VHF Cathode Ray Direction Finder Equipments

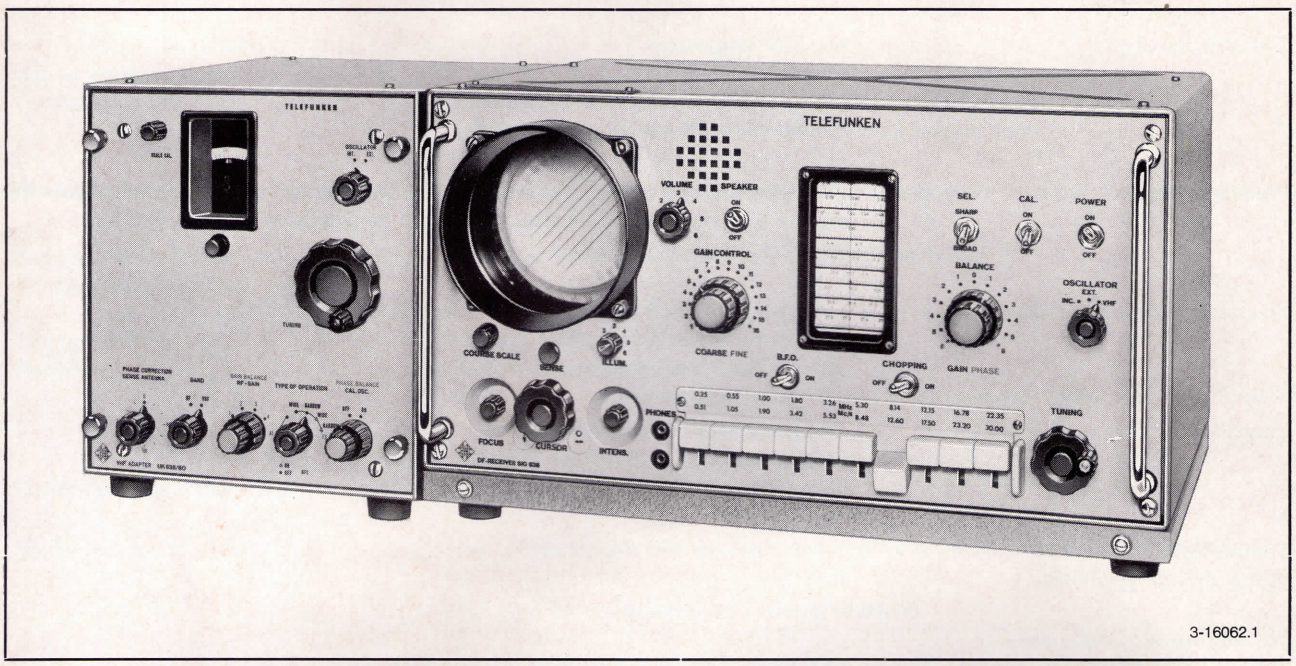
with Cathode Ray DF Receiver TELEGON IV as principal unit

PST 638-U/80	**20 to 80 MHz**
PST 638-U/180	**60 to 180 MHz**
PST 638-U/20-180	**20 to 180 MHz**

TELEFUNKEN

Leaflet

IB 602 E



VHF Accessory Unit UK 638/80 (left) and Main DF Receiver Unit SiG 638/2 (right)

General Remarks

VHF DF accessory units and VHF DF antenna systems for the HF Cathode Ray DF Receiver SiG 638/2 (TELEGON IV) are at present being prepared for delivery by Messrs. AEG-TELEFUNKEN. These units are designed to cover a frequency range from 20 to 180 MHz. This complete frequency range is subdivided into two subranges, from 20 to 80 MHz and from 60 to 180 MHz respectively. A separate DF accessory unit is provided for each of these subranges. A range switch is required in addition if both DF accessory units are to be used ahead of the DF Receiver SiG 638/2.

The VHF DF antenna system is an H-Adcock having two antenna planes mutually displaced through 90°. Each antenna plane contains parallel-connected dipole pairs which are arranged diagonally with respect to each other, so that the complete antenna system consists of eight vertical dipoles. The DF antenna system for the range from 20 to 80 MHz uses a base of 1.4 m, whereas that for the range from 60 to 180 MHz uses a base of 0.83 m. The sense antenna rod is in each case arranged centrally with respect to the upper dipole halves.

Applications

The VHF Cathode Ray DF Equipment PST 638-U is suitable as VHF DF equipment and for omnidirectional VHF reception, in the frequency range from 20 to 80 MHz or 60 to 180 MHz, or from 20 to 180 MHz with both ranges combined. The DF bearing indication and quadrant display for sense determination are given on the cathode ray tube of the DF Receiver SiG 638/2 (TELEGON IV). The equipment is suitable for DF and omnidirectional reception of amplitude modulated and frequency modulated transmissions.

A ferrite HF DF antenna or an HF U-Adcock antenna system with Adcock accessory unit can be connected additionally to the VHF DF accessory unit. DF and omnidirectional reception is then additionally possible in the HF range.

Technical Data

(VHF Accessory Units UK 638/80 with VHF DF Antenna A 638/80, and UK 638/180 with A 638/180)

Frequency Range:	20 to 80 MHz for Type UK 638/80 60 to 180 MHz for Type UK 638/180
Types of Reception:	AM with AFC AM without AFC FM, broad, without AFC FM, sharp, without AFC FM, broad, with AFC FM, sharp, with AFC
Types of Service:	A1 CW telegraphy A2 MCW telegraphy A3 telephony, amplitude-modulated F3 telephony, frequency-modulated
Frequency Scale:	vertical spiral scale, total length about 2 m with 6.5 turns, with follow-up covering mask and floodlit read-off marker which can be displaced through ± 3 mm for calibration adjustments
Frequency Scale Resolution:	1 mm scale rotation corresponds to a mean frequency change of: 55 kHz for Type UK 638/80 160 kHz for Type UK 638/180
Sensitivity:	measured after the chopper stage, better than 10 kT_o (10 dB) for Type UK 638/80 better than 15 kT_o (12 dB) for Type UK 638/180
Intermediate Frequency of the VHF DF Channels:	10.7 MHz
1st. Intermediate Frequency of the F3 Aural Channel:	10.7 MHz
2nd. Intermediate Frequency of the F3 Aural Channel:	10.175 MHz
Bandwidth:	a) about ± 50 kHz (for 3 dB down) b) about ±5.5 kHz (for 3 dB down)
Image Frequency Rejection:	≧ 60 dB for Type UK 638/80 ≧ 40 dB for Type UK 638/180
RF Gain Control Range:	about 21 dB, in three fixed-value steps each giving a control factor of $\sqrt{5}$ (7 dB)
Gain Matching Factor:	1 : 4 (12 dB)
Phase Control Range in the DF Channels:	± 80°
Phase Control Range in the Sense Antenna Channel:	continuous from 0 to 360°, latching at 0°
RF Inputs from the Antennas:	a) 3 × 60 Ω, coaxial (VHF DF antenna) b) 3 × 120 Ω, balanced (MF/HF DF antenna)

RF Outputs to DF Receiver SiG 638/2:

3 × 120 Ω, balanced, 10.7 MHz for VHF operation
or 250 kHz to 30 MHz for MF/HF operation

VHF Oscillator Outputs:

for Type UK 638/80:
a) 30.7 to 90.7 MHz, 60 mV across 60 Ω, for frequency indicator or other purposes
b) 30.7 to 90.7 MHz, ≧ 2 mV across 60 Ω, for special purposes
for Type UK 638/180:
a) 35.35 to 95.35 MHz, 60 mV across 60 Ω, for frequency indicator or other purposes
b) 70.7 to 190.7 MHz, ≧ 2 mV across 60 Ω, for special purposes

External Oscillator Input:

60 mV across 60 Ω
30.7 to 90.7 MHz for Type UK 638/80
70.7 to 190.7 MHz for Type UK 638/180

RF Output for Back-Mixing Signal Voltage to DF Receiver SiG 638/2:

a) 10.175 MHz, crystal-controlled, for A1 to A3 service types
b) 10.175 MHz, frequency-modulated, for F3 service type

IF Output "broad":

10.7 MHz ± 1 MHz, for VHF panorama accessory unit or other purposes

IF Input "sharp" from DF Receiver SiG 638/2:

525 kHz, for AFC function on A1 to A3 service types

Voltage and Current Requirements:

+ 24 V, about 200 mA
+ 14 V (stabilised), about 65 mA
both voltages are provided by the power supply section in the main DF Receiver Unit SiG 638/2

Equipment Accuracy:

better than ± 2°

DF Sensitivity:

the following field strengths are required for a signal/noise ratio of 3 : 1

for Type UK 638/80 with DF Antenna A 638/80:

Service Type	A1	F3	F3
Bandwidth	–	sharp	broad
Deviation	–	± 5 kHz	± 15 kHz
Modulation	–	voice	voice
20 MHz	7.0 µV/m	13 µV/m	16.0 µV/m
50 MHz	1.5 µV/m	3 µV/m	3.5 µV/m
80 MHz	1.4 µV/m	3 µV/m	3.8 µV/m

for Type UK 638/180 with DF Antenna A 638/180:

Service Type	A1	F3	F3
Bandwidth	–	sharp	broad
Deviation	–	± 5 kHz	± 15 kHz
Modulation	–	voice	voice
60 MHz	7.0 µV/m	13.0 µV/m	16.0 µV/m
100 MHz	1.6 µV/m	3.5 µV/m	4.5 µV/m
180 MHz	1.8 µV/m	3.5 µV/m	4.5 µV/m

Voice-modulated F3 transmissions can also be observed in the equipment operating mode A1 to A3 for taking DF bearings, if the voice modulation contains sufficiently long and frequent breaks.

Antenna System Errors					
for Type A 638/80:	MHz:	20	50	80	
	degrees:	0	0.3	1	
for Type A 638/180:	MHz:	60	100	140	180
	degrees:	0	0.2	0.5	1

The system error is azimuth- and frequency-dependent. The error pattern over the full bearing circle has approximately eights-circle symmetry and can be compiled in the form of correction curves for graded frequencies.

RF Cables between VHF DF Antenna and VHF Accessory Unit: 3 cables, 60 Ω coaxial with special shielding, Type: 1.5/6.5 LDD

RF Cable Lengths:

a) standard version 9 m, permanently attached to the antenna crosshead
b) additional RF cables fitted with plugs, maximum length 36 m, for removed DF antenna system

Antenna Version	**A 638/80 (20 to 80 MHz)**	**A 638/180 (60 to 180 MHz)**
Number of Dipoles:	8	8
Length of Dipoles:	1.4 m	0.84 m
Diameter of Dipoles:	40 mm	40 mm
Dipole Base:	1.4 m	0.83 m
Length of Sense Antenna Rod:	1.2 m	0.67 m
Length of one Dipole Half:	0.67 m	0.39 m

Distance from lower edge of fixing flange to center of dipole arm: 106 mm

Fixing Flange
outer diameter: 130 mm
hole circle diameter: 110 mm (6 × 60°)
hole: 9.5 mm

For technical data of the main DF Receiver Unit SiG 638/2 (TELEGON IV), see IB 423 E and KB 016/1 E.

Dimensions and Weights

	Height mm	Width mm	Depth mm	Weight approx. kg
VHF Accessory Unit UK 638/80				
or UK 638/180	294	270	440	9
overall dimensions	314	274	495	
DF Receiver Unit SiG 638/2	261	511	441.5	34.5
with support base	294			36
overall dimensions	314		495	
VHF DF Antenna A 638/80				
without supporting shaft	2007	1460	1460	30
VHF DF Antenna A 638/180				
without supporting shaft	1195	890	890	26
Range Switch BU 638	120	270	320	3
overall dimensions	140		360	

Further details are given in our Description KB 076 E

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