INFORMATION SHEET

MX294

MX290 SERIES VHF FM MOBILE RADIO

Frequency-synthesised systems orientated mobile radio, professionally engineered for maximum cost effectiveness and flexibility.

Restyled fascia panel with extra safety features

Rugged, lightweight construction

Single or up to 256 channels

Theft-resistant mounting

Extensive signalling options

Easy conversion to fixed station or transportable role

The exceptionally versatile two-way radio Type MX294 has been designed around an advanced final-frequency synthesiser which permits multiple channel operation from a single master reference crystal with frequency information stored within a Programmable Read Only Memory (PROM).

The resulting concept allows for present and future needs of the private mobile radio users offering extreme flexibility to meet the most basic requirement with the cost-effective option of future system expansion.

Type MX294 caters for users requiring systems from single channel up to 256 channels. The 16-channel equipments use conventional rotary channel selection. For those requiring more channels, a range of 'plug-in' front panels allow for up to 40 or 80-channel operation by rotary channel selection, or up to 256 channels either by preselected group switching or using automatic channel selection by the base station.

User safety features in the restyled fascia panel giving extra protection against accidental knocks. Compact, space-saving dimensions allow neat, safe and convenient installation of the radio in almost any vehicle. The theft-resistant mounting secures the radio from above and below. Equally secure installation can be achieved in a vacant radio slot. The few simple controls are ergonomically designed, easily identified and discreetly illuminated. The separate loudspeaker can be installed where most convenient.

Other features include electronic antenna switching, a synthesiser lock detector and for versions incorporating an LED display, automatic control of brilliance.

Electronic antenna switching ensures fast, reliable transmit/receive switching and compatability when the MX294 is adapted for data and trunking applications. The synthesiser lock detector prevents transmissions on unauthorised frequencies or non-programmed channels.

For those applications which require signalling facilities, the MX294 offers a most extensive range. CTCSS and multi-tone sequential signalling are catered for by new generation 'plug-in' signalling modules.

Ready conversion of the mobile radio for operation as a compact, efficient, desk-top station is achieved by the addition of a power supply unit. Type AC90PU and Type AC200PU provide alternative options. For the transportable application, the MX294 fits conveniently into power unit Type P200PU to form a self-contained unit.

Ergonomic design and rugged construction combine with the high performance specification to make this versatile MX294 mobile radio suitable for world-wide deployment.

PHILIPS

Mechanical Design
The chassis is constructed from zinc alloy to form a rigid die-cast frame with a finned heatsink and die-cast covers. Excellent screening ensures compliance with CEPT and other international specifications for spurious radiation.

Internal construction is on a two-tier principle with separate printed circuit boards (PCBs) for the radio and its options.

Ease of maintenance continues to be an important design consideration. The removal of four screws from the back panel enable the radio PCB to be accessed for servicing. Removal of the front panel and options PCB is just as simple.

Double-sided boards with plated hole connections result in excellent solder joints and provide easy access from either side for servicing. Numerous test points, backed by a comprehensive service manual, assist in keeping time off the air to a minimum. Maintenance and assistance are available through our accredited agents world-wide. Computer-aided logistic support ensures the prompt supply of spares.

Frequency Synthesiser
This, the heart of the transceiver, has eliminated the need for all crystals except the reference and the receiver second oscillator crystals.

Channel frequency information is contained within a fusible link PROM, which is computer programmed. The PROM, a 'plug-in' component, is easily replaced should channel allocation change.

MX290 series mobile radio installation fitted with selective signalling.

The optional facility of frequency group select greatly enhances MX294 versatility by the ability to program the PROM into discrete groups. For examples of group/channel combinations see 'Technical Data'.

Each group can be assigned to a specific geographical area which is preselected by internal switches. Each channel within the selected group is available using the channel selector.

A copy of the programmed frequencies, including optimum channels for alignment, is provided with each PROM.

Transmitter
The transmitter provides up to 25W RF output and features a power level control. This facility allows the RF output to be preset within the range of 6–25W which is then maintained over wide variations in temperature and supply voltage.

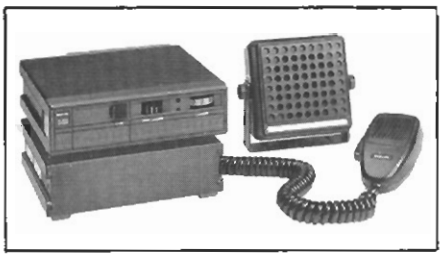
The generously finned aluminium heatsink at the rear, in conjunction with the rugged semiconductor output stages, allows extended transmission periods without degradation of performance.

Receiver
The high performance receiver has the option of wide or narrow switching bandwidth. Its high selectivity gives excellent protection against intermodulation and blocking interference.

Thermally self-protecting and short circuit proof integrated AF circuits allow a full, clear 3W audio output with low distortion.

Ancillaries

Desk-top Station



In common with others in the MX290 series the mobile is readily adaptable as a locally-controlled simplex base station in either of two configurations. The radio locks on top of the AC power supply unit Type AC90PU (illustrated above) or fits into the alternative Type AC200PU to form a compact, attractive and efficient desk-top station. For details, see Publication Ref. No. PT TSP871 for Type AC90PU or PT TSP764 for Type AC200PU

Voltage Converters
Available for vehicle supplies other than 12V DC, negative ground, converter Types VC290/12 and VC290/24 operate respectively from 12V and 24V supplies of any polarity.

Transportable Unit

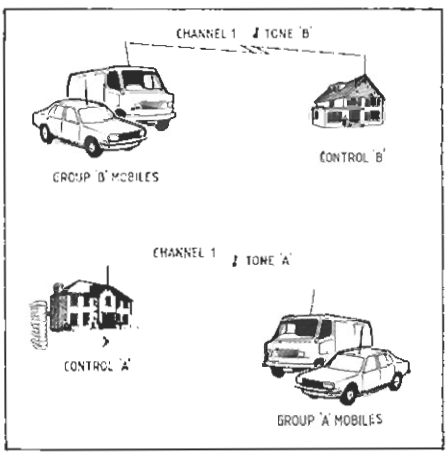
Any MX290 series equipment can be easily and rapidly converted for service as a rugged, self-contained transportable, providing greater flexibility in its use. The transportable case, Type P200PU, accepts the complete transceiver unit, and is fitted with loudspeaker, microphone, antenna and battery cassette. Facilities are provided for battery recharging in situ. (See Publication Ref. No. PT TSP661 for details).

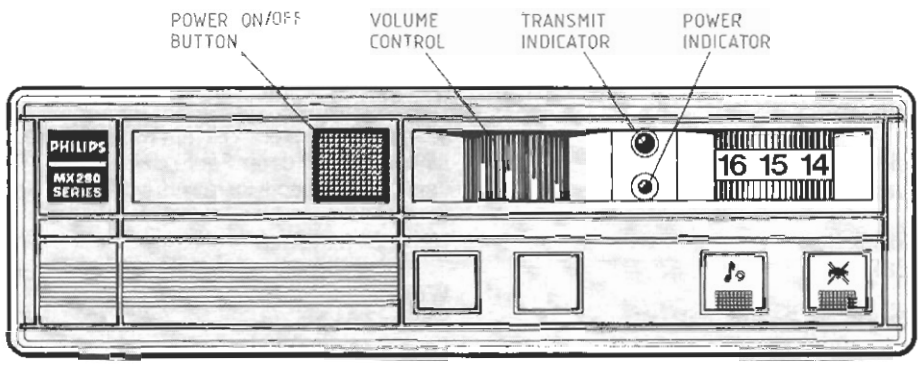
Antennas

The wide choice of antennas available for use with any MX290 series mobile include gain whip antennas and encapsulated low profile types suitable for use in restricted height situations. Details are given in separate publications.

Mobile Repeater Control Head
Compact control head Type MR290 interconnects two mobile radio units in a repeater configuration, providing central control of both. The unit is fully compatible with the new generation signalling modules TED3 and TEDX. (See Publication Ref. No. PT TSP750).

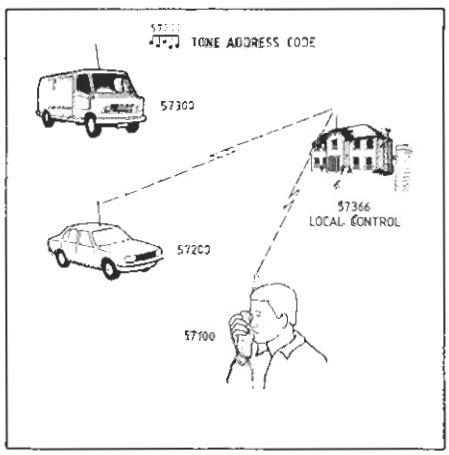
CTCSS

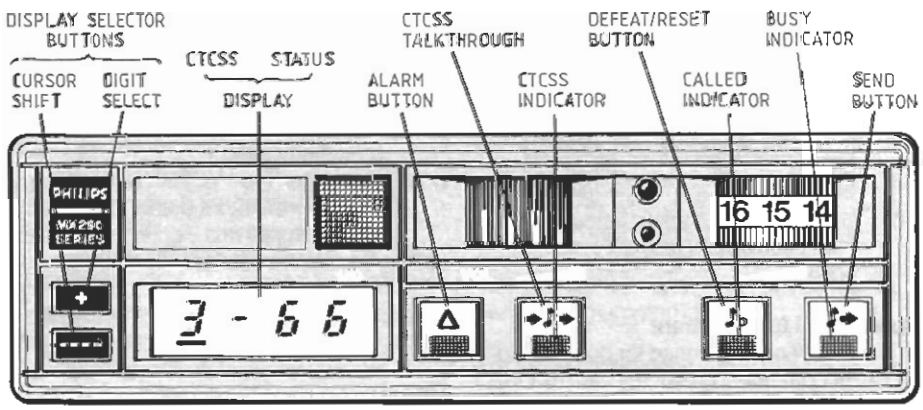




The continuous tone controlled squelch system (CTCSS) can be fitted to provide two-way protection from unwanted calls on a shared radio channel, or to switch unmanned repeater stations for mobile-to-mobile conversation. Single and multi-tone selectable versions are available. (See Publication Ref. No. PT TSP363 for further details).

Sequential Signalling



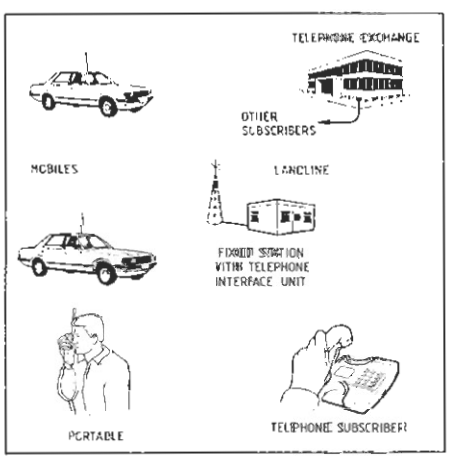


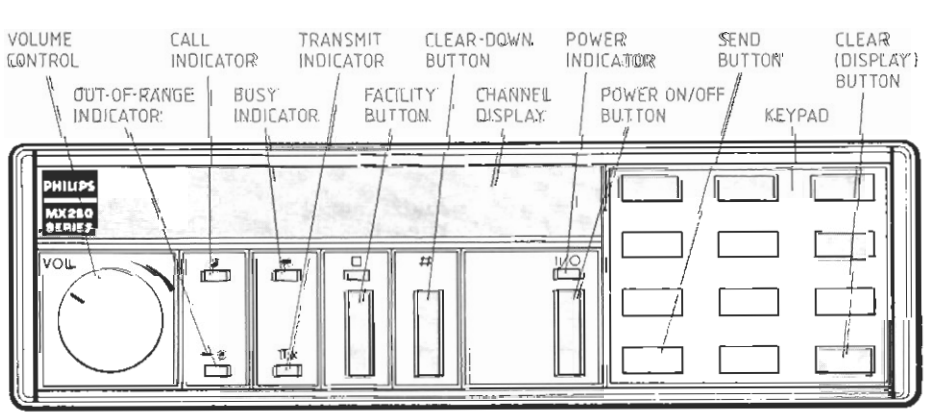
This option presents the Company's highly versatile sequential signalling system recognised as an industry standard.

Options include group/all call, alarm, auto-interrogation, audio alert, transmit inhibit, receiver lockout, remote and timed reset. Up to four variable digits of the encode address can be used for selective calling of other users or for vehicle status reporting.

Sequential signalling can be combined with a fixed CTCSS encode function for access to a repeater station. (See Publication Ref. No. PT TSP561 for further details).

Selective Call Encode/Dialling





More sophisticated versions are available offering keypad selection of functions or where dialling facilities are necessary.

Illustrated is an example of a customised version for dialling into a PABX system under the control of a microprocessor.

Technical Data

CATALOGUE SECTION
MOBILES

Publication Ref. No. PT TSP783 (Issue 1)
Printed in England May 1987 5M

Type MX294

General

Operation
Single or two frequency simplex

Modulation
Phase

Frequency Bands
Band A0 148–174 MHz
Band AW 148–174 MHz (wide band receiver)
Band B0 132–156 MHz
Band E0 66–88 MHz
Band EW 66–88 MHz (wide band receiver)

Channel Spacing
12.5 kHz (type S), 20 kHz (type R) or 25 kHz (type V)

Number of Channels
(i) Single, or up to 16 by rotary switch
(ii) Up to 40 or 80 by rotary switch
(iii) Up to 256 by preselected group switches and rotary channel switch. Typical examples of group/channel combinations as follows:

Max. No. of groups	16	256
Max. No. of channels	16	1

(iv) Up to 256 by automatic selection from base station (special systems only)

Operational Environment
This equipment is designed for operation to CEPT recommendations or relevant national specifications from –25°C to +55°C (–30°C to +60°C functional)

Frequency Stability
±5 ppm over the temperature range –10°C to +55°C, or as required by relevant national specifications

Power Supply
12V (nominal) DC vehicle supply, negative ground

Current Consumption
Receive (standby): 500 mA approx.
Transmit (at 25W output): 8A max.

Operator Controls and Indicators
(See inside pages for details)

Antenna Connector/Impedance
Type BNC/50 ohms

Cabinet Radiation
To CEPT or relevant national specification

Dimensions
16-channel version: 175 mm wide x 52 mm high x 190 mm deep. For higher channel versions, the depth increases to 202 mm
Loudspeaker unit: 112 mm wide x 112 mm high x 64 mm deep

Weight
Radio: 3.5 kg
Loudspeaker: 0.6 kg

Finish
Radio: fascia panel; dark grey
Case and Loudspeaker: textured black

Additional Options
(i) Sequential signalling (EEA/CCIR/ZVEI)
(ii) CTCSS (EIA)
(iii) Combined sequential signalling and CTCSS
(iv) Carrier level detector
(v) External facility socket
(vi) Fascia mount locking cradle for 178 x 51 mm DIN'A' car radio aperture
(vii) Quick release, cassette-type mounting cradle
(viii) Converter Type VC290/12 (for 12V) or Type VC290/24 (for 24V) floating ground supplies
(ix) AC power units Type AC90PU or Type AC200PU
(x) Transportable conversion unit, Type P200PU

Receiver

Sensitivity
12 db SINAD for 0.31μV pd signal input

Spurious Response Attenuation
Better than 80 db

Adjacent Channel Selectivity
Better than 70 db

Intermodulation Attenuation
Better than 75 db (CEPT method)

Squelch Sensitivity
10 db SINAD (preset)

Audio Response
+1 db to –3 db of 6 db/octave de-emphasis characteristic from 300 Hz to 3 kHz
(2.55 kHz for 12.5 kHz channel spacing)

Audio Output
Better than 3W with less than 5% distortion into a 3 ohm loudspeaker

Switching Bandwidth (1 db)
±0.5% (±2% optional) of the mean frequency between the lowest and highest switched channels

Transmitter

Power Output
Adjustable from 6W to 25W

Spurious Output
Less than 0.25 μW (CEPT method)

FM Noise Level
Better than –40 db

Modulation
Adjustable up to ±5 kHz peak (25 kHz channel spacing)

Modulation Response
+1 db to –3 db of 6 db/octave pre-emphasis characteristic from 300 Hz to 3 kHz
(2.55 kHz for 12.5 kHz channel spacing)

Modulation Distortion
Less than 4% (at 60% deviation with 1 kHz modulation)

Switching Bandwidth (1 db)
±2% of the mean frequency between the lowest and highest switched channels

Typical figures based on normal operating conditions. Certain options may modify the figures quoted.

Our policy is one of continuous improvement; therefore the right is reserved to change specifications without notice.

NOTE: not all combinations of frequency bands, options etc. are available for every market area.

MX290 series, 40-channel version

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