

M294

M290 SERIES VHF FM MOBILE RADIO



Versatile two-way radio of advanced design

Restyled fascia panel with extra safety features

Rugged, lightweight construction

Single or up to 6 channels

Theft-resistant mounting

Extensive signalling options

Adjustable transmitter power and receiver sensitivity

Easy conversion to fixed station or transportable role

Type M294 is an exceptionally versatile two-way radio. Resulting from in-depth study of the present and future needs of private mobile radio users, this high specification equipment has the essential flexibility to meet the most basic initial requirement – with the option of cost-efficient expansion later, or to satisfy the most complex and sophisticated fleet operation at the outset.

User safety – always a top design consideration – features in the restyled fascia panel, with its bevelled edging and

recessed controls giving extra protection against accidental knocks. Compact, space-saving dimensions allow neat, safe and convenient installation of the radio in almost any vehicle. Its neat, theft-resistant mounting secures the radio from above or below to choice. Equally secure installation can be achieved in a vacant radio slot. The few simple controls are ergonomically designed, easily identified and discreetly illuminated.

For those applications which require signalling facilities, the M294 offers a most extensive range. CTCSS and multi-tone selective signalling are catered for by new generation plug-in signalling modules, incorporating custom designed integrated circuits. The advanced TEDX module uses a sophisticated microprocessor capable of extreme application flexibility. The numerous signalling options include vehicle identity and status reporting, mobile alarms, automatic message systems and community repeater facilities.

M294 versatility extends still further... To meet specific local requirements, the 25W transmitter can be adjusted to provide lower RF output levels. Similarly, receiver

sensitivity can be preset for optimum radio reception in a given operating environment.

The internal connection used for the addition of signalling options has a further application as a test socket, facilitating routine maintenance by allowing the service engineer to control, monitor and evaluate many of the radio functions.

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. Types AC90PU and AC200PU provide alternative options, each operating from any standard AC supply. For the handy transportable application, the M294 fits conveniently into power unit Type P200PU to form a self-contained unit, powered by a rechargeable battery cassette.

Ergonomic design, rugged construction, exceptional versatility and a high performance specification conforming to MPT1301 make the M294 suitable for a wide range of applications in private mobile radio.



PHILIPS

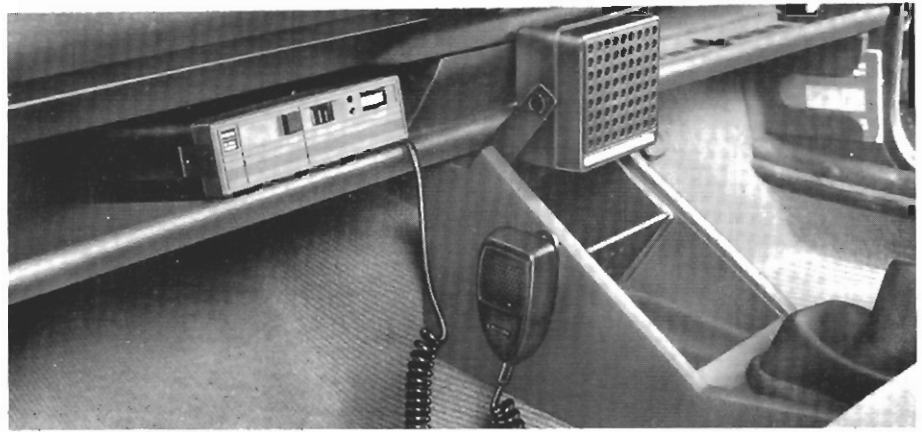
Mechanical Design

The M294 is housed in a rugged, light-weight aluminium case which provides protection and screening from outside sources, reduces cabinet radiation and contributes to heat dissipation.

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 option PCB is just as simple.

Double-sided boards (with plated hole connections) result in excellent solder joints and provide equal access from either side for easier servicing. Numerous test points, backed by a comprehensive service manual, assist in keeping time off the air to a minimum. Contract maintenance and assistance are available through your local Service centre. Computer-aided logistic support ensures the prompt supply of spares.



Transmitter

The transmitter has a full power capability of 25W and features an adjustable level control which allows RF output to be preset and maintained at any level in the range 6–25W. An alternative version with a fixed 1W RF output is available for certain markets only.

Receiver

The high performance receiver maintains good sensitivity over ample switching bandwidth. This is matched by an equally high selectivity giving excellent protection against intermodulation and blocking interference. Sensitivity can be internally preset to cater for the different

performance requirements of urban and rural areas. The noise-operated squelch is well-protected against triggering by interference. Thermally self-protecting and short-circuit proof, integrated audio circuitry provides a full 3W audio output with low distortion.

Ancillaries

Desk-top Station



In common with others in the M290 series, the mobile is readily adaptable for operation as a locally-controlled, simplex base station in either of two configurations. The radio locks on top of 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 M290 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, antenna and battery cassette. Facilities are provided for battery recharging in situ. (see Publication Ref. No. PT TSP661 for details.)

Antennas



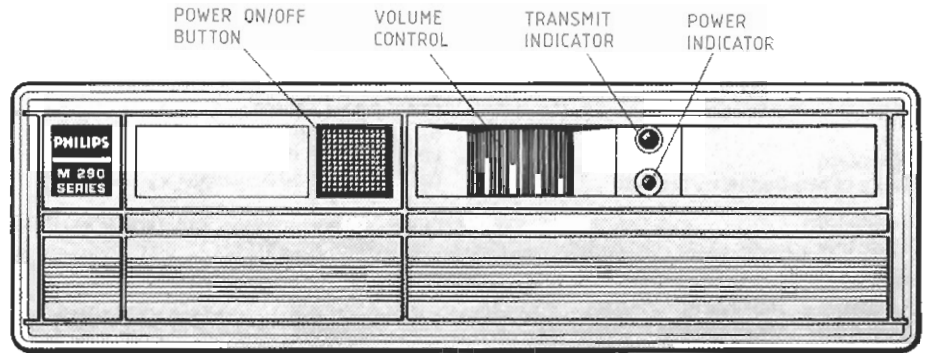
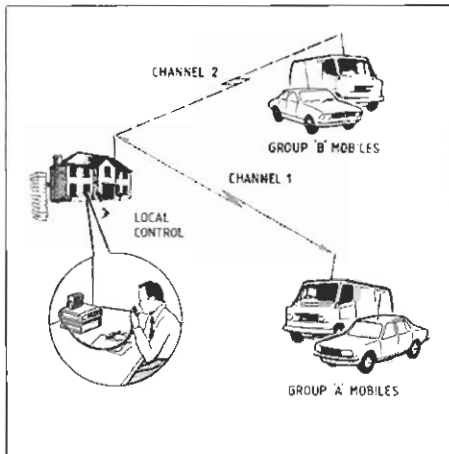
The wide choice of antennas available for use with any M290 series mobile includes gain whip antennas and encapsulated low profile types suitable for use in restricted height situations. Details are given in separate publications.

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.)

Applications and Options

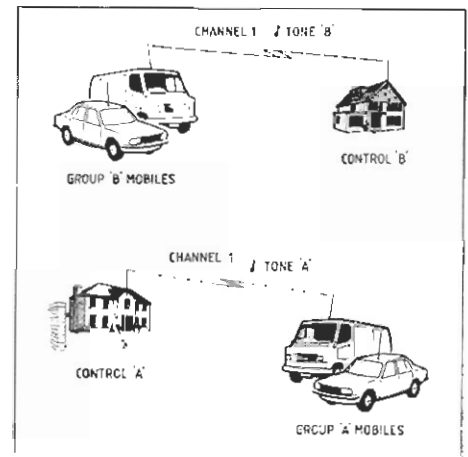
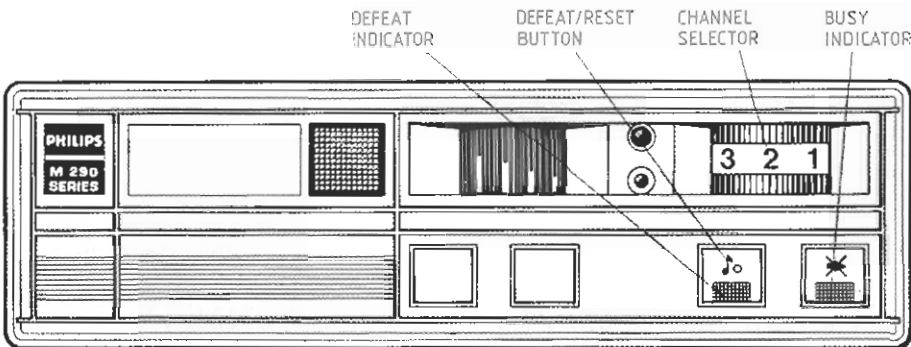
Basic Version



The single channel version allows the user to get on the air with minimal cost. Discrete vehicle groups are allocated a channel for communication with control.

Additional channels, CTCSS or sequential signalling can be added at any time to take care of system expansion.

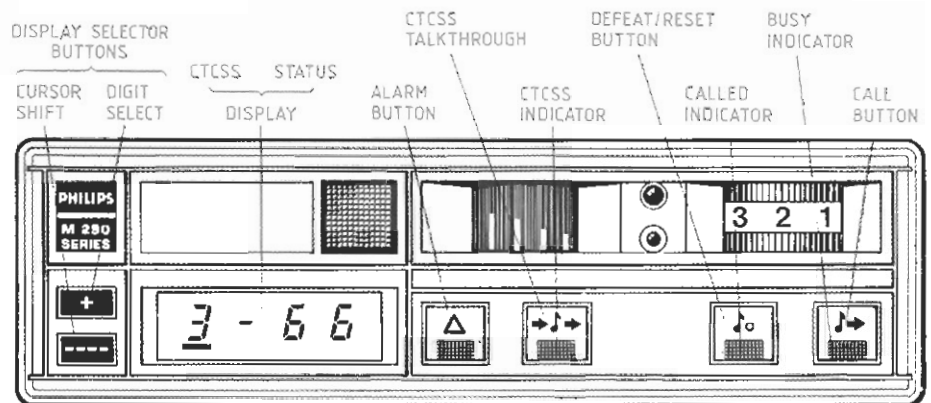
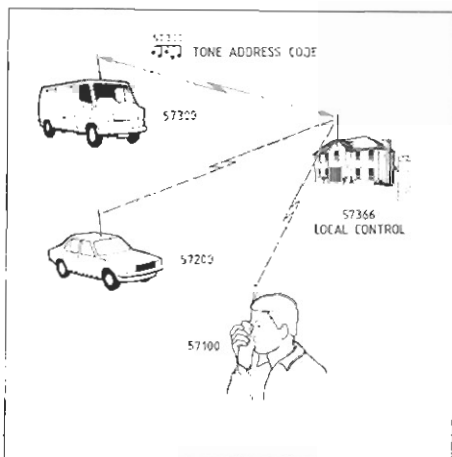
CTCSS



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, now 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.)

General

Operation

Single or two-frequency simplex

Modulation

Phase (F3E)

Frequency Bands

Band A0	148–174 MHz
Band AG	146–172 MHz
Band B0	132–156 MHz
Band E0	68– 88 MHz
Band M1	105–108 MHz
Band M2	138–141 MHz (receive only)
Band P5	79– 88 MHz (transmit only)
Band P8	96–106 MHz

Channel Spacing

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

Number of Channels

Single or up to 6

Switching Bandwidth

±0.2% of the mean frequency between the lowest and highest switched channels

Operational Environment

The equipment is designed for operation to CEPT recommendations or relevant national specifications over the range –25°C to +55°C (functional from –30°C to +60°C)

Frequency Stability

- (i) ±10 ppm over the temperature range –10°C to +60°C
- (ii) ±5 ppm over the temperature range –10°C to +60°C
- (iii) ±10 ppm over the temperature range –30°C to +60°C

Power Supply

12V (nominal) DC vehicle supply, negative ground

Current Consumption

Receive (standby): 300 mA approx.
Transmit: 5A approx. (25W version)

Operator Controls and Indicators

(see inside pages)

Antenna Connector/Impedance

Type BNC; 50 ohms

Cabinet Radiation

To CEPT or relevant national specification

Dimensions

Radio: 175 mm wide x 52 mm high x 190 mm deep
Loudspeaker: 112 mm wide x 112 mm high x 64 mm deep

Weight

Radio: 1.8 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) AC power supply unit, Type AC90 PU or Type AC200 PU
- (v) Transportable conversion unit, Type P200 PU
- (vi) Converter type VC290/12 (for 12V) or Type VC290/24 (for 24V) floating ground supplies
- (vii) Fascia mount locking cradle for DIN 'A' car radio aperture
- (viii) External facility socket

Receiver

Sensitivity*

12 db SINAD for 0.31 µV (pd) signal input

Spurious Response Attenuation

Better than 80 db

Adjacent Channel Selectivity

Better than 100 db (at 12.5 kHz channel spacing)

Intermodulation Attenuation

Better than 80 db (CEPT method)

Squelch Sensitivity

10 db SINAD (preset)

Audio Response

+1 db to –3 db of a 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

* Sensitivity can be increased by preset control to 0.2 µV (typical) with slight degradation of intermodulation attenuation to 75 db.

Transmitter

Power Output

- (i) Adjustable from 6W to 25W
- (ii) 6W fixed output
- (iii) 1W fixed output

Spurious Outputs

Less than 0.25 µW

FM Noise

Better than –55 db

Modulation

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

Modulation Response

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

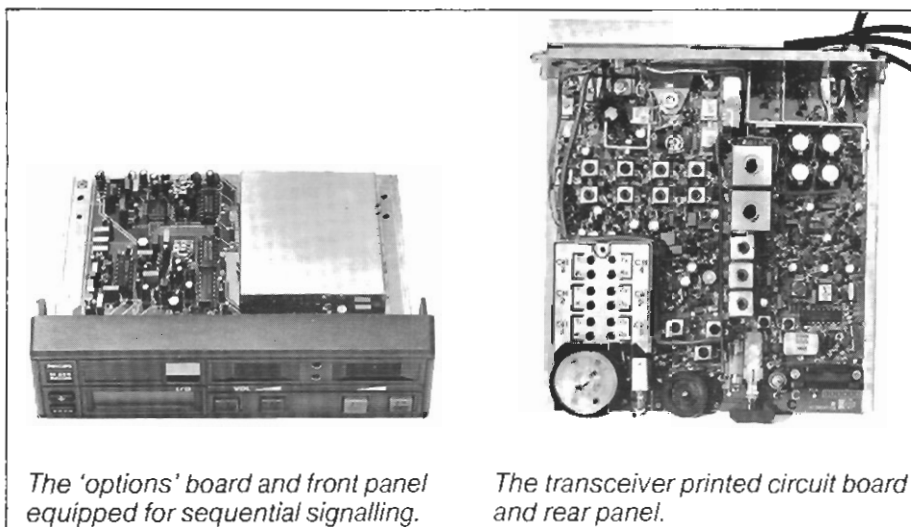
Modulation Distortion

Less than 3% (at 60% deviation with 1 kHz modulation)

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

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.



The 'options' board and front panel equipped for sequential signalling.

The transceiver printed circuit board and rear panel.