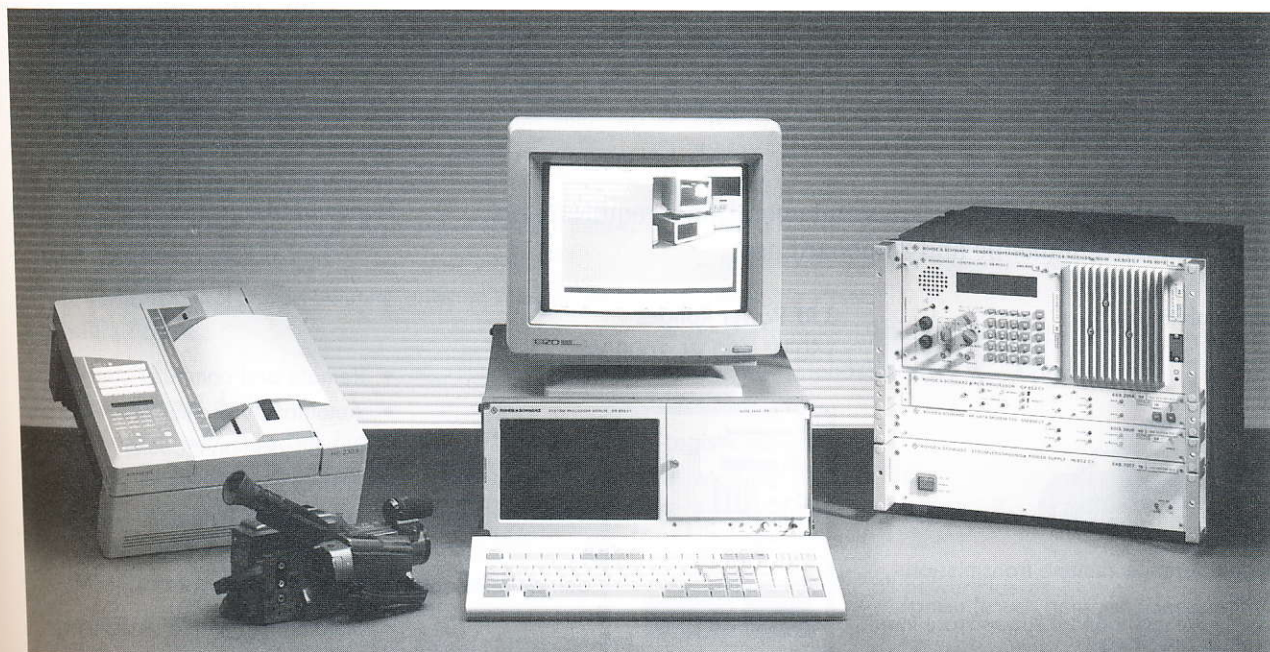


Shortwave Radio Equipment Family HF850 – Overview



Superior RF characteristics pave the way for broad application of the HF850 Radio Equipment Family in existing or newly created shortwave radio networks. Modular design throughout and special constructional features ensure high MTBF (Photo 40321)

In the HF850 Radio Equipment Family Rohde & Schwarz continues its long tradition in the field of shortwave equipment using all available know-how and development potential. The HF850 series includes receivers and transceivers for both mobile and stationary use with transmitting power of 150 W, 400 W and 1000 W

Shortwaves from Rohde & Schwarz

The HF850 family comprises transmitting/receiving systems for mobile/stationary use with transmitter output powers of 150 W, 400 W and 1000 W, a communication receiver for duplex systems as well as an intelligent communication and monitoring receiver with a great variety of operational features. The equipment family is not only characterized by a common design (eg control panel), but is also made up of identical modules.

Moreover, an optimum equipment configuration to meet different operational requirements is ensured by a variety of options and alternatives, such as ALIS (automatic link setup), ISB modem (also high-speed data transmission to LINK 11), ARQ (automatic repeat request), fast data transmission (2700 bits/s), FEC (forward error correction) and frequency hopping (FH).

Basic unit

All HF transceivers of the HF850 family are designed for reception in the frequency range 0.4 to 30 MHz (or

receivers from 10 kHz to 30 MHz) and for transmission in the range 1.5 to 30 MHz. The frequency can be set in smallest increments of 10 Hz. Up to 100 frequencies (in halfduplex mode separate transmit and receive frequencies) can be stored in a nonvolatile channel memory.

The built-in test equipment continuously monitors all major functions of the transmitting/receiving system and indicates the current operating status on the control unit. If a fault occurs, which is indicated by a CM (continuous monitoring) message, a test routine can be triggered for localizing the defective module. Since the electrically and mechanically exactly defined modules are factory-adjusted within specified tolerances, they can be replaced without any need for readjustment. This, coupled with rapid replacement of the modules, makes for

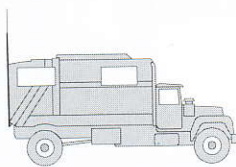
minimum repair times. Special constructional measures reduce heat generation and enable 24-hour continuous operation. Densely integrated components and the low self-heating ensure a MTBF of more than 4000

hours for the HF transceivers. Very high MTBF and rapid localization and replacement of defective modules result in an extremely high availability for the user.

This section provides an overview of the main members of the HF850 family. The range of applications is further enhanced by a great variety of add-on units.

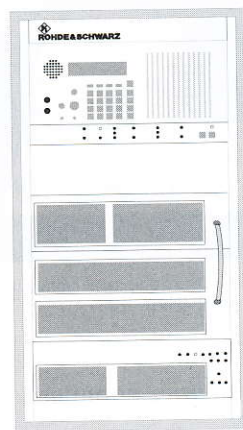
HF850 equipment characteristics and operational requirements in stationary, landmobile and shipboard use

Landmobile use



- Interference-immune transmission (frequency hopping, burst) using ALIS processor
- Transmission and reception while on the move
- Single or three-phase connection for line power
- High efficiency
- Low weight and small dimensions
- Low noise level
- Battery driven backup (emergency) operation

3 RF Power Ranges 150 W, 400 W, 1000 W



Stationary use



- Remote and computer control
- Automatic link setup with ALIS processor (add-on module)
- Error protected data transmission (ARQ, FEC) by means of add-on modules
- Duplex capability
- Automatic antenna switchover (add-on unit)

Shipboard use



- Excellent collocation characteristics
- LINK 11 capability ensured by ISB modem (add-on unit)
- Silent tuning
- Power supply in line with MIL-STD-761B
- Nonmagnetic design (option)

Application-specific transceiver models

Type	Power class	Model	Uses, special features
XK852...	150 W	...C1:	Standard model for landmobile and stationary use, 19"
		...C2:	same as C1, desktop
		...C3:	Marine model, reception from 10 kHz, silent tuning
		...H2:	f-hop capability, with double synthesizer
		...L1:	LINK 11 capability, collocation-immune, selective probe (forward and reflected), no power reduction with VSWR, otherwise same as C3
XK855...	400 W	...C1:	Standard model for mobile use with DC supply or for stationary use with AC supply
XK859...	1000 W	...C1:	Standard model for stationary or shelter applications, in 19" rack
		...H2:	f-hop capability, with double synthesizer
		...L1:	LINK 11 capability, separate RX (EK851L1) required

Essential equipment characteristics in brief

Operational

- Easy and reliable to operate thanks to integrated, intelligent control unit and uniform operating concept for all transceivers of the HF850 family
- 100 preselectable channels for complete settings with separately programmable transmit and receive frequency (half duplex operation)
- System-compatible through universal remote-control interface V.24/V.28 (RS-232-C)
- Interface for control of add-on units (antenna selector, AF matrix, etc.)

Obsolescence-proof design

- In conjunction with ALIS Link Processor GP853 suitable for automatic link setup and adaptive radio transmission methods. Add-on modules make the transceiver suitable for methods with low probability of intercept (LPI) and for ECM-resistant methods such as burst transmission and frequency hopping
- With additional modem suited for high-speed data transmission
- Flexible incorporation of receiver/exciter, amplifier and antenna tuning unit

- FSK modem for direct connection of teletype (recommended add-on)
- Integrated voice compressor
- Short-circuit- and open-circuit-proof power amplifier with FETs
- 24-h duty cycle
- Filter stage: choice of three modules
- TX/RX switchover <10 ms
- Complies with all relevant military standards such as
 - MIL-STD-461 to 463
 - MIL-STD.810C
 - MIL-STD.1399
- Power supply: 19 to 31 V_{DC} or 115/230 V_{AC} 1 phase, 230 V_{AC} 1 phase or 380 V_{AC} 3 phase

Logistic advantages

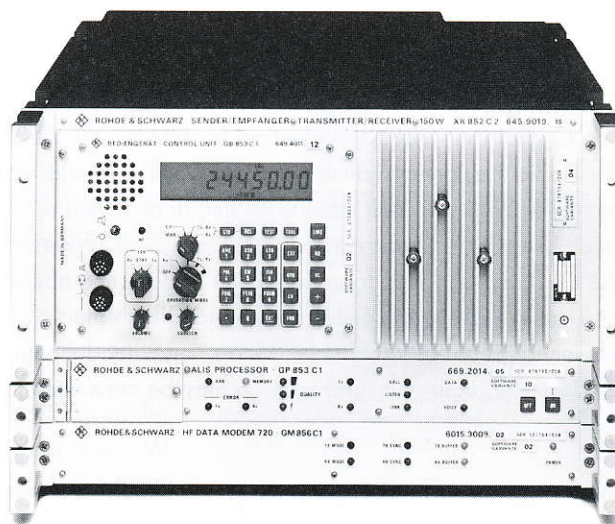
- Modular design
- Practically identical modules for all transceivers of HF850 family
- Same exciter for all power classes
- Built-in test equipment (continuous monitoring/fault location down to module level, modules replaceable without readjustment)
- High availability MTBF >4000 h (XK852)

HF850 – Product overview

150-W HF Transceiver XK852

The rugged, waterproof and dustproof construction (photo) permits use on ships and even on open vehicles in addition to stationary use. This radio system complies with the major civil and military standards. The extremely fast tuning Antenna Tuners FK852 (C1=standard, C3=marine, H2 for f-hop capability) enable the transmitter output stage to be matched to all conventional vehicle antennas and antenna systems plus silent tuning on the 100 programmable channels without any radiation of power.

The supply voltage is 19 to 31 V_{DC}. Using the AC Power Supply IN852C1 AC operation (115/230 V, single phase, with backup-battery input) is possible.



150-W HF Transceiver XK852 with ALIS Processor GB853 and Power Supply IN852 (Photo 38810)

400-W HF Transceiver XK855

The photo shows Receiver/Exciter GX855 together with ISB Modem GM853 and 400-W HF Power Amplifier VK855. The latter is a linear amplifier; all stages are designed with power FETs, ensuring high efficiency and spectral purity of the output signal.

The power supply comes in two versions:

- IN855P1 for AC supply operation (100 to 250 V_{AC})
- IN855P2 for battery operation (19 to 31 V_{DC})

Three antenna tuners are available for matching antennas to the amplifier output:

- Line Flattener FK859C1 permits operation on broadband antennas with VSWR up to 3,
- Antenna Tuning Units FK855 (C1 = standard and C3 = marine) permit matching of electrically short antennas.

1000-W HF Transceiver XK859

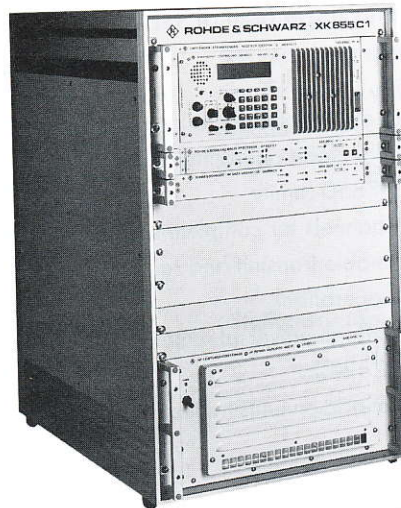
The photo shows the 1000-W transceiver XK859 in a rugged 19" rack. It consists (top to down) of the Receiver/Exciter GX859, the ALIS Link-Processor GP853 (option), space for further options, the Line Flattener FK859C1, the Linear Power Amplifier VK859 and the AC Power Supply IN859 which is available for single or three phase AC lines.

Three antenna tuners are available, the Line Flattener FK859C1, the ATUs FK859 (standard) and FK859M1 (marine).

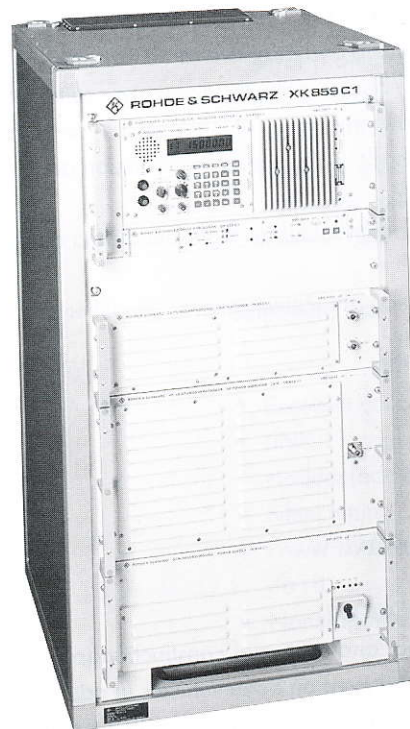
Control Unit GB853

The Control Unit GB853 is identical for all transceivers of the Radio Equipment Family HF850. Control is effected locally with the unit built into the exciter, in detached operation over short distances or via remote control. Whereas the GB853 is supplied from the exciter in detached operation, units for remote control are provided with their own power supplies. Microphone, Morse key, headphones, loudspeaker, data units and teletype may be connected to the control unit.

The remote control interface is fully compatible to CCITT V.24/V.28 RS-232-C and BUS compatible (RS-485), allowing particularly simple and direct remote control concepts to be implemented.



400-W HF Transceiver XK855 with ISB Modem GM853 (Photo 39731)



1000-W Transceiver XK859 (Photo 35172)



Control Unit GB853 for Radio Equipment Family HF850 (Photo 41205)

150-W Transceiver XK852

CW, AME, USB, LSB,
ISB, FSK, data

Uses, characteristics

Uses

The XK852 is a microprocessor-controlled HF transceiver for stationary, landmobile and shipboard use. It is used for establishing simplex or half-duplex operation in the operation modes CW, AME, USB and LSB. With the aid of add-on modules it can be easily adapted for FSK, ISB and high-speed data signals. Transmission is possible in the frequency range from 1.5 to 30 MHz, reception in the range from 400 kHz to 30 MHz. The ALIS Processor GP853 (alternative configuration) makes the XK852 suitable for adaptive EMC-resistant radio transmission methods, thus extending its range of applications.

Intelligence

The microprocessor ensures easy operation by automatically assigning the bandwidth, control time constant and BFO setting to selected operating mode. The transceiver is thus protected against incorrect operation and impermissible settings. Incorrect operation is indicated by ERROR on the display.

Interfaces

For remote control over short and long distances and computer control the transceiver is fitted with a standard data interface to CCITT V.24/V.28 (RS-232-C). This interface enables to control several transceivers from a central computer or central control unit

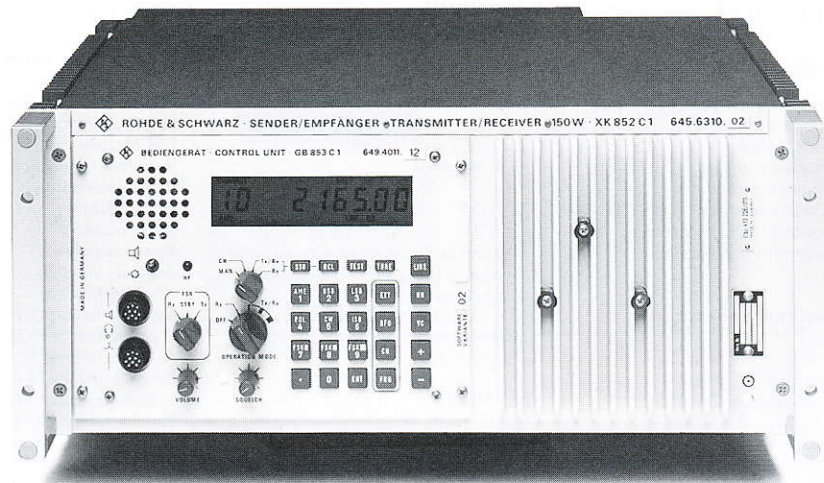


Photo 34599

as well as control of peripheral equipment. Remote control can also be performed via telephone lines or microwave links channels without any problems.

The Control Unit GB853 integrated into the XK852 is also available as a stand-alone unit. It is fitted with a standard interface V.24/V.28 (RS-232-C) and can be used for the remote control of the XK852 over any distance.

Design

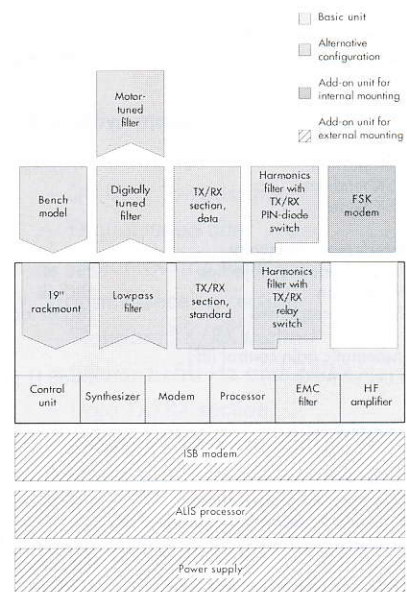
The transceiver is designed for 24-hour continuous operation. The compact design makes it suitable for use in mobile systems. Thanks to these characteristics, together with the water- and dust-protected, robust construction the receiver can also be used under adverse conditions.

Basic unit

Built-in Control Unit GB853; configured for the modes of operation CW, AME, USB and LSB; 150 W (PEP); 100 programmable channels; voice compressor; BFO; squelch; V.24/V.28 interface; BCD output for control of external units; built-in test equipment (BITE).

Alternative configurations

- Bench model
- 19" rackmount
- 30-MHz lowpass filter
- Digitally tuned TX/RX filter
- Motor-tuned TX/RX filter
- Transmitter/receiver section with standard SSB filters:
±150 Hz, 2.4 kHz
- Transmitter/receiver section with SSB filters for fast data transmission (2.4 kbits/s):
±150 Hz, 3.1 kHz



Incorporation into the basic unit is only possible for two add-on units. A third one must be ordered as stand-alone unit

Specifications XK852

Common data of transmitter and receiver

Frequency range for transmission	1.5 to 29.99999 MHz
for reception	0.4 to 29.99999 MHz
Frequency setting	in 10-Hz steps
Frequency error within one day	$\leq 3 \cdot 10^{-8}$
within rated temperature range	$\leq 3 \cdot 10^{-7}$
Programmable channels	100 (transmit and receive frequencies separately programmable for half-duplex operation)

Classes of emission

A1A (A1), J3E (A3J), upper/lower sideband, switch-selected, H3E (A3H), J7B (A7J), data transmission

Options

ISB modem GM853C1	B8E (A3B)
FSK modem GM852P1	F1B (F1) with three frequency shifts

Selectivity characteristics

Digitally tuned filter (alternative configuration)	
Frequency range	1.5 to 30 MHz
Selectivity ($\Delta f/f \geq 0.25$ in the range 12 to 30 MHz)	≥ 15 dB
Bandpass filter in the range	0.4 to 1.5 MHz
Tuning time	=20 ms
Motor-tuned filter (alternative configuration)	
Frequency range	1 to 30 MHz
Selectivity ($\Delta f/f \geq 0.1$)	≥ 40 dB, typ. 45 dB
Lowpass filter in the range	<1 MHz
Tuning time	=2 s

Transmitter data

Output power into 50 Ω with 26.5 V supply voltage)	>100 W CW, 150 W PEP -1 dB according to mismatch (no cutout)
Power reduction	

Intermodulation products (with two-tone modulation referred to PEP) with data transmission	≥ 36 dB down
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Receiver data

Antenna input	50 Ω
Max. input voltage 0.4 to 30 MHz	100 V _{EMF} into 50 Ω
Sensitivity (f = 1.5 to 30 MHz) for A1A (A1)	≤ 0.4 μ V (≤ 0.6 μ V) EMF
J3E (A3J), J7B (A7J), H3E (A3J)	≤ 0.4 μ V (≤ 1.5 μ V)

Receiving bandwidths

Class of emission	CCIR designation	3-dB bandwidth
CW	A1A, A1B	± 150 Hz
AME in RX mode	H2A, H2B, H3E	-100 to +2300 Hz
USB (and AME in RX/TX mode)	J3E, R3E	+300 to +2700 Hz -300 to -2700 Hz
LSB		
FSK narrow	F1A, F1B	± 150 Hz
FSK medium		± 150 Hz
FSK wide		± 1200 Hz

Interference immunity

Image-frequency rejection	≥ 80 dB
IF rejection	≥ 80 dB
Spurious responses	≥ 80 dB down at $\Delta f \geq 30$ kHz

Automatic gain control (RF)

Error of AGC	≤ 4 dB (1 μ V to 3 V _{EMF})
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General data

Rated temperature range	-25 to +55°C
Storage temperature range	-40 to +85°C
Protection against foreign matter and water (DIN 40 050, p. 1: IP54)	splash-proof, protected against dust deposits
Max. altitude above sea level	3000 m
Power supply	19 to 31 V _{DC} , floating input
with additional Power Supply IN852C1	115/220 V, 47 to 63 Hz (max. 550 VA)

Ordering information

HF Transceiver 150 W	XK852C1	0645.6310.xx
Recommended extras and auxiliary equipment		
Shockmount for XK852	KS852C1	0647.3018... ¹⁾
FSK Modem	GM852P2	0646.4710.02
for direct connection of teletype (to be incorporated in transceiver)		
ISB Modem	GM853C1	0648.6010... ¹⁾
ALIS Processor	GP853	0669.2014... ¹⁾
Power Supply	IN852C1	0648.7017... ¹⁾
Control Unit	GB853C1	0649.4011... ¹⁾
HF Data Modem	GM857C4	6053.1500.02
Antenna Tuning Unit, standard	FK852C1	0649.0016... ¹⁾
Shockmount for FK852C1	KS852T1	0649.3715... ¹⁾
Antenna Tuning Unit, navy	FK852C3	0703.0008... ¹⁾
Shockmount for FK852C3	KS852T3	0703.4003... ¹⁾
System Processor MERLIN	GR856C1	6006.3500... ¹⁾
Service Kit for XK852	KA852C1	0648.8513.02
Loudspeaker	GA852C7	0648.9603.02
Headphones	GA852	0648.9632.02
Handset	GA852C2	0655.5816.03
Morse key	GA852C3	0655.5839.03

Cables (specify cable length), male and female connectors

Power supply

Cable between IN852 and XK852 (compl.)	XK851Z4	0648.7017.03
Shielded cable, 2-wire		0025.0810.00
Female cable connector, 6-contact		0432.5760.00

Control of Antenna Tuning Unit FK852C1

Cable between ATU and XK852 (compl.)	XK851Z2	0647.9316.01
Shielded cable, 26-wire		0611.7765.00
Male cable connector, 26-contact		0612.7400.00
Shrink sleeve 180°		0080.2463.00
(or shrink sleeve 90°)		0070.4986.00
Female cable connector, 26-contact		0511.9296.00
Shrink sleeve 180°		0080.2463.00
(or shrink sleeve 90°)		0070.4986.00

Control of Antenna Tuning Unit FK852C3

Cable between ATU and XK852 (compl.)	XK851ZM	0703.3907.01
Shielded cable, 26-wire		0611.7765.00
Male cable connector, 26-contact		0612.7400.00
Shrink sleeve 180°		0080.2463.00
(or shrink sleeve 90°)		0070.4986.00
Female cable connector, 26-contact		0703.2117.00
Shrink sleeve 180°		0080.2463.00
(or shrink sleeve 90°)		0070.4986.00

Control of XK852 from remote Control Unit GB853

Cable between GB853 and XK852 (compl.)	XK851Z3	0647.9368.00
Shielded cable, 32-wire		0645.8664.00
Male cable connector, 32-contact (2x)		0549.8474.00
Shrink sleeve 180° (2x)		0080.2457.00
(or shrink sleeve 90° [2x])		0070.4992.00
Control of external units		0549.8439.00
Female cable connector, 32-contact		0080.2457.00
Shrink sleeve 180°		0070.4992.00
(or shrink sleeve 90°)		

RF connection between XK852 and Antenna Tuning Unit FK852

Cable	RG213C/U	0025.4580.00
Male cable connector, N crimp (2x)		0567.5973.00

RF connectors

Cable	RG58C/U	0025.2071.00
Male cable connector (BNC crimp)		0241.1378.00

AF connectors (head set, Morse key)

Male cable connector, 10-contact		0645.8270.00
Shrink sleeve 180°		0586.8245.00
(to shrink sleeve 90°)		0645.8287.00

¹⁾ On request.

400-W HF Transceiver XK855

CW, AME, USB, LSB,
ISB, FSK, data

Uses, characteristics

Uses

The XK855 is a microprocessor-controlled HF transceiver primarily designed for landmobile and ship-board use. It is suitable for establishing and maintaining simplex or half-duplex operation even under difficult conditions. The basic transceiver model featuring the operating modes CW, AME, USB and LSB can easily be adapted for FSK, ISB, fast data transmission, automatic link setup (ALIS), frequency hopping, ARQ, FEC and burst transmission by means of add-on modules.

Operation

The transceiver is operated from the Control Unit GB853 (see page 52) which is usually used for the whole HF850 family. It continuously monitors all essential operating parameters and indicates deviations from standard performance as well as incorrect entries.

Interfaces

The XK855 is fitted with a standard V.24/V.28 (RS-232-C) interface to CCITT for detached operation, remote control (via an additional control unit) or computer control.

Design

The transceiver is designed for 24-hour continuous operation. Its three-component design with separate

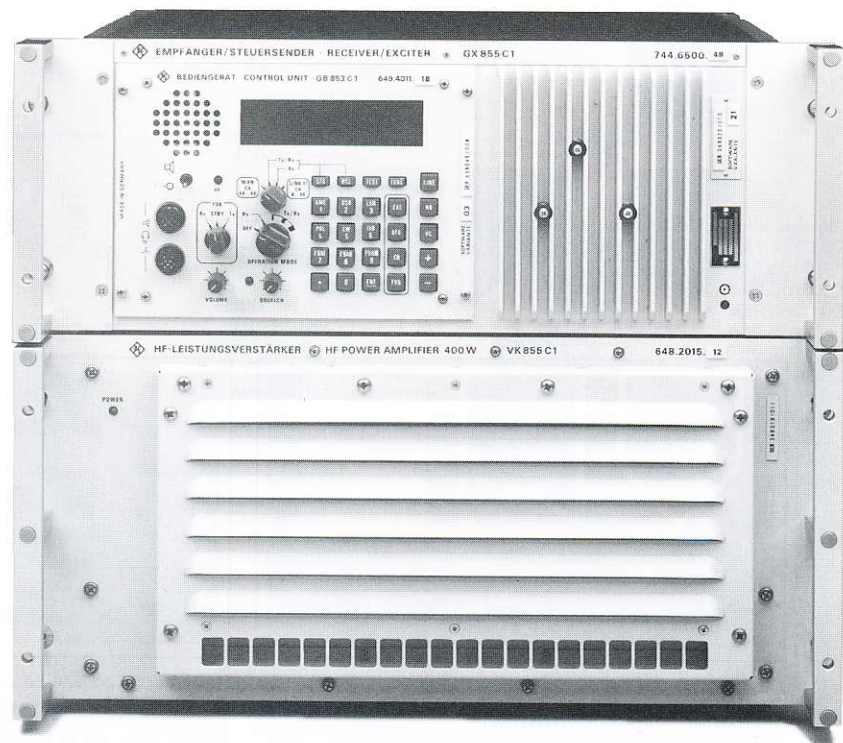


Photo 42003

receiver/exciter, amplifier and antenna tuning unit makes it ideal for use in mobile systems. The drip-proof, dust-protected and rugged design even allows the XK855 to be used under severe environmental conditions.

Basic Unit

The XK855 consists of two separate units, the Receiver/Exciter GX855 and the Amplifier VK855. Modular design which provides for a wide range of modules or options makes customized configuration possible. The table below includes the most important standard versions and relevant order numbers.

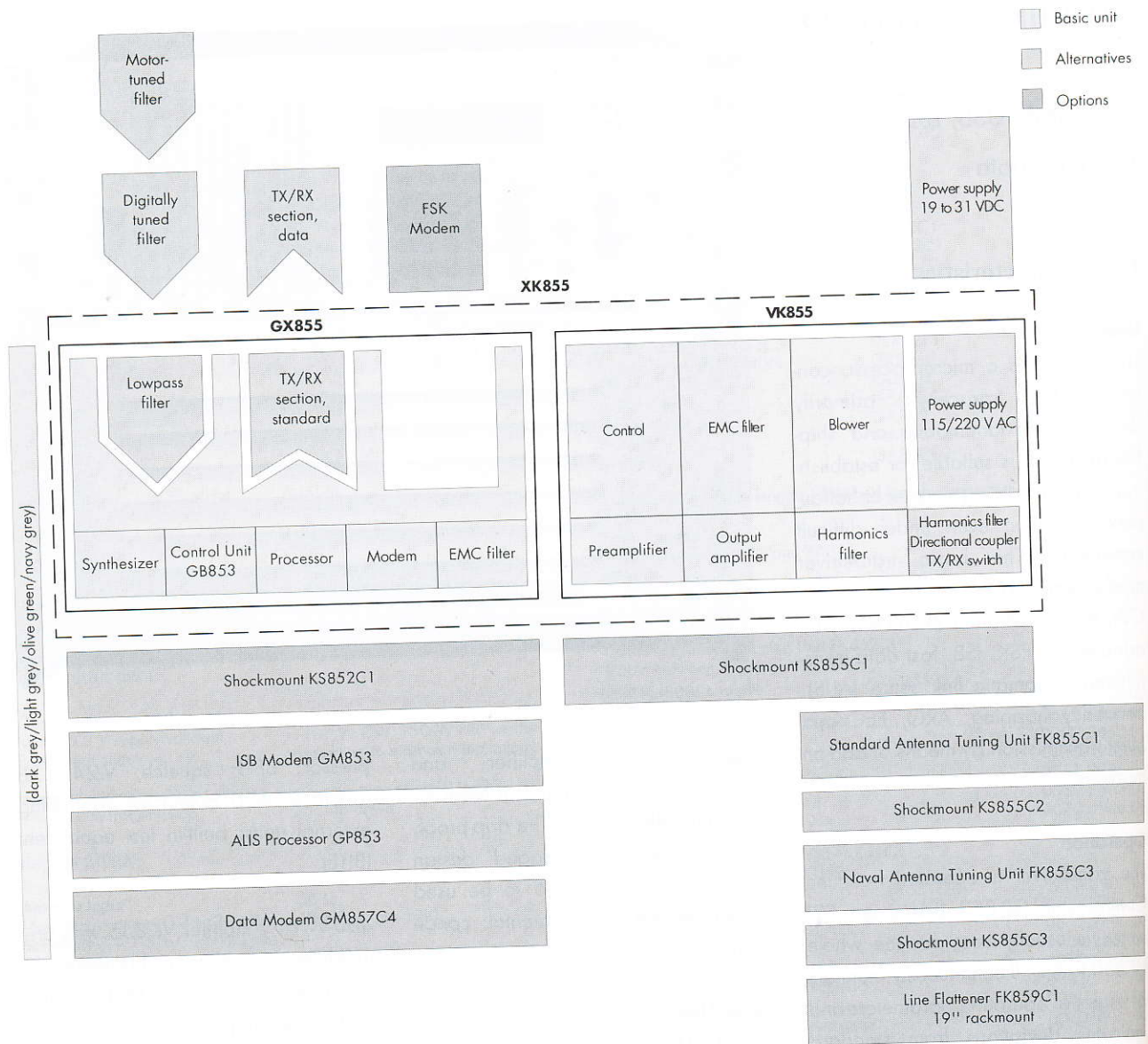
Receiver/Exciter GX855 with built-in Control Unit GB853; designed for CW, AME, USB and LSB modes; 100 programmable channels; voice com-

pressor; BFO; squelch; V.24/V.28 interface; BCD output for controlling external units; built-in test equipment (BITE).

400-W HF Amplifier VK855 with pre-amplifier, output stage, harmonics filter, directional coupler, TX/RX switch and power supply.

Alternative modules

- Filter
 - 30-MHz lowpass filter
 - Digital tuned filter
 - Motor-racking filter
- Transmit/receive section
 - Standard TX/RX section (filters: ± 150 Hz and 2400 Hz)
 - Data TX/RX section (filters: ± 150 Hz and 3350 Hz)
- Power supply
 - AC power supply 115/230 V
 - DC power supply 19 to 31 V



Overview XK855C1

Specifications

Common transmitter and receiver data

Frequency range for transmission	1.5 to 29.99999 MHz
reception	0.4 to 29.99999 MHz
Frequency setting	decadic in 10-Hz increments
Frequency error after 10 min warm-up	$<3 \cdot 10^{-7}$ at 25°C
within one day	$<3 \cdot 10^{-8}$
by aging	$<1 \cdot 10^{-6}$ /year
within rated temperature range	$<3 \cdot 10^{-7}$
Programmable channels	100 (transmit and receive frequencies separately programmable for halfduplex operation)

Classes of emission

A1A (A1), J3E (A3J), upper and lower sidebands, switch-selected
 H3E (A3H), upper sideband
 J7B (A7J), data transmission (via add-on units)

Options

ISB modem
 FSK modem

B8E (A3B, data link)
 F1B (F1) with three frequency shifts

Selectivity characteristics

Digitally tuned filter (alternative configuration)	
Frequency range	1.5 to 30 MHz
Selectivity ($\Delta f/f \geq 0.15$)	≥ 15 dB
Lowpass filter in the range	<1 MHz
Tuning time	≈ 20 ms
Motor-tracking filter (alternative configuration)	
Frequency range	1 to 30 MHz
Selectivity ($\Delta f/f \geq 0.1$)	>40 dB, typ. 45 dB
Lowpass filter in the range	0.5 to 1 MHz
Tuning time	<2 s

Transmitter data

Output power into 50 Ω	400 W ±0.5 dB, PEP or CW
Forward power with VSWR <1.3	no power reduction
VSWR >1.3	continuous power reduction
Matching range of Line Flattener FK859C1	VSWR <3

Intermodulation products with two-tone modulation	≥36 dB referred to PEP
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Receiver data

Antenna input	50 Ω
Max. input voltage in range 0.4 to 30 MHz	100 V _{EMF}
30 to 400 MHz	50 V _{EMF}
Oscillator reradiation	≤5 μV at antenna input with 50-Ω termination
Sensitivity (f=1.5 to 30 MHz) for A1A (A1)	<0.3 μV (<0.6 μV) ¹⁾ EMF for (S + N)/N = 10 dB, b = 300 Hz
J3E (A3J), J7B (A7J), H3E (A3J)	<0.6 μV (<1.5 μV) ¹⁾ EMF for (S + N)/N = 10 dB, b = 2.4 kHz

Receiving bandwidths	CCIR designation	3-dB bandwidth
Class of emission	A1A, A1B	±150 Hz
CW	H2A, H2B, H3E	-100 to +2300 Hz
AME in RX mode	J3E, R3E	+300 to +2700 Hz
USB (and AME in RX/TX mode)	F1A, F1B	-300 to -2700 Hz
LSB		±150 Hz
FSK narrow		±150 Hz
FSK medium		±1200 Hz
FSK wide		

Interference immunity	
Image-frequency rejection	≥80 dB down (≥100 dB)
IF rejection	≥100 dB down
Spurious responses	≥80 dB down at Δf >30 kHz

Automatic gain control (RF)	
Error of AGC	≤4 dB (1 μV to 3 V _{EMF})

General data

Operating temperature range	-25 to +55 °C
Storage temperature range	-40 to +85 °C
EMC	to MIL-STD-461 B, class A3, A4
MTBF	3000 h
Fault location	built-in, can be called at module and subassembly level (digital display on control unit)

Power supply (incorporated in VK855)	
alternatively:	
IN855P2	19 to 31 V _{DC} (<1750 W) floating
IN855P1	115/220 V _{AC} , 47 to 63 Hz (<1800 VA)

Max. distance between receiver/exciter and amplifier amplifier and antenna tuning unit	2 m
	50 m

Ordering information

HF Transceiver 400 W	XK855C1	0686.7010.xx
consisting of basic units:		

Receiver/Exciter	GX855C1
400-W Amplifier	VK855C1

Options

The options complementing the standard transceiver model can be ordered.		
FSK Modem	GM852P1	646.4710.02
ISB Modem	GM853C1	648.6010... ¹⁾
Line Flattener	FK859C1	680.3013.02
Antenna Selector	GV851	429.4620.02
ALLS Processor	GP853	669.2014... ¹⁾
Antenna Tuning Unit	FK855C1	729.1001.02
Suitable Shockmount	KS855C2	729.4800.02
Antenna Tuning Unit (navy)	FK855C3	724.8908.04
Suitable Shockmount	KS855C3	729.4900.04
Shockmount for GX855	KS852C1	647.3018.05
Shockmount for VK855	KS855C1	754.2509.00

Recommended extras and add-ons

Control Unit	GB853C1	s. data sheet N2-334
Suitable cabinet with EMC filter for distances <50 m with power supply for distances <1000 m	KK853C1	641.4010... ¹⁾
Handset	KK853C2	691.3510... ¹⁾
Headset	GA852C2	655.8516.03/13
Loudspeaker	GA852C5	648.9549.03
Headphones	GA852C7	648.9603... ¹⁾
Morse Key	GA852C8	648.9632.02
Microphone + PTT	GA852C3	655.5839.03
Antenna Diversity Unit	GA852C6	648.9578.03
MERLIN System Processor	GR046	s. data sheet N2-348
	GR856	on request

Cables, male and female connectors

Connector for external equipment		
32-contact female cable connector		549.8439.00 ²⁾
Shrink sleeve (180°)		080.2457.00 ²⁾
Shrink sleeve (90°)		070.4992.00 ²⁾
Connectors for antenna tuning units		
26-contact male cable connector (for GX855)		612.7400.00 ²⁾
26-contact female cable connector (for FK855)		511.9296.00 ²⁾
Shrink sleeve (180°)		080.2463.00 ²⁾
Shrink sleeve (90°)		070.4986.00 ²⁾
Cable (26 x 0.6 mm ²)		611.7765.00 ²⁾
Connectors for detached Control Unit GB853		
32-contact male cable connector (for GX855)		549.8474.00 ²⁾
32-contact male cable connector (for GX853)		549.8474.00 ²⁾
Shrink sleeve (180°)		080.2457.00 ²⁾
Cable (26 x 0.6 mm ²)		645.8664.00 ²⁾

Required cables

Control Cable (GX855-VK855)	XK855Z1	744.7259... ¹⁾³⁾
RF Cable (GX855-VK855)	XK855Z2	744.7309... ¹⁾³⁾
Power Cable (AC)	XK855Z3	744.7359... ¹⁾
Battery Cable (AC)	XK855Z4	744.7407... ¹⁾
Battery Cable (DC)	XK855Z5	744.7459... ¹⁾
Control cable (GX855-FK855)		647.9316... ¹⁾
RF cable (VK855-FK855)		724.9856... ¹⁾

¹⁾ Different lengths (eg .02 = 2 m).

²⁾ Please specify cable length.

³⁾ Maximum length 2 m.

1-kW HF Transceiver XK859

CW, AME, USB, LSB,
ISB, FSK, data

Uses, characteristics

Uses

The XK859 is microprocessor-controlled HF transceiver for stationary and shipboard use. It renders possible simplex or halfduplex communication in the operation modes CW, AME, USB and LSB. By means of add-on modules, the transceiver can easily be adapted for FSK, ISB and high-speed data transmission. Transmission is possible in the frequency range 1.5 to 30 MHz. The ALIS Processor GP853 (option) extends the fields of application of the XK859 by making it suitable for adaptive and EMC-resistant radio transmission methods.

Operation

The transceiver is operated from the Control Unit GB853, which is commonly used for the whole HF850 family. A separate microprocessor allows simultaneous assignment of several settings by means of only one operational step and thus protects the transceiver against faulty operation and inadmissible settings. False operation is indicated with E (= error). The transceiver continuously monitors all essential parameters and indicates deviations from standard performance.

Interface

For remote control over short and long distances or for computer control, the XK859 is fitted with a standard RS-232-C interface to CCITT V.24/V.28 (RS-232-

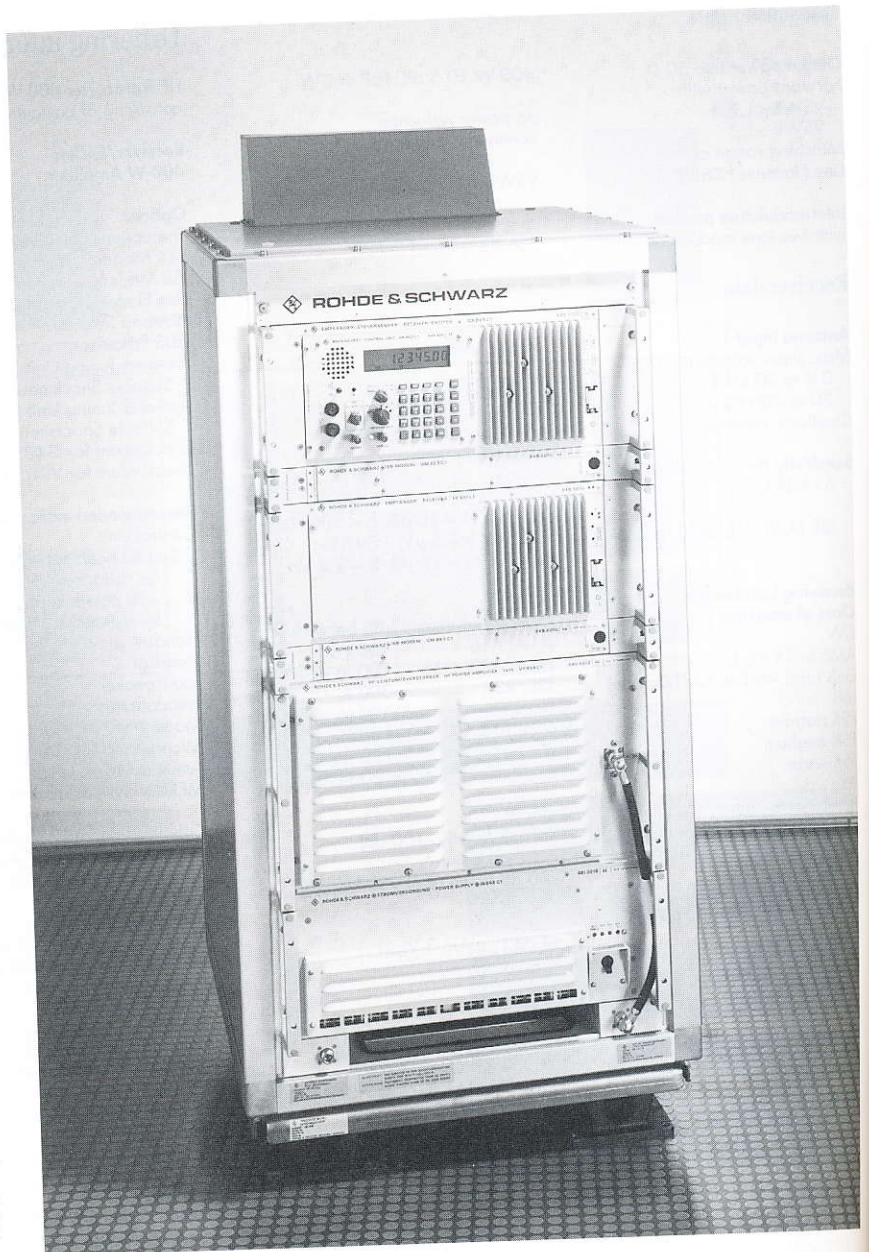


Photo 38712-2

C). This interface allows the control of several transceivers from a central computer or central control unit and the control of peripheral equipment. When using an additional modem, remote control can also be easily performed via telephone lines or directional radio channels. The Control Unit GB853 integrated in the XK859 is also available as an independent equipment. It has also a standard

interface V.24/V.28 (RS-232-C) and can be used for remote control of the XK859 over any distance.

Design

The transceiver is designed for 24-hour continuous operation. The XK859 is drip-proof, dust-protected and sturdy and, therefore, able to withstand adverse conditions.

Basic unit

The XK859 is accommodated in a cabinet rack for stationary operation. It consists of Receiver/Exciter GX859, 1000-W HF Amplifier VK859 and Power Supply IN859.

Free space is provided in the rack to permit easy incorporation of options. The table below includes the most important standard versions.

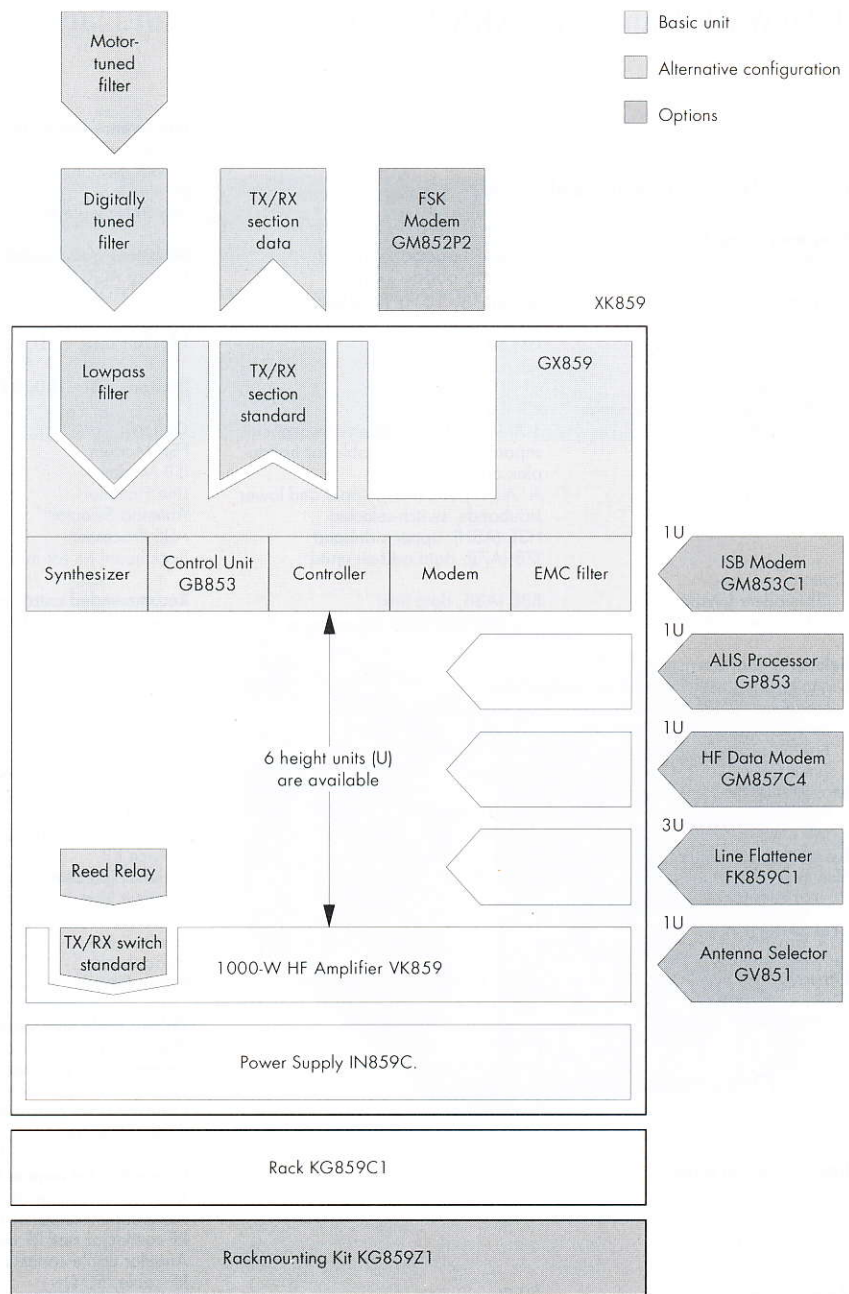
Receiver/Exciter GX859 with built-in Control Unit GB853 is designed for the modes CW, AME, USB and LSB. It features 100 programmable channels, voice compressor, BFO, squelch and V.24/V.28 remote-control interface. The GX859 is further fitted with a BCD output for the control of external units and with a built-in test equipment (BITE).

1000-W HF Amplifier VK859 includes preamplifier, output stage and harmonics filter.

Power Supply IN859C1 is designed for three-phase supply and 24 V_{DC}, C2 for single phase and 24 V_{DC}.

Alternative equipment

- Filters
 - 30-MHz lowpass filter
 - Digitally tuned filter
 - Motor-tuned filter
- Transmitter/receiver section
 - Standard TX/RX section (filter: ±150 Hz and 2400 Hz)
 - Data TX/RX section (filter: ±150 Hz and 2400 Hz)
- Harmonics filter with transmit/receive switch
 - Standard TX/RX switch (with relays)
 - TX/RX switch (reed relay)



Overview XK859

1000-W HF Transceiver XK859

Specifications

Common data of transmitter and receiver

Frequency range for transmission	1.5 to 29.99999 MHz
reception	0.4 to 29.99999 MHz
Frequency setting	decadic by 10-Hz increments
Frequency error after 10 min warm-up	$<3 \cdot 10^{-7}$ at 25 °C
within one day	$<3 \cdot 10^{-8}$
by aging	$<1 \cdot 10^{-6}$ /year
within rated temperature range	$<3 \cdot 10^{-7}$
Programmable channels	100 (transmit and receive frequencies separately programmable for half-duplex operation)
Classes of emission	A1A (A1), J3E (A3J), upper and lower sidebands, switch-selected H3E (A3H), upper sideband J7B (A7J), data add-on units

Options	B8E (A3B, data link)
ISB modem GM853C1	F1B (F1) with three frequency shifts
FSK modem GM852P1	

Selectivity characteristics

Digitally tuned filter (alternative configuration)	
Frequency range	1.5 to 30 MHz
Selectivity ($\Delta f/f \geq 0.15$)	≥ 15 dB
Bandpass filter in the range	0.4 to 1.5 MHz
Tuning time	≈ 20 ms
Motor-tuned filter (alternative configuration)	
Frequency range	1 to 30 MHz
($\Delta f/f \geq 0.1$)	>40 dB
Lowpass filter in the range	<1 MHz
Tuning time	<2 s

Transmitter data

Output power into 50 Ω	1000 W ± 0.5 dB, PEP or CW, switch-selected to 250 W or 100 W
Incident power with VSWR <1.3	no power reduction
VSWR >1.3	continuous power reduction
with short- or open circuit	no switching off
Matching range of Line Flattener FK859C1	VSWR <3
Intermodulation products with two-tone modulation	≥ 36 dB referred to PEP

Receiver data

Antenna input max. input voltage in range 0.4 to 30 MHz	50 Ω
Sensitivity (f = 1.5 to 30 MHz) for A1A (A1)	100 V _{EMF}
J3E (A3J), J7B (A7J), H3E (A3J)	<0.3 μ V (<0.6 μ V) EMF for (S + N)/N = 10 dB, b = 300 Hz
	<0.6 μ V (<1.5 μ V) EMF for (S + N)/N = 10 dB, b = 2.4 kHz

Receiving bandwidths

Class of emission	CCIR designation	3-dB bandwidth
CW	A1A, A1B	± 150 Hz
AME in RX mode	H2A, H2B, H3E	-100 to +2300 Hz
USB (and AME in RX/TX mode)	J3E, R3E	+300 to +2700 Hz
LSB		-300 to -2700 Hz
FSK narrow	F1A, F1B	± 150 Hz
FSK medium		± 150 Hz
FSK wide		± 1200 Hz

Interference immunity	≥ 80 dB down
Image-frequency rejection	≥ 100 dB down
with motor-tuned filter	≥ 100 dB down
IF rejection	≥ 80 dB down at $\Delta f > 30$ kHz
Spurious responses	

Automatic gain control (RF)	≤ 4 dB (1 μ V to 3 V _{EMF})
Error of AGC	

Ordering information

HF Transceiver 1000 W	XK859C1	0680.1210.xx
Options	GM852P2	646.4710.02
FSK Modem	GM853C1	648.6010...
ISB Modem	FK859C1	680.3013.02
Line Flattener	GV851	429.4620.02
Antenna Selector	GP853	669.2014...
ALIS Processor	KG859Z1	681.5461...
Rackmount Kit for mobile use		
Recommended extras and auxiliary equipment		682.1018.02
Antenna Tuning Unit	FK859	723.7508.02
Appropriate Shockmount	KS859	4000.1802.14
Antenna Tuning Unit (navy)	FK859M1	4019.0501.04
Appropriate Shock Absorber Set	AK002Z1	on request
System Processor Merlin	GR856	see data sheet
Control Unit	GB853C1	756.5940.11
Appropriate housing with EMC filter for distances <50 m	KK853C1	641.4010...
with power supply		
for distances <1000 m	KK853C2	691.3510...
Service Kit	KA858C1	724.8508.02
Handset (piezo microphone)	GA852C2	655.5816.02
Handset (dyn. microphone)	GA852C2	655.5816.03
Handset	GA852C5	648.9549.03
Loudspeaker	GA852C7	648.9603.02/03
Headphones	GA852C8	648.9632.02
Morse Key	GA852C3	655.5839.02/03
Cables, male and female connectors		
(Please indicate desired cable length when placing order)		
Connector for external equipment		
Female cable connector, 37-contact, with cable (37 x 0.25)		681.5410.03
Connectors for antenna tuning units		
Male cable connector, 26-contact, with cable (37 x 0.25)		681.5410.04
Male cable connector for Antenna Tuning Unit FK859		681.5410.05
Connectors for remote Control Unit GB853		
Male cable connector, 37-contact, with cable (37 x 0.25)		681.5410.06
Male cable connector for Control Unit GB853		681.5410.07
RF connector and RF cable		
Angular cable connector		017.7184.00
RF cable, 50 Ω	RG213U	025.4580.00
Cables for power supply		
380-V cable (4 x 2.5 mm ²)	NY MHY	025.5458.00
Battery cable (2 x 4 mm ²)	NSH DEU	025.5493.00
20-m cables (with connector) between transceiver and antenna tuning unit		724.9904.20
Transceiver and remote Control Unit GB853		724.9956.20
RF cable between transceiver and antenna tuning unit		724.9856.20
Cable (with connector) between transceiver and antenna tuning unit (navy) (length on request)		724.9804.00