon of a microphone encoder station is received.
P	Position	This is displayed when the beacon of a fixed station (FIXED) or moving station (MOVING) is received.
p	Position	This is displayed when the beacon of a fixed station (fixed) or moving station (moving) is received (compressed type).
W	Weather report	This is displayed when the beacon of a weather station is received.
w	Weather report	This is displayed when the beacon of a weather station is received (compressed type).
O	Object	This is displayed when the beacon of an object station is received.
o	Object	This is displayed when the beacon of an object station is received (compressed type).
I	Item	This is displayed when the beacon of an item station is received.
i	Item	This is displayed when the beacon of an item station is received (compressed type).
K	Killed Object/Item	This is displayed when an object station or item station that has been deleted is received.
k	Killed Object/Item	This is displayed when an object station or item station that has been deleted is received (compressed type).
S	Status	This is displayed when the beacon of a status station is received.
G	Raw NMEA	This is displayed when the beacon of the raw NMEA data (GGA/GLL or GPRMC) station is received.
?	Other	This is displayed when a beacon that cannot be deciphered is received.
Emg	This is displayed when an emergency signal is received from a Mic-E station.	

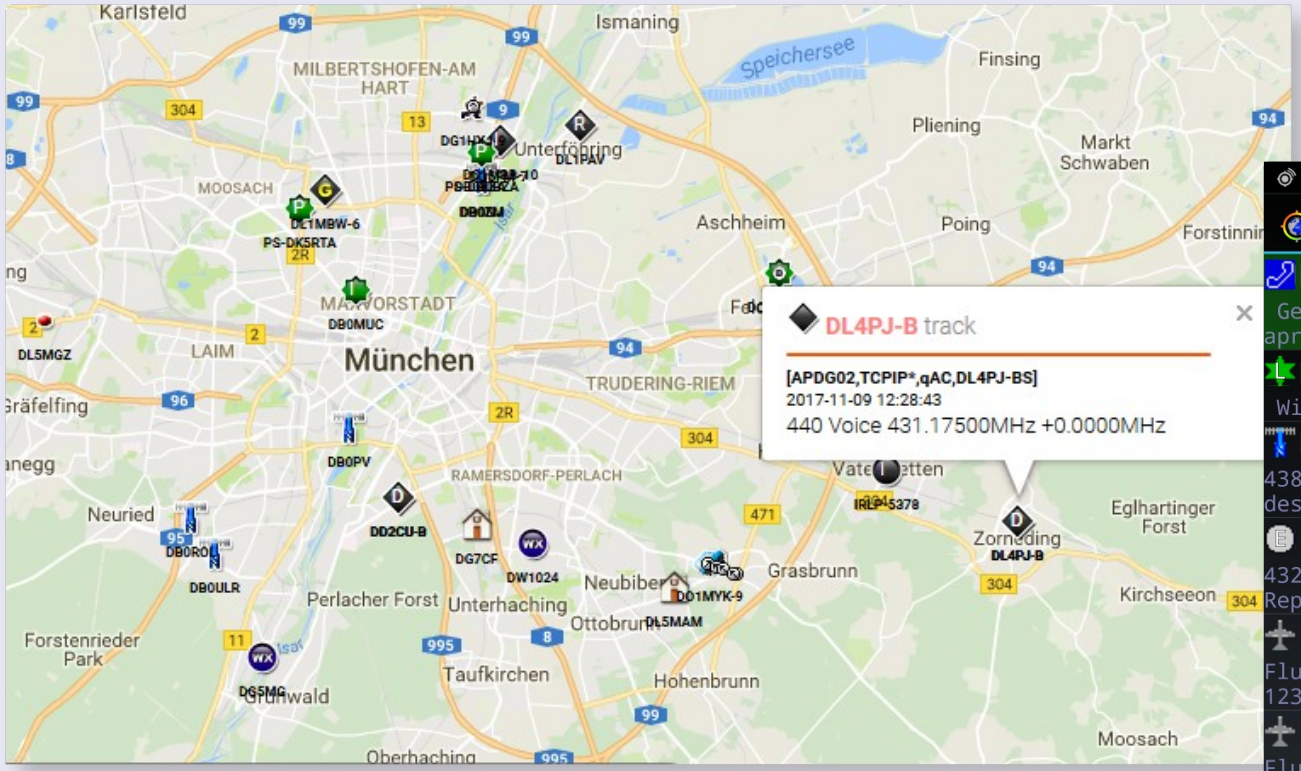
APRS - FTM100 Station List

USED SSIDs:



- 0 Your primary station usually fixed and message capable
- 1 .. .4 generic additional station, digi, mobile, wx, etc
- 5 Other networks (Dstar, Iphones, Androids, Blackberry's etc)
- 6 Special activity, Satellite ops, camping or 6 meters, etc
- 7 walkie talkies, HT's or other human portable
- 8 boats, sailboats, RV's or second main mobile
- 9 Primary Mobile (usually message capable)
- 10 internet, Igates, echolink, winlink, AVRS, APRN, etc
- 11 balloons, aircraft, spacecraft, etc
- 12 APRStt, DTMF, RFID, devices, one-way trackers*, etc
- 13 Weather stations
- 14 Truckers or generally full time drivers
- 15 generic additional station, digi, mobile, wx, etc

APRS - weitere Infos



http://www.openaprs.net/
http://aprs.org/

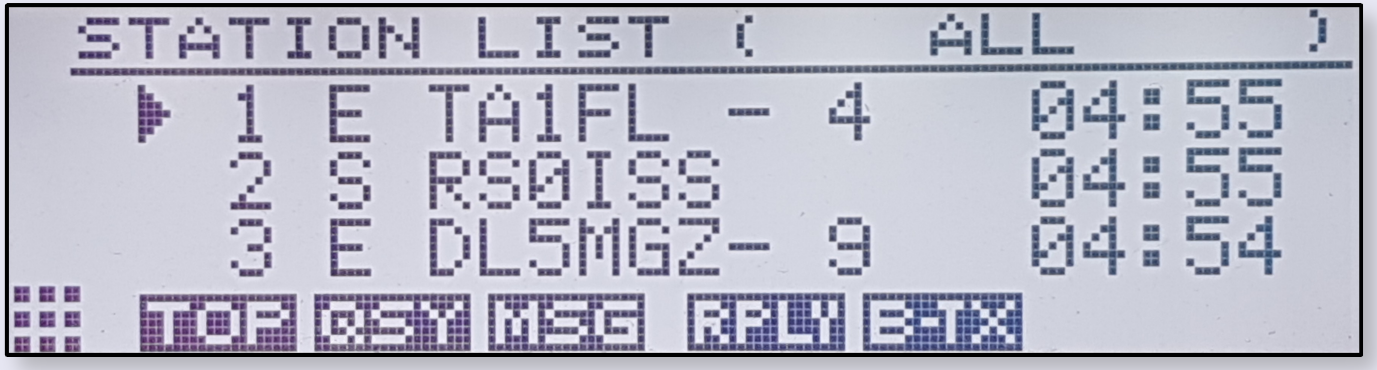
https://aprsdroid.org/

APRS via ISS

APRS Betrieb kann man auch über Satelliten und sogar über die Internationale Raumstation ISS machen. Das funktioniert auch mit einfachen Rundstrahlantennen. APRS Pakete werden von der ISS digipeated und von sogenannten SGates (Satellite gateways) gehört und ins Internet weitergeleitet. Um den 50. Breitengrad herum ergeben sich täglich bis zu sieben brauchbare Überflüge.

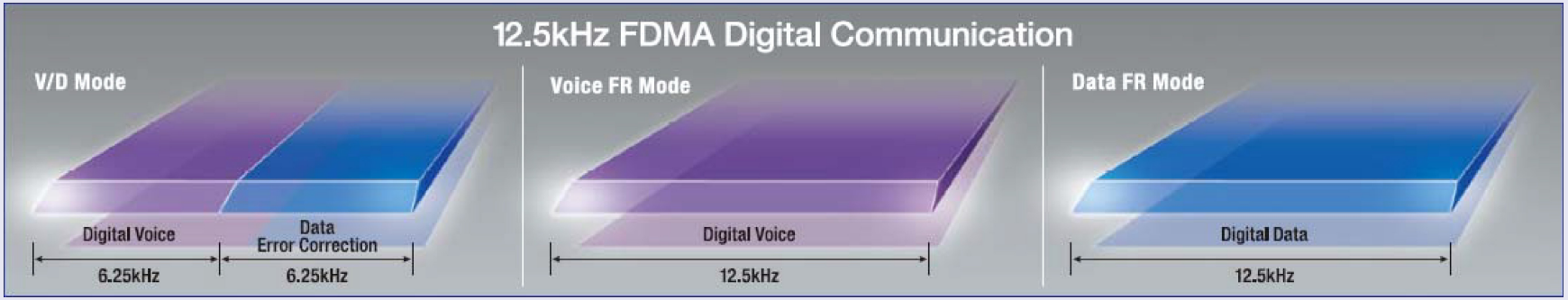
http://wiki.oevsv.at/index.php/APRS_via_ISS

Sendebetrieb über ISS mit FTM100 nicht unterstützt! (Path = ARISS)



C4FM

C4FM



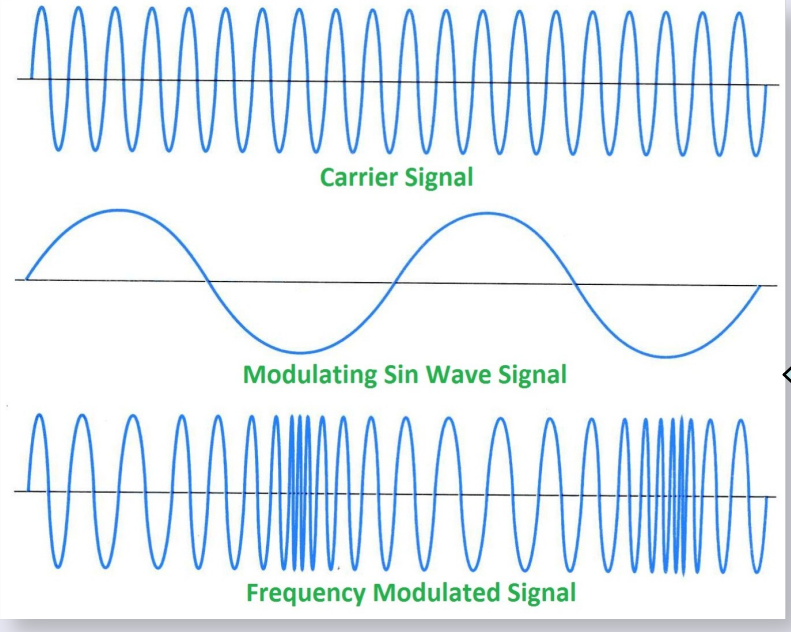
C4FM ist **digitale Sprachübertragung** im VHF/UHF Frequenzbereich

- Übertragung von **Sprache und Daten** (SMS, APRS, Control)

Modes

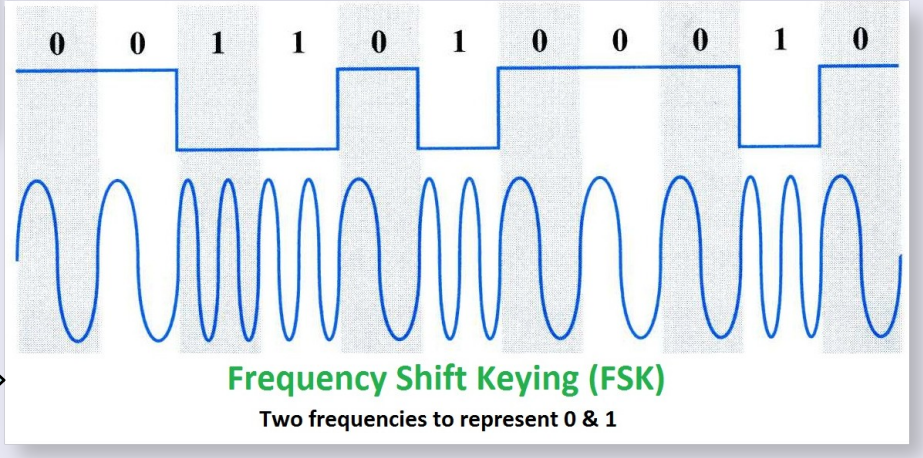
- **DN:** V/D Mode (Voice/Data Simultaneous Communication Mode)
- **VW:** Voice FR (Full Rate Voice Mode)
- Data FR (Full Rate Data)
- FM (Analog FM Mode)

Grundlagen - digitale Modulation



FM: Die Frequenz des Trägersignals folgt kontinuierlich der Spannung des analogen Signals (Sprache)

2-FSK: Die Frequenz des Trägersignals wird zwischen zwei diskreten Werten umgetastet (Daten)



http://ironbark.xtelco.com.au/subjects/DC/lectures/7

Grundlagen - DMR Modulation 4FSK

Dibit	Symbol	Frequency Deviations
00	+1	+900 Hz
01	+3	+2700 Hz
10	-1	-900 Hz
11	-3	-2700 Hz

<= C4FM

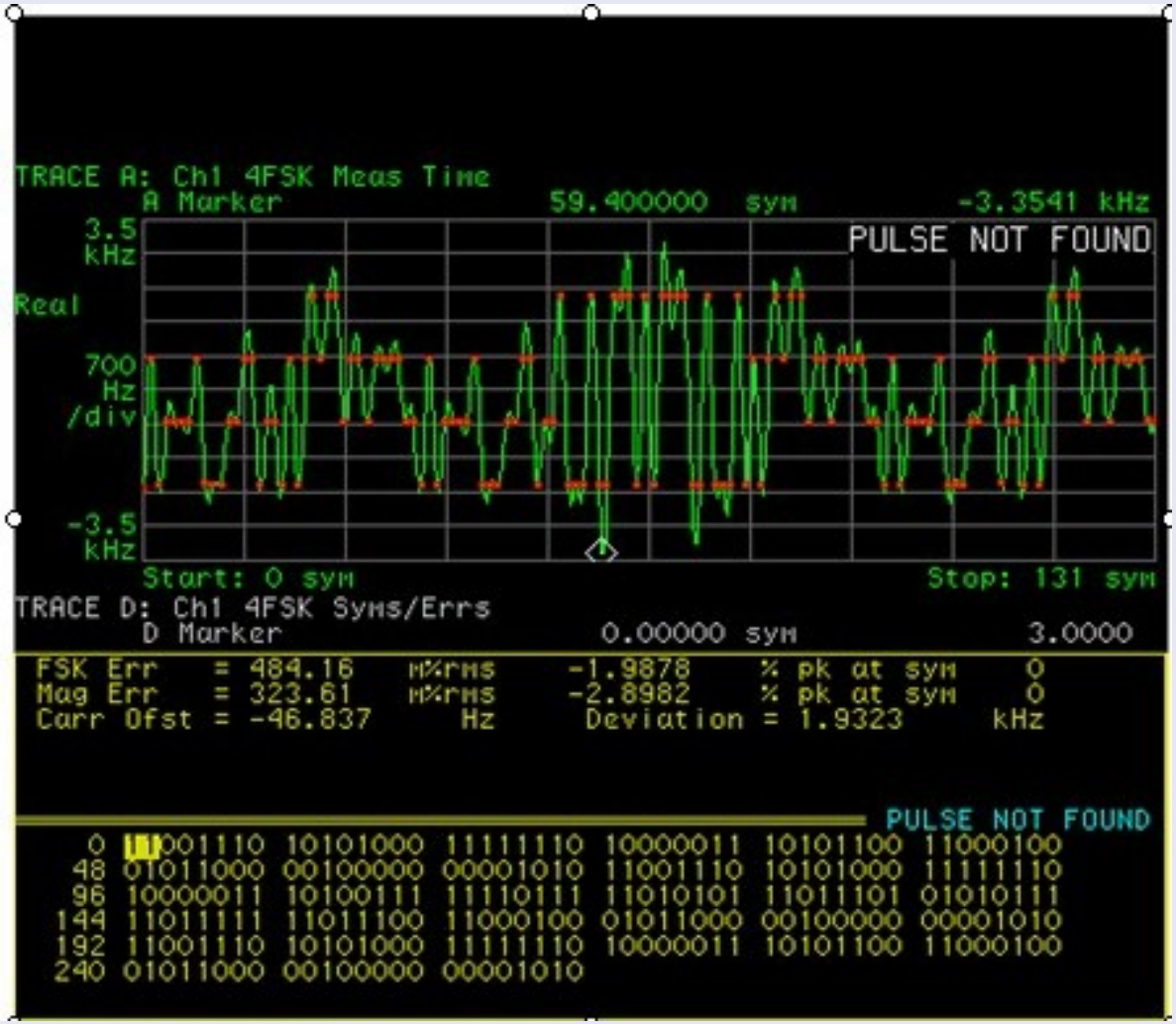
zum Vergleich:
DMR =>

Information bits		Symbol	4FSK deviation
Bit 1	Bit 0		
0	1	+3	+1,944 kHz
0	0	+1	+0,648 kHz
1	0	-1	-0,648 kHz
1	1	-3	-1,944 kHz

C4FM Modulationsverfahren und Bitrate:

- **4 FSK** mit 4800 symbols/sec. ➔ 2 Bit pro Symbol ➔
- **9,6 kbps** Brutto
- Funkschnittstelle und Protokoll nach Yaesu-Spezifikation

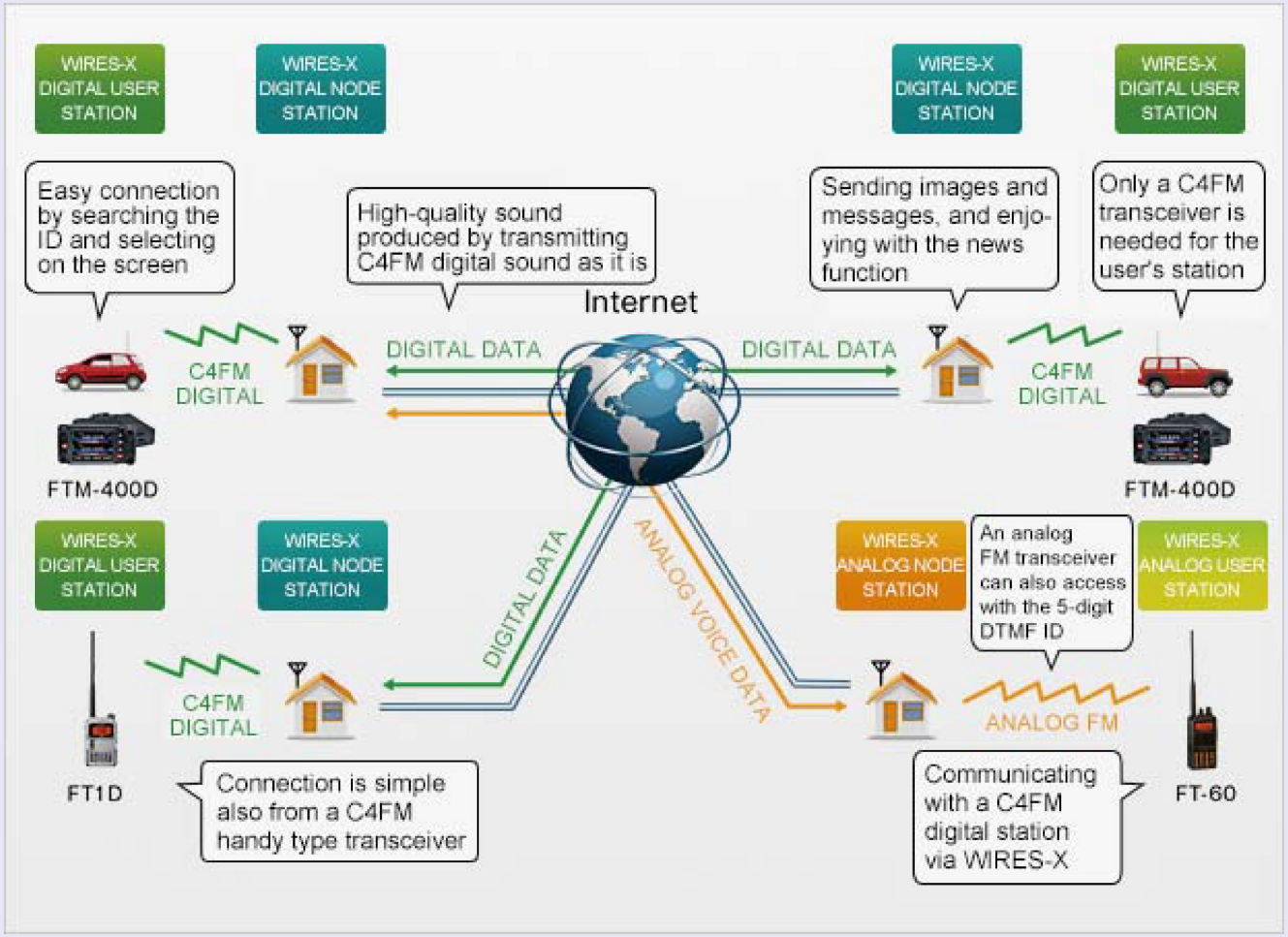
Grundlagen - 4FSK Modulation



Wires-X

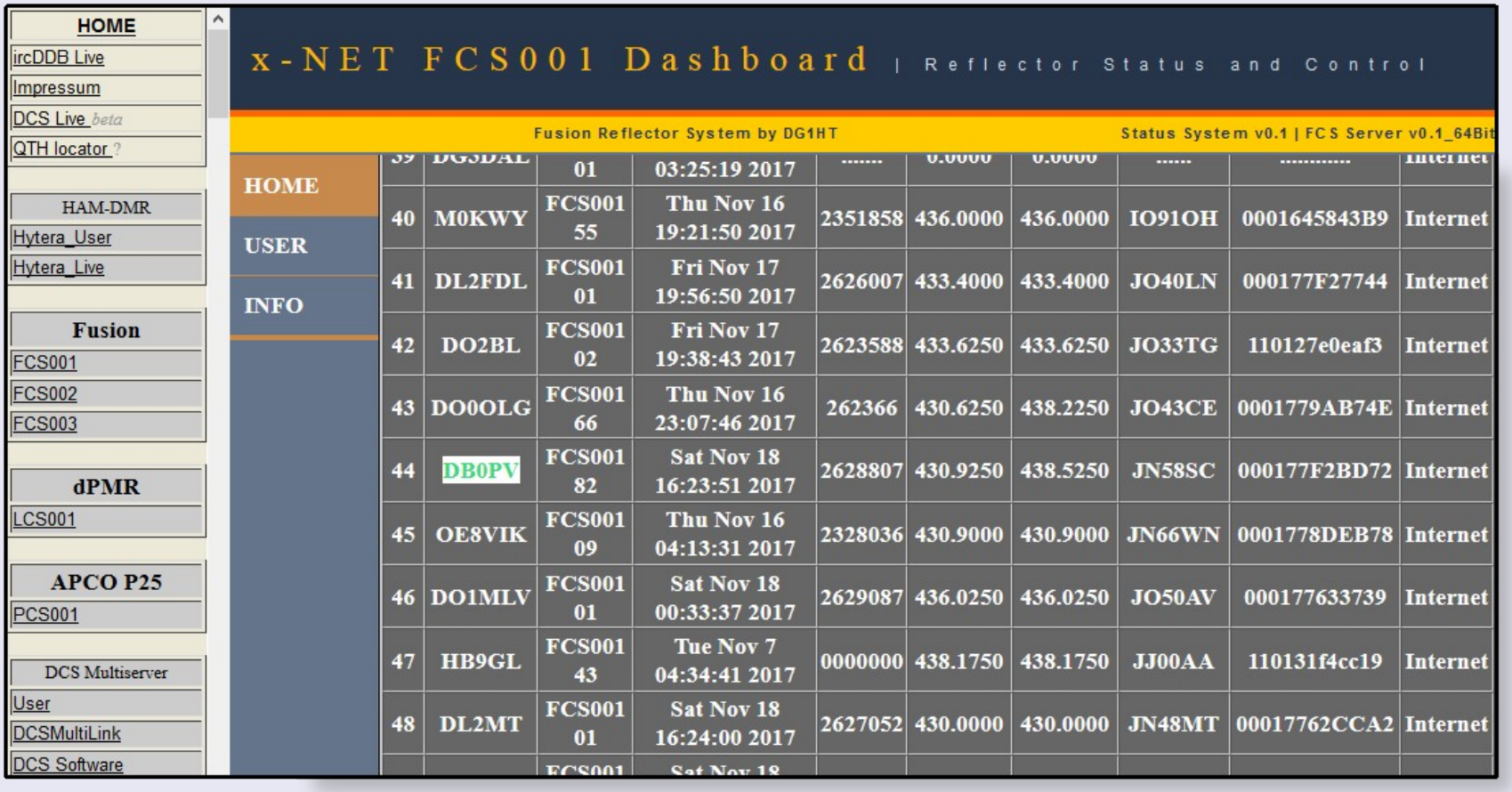
Wires-X Network:

X-Taste am TRX führt in Menü
=> DB0BZA



X-Reflektor Netz

http://xreflector.net DTMF-Steuerung(„A001“ = DL) => DB0PV



39	DG3DAL	01	03:25:19 2017	.....	0.0000	0.0000	.....	.....	Internet
40	M0KWY	FCS00155	Thu Nov 16 19:21:50 2017	2351858	436.0000	436.0000	IO91OH	0001645843B9	Internet
41	DL2FDL	FCS00101	Fri Nov 17 19:56:50 2017	2626007	433.4000	433.4000	JO40LN	000177F27744	Internet
42	DO2BL	FCS00102	Fri Nov 17 19:38:43 2017	2623588	433.6250	433.6250	JO33TG	110127e0eaf3	Internet
43	DO0OLG	FCS00166	Thu Nov 16 23:07:46 2017	262366	430.6250	438.2250	JO43CE	0001779AB74E	Internet
44	DB0PV	FCS00182	Sat Nov 18 16:23:51 2017	2628807	430.9250	438.5250	JN58SC	000177F2BD72	Internet
45	OE8VIK	FCS00109	Thu Nov 16 04:13:31 2017	2328036	430.9000	430.9000	JN66WN	0001778DEB78	Internet
46	DO1MLV	FCS00101	Sat Nov 18 00:33:37 2017	2629087	436.0250	436.0250	JO50AV	000177633739	Internet
47	HB9GL	FCS00143	Tue Nov 7 04:34:41 2017	0000000	438.1750	438.1750	JJ00AA	110131f4cc19	Internet
48	DL2MT	FCS00101	Sat Nov 18 16:24:00 2017	2627052	430.0000	430.0000	JN48MT	00017762CCA2	Internet
		FCS001	Sat Nov 18						

Workshops

- 11.12.2017 Mohr-Villa, New-Comer Treff