Series 50T Fetal Telemetry System

Setting Up and Using Your Fetal Telemetry System

Series 50 T

HEWLETT PACKARD

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assembly operations, extensions, re-adjustments, modifications or repairs are carried out by persons authorized by HP, and

the electrical installation of the relevant room complies with national standards, and

the instrument is used in accordance with the instructions for use.

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Warning

Failure on the part of the responsible individual hospital or institution employing the use of this equipment to implement a satisfactory maintenance schedule may cause undue equipment failure and possible health hazards.

Important

United States federal law restricts this device to sale by or on the order of a physician.

This device is not intended for home use.

FCC WARNING

This equipment generates, uses and can radiate radio-frequency energy, and if it is not installed and used in accordance with this manual, may cause interference to radio communications.

Operation of this equipment in a residential area may cause interference, in which case the users, at their own expense, must take whatever measures may be required to correct the interference.

Additional Documentation

Technical Data Sheet (5962-6291L)
Features and benefits, technical specifications, accessories, ordering, upgrading and re-ordering information.

Technical Data Sheet (5091-8155E)
The transducers, cables and supplies that can be used with the Telemetry System.

Service Manual (M1310-9000A)
Detailed servicing information.

This guide *Setting Up and Using Your Telemetry System* is to be used in conjunction with the following Fetal Monitor documentation:

Setting Up and Using Your Monitor (M1351-9001D)
Detailed operating instructions for the Series 50 A Fetal Monitor.

Setting Up and Using Your Monitor (M1353-9001D)
Detailed operating instructions for the Series 50 IP Fetal Monitor.

Setting Up and Using Your Monitor (M1350-9001L)
Detailed operating instructions for the Series 50 IX Fetal Monitor.

Operating Guide (08040-90001)
Detailed operating instructions for the HP 8040 Fetal Monitor.

Operating Guide (08041-90001)
Detailed operating instructions for the HP 8041 Fetal Monitor.

How to use this Guide

The guide is intended for midwives, nurses and MDs/Doctors, and describes how to install and operate the Series 50 T Fetal Telemetry System.

First, read the safety information in Chapter 10.

Then, follow the instructions in Appendix A for unpacking the Telemetry System and setting it up ready for use. Then read Appendix B for details on how to mount the Telemetry Receiver.

Read Chapter 1 to familiarize yourself with the Telemetry System and to obtain a brief overview of its application.

The main body of the guide (Chapter 2 to Chapter 5) describes how to monitor Fetal Heart Rate (FHR) and Uterine Activity. The remaining chapters describe recording fetal movements, how to use the Nurse Call function, how to mark events on the trace, and how to carry out tests and respond to error messages.

This guide provides telemetry specific information. For more application information, please refer to the *Operating Instructions* provided with your Fetal Monitor. The following Fetal Monitors can be used with the Series 50 T Fetal Telemetry System:

- Series 50 Family (50 IX, 50 IP, 50 A).
- HP 8040A Intrapartum Fetal Monitor.
- HP 8041A Antepartum Fetal Monitor.

If you need help or additional information at any time, call your local HP Response Center. You'll find a list of telephone numbers on the back cover of this document.

The following conventions for notes, cautions, and warnings are used in this guide:

Note 

A note calls attention to an important point in the text.

Caution 

A caution calls attention to a condition or possible situation that could damage or destroy the product or the user's work.

Warning 

A warning calls attention to a condition or possible situation that could cause injury to the user and/or patient.

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Contents

1

Overview

The HP Series 50 T Fetal Telemetry System allows continuous non-invasive or invasive Fetal Heart Rate (FHR) and Uterine Activity monitoring of an ambulant patient during antepartum testing and labor and delivery.

The FHR and uterine activity signals are transmitted continuously via radio frequency from the Telemetry Transmitter to the Telemetry Receiver, where they are displayed and recorded on the connected Fetal Monitor.

With the Series 50 IX, Series 50 IP and the HP 8040A Fetal Monitors, you can monitor:

- FHR using Ultrasound.
- FHR using DECG.
- Uterine activity using TOCO.
- Intrauterine Pressure.

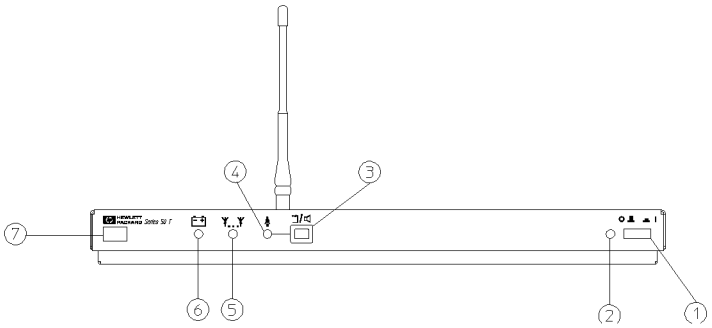
With the Series 50 A and HP 8041A Fetal Monitors, you can monitor:

- FHR using Ultrasound.
- Uterine activity using TOCO.

Fetal movement can only be monitored with the Series 50 Family of Fetal Monitors that have Fetal Movement Profile (FMP) installed with the correct software revision and interface for Telemetry FMP.

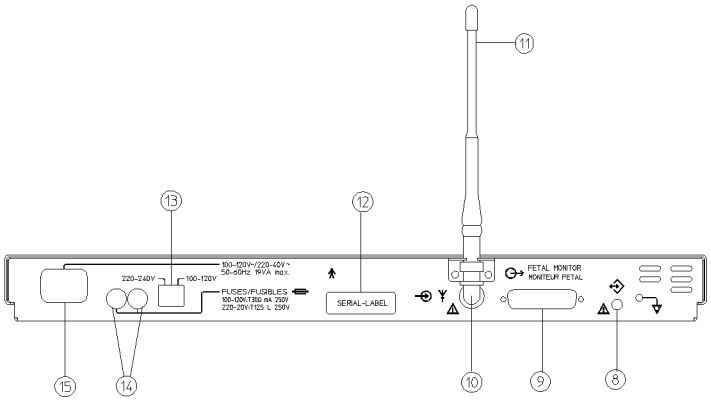
It is not recommended to use FMP during ambulant monitoring, as any movement of the ultrasound transducers whilst the patient is walking, may be recorded as fetal movement.

Product Overview



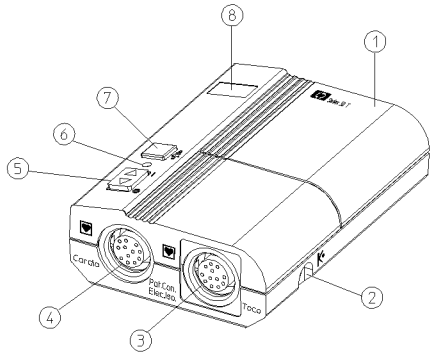
Telemetry Receiver (Front View)

1. **Power On/Off Button**
2. **Power On Light** — Green LED, lit when the Receiver is switched on.
3. **Nurse Call Acknowledge/ Volume Control Button** — Pressed when Nurse Call activated on the Transmitter to acknowledge the call and stop Nurse Call Light flashing and the intermittant tone sounding. It can also be used to set Nurse Call volume.
4. **Nurse Call Light** — Yellow LED, flashes when the Nurse Call Button is pressed on the Transmitter.
5. **Transmission INOP Light** — Yellow LED, lit when:
   - the Transmitter is switched off.
   - the Transmitter is out-of-range of the Receiver.
   - the Transmitter is defect.
   - the Transmitter and Receiver do not have matching serial numbers and channel frequency numbers.
   - the batteries in the Transmitter are dead.
6. **Battery Low Light** — Yellow LED, lit when batteries in the Transmitter are low.
7. **Channel Frequency Label** — Shows the channel number of the Receiver. This number must match the one on the Transmitter.



Telemetry Receiver (Rear View)

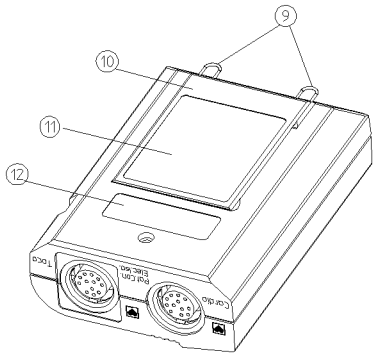
8. **Service Socket**
9. **Output Socket to Fetal Monitor**
10. **Antenna Input**
11. **Antenna**
12. **Product Serial Number**
13. **Voltage Switch** — 220-240V / 100-120V
14. **Fuses** — Fuses/Fusibles; 100-120V: T300 mA 250V; 220-240V: T125 L 250V
15. **Mains Socket** — 100-120V~/220V-240V~ 50-60Hz 19VA max.



Telemetry Transmitter (Top View)

1. **Battery Compartment** — For 3 x 1.5V AA batteries.
2. **Remote Event Marker/ Service Socket** — For recording significant events on the fetal trace with the Event Marker.

   It can also be used by Service Engineers for servicing.
3. **Toco Socket** — For connecting a Toco or IUP transducer. (Pat. Con. Elec Iso)
4. **Cardio Socket** — For connecting an ultrasound or DECG transducer. (Pat. Con. Elec Iso)
5. **On/Off Switch** — Off position O , On position |.
6. **On Light** — Green LED, lit when the Transmitter is switched on.
7. **Nurse Call Button** — Pressed to give an optical and acoustic signal to the Receiver.
8. **Channel Frequency Label** — Shows the channel number of the Transmitter, the number on this label must match the one on the Receiver.

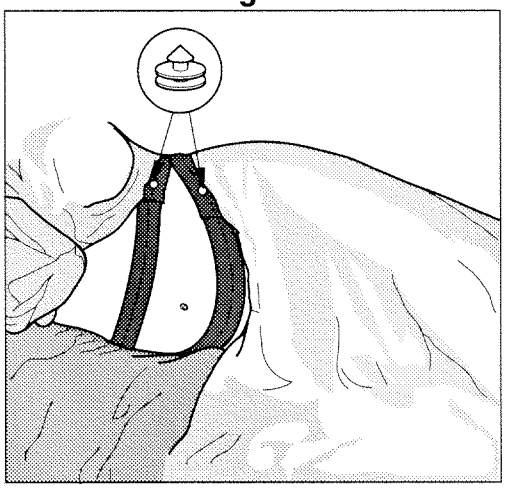


Telemetry Transmitter (Bottom View)

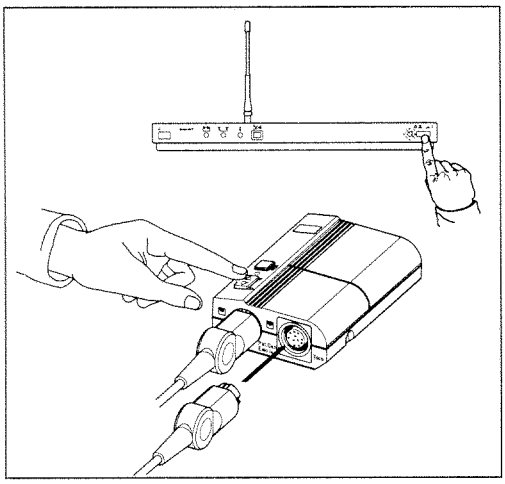
9. **Carrying Belt Clips** — For attaching the carrying belt to the Transmitter.
10. **Carrying Clip** — Clipped to patients' clothes during ambulant monitoring.
11. **PTT Approval Label**
12. **Product Number and Serial Number Label**

Application Overview

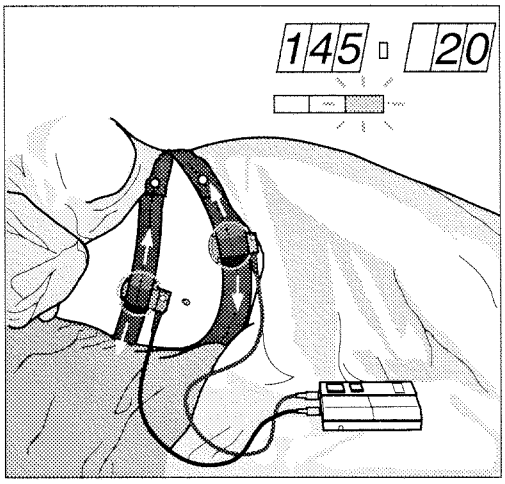
External Monitoring



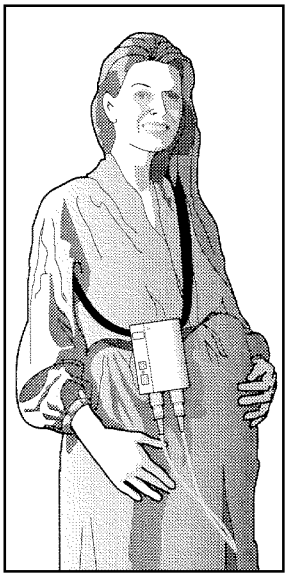
Fastening the Belts



Switching On and Plugging in

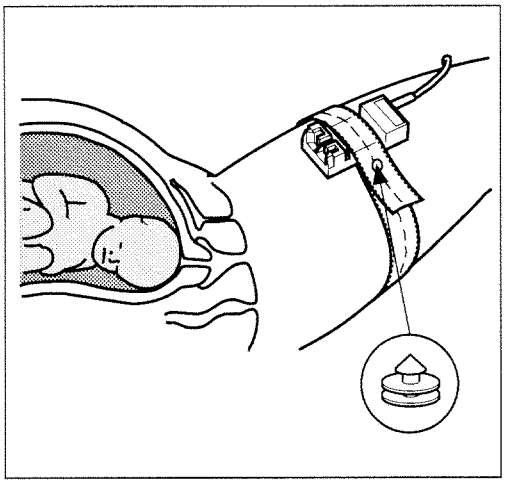


Applying the Transducers

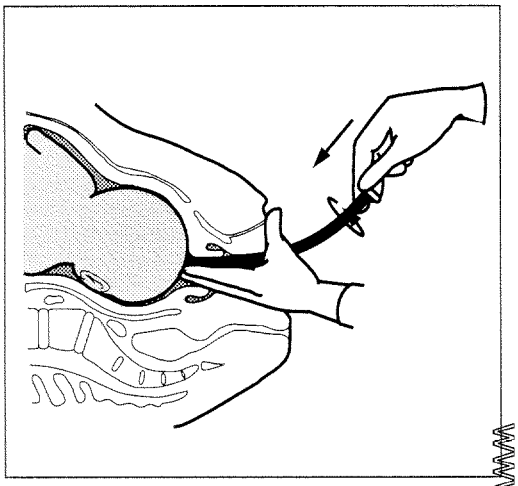


Ambulant Monitoring

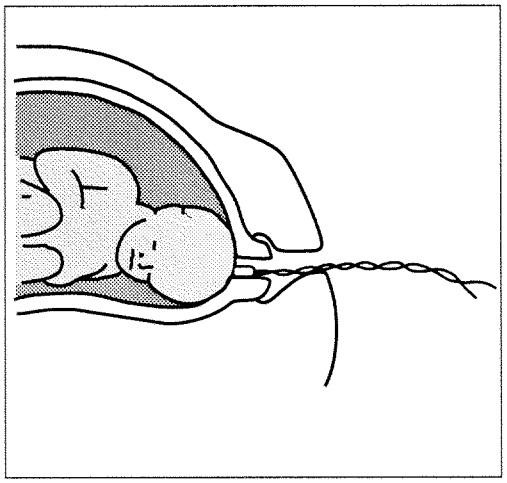
Internal Monitoring: DECG



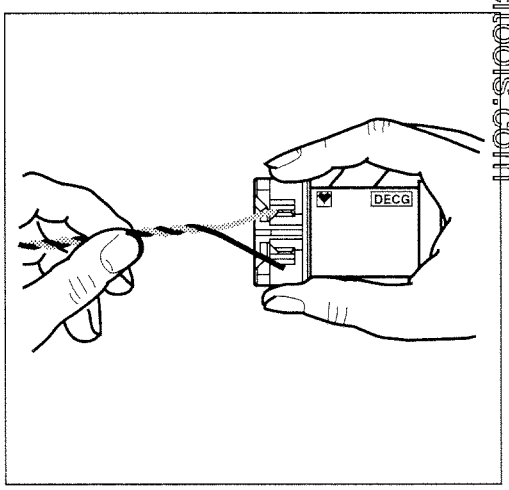
Attaching the Leg Belt



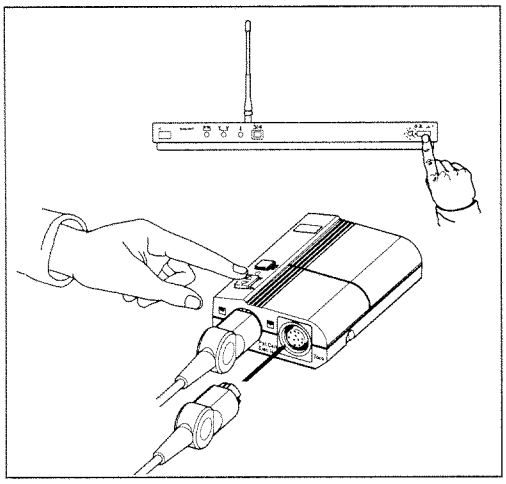
Attaching the Scalp Electrode



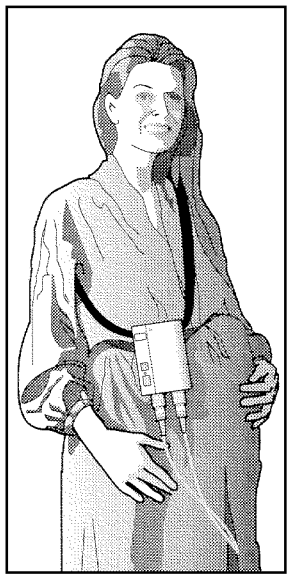
Electrode Attached



Connecting the Electrode to the Transducer



Switching On and Plugging In



Ambulant Monitoring

Internal Monitoring: IUP

Follow the same procedure for preparing and applying the IUP transducer as decribed in the *Operating Instructions* supplied with your Fetal Monitor.

For details of how to prepare and apply HP 13975B or 13995A transducer-tipped catheters, refer to the Application Notes that accompany them.

2 Monitoring FHR using Ultrasound

This chapter describes how to use the Series 50 T with a Fetal Monitor (a Series 50 A, 50 IP , 50 IX, 8040A or 8041A) and an ultrasound transducer to monitor FHR.

It lists the materials you need and describes how to:

- Fasten the belt around the patient.
- Switch on the Receiver and Fetal Monitor.
- Connect the transducer and switch on the Transmitter.
- Apply the transducer to the patient.
- Prepare the patient for ambulant monitoring.

At the end of the chapter is a table of the most common problems and their solutions.

While monitoring FHR, you may also monitor uterine activity externally or internally (see Chapter 4 or Chapter 5).

Fetal movements can also be recorded during FHR monitoring using the ultrasound transducer with the Series 50 Family of Fetal Monitors, see Chapter 6 for details. However, it is not recommended to use the Fetal Movement Profile during ambulant monitoring, as any movement of the ultrasound transducer whilst the patient is ambulating, may be recorded as fetal movement.

Warning

Under no circumstances are the brown ultrasound transducers to be used to monitor patients under water.

Ultrasound transducers that are colored blue are watertight and comply with IEC 529 (IP68). Under NO circumstances are these blue transducers to be directly connected to the Fetal Monitor when they are immersed in water, or come in contact with water.

Like every other external method available today, ultrasound has certain limitations in obtaining an ideal recording of FHR. These include:

- Patient discomfort.
- Possible signal loss due to fetal movement.
- Possible recording of maternal heart rate (see caution).
- Possible artefacts and gaps caused by the patient ambulating.

Caution

Because of the possibility of recording maternal heart rate instead of FHR, we recommend that you check the mother's pulse periodically during monitoring and compare this to the FHR signal. But beware of mistaking a "doubled" maternal heart rate for FHR.

Performing ultrasound imaging or Doppler flow measurements in conjunction with ultrasound fetal monitoring may cause false readings of FHR (recording of the trace may deteriorate).

What You Need

Materials	Product Number
US transducer (2.5m cable) or US Telemetry transducer (70cm cable)	M1356A M1356A Option C03
Gel	40404A (Europe only) 40483A (Worldwide)
Transducer belt and button	M1562A and M1569A

Caution 

Using ultrasound gel that is not approved by HP may reduce signal quality and may damage the transducer. This type of damage will not be covered by warranty.

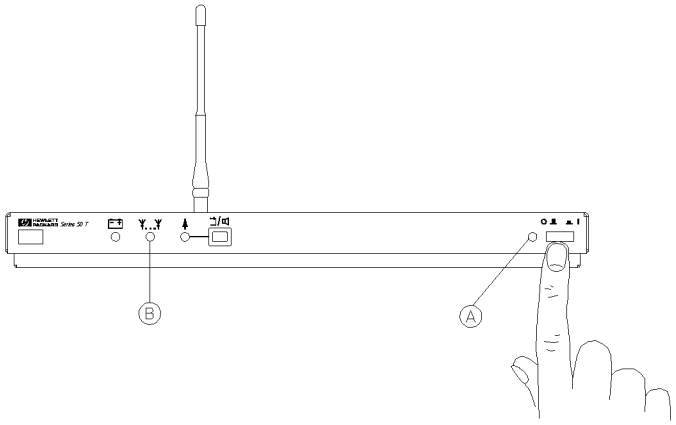
Fastening the Belt around the Patient

Follow the same procedure for fastening the belt as shown in Chapter 1 *Application Overview*.

2

Switching On the Receiver and the Fetal Monitor

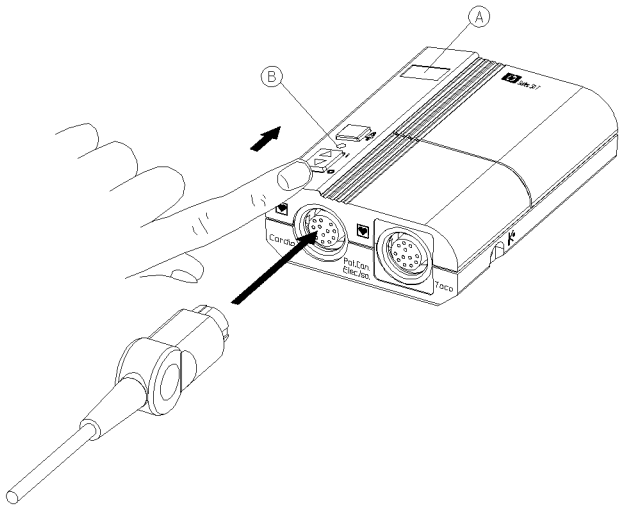
1. Ensure that the Receiver is connected to the Fetal Monitor via the Interface Cable (see Appendix A for details).
2. Remove all transducers from the front panel of the Fetal Monitor, otherwise telemetry will not function. (See Chapter 9 for a list of possible error messages.)
3. Switch on the Fetal Monitor and Recorder.
4. Switch on the Receiver by pressing the Power On/Off Button.



5. Ensure that the Power On light **(A)** and the Transmission INOP Light **(B)** come on.
6. Ensure that the Telemetry Indicator Lamp on the Fetal Monitor is lit, indicating telemetry monitoring mode.
7. Check that `TELE` is annotated on the Fetal Trace.

Switching On and Plugging In

1. Ensure that the number on the Channel Frequency Label **(A)** on the Transmitter is the same as the number on the Receiver.
2. Connect the Ultrasound transducer to the Cardio socket.
3. Push up the On/Off Switch to position **|** to switch on the Transmitter. The green On Light **(B)** comes on and the Transmission INOP light on the Receiver will then go out.



Connecting the Ultrasound Transducer to the Transmitter

Applying the Transducer to the Patient

1. Find the fetal heart by palpation, ausculation, or ultrasound imaging.
2. Apply a small amount of gel onto the surface of the transducer. There should be enough to give a thin layer over the surface of the transducer when it is applied to the patient's abdomen.

   Do not apply too much gel to the Ultrasound transducer. This could cause the transducer to slip or move from its optimal position on the abdomen, especially during ambulant monitoring.
3. Apply the transducer to the patient and gently "work" it in a circular motion to ensure that the gel layer makes good contact.
4. When the fetal heartbeat is clearly heard over the loudspeaker clip the transducer to the belt.

When the ultrasound transducer is applied and a good signal is obtained, check the mother's pulse and compare this to the signal from the loudspeaker to ensure that the transducer is recording FHR and not maternal heart rate. You should also do this periodically during monitoring.

Note

Use of ultrasound gel on the blue transducers may cause slight discoloration but will not affect ultrasound performance.
Blue transducers are water-tight to a depth of 0.5 meters. Transducers may be imersed in water **ONLY** when monitoring with the Series 50 T Telemetry System. The telemetry transmitter must **Never** be immersed in water.

Warning

Under NO circumstance should the transducers be immersed in water when connected to a Fetal monitor.

Ambulant Monitoring

When a clear signal is obtained on the Fetal Monitor:

1. Ask the patient to stand up.
2. Ensure that the Ultrasound transducer stays in position after the patient has moved and that you have not lost the FHR signal as the fetal position may change.
3. If the FHR signal is lost or unclear (yellow or red on the Signal Quality Indicator Panel on the Fetal Monitor), reposition the transducer while the patient is standing and if necessary tighten the belt to stop the transducer slipping.
4. Hook the Transmitter to the transducer belt or patient's clothing using the carrying clip at the back of the Transmitter, or attach the carrying belt to the Transmitter.

Note

You must ensure that you have obtained the best possible signal before you allow the patient to ambulate:

a. The Signal Quality Indicator on the Fetal Monitor should show green. A trace is produced when the Signal Quality Indicator is yellow, but for the best possible trace it should be green continuously.

b. The sound coming from the Fetal Monitor should be clear. This indicates that the best position for the transducer has been obtained.

Caution

During ambulant FHR monitoring, the chance of losing the signal or detecting the maternal heart rate is higher than during stationary monitoring. It is also possible, in some cases, that the frequency of the patient's walk may be detected. The risk that this may happen is higher when the patient is overweight or with a breech presentation.

The operating range of your Series 50 T Fetal Telemetry System will have been defined during purchase. Find out what it is, and make sure that your patient knows the boundaries within which she can walk and still be monitored.

Caution

Signal transmission can be disturbed when the Patient passes concrete walls or elevator doors.

Solving Common Problems

Problem	Possible Causes	Solutions
Erratic trace.	Fetal arrhythmia.	None.
	Obese patient.	None.
	Transducer wrongly positioned.	Reposition the transducer until the Signal Quality Indicator is green.
	Belt loose.	Tighten the belt.
	Too much gel.	Remove excess.
	Very active fetus.	None.
	Patient walking heavily.	Ask Patient to walk quietly.
	Insufficient gel.	Use the recommended amount.
Transducer slipping down.	Too much gel.	Use the recommended amount.
	Belt too loose.	Tighten the belt.
No FHR Trace.	Transducer wrongly positioned.	Reposition transducer.
	Transducer slipped.	Tighten belt. Check amount of gel on Transducer.
FHR low.	Recording maternal heart rate.	Check maternal pulse for coincidence with the audible signal.
Series 50 Users Only Suspicious Fetal Movement Profile	Maternal movement due to patient ambulating.	Turn off FMP.

Problem	Possible Causes	Solutions
Questionable FHR.	Recording MHR. FHR exceeds 300 bpm.*	Reposition the transducer. FHR is half-counted (for example, 320 bpm is recorded as 160 bpm).
An error message is displayed on the Monitor.		See Chapter 9 for a table of error messages, their causes and solutions.
If you suspect the signal from the transducer.		Carry out the Parameter Test described in Chapter 9.
* If the FHR is less than 50 bpm or between 240 and 300 bpm, it is not recorded. The Signal Quality Indicator is red.		

3

Monitoring FHR using DECG

This chapter describes how to use the Series 50 T with a Fetal Monitor (a Series 50 IP, 50 IX or a HP 8040A) and a spiral electrode to monitor FHR. It lists the materials you need and describes how to:

- Fasten the leg belt.
- Connect the spiral electrode to the fetus.
- Switch on the Receiver and Fetal Monitor
- Connect the transducer and switch on the Transmitter.
- Prepare the patient for ambulant monitoring.

At the end of the chapter is a table of the most common problems and their solutions.

A cervical dilation of two centimeters and a fetal station of at least minus two are necessary before the spiral electrode can be applied.

Unless you suspect fetal arrhythmia, be sure that Logic is on when monitoring FHR using DECG. See the *Operating Instructions* supplied with your Fetal Monitor for more details.

Caution

While using the DECG method with the Series 50 T Fetal Telemetry System, if you suspect the fetal heart rate being recorded, it is recommended to check the mother's pulse periodically during monitoring and compare this to the FHR signal.

Warning

Because the tip of the spiral electrode is designed to penetrate the fetal epidermis, the possibility of trauma, hemorrhage and infection exists. It should therefore be used only under aseptic conditions.

Membranes must be ruptured prior to attachment of the spiral electrode.

The spiral electrode should not be used when placenta previa is present or when it is not possible to identify the portion of the fetal body where application is contemplated.

Do not apply the spiral electrode to the fontanels, fetal face or genitalia.

What You Need

Materials	Product Number
DECG transducer (2.5m/8ft 2in cable) or Telemetry DECG transducer (70cm/28in cable)	M1357A or M1357A Option C03
Cable electrode	15243B
Spiral electrode: Double spiral and applicator **or** Single spiral **or** Double spiral	 15130A and 15131A 15133A 15133C
Leg belt and button	M1563A and M1569A

Warning

Be sure the belt is correctly attached to prevent tension in the cable from pulling on the spiral electrode and causing injury to the fetus.

Fastening the Leg Belt

Follow the same procedure for fastening the belt as shown in Chapter 1 *Application Overview*.

Note

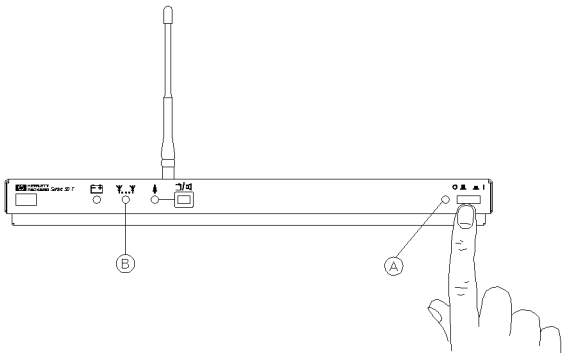
If the patient is going to ambulate during monitoring, ensure that the belt is tighter than usual, but still comfortable.

Connecting the Spiral Electrode

Follow the same procedure for connecting the Spiral Electrode as described in the *Operating Instructions* supplied with your Fetal Monitor.

Switching On the Receiver and the Fetal Monitor

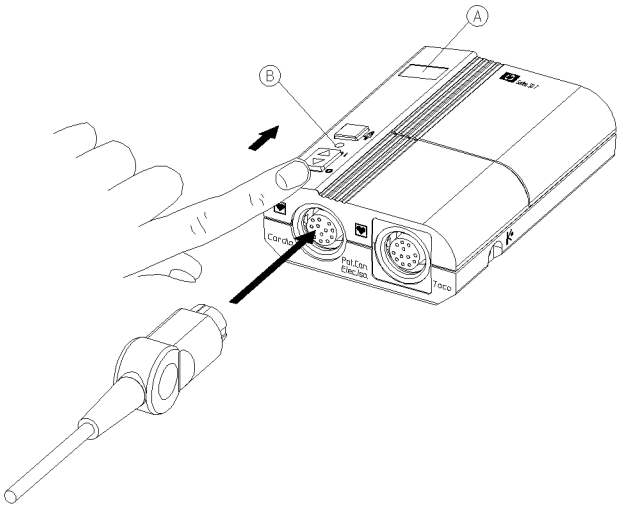
1. Ensure that the Receiver is connected to the Fetal Monitor via the Interface Cable (see Appendix A for details).
2. Remove all transducers from the front panel of the Fetal Monitor, otherwise telemetry will not function. (See Chapter 9 for a list of possible error messages.)
3. Switch on the Fetal Monitor and Recorder.
4. Switch on the Receiver by pressing the Power On/Off Button.



5. Ensure that the Power On light **(A)** Transmission INOP Light **(B)** are lit.
6. Ensure that the Telemetry Indicator Lamp on the Fetal Monitor is lit, indicating telemetry monitoring mode.
7. Check that `TELE` is annotated on the Fetal Trace.

Switching On and Plugging In

1. Ensure that the number on the Channel Frequency Label **(A)** on the Transmitter is the same as the number on the Receiver.
2. Connect the DECG transducer to the Cardio socket.
3. Push up the On/Off Switch to position **|** to switch on the Transmitter. The green On light **(B)** comes on and the Transmission INOP light on the Receiver will then go out.



Connecting the DECG Transducer to the Transmitter

If the spiral electrode and electrode wires are connected correctly and a good signal is being produced, the Signal Quality Indicator should be green. If not, `nop` is displayed. (see *Solving Common Problems* later in this chapter).

Ambulant Monitoring

When a clear signal is obtained:

1. Ask the patient to stand up.
2. Check that the DECG transducer stays in position after the patient has moved and that you have not lost the FHR signal.

Warning

Ensure that the leg belt is tight enough and will not slip whilst patient is walking around.

3. Hook the Transmitter to the patient's clothing using the carrying clip at the back of the Transmitter or attach the carrying belt to the Transmitter.

Note

You must ensure that you have obtained the best possible signal before you allow the patient to ambulate.

a. The Signal Quality Indicator on the fetal monitor should show green. A trace is produced when the Signal Quality Indicator is yellow, but for the best possible trace it should be green continuously.

The operating range of your Series 50 T Fetal Telemetry System will have been defined during purchase. Find out what it is, and make sure that your patient knows the boundaries within which she can walk and still be monitored.

Caution

Signal transmission can be disturbed when the Patient passes concrete walls or elevator doors.

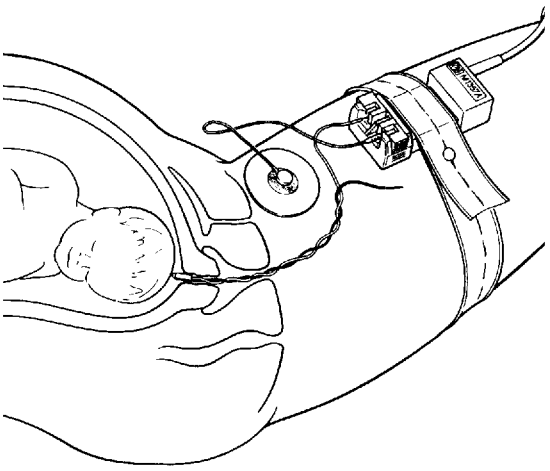
Solving Common Problems

Problem	Possible Causes	Solutions
Erratic trace. Erratic display on Monitor. Signal Quality Indicator on Monitor is red continuously.	No ECG signal. Poor contact between the reference electrode and the mother. Fetal arrhythmia.	Replace the red electrode wire with electrode 15243B (see *Replacing the Electrode Wire*.) If this does not solve the problem, use a new spiral electrode. Be sure that Logic is off. See *Operating Instructions* provided with your Fetal Monitor.
`nop` displayed on Monitor.	Improper connection of electrode leads to cable block. No contact or poor contact between the reference electrode and the mother. Spiral electrode detached.	Check electrode lead connection. Replace the red electrode wire with electrode 15243B (see *Replacing the Electrode Wire*). If this does not solve the problem, use a new spiral electrode. Reattach the spiral electrode.
An error message is displayed on the Monitor.		See Chapter 9 for a table of error messages, their causes and solutions.
If you suspect the signal from the transducer.		Carry out the Parameter Test described in Chapter 9.

Replacing the Electrode Wire

If there is no trace or an erratic trace, due to no contact or poor contact between the reference electrode and the mother, you should replace the electrode wire.

1. Disconnect the red electrode wire from the ECG cable block.
2. Connect electrode 15243B in its place.
3. Place a pre-gelled disposable ECG electrode on the patient's thigh.
4. Connect electrode 15243B to it.



Replacing the Electrode Wire

Heart Rate Limits

Although the following problem has no solution, it should be noted that questionable heart rate only occurs in extremely rare cases. These are detailed below.

Problem	Possible Cause
Questionable heart rate	FHR less than 30 bpm. FHR is not recorded and the Signal Quality Indicator is red. FHR between 30 and 50 bpm. **With Series 50 Monitors only** 50-210 bpm paper records a straight line at 50 bpm. 30-240 bpm paper records the FHR. FHR is between 210 and 240 bpm. **With Series 50 Monitors only** 50-210 bpm paper records a straight line at 210 bpm until 240 bpm is exceeded. 30-240 bpm paper records the FHR up to 240 bpm. FHR exceeds 240 bpm. FHR is not recorded and the Signal Quality Indicator is red. If the FHR is suspect (fetus may not be viable) it is recommended to check MHR during DECG monitoring.

4

Monitoring Uterine Activity

This chapter describes how to use the Series 50 T with a Fetal Monitor (a Series 50 A, 50 IP, 50 IX, HP8040A or 8041A) and a Toco transducer to monitor uterine activity. It lists the materials you need and describes how to:

- Fasten the belt around the patient.
- Connect the transducer to the Transmitter.
- Apply the transducer to the patient.
- Prepare the patient for ambulant monitoring.

At the end of the chapter is a table of the most common problems and their solutions.

Note

Uterine activity can only be monitored via Telemetry when FHR is also being monitored.

Warning

Under no circumstances are brown Toco transducers to be used to monitor patients under water.

External Toco transducers that are colored blue are watertight and comply with IEC 529 (IP68). Under NO circumstances are these blue transducers to be directly connected to the Fetal Monitor when they are immersed or come in contact with water.

Monitoring uterine activity using a Toco transducer is an external method. Therefore the measurement is always **relative** and absolute pressure measurements cannot be determined. Amplitude and sensitivity depend on various factors: the position of the transducer, the belt tension and the size of the patient.

An **absolute** measurement can only be obtained by monitoring intrauterine pressure.

What You Need

Materials	Product Number
Toco transducer (2.5m/8ft 2in cable) or Toco Telemetry transducer (70cm/28in cable)	M1355A M1355A Option C03
Transducer belt and button	M1562A and M1569A

Note Only use belts supplied by HP to ensure good quality Toco recording.

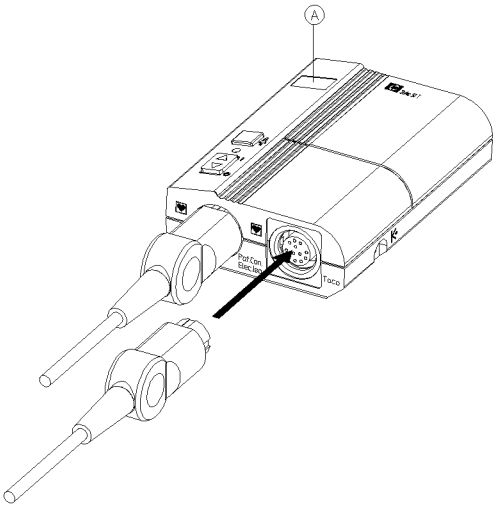
Fastening the Belt around the Patient

Follow the same procedure for fastening the belt as shown in Chapter 1 *Application Overview*.

Note If the patient is going to ambulate during monitoring, ensure that the belt is tighter than usual, but is still comfortable for the patient. This is to reduce the interference on the Toco channel which will be modulated on the Toco trace due to the patient ambulating.

Connecting the Transducer to the Transmitter

1. Ensure that the number on the Channel Frequency Label **(A)** on the Transmitter is the same as the number on the Receiver.
2. Connect the Toco transducer to the Toco socket.



Connecting the Toco Transducer to the Transmitter

Applying the Transducer to the Patient

1. Place the transducer just above the umbilicus and not at the fundus; this ensures the optimum uterine activity recording for ambulant monitoring.
2. Slide the belt over the transducer and clip the transducer in place.
3. Between contractions, adjust the Toco Baseline on the Fetal Monitor; this resets the display and trace to 20.

Ambulant Monitoring

When contractions are displayed on the Monitor and obtained on the fetal trace:

1. Ask the patient to stand up.
2. Adjust the Toco Baseline on the Fetal Monitor to reset the display and trace to 20.
3. Ensure that the Toco transducer stays in position after the patient has moved and that you have not lost the uterine activity displayed on the monitor and obtained on the fetal trace.
4. If the uterine activity signal is lost or unclear, reposition the transducer while the patient is standing and if necessary, tighten the belt to stop the transducer slipping.
5. Hook the Transmitter to the transducer belt or patient's clothing using the carrying clip at the back of the Transmitter or attach the carrying belt to the Transmitter.

Note

You must ensure that you have obtained the best possible signal before you allow the patient to ambulate.

While the patient is ambulating, it is possible that the frequency of the patient's walk may be detected.

The operating range of your Series 50 T Fetal Telemetry System will have been defined during purchase. Find out what it is, and make sure that your patient knows the boundaries within which she can walk and still be monitored.

Caution

Signal transmission can be disturbed when the Patient passes concrete walls or elevator doors.

Solving Common Problems

Problem	Possible Causes	Solutions
Quality of the trace deteriorates or the Toco baseline varies.	The belt is too slack or too tight.	Reposition the transducer just above the umbilicus, adjust the belt, and press the Toco Baseline Key.
Artefact on Toco trace.	Maternal respiration being recorded. Walk frequency is being recorded.	Position toco transducer lower. None.
Toco flat.	Belt is loose. Fetal Monitor is not set correctly.	Tighten the belt. Reset the Toco baseline.
Toco sensitivity is too high (above 100 units.)	The belt is loose. Physical transmission of pressure from the uterus to the sensor is much higher than the average value.	Tighten the belt. Reposition the transducer to reduce sensitivity.
An error message is displayed on the Monitor.		See Chapter 9 for a table of error messages, their causes and solutions.
If you suspect the signal from the transducer.		Carry out the Parameter Test described in Chapter 9.

5

Monitoring Intrauterine Pressure

This chapter describes how to use the Series 50 T with a Fetal Monitor (a Series 50 IP, 50 IX or a HP 8040A) and a fluid-filled catheter to monitor intrauterine pressure (IUP).

It lists the materials you need and describes how to:

- Prepare and apply the transducer to the patient.
- Connect the transducer to the Transmitter.
- Prepare the patient for ambulant monitoring.

At the end of the chapter is a table of the most common problems and their solutions.

Note 

Uterine activity can only be monitored via Telemetry when FHR is also being monitored.

Note

You may experience problems monitoring IUP with an HP 8040A Fetal Monitor and the Series 50 T Fetal Telemetry System. The sensitivity setting for IUP with the 8040A may be higher than the setting used with Series 50 T Fetal Telemetry System. This sensitivity setting can be changed, but once it is changed you will only be able to monitor IUP with the Series 50 T and not with the HP8040A.

To change the setting, contact your HP Response Center

Warning

Uterine catheterization should only be performed following complete clinical evaluation and membrane rupture. It should not be performed if placenta previa is diagnosed or if uterine bleeding from an undetermined source is present.

What You Need

If you are using the re-usable transducer 1290C Option J05, then you need the following materials:

Materials	Product Number
Transducer	1290C Option J05
Disposable intrauterine kit	14099C, D or E
Dome (not included in 14099C, D)	1295CK
Sterile water or saline solution	

Note

The IUP Transducer 1290C Option J06 and adapter cable 40460C Option JO5 cannot be used with the Series 50T Fetal Telemetry System.

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If you are using the disposable transducer 13972A, then you need the following materials:

Materials	Product Number
Disposable intrauterine kit with disposable transducer	13972A
Transducer adapter cable	1271A Option J05
Sterile water or saline solution	

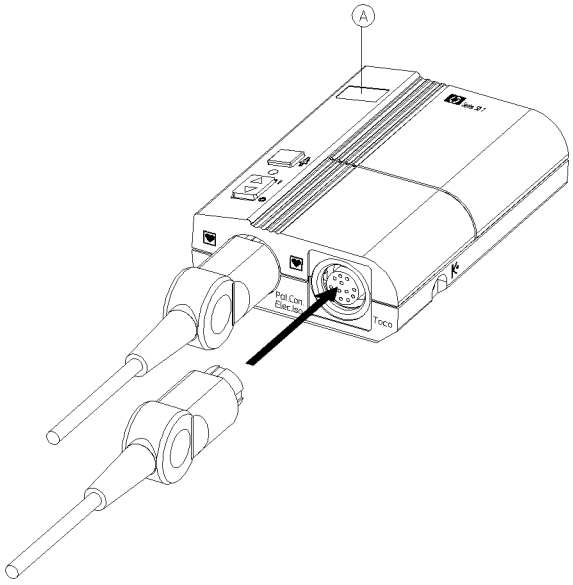
IUP can also be monitored using the HP 13975B or 13995A transducer-tipped catheter. Detals of how to use these catheters are given on the Application Notes that accompany them.

Preparing and Applying the Transducer to the Patient

Follow the same procedure for preparing and applying the IUP transducer as decribed in the *Operating Instructions* supplied with your Fetal Monitor. For details of how to prepare and apply HP 13975B or 13995A transducer-tipped catheters, refer to the Application Notes that accompany them.

Connecting the Transducer to the Transmitter

1. Ensure that the number on the Channel Frequency Label **(A)** on the Transmitter is the same as the number on the Receiver.
2. Connect the IUP transducer to the Toco socket.



Connecting the IUP Transducer to the Transmitter

Ambulant Monitoring

When contractions are displayed on the Monitor and obtained on the fetal trace:

1. Ask the patient to stand up.
2. Set the Toco baseline to 0 by adjusting the Toco baseline on the Fetal Monitor.
3. Ensure that the IUP transducer stays in position after the patient has moved and that the IUP transducer is positioned at the same height as the tip, so you do not lose the uterine activity signal displayed on the monitor and obtained on the fetal trace.
4. Hook the transmitter to the patient's clothing using the carrying clip at the back of the transmitter or attach the carrying belt to the Transmitter.
5. If the uterine activity signal is lost or unclear, reapply the IUP catheter.

Note

You must ensure that you have obtained the best possible signal before you allow the patient to ambulate.

The operating range of your Series 50 T Fetal Telemetry System will have been defined during purchase. Find out what it is, and make sure that your patient knows the boundaries within which she can walk and still be monitored.

Caution

Signal transmision can be disturbed when the Patient passes concrete walls or elevator doors.

Solving Common Problems

Problem	Possible Causes	Solutions
No trace. No change in pressure during contraction.	Catheter clogged. 'Dry' environment.	Flush with sterile solution.
Only pressure peaks can be seen (baseline not visible). "-" indicator flashes.	Zero adjustment is incorrect.	Zero the system.
Trace is a straight line.	Transducer defective.	Touch the catheter. If it does not show up and down movements, replace the transducer.
Trace superimposed with noise.	End of the catheter is in the uterine wall or dry column.	Retract the catheter a little and flush.
`Err 3` displayed when using the Series 50 T with a HP 8040A Monitor.	IUP sensitivity setting is incorrect.	Contact your HP Response Center to change setting. *Once the setting is changed, you will only be able to monitor IUP with the Series 50T.*
Fluctuations in IUP baseline.	The tip of the IUP catheter is higher or lower that the transducer.	Reposition the transducer so it is at the same height as the tip.
An error message is displayed on the Monitor.		See Chapter 9 for a table of error messages, their causes and solutions.
If you suspect the signal from the transducer.		Carry out the Parameter Test described in Chapter 9.

6

Fetal Movement Profile

The Fetal Movement Profile (FMP) measurement can only be obtained whilst monitoring FHR using ultrasound with a Series 50 Fetal Monitor, and if FMP is available on the Fetal Monitor.

The  label underneath the US socket on Series 50 Fetal Monitors indicates that the Monitor can detect fetal movements via the ultrasound transducer.

Note 

FMP via the Series 50 T Fetal Telemetry system is only available with Series 50 Fetal Monitors that have FMP installed with the correct software revision and interface for Telemetry FMP.

The transducer detects gross fetal body movements: eye movements are not detected and movement of the feet and hands may not be detected.

For details of FMP annotation, refer to the *Setting Up and Using Your Monitor* provided with your Series 50 Fetal Monitor.

Note

It is not recommended to use FMP during ambulant monitoring, as any movement of the ultrasound transducer whilst the patient is ambulating, may be recorded as fetal movement.

Positioning or repositioning the transducer may be recorded as fetal movement; maternal movement, excessive fetal breathing or fetal hiccups may also be recorded as fetal movement. You can mark this artifact on the paper using the Remote Event Marker (see Chapter 7) and these "fetal movements" should be ignored when interpreting the FMP.

Switching FMP Off and On ⚠

It is not recommended to use FMP during ambulant monitoring, as any movement of the ultrasound transducer whilst the patient is ambulating may be recorded as fetal movement.

You can switch FMP on and off using the keys on the Monitor or the optional Barcode Reader.

Refer to *Setting Up and Using Your Monitor* for more details.

Note

FMP is switched off whenever a Series 50 T Telemetry System (plugged into the Monitor) is switched on. FMP is switched back on again when the telemetry system is switched off (or uplugged). If you want to monitor FMP with a Series 50 T Telemetry System (and have the correct software revision and interface for Telemetry FMP) switch FMP on by using either the Key or the barcode method.

Solving Common Problems

Problem	Possible Causes	Solutions
FMP does not appear on the trace.	FMP is switched off.	Switch FMP on.
	The FMP Option was not ordered with the Fetal Monitor	Order FMP Option.
	Older software revision or older Telemetry Interface in Fetal Monitor.	Update Monitor with newest software revision and enhanced interface.
FMP printed on Series 50 A or 50 IP trace but cannot be switched off.	Software revision not compatible with FMP from Series 50 T Fetal Telemetry System.	Order software upgrade.

7

Marking Events

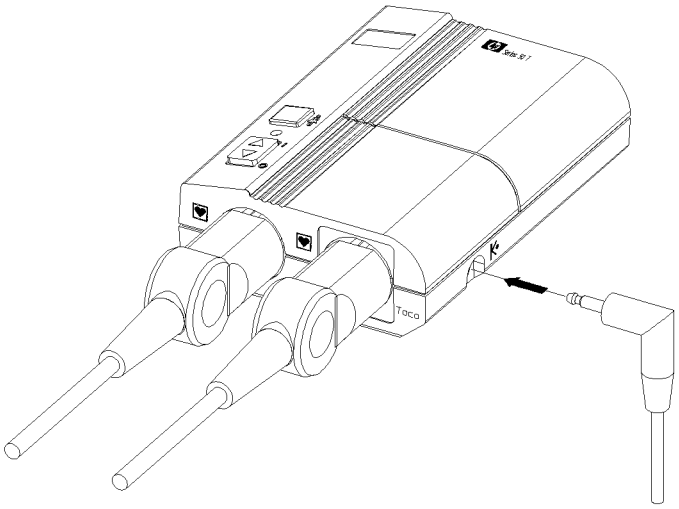
The Remote Event Marker (HP 15249A) records significant events on the fetal trace (for example, when pain medication is administered or when a contraction is felt).

Note

The Remote Event Marker will only function when a Toco or IUP transducer is also connected to the Transmitter.

To attach the Remote Event Marker to the Transmitter:

1. Insert the Remote Event Marker into the Remote Event Marker Socket on the Transmitter.



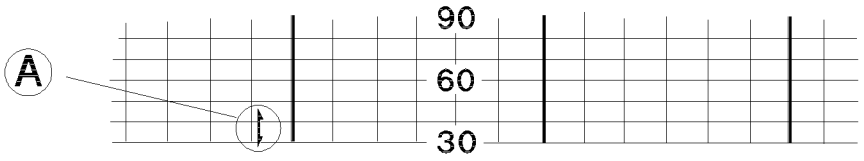
Socket for Remote Event Marker

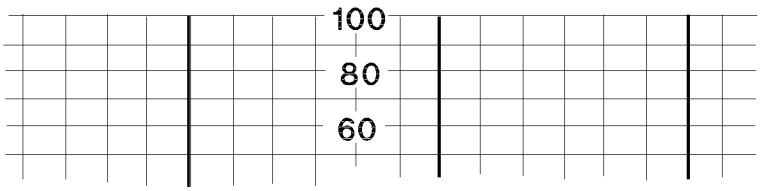
To mark an event on the paper:

1. Press the button on the Remote Event Marker.

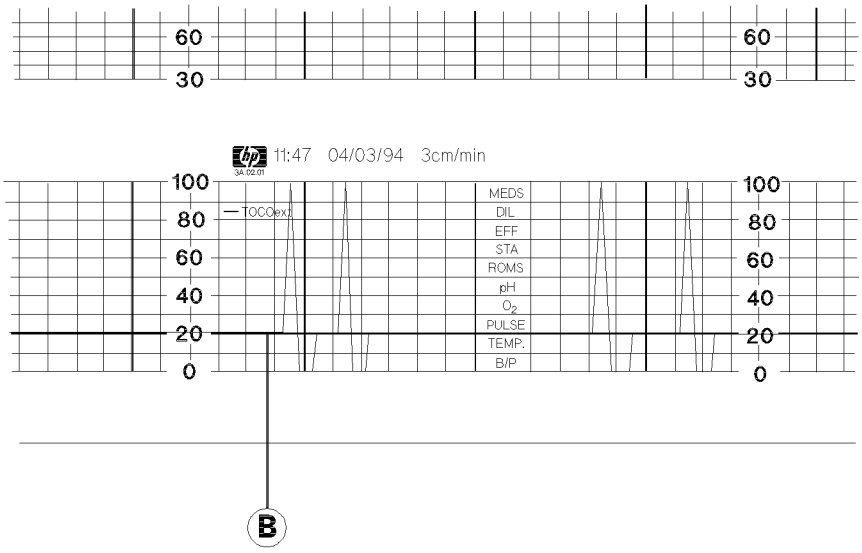
When you press the button, the following is printed on the trace:

- *Series 50 Fetal Monitors with enhanced interface*
  A small arrow (**A**) is printed on the FHR scale. The arrow starts with the peak to show the exact time when the button is pressed.





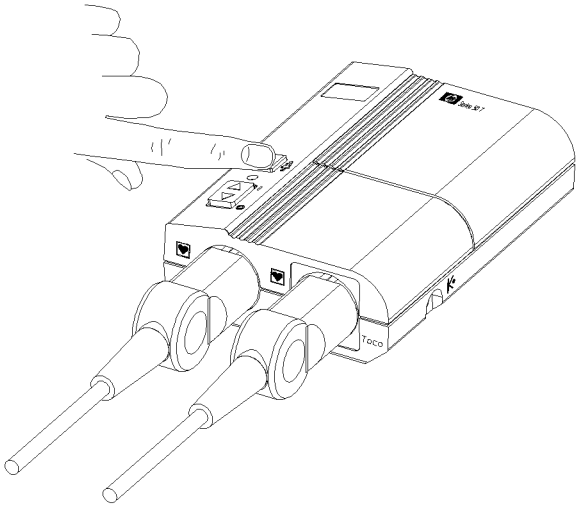
■ *Series 50, HP 8040 and HP 8041 Fetal Monitors*
A fullscale deviation of 100 units **(B)** is printed on the Toco scale.



8

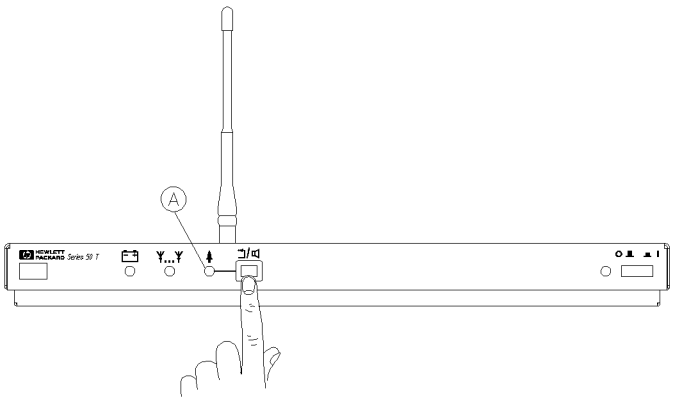
Using the Nurse Call

1. If the patient needs to call a Nurse during monitoring she can press the Nurse Call Button on the Transmitter.



Nurse Call Button - Transmitter

2. When this button is pressed the Nurse Call Light on the Receiver **(A)** flashes and an intermittant tone sounds.



Nurse Call Button - Receiver

3. To acknowledge the call and turn off the tone, press the Nurse Call Acknowledge/Volume Control Button. The Nurse Call Lamp **(A)** also goes out when the call is acknowledged.

Note

The volume of the Nurse Call can be changed provided the Nurse Call is not being activated. See Appendix A for details on how to change the volume of the Nurse Call.

9

Troubleshooting

Common problems that may occur during monitoring are dealt with in Chapters 2 to 5. This chapter describes how to:

- Solve General Problems.
- Carry out the Parameter Test.
- Test the Receiver.
- Test the Transmitter.

At the end of the chapter is a table of error messages related to telemetry that appear on the Fetal Monitor, their causes and solutions.

Detailed tests are given in the *Service Manual (M1310-9000A)*.

Solving General Problems

Problem	Possible Causes	Solutions
All the lights on the Receiver stay on when the Receiver is turned on.	Fetal Monitor is switched off. Possible defect in the Receiver, Interface Cable or Fetal Monitor.	Switch on Fetal Monitor. Carry out the tests described in later in this chapter in *Testing Your Receiver.*
The Telemetry Indicator Lamp on the Fetal Monitor does not light when the Monitor and the Receiver are switched on.	Incorrect interface connection between the Monitor and the Receiver. Faulty interface cable.	Follow the instructions in Appendix A for details on how to connect the Monitor to the Receiver. Replace interface cable. *Contact your HP Response Center.*
Receiver Power On Light does not light when the Receiver is switched on.	Power cable not plugged in to the power supply. Fuses need replacing. Line voltage incorrect.	Plug in and switch on. Replace fuses, see Appendix B for details. *Contact your HP Response Center.*
Transmission INOP light on the Receiver is still lit when the Transmitter is switched on.	Receiver and Transmitter do not have the same Channel or Serial Number. Batteries in the Transmitter are dead.	Check Channel number and Serial numbers are the same on the Receiver and the Transmitter. Change the batteries in the Transmitter (refer to Appendix B for details.)

Problem	Possible Causes	Solutions
Battery Low Light lit on Receiver.	Power in batteries is low. From the time that the Lamp is first lit you have a certain length of time until the batteries are completely empty. This time varies depending on the type of batteries See table *Remaining Battery Life after Battery Low Light*.	Change Batteries.
INOP Transmission Lamp is lit after the patient has moved a short distance away form the Receiver.	**Local Antenna:** Antenna not connected correctly. **Remote Antenna System:** Antenna cable not connected correctly to Receiver.	Check antenna is connecting correctly. Refer to Appendix A *Connecting the Antenna to the Receiver* for more details. Test the Antenna System by bringing the Transmitter close to the Receiver. If the transmission is good, then the Antenna System is not functioning properly. *Contact your HP Response Center.*

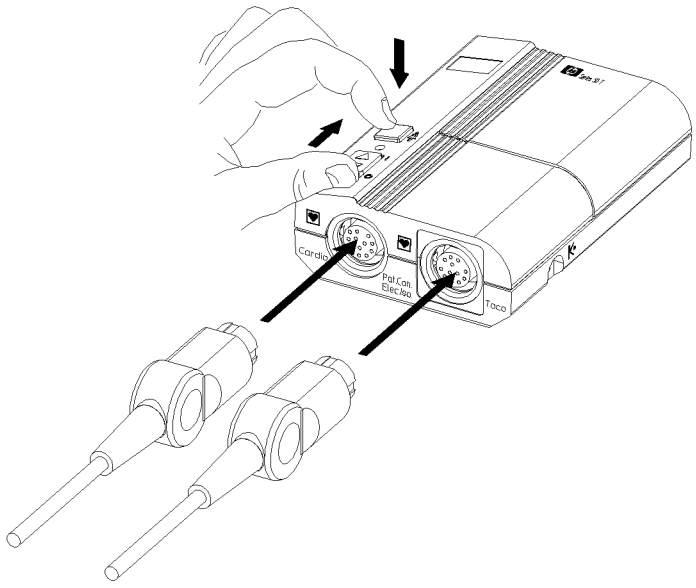
Remaining Battery Life (in minutes) after Battery Low Light

Battery Type	Monitoring Modes		
	US + TOCO(ext)	DECG + TOCO(ext)	DECG + IUP
Alkaline (1.8 AH)	180 min	100 min	80 min
NiCd accu (0.6 AH)	10 min	6 min	5 min
NiMH accu (1.2 AH)	20 min	12 min	10 min

Carrying out the Parameter Test

The Parameter Test tests the signal path to and from the transducer sockets, but not the transducers themselves. To carry out the test:

1. Switch on the Fetal Monitor, the Recorder and the Telemetry Receiver.
2. Connect the appropriate transducer to each socket on the Transmitter.
3. Standing within view of the Fetal Monitor, press the Nurse Call Button on the Transmitter and switch on the Transmitter simultaneously. The test will run as long as the Nurse Call is pressed.



The correct Monitor response for each signal is given in the following table:

Signal	Correct Monitor Response
US	`125` is displayed and printed. Signal Quality Indicator is green. Fetal heartbeat is heard from the loudspeaker.
Toco	A triangle signal with an amplitude of `40` units is displayed and printed. Each cycle last for 12 seconds.
DECG	`150` is displayed and printed. Signal Quality Indicator is green. Fetal heartbeat is heard from the loudspeaker.

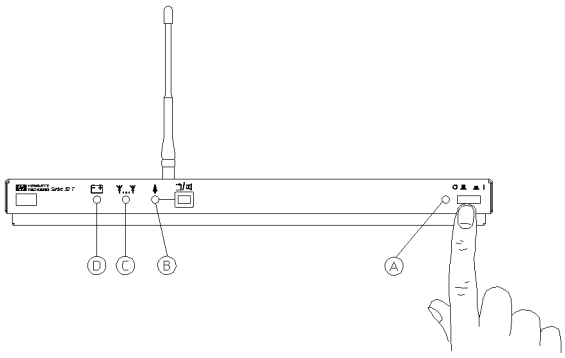
If the response is different, contact your HP Service Engineer or Response Center.

Testing the Receiver

Self-Test

1. Switch on the Fetal Monitor and Recorder.
2. Press the Power On/Off Button to switch the Receiver on.

   When you switch on:



- The Receiver On light **(A)** comes on.
- The Nurse Call Light **(B)** and the Battery Low light **(C)** are lit for 1 second.
- The Transmission INOP Light **(D)** lights and stays lit until the Transmitter is switched on.
- The Telemetry Lamp Indicator on the Fetal Monitor lights, indicating Telemetry monitoring mode.
- `TELE` is annotated on the fetal trace.

Testing the Interface between the Fetal Monitor and Receiver

1. Remove Fetal Monitor interface cable from the back of the Receiver.
2. All the lights on the front of the Receiver will go out. If they are still lit the Receiver is not working properly.

   Please contact your HP Response Centre.

Testing the Interface Cable

1. Ensure that the interface cable is connected to the Receiver.
2. Remove interface cable from the Fetal Monitor.

   There are two possible outcomes of this test:

   a. If all the lights on the Receiver are lit, the interface cable is faulty.

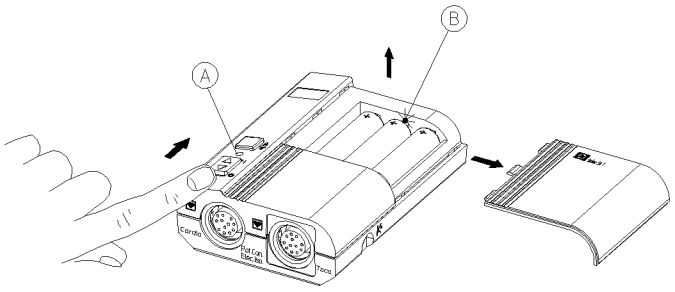
   b. If the lights on the Receiver go out, there is a fault with the telemetry interface in the Fetal Monitor.

   In both cases, contact your HP Response Centre.

Testing the Transmitter

Self Test

1. Slide back the battery cover.



2. Push the On/Off switch to position | on the Transmitter.
3. The green On/Off Light **(A)** lights and the Transmitter is on.
4. Check the red Light **(B)** situated behind the middle battery. The possible LED reponses are given in the following table:

LED Response	Cause and Solution
Red Light is lit for a few seconds then goes out.	Self Test completed successfully.
Red Light not permanently out after 3 seconds. (Blinking or on).	Batteries are low. *Change batteries.* Hardware error. *Contact your HP Response Center.*

Error Messages

The following error messages are directly related to Telemetry and appear on the Fetal Monitor. Refer to the *Operating Instructions* provided with your Monitor for error messages not related to Telemetry monitoring.

Series 50 Family

Message	Display	Cause and Solution
`Err 9`	US Toco	Invalid Telemetry mode. *Check the cable from the Telemetry Receiver and, if necessary, replace it.*
`Err 14`	US Toco	Incorrect transducer connected into Transmitter. *Check that the transducer is compatible with Series 50T Fetal Telemetry System.*
`Err 16`	US Toco	Transducers are connected to the front panel of the Fetal Monitor. *Disconnect the transducers from the Fetal Monitor or switch off the Telemetry Receiver.*

HP 8040A

Message	Display	Cause and Solution
`Err 16`	US Toco	Transducers are connected to the front panel of the Fetal Monitor. *Disconnect the transducers from the Fetal Monitor or switch off the Telemetry Receiver.*

HP 8041A

Message	Display	Cause and Solution
Signal indicator lamps flashing.	Indicator Panel.	Invalid Telemetry mode. *Check the cable from the Telemetry Receiver and, if necessary, replace it.* Incorrect transducer connected into Transmitter. *Check that the transducer is compatible with Series 50T Fetal Telemetry System.* Transducers are connected to the front panel of the Fetal Monitor. *Disconnect the transducers from the Fetal Monitor or switch of the Telemetry Receiver.*

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10

Safety Information

Safety Information

Read this chapter before setting up and using your Series 50 T Fetal Telemetry System.

Warning

FCC WARNING:

This equipment generates, uses and can radiate radio-frequency energy, and if it is not installed and used in accordance with this manual, may cause interference to radio communications.

Operation of this equipment in a residential area may cause interference, in which case the users, at their own expense, must take whatever measures may be required to correct the interference.

Equipotential Terminal 

This symbol is used to identify terminals which are connected together, bringing various equipment or parts of a system to the same potential. This is not necessarily earth potential. (The value of potentials of earth may be indicated adjacent to the symbol.)

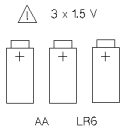
Caution Symbol 

This symbol indicates that the operator should refer to the manual *Setting Up and Using Your Telemetry System* before beginning a procedure.

Earth Terminal

This symbol identifies the terminal for connection to an external protective earth system.

Battery Symbol 3 x 1.5V



This symbol identifies the battery holder in the transmitter containing three 1.5 V batteries. Three types of batteries can be used in the transmitter:

- Alkaline
- NiCd (rechargeable)
- NiMH (rechargeable)

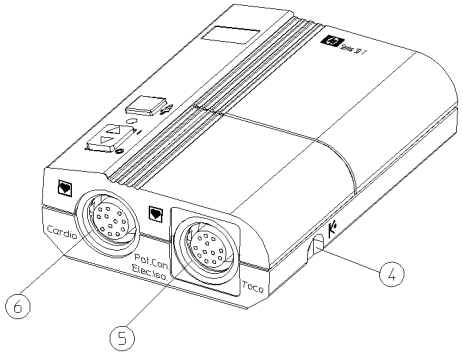
Note

Use only high quality batteries.

Zinc-carbon batteries are not recommended as they have a low energy content, resulting in shorter operating times. They can also leak.

Maximum Input/Output Voltages

Receiver (Rear View)



Transmitter

1. Service Socket The Service Engineer can also connect an HP Omnibook, HP 95LX/100LX or HP Vectra to this socket and so carry out various extended configuration and service functions.
   Maximum voltage of ±12V.
2. Socket to Fetal Monitor
   Maximum voltage of ±12V.
3. Power Input Socket
   100-120V ~ or 220-240V ~
4. Event Marker/Service Socket
   Maximum Voltage of +5V.
5. Toco Socket
   Maximum Voltage of +5V.
6. Cardio Socket
   Maximum Voltage of +5V.

Protective Earth

The following guidelines, if conscientiously followed, will guarantee maximum patient safety:

- To protect hospital personnel and the patient, the cabinet must be grounded. Accordingly, the Receiver is equipped with a 3-wire power cable which grounds it to the power line ground when plugged into an appropriate 3-wire receptacle. Do not use a 3-wire to 2-wire adapter with the Receiver. Any interruption of the protective earth grounding will cause a potential shock hazard that could result in serious personal injury.

  Whenever it is likely that the protection has been impaired, the Receiver must be made inoperative and be secured against any unintended operation.

Caution 

Check each time before use that the Telemetry System is in perfect working order and the Receiver is properly grounded.

- The patient cable must be positioned so that it does not come into contact with any other electrical equipment.
- Before operation, make sure that the Receiver is free from condensation. This can form when equipment is moved from one building to another, and is exposed to moisture and differences in temperature.

Warning 

Possible explosion hazard if used in the presence of flammable anesthetics.

Patient Safety

The Telemetry System should only be used by, or under the direct supervision of, a licensed physician or other health care practitioner who is trained in the use of fetal heart rate monitors and in the interpretation of fetal heart rate traces. US federal law restricts this device to sale by, or on the order of, a physician.

The Telemetry Receiver is a Protection Class 1, Type B instrument. It is designed to fulfill safety requirements according to IEC 601-1, UL 544 and CSA-C22.2 No.601.1-M90.

The Telemetry Transmitter is a battery operated device, applied parts (patient connectors) are Type CF.

Environment

The Series 50 T Fetal Telemetry System should be used in an environment which is reasonably free from vibration, dust, corrosive or explosive gases, extremes of temperature, humidity, etc. It operates within specifications at ambient temperatures between 0 and 45°C . Ambient temperatures which exceed these limits can affect the accuracy of the Series 50 T Fetal Telemetry System, the Transmitter radio frequency transmission, and cause damage to the components and circuits.

The Series 50 T Fetal Telemetry System can be stored at ambient tempertures between -40°C and 75°C.

Warning

Under NO circumstances should the Blue transducer be immersed in water when connected to the Fetal Monitor.

Note

The **Blue** Toco and Ultrasound transducers are water-tight to a depth of 0.5 meters. The transducers can be immersed in water **ONLY** when monitoring with the Series 50 T Telemetry System. The telemetry transmitter must **NEVER** be immersed in water.

A

Setting Up the Fetal Telemetry System

This chapter describes how to set up the Telemetry Receiver and Transmitter for use and how to connect the Receiver to a Fetal Monitor and mount the Receiver on a wall, an angled mount and a cart.

The procedure for setting up the Telemetry System is straightforward and consists of the following major steps:

1. Unpacking the Telemetry System.
2. Connecting the Antenna to the Receiver.
3. Connecting the Receiver to the Fetal Monitor.
4. Connecting power to the Receiver.
5. Setting up the Transmitter.

For information on how to mount the Receiver see Appendix B and how to test the system Chapter 9.

A

Unpacking the Telemetry System

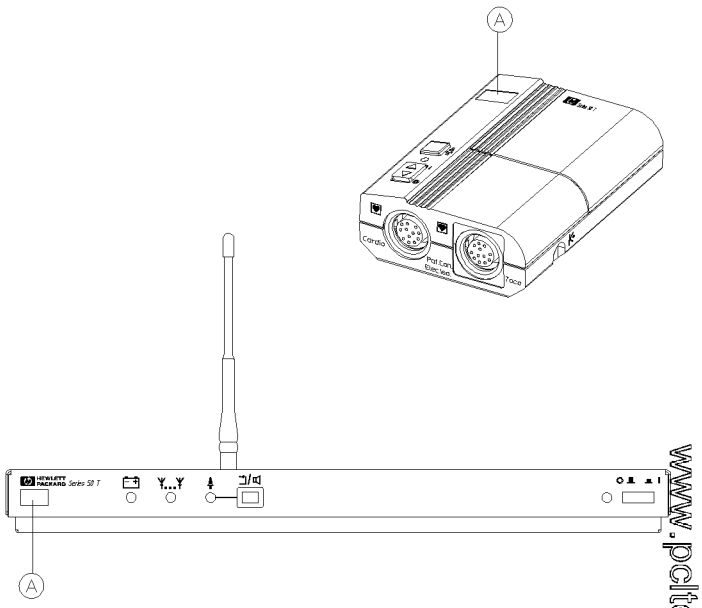
1. Unpack the Telemetry System.

   If any of the equipment is damaged, contact the carrier and your local HP Service Organization.

2. Ensure that the contents are complete.

   The Series 50 T Fetal Telemetry System consist of:

   - A Receiver with:
     - Antenna.
     - Power Cable.
     - Interface Cable to the Fetal Monitor.
   - A Transmitter with:
     - 3 Batteries.
     - Carrying Strap
   - An Operating Guide



Checking the Channel Frequency Labels

3. Ensure that the number on the Channel Frequency Label **(A)** on the Transmitter is the same as the number on the Receiver.

   If the numbers are not the same, contact your HP Response Center.

A

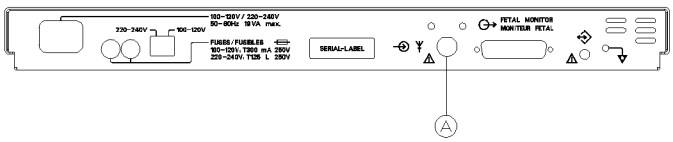
Connecting the Remote Antenna System

The operating range of your Series 50 T Fetal Telemetry System will have been defined prior to purchase. (If this has not been done, contact your HP Customer Engineer or Response Center.)

During this survey, your Customer Engineer will have established whether you require a Remote Antenna System or if the antenna on the Telemetry Receiver provides a sufficient operating range.

If you require a Remote Antenna System, the System will be sent separately to the Series 50 T Fetal Telemetry System. For details of how to install your Remote Antenna System, refer to the documentation supplied with it.

1. Connect Remote Antenna cable to socket **(A)** at the rear of the Receiver. This socket is marked with the symbol ⋎.

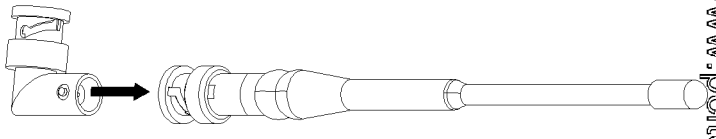


Connecting the Local Antenna

Assembling the Antenna

Before you can connect the antenna to the Receiver, you must connect it to the right angle connector.

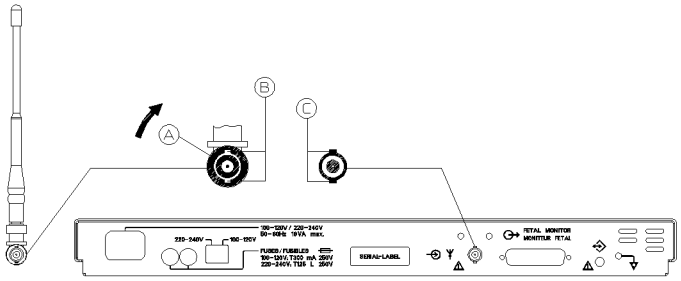
1. Line up the nodules on the right angle connector with the spaces on the antenna connector.
2. Push in and twist.



Assembling the right angle connector and antenna

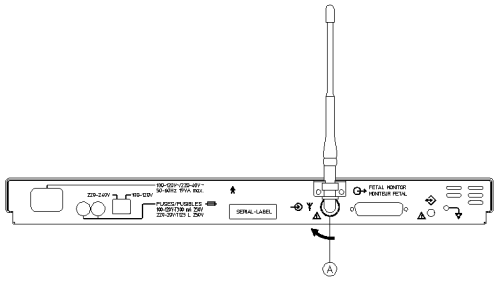
Connecting the Antenna to the Receiver

The Antenna input socket is located at the rear of the Receiver and marked with the symbol ⋎. To connect the Antenna to the Receiver:



Put artwork here for antenna1

1. Turn the connector screw **(A)** at the base of the antenna so that the two spaces **(B)** are positioned at the top and bottom. These fit over the two notches **(C)** on the Receiver antenna socket.



2. Push the antenna onto the socket connection.
3. Turn the connector screw **(A)** clockwise until it stops.

To remove the Antenna from the Receiver:

1. Turn the connector screw **(A)** anti-clockwise and pull the Antenna off the socket.

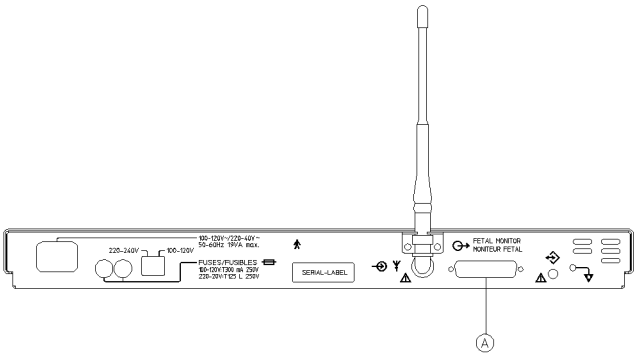
Connecting the Receiver to the Fetal Monitor

The Series 50 T Fetal Telemetry system can be used with the following Fetal Monitors:

- Series 50 Fetal Monitors:
  - Series 50 IX.
  - Series 50 IP.
  - Series 50 A.
- HP 8040A Fetal Monitor.
- HP 8041A Fetal Monitor.

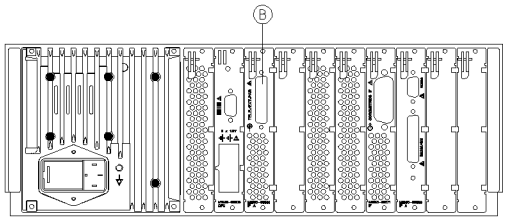
1. Connect one end of the interface cable to the socket **(A)** on the Receiver.

   This socket is labeled `FETAL MONITOR/MONITEUR FETAL` and ⊖→ (Electrical Output).

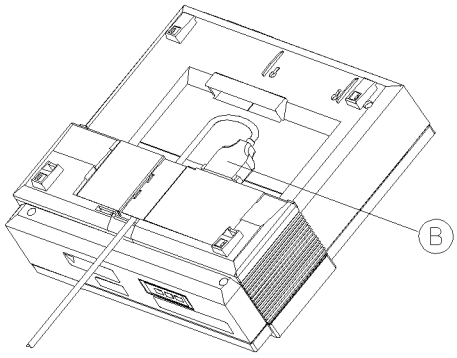


2. Connect the other end of the interface cable to the Telemetry socket **(B)** on the Fetal Monitor.

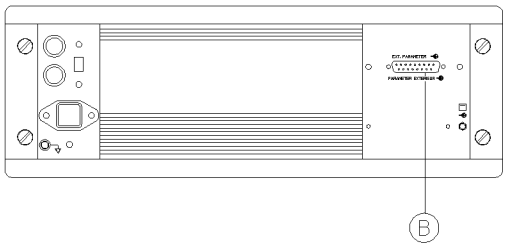
   This socket is labeled with a ⊣⊙ (Electrical Input).



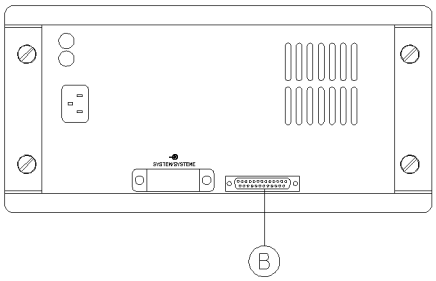
Series 50 IX



Series 50 A and 50 IP



HP 8040A



HP 8041A

Note

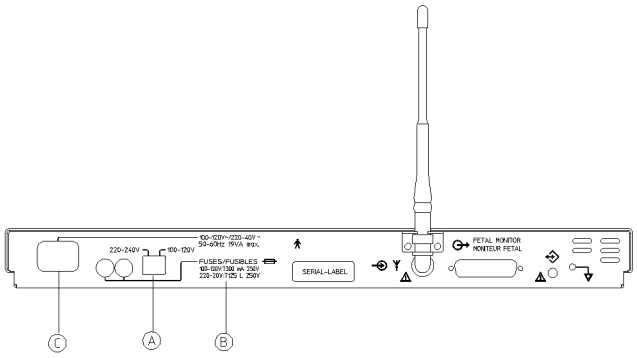
If you wish, you can leave the Receiver connected to the Fetal Monitor during normal monitoring. In this case, the Receiver must be switched off.

Connecting Power

The Receiver will be set to the correct voltage at the factory, but before you connect power:

1. Ensure that the voltage switch **(A)** is in the correct position for your country. The voltage and fuse values are shown on the rear panel **(B)**.

   If it is incorrect, contact your HP Response Center.

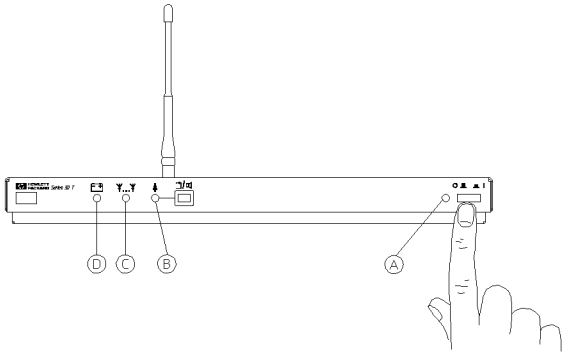


2. Connect the power cord to the mains socket **(C)**

A

Switching On the Receiver

1. Switch on the Fetal Monitor and Recorder.
2. Press the Power On/Off Switch to switch the Receiver on.



When you switch on:

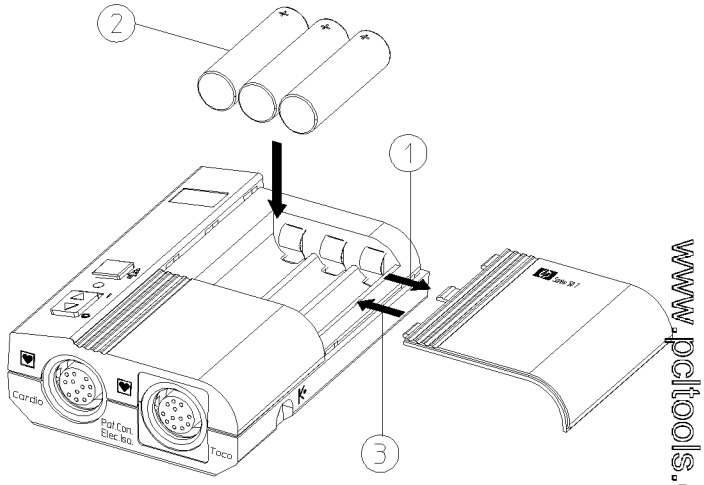
- The Receiver On light **(A)** comes on.
- The Nurse Call Light **(B)** and the Battery Low light **(C)** are lit for 1 second.
- The Transmission INOP Light **(D)** lights and stays lit until the Transmitter is switched on.
- The Telemetry Lamp Indicator on the Fetal Monitor lights, indicating Telemetry monitoring mode.
- `TELE` is annotated on the fetal trace.

Details of troubleshooting general problems and error messages are given in Chapter 9.

Setting Up the Transmitter

Inserting Batteries

1. Slide back the battery cover.



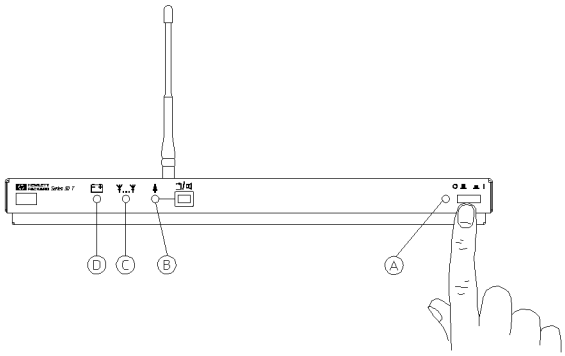
2. Insert 3 AA size batteries (1.5V) noting their polarity. The following type of batteries can be used:
   - Alkaline
   - NiCd (rechargeable)
   - NiMH (rechargeable)

Note

Use only high quality batteries. Zinc-carbon batteries (also known as "Leclanche")are not recommended as they have a low energy content, resulting in shorter operating times. They can also leak.

Remove the batteries if you do not intend to use the Transmitter for a long period of time.

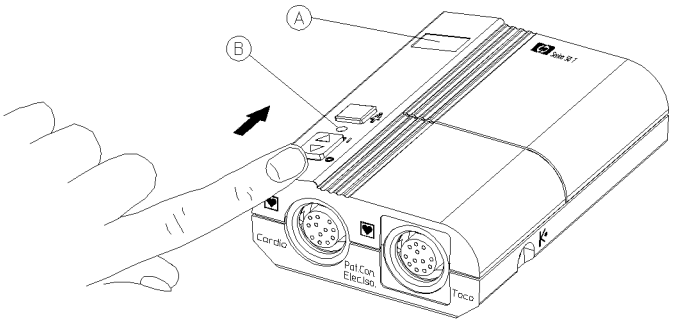
3. Close the battery cover.
4. Switch on the Receiver. The green Power On light **(A)** lights. The yellow Transmission INOP light **(B)** will be lit if the transmitter is not switched on.



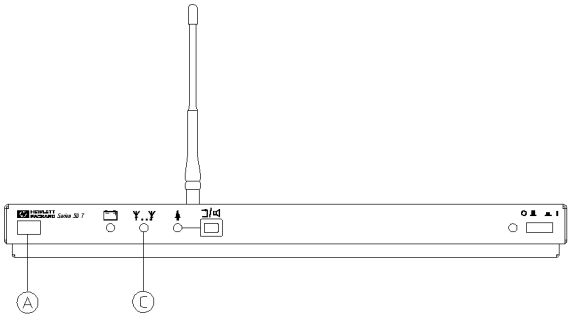
Details of troubleshooting general problems and error messages are given in Chapter 9.

Switching On the Transmitter

1. Check that the number on the Channel Frequency Label (**A**) on the Transmitter is the same as the number on the Receiver.



2. Push the On/Off switch to position **|** on the Transmitter.
3. The green On Light (**B**) lights and the Transmitter is on.
4. The yellow Transmission INOP light (**C**) on the Receiver will go out after 3 seconds.



Details of solving general problems and error messages are given in Chapter 9.

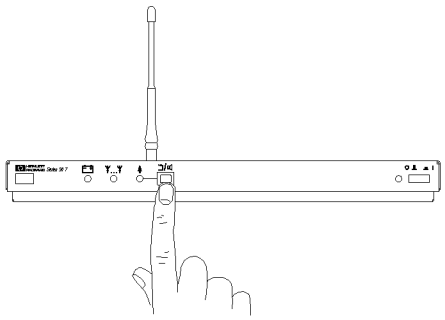
A

Setting the Volume of the Nurse Call

The volume of the Nurse Call can be changed provided that the Nurse Call is not being currently activated.

To set the Nurse Call volume:

1. Press the Nurse Call Acknowledge/Volume Control Button on the Receiver.



   You will hear a constant tone which will increase in volume until it gets to the maximum level then decreases in volume.

2. Establish how loud you want the volume and let go of the button when that volume is reached. This volume level has now been saved and stored.

B

Mounting the Receiver

There are a variety of different ways to mount the Receiver. It can be mounted:

- Under the following:
  - A Fetal Monitor
  - An Angle Mount
- On top of the following:
  - A flat surface
  - Series 50 Mobile Cart.
  - Series 50 IX Fetal Monitor (with Top Mounting Kit)
  - HP 8040A Fetal Monitor
  - HP 80300A Mobile Cart (with Top Mounting Kit)
- On a wall with a Wall Mount.
- Inside a HP 80300A Mobile Cart

Mounting the Receiver under a Fetal Monitor

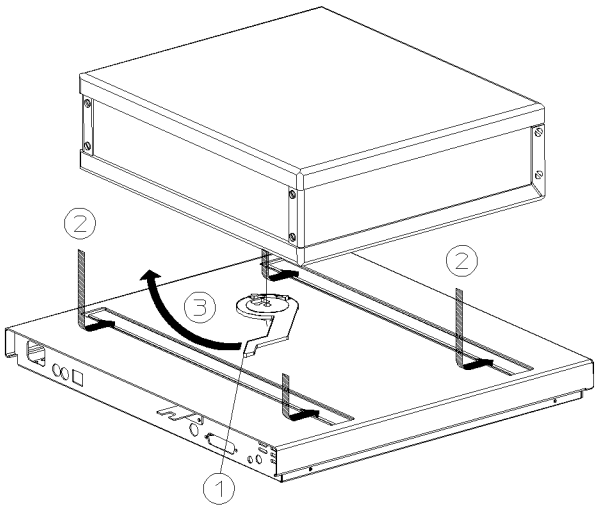
B

Series 50 IX, HP 8040A and HP 8041A

These Monitors require a mounting cam (part number 5051-8340 for the Series 50 IX, 5061-5654 for the HP 8040A and 8041A).

To mount the Receiver under the Fetal Monitor:

1. Attach the mounting cam kit to the base of the Fetal Monitor and ensure the locking lever is moved fully to the left.



2. Slot the feet on the base of the Monitor into the slots on the Receiver.
3. Secure the Monitor in place by turning the mounting cam into the lock position.

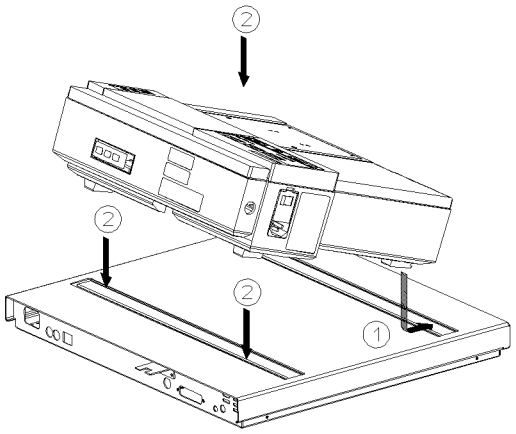
Series 50 A and 50 IP

The Series 50 A and 50 IP Monitors just fit inside the slots on the Receiver.

To fit the Series 50 A or 50 IP to the Receiver:

1. Holding the Monitor at a slight angle, sit the front feet in the front slots along the top of the Receiver. The small step on each foot helps it locate firmly in place.
2. Lower the Monitor till the back feet "click" into the back slots.

Warning **Make sure that all four feet are located firmly in place.**



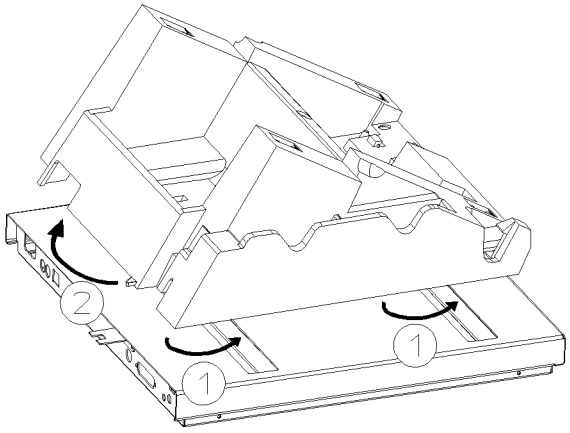
To remove the Monitor from the Receiver:

1. Holding the Monitor in both hands, press the Lock-Release Buttons, lift out the back feet and then the front feet.

Mounting the Receiver under an Angle Mount

To fit the angle mount to the Receiver:

1. Slide the feet of the angle mount into the recesses on top of the Receiver.
2. Secure the angle mount in place by turning the mounting cam to the locked position.



To remove the angle mount from the Receiver:

1. Turn the mounting cam to the unlocked position.
2. Lift off.

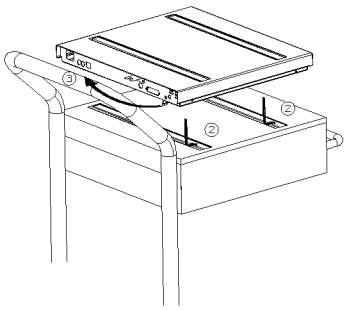
Mounting the Receiver on a flat surface

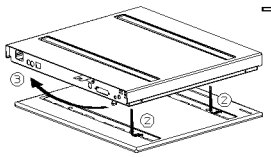
The Receiver can be rested on, but not fixed to an existing surface.

Mounting the Receiver on top of a Series 50 Mobile Cart or HP 8040A

To mount the Receiver on top of a Series 50 Mobile Cart or HP 8040A Monitor:

1. Move the mounting cam on the base of the Receiver to the left.
2. Slot the feet on the base of the Receiver into the slots on the HP 8040A Monitor or Series 50 Mobile Cart.
3. Secure the Receiver in place by turning the mounting cam into the lock position.





Mounting the Receiver on top of a Series 50 IX

To mount the Receiver on top of a Series 50 IX you require the Top Mounting Kit HP M1360A Option #1AB (kit number **M1350-68701**).

Refer to the Series 50 IX *Installation Guide* for details of how to install the Top Mounting Kit onto the Monitor.

When it is in position:

1. Move the mounting cam on the base of the Receiver to the left.
2. Slot the feet on the base of the Receiver into the slots on the Top Mounting Kit.
3. Secure the Receiver in place by turning the mounting cam into the lock position.

On top of the HP 80300A Mobile Cart

To mount the Receiver on top of a HP 80300A Mobile Cart you require the Top Mounting Kit (kit number **80300-68709**).

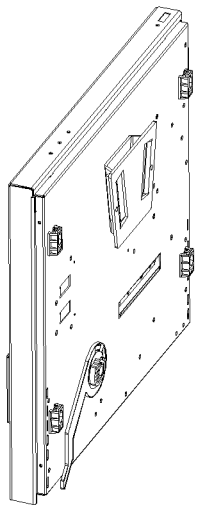
To mount the Receiver on top of the HP 80300A and mounting kit, follow the same instructions as mounting the Receiver on a Series 50 IX.

On a Wall

The Series 50 T Fetal Telemetry Receiver can be mounted on the wall when used with a Series 50 A or Series 50 IP Monitor.

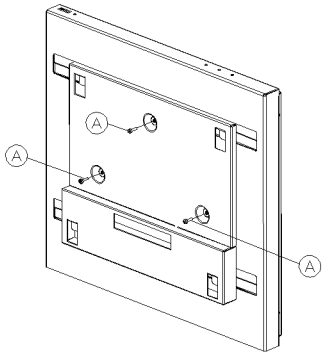
To mount the Series 50 T Fetal Telemetry Receiver on a wall you require the Telemetry Receiver Wall Mounting Kit (kit number **M1310-64150**.) To then mount your Series 50 A or Series 50 IP on top of the Receiver when it is on the wall, you need the Fetal Monitor Wall-Mounting Kit (**M1353-64150**)

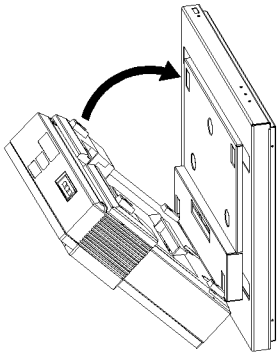
1. Fit the Receiver Mounting Kit to the wall and the Telemetry Receiver by refering to the instructions supplied with the kit.
2. Turn the Receiver so that the Power On/Off Button and Lights face upwards.
3. From above, slide the V mounting plate on the Receiver into the mounting plate on the wall.



Mounting the Receiver to the Wall

4. Attach the Fetal Monitor Wall Mount to the Receiver with 3 screws **(A)**.





You can now mount your Monitor on top of the Receiver.

Inside a HP 80300A Mobile Cart

To mount the Receiver inside the HP 80300A Mobile Cart you require the Rack Mounting for MPG Cabinet, (kit number **5061-5676**).

Refer to the equipment note (**80300-90000**) for details.

C

Care and Cleaning

Transmitter and Receiver

Keep the outside surfaces of the Transmitter and Receiver clean and free of dust and dirt: use soap and water or ETHANOL 70%.

Caution

Although the Transmitter and Receiver are chemically-resistant to most common hospital cleaners and non-caustic detergents, different cleaners are not recommended and may stain the Transmitter and Receiver.

Many cleaners must be diluted before use. Follow the manufacturer's directions carefully to avoid damaging the Transmitter and Receiver.

Do not allow any liquid to enter the Transmitter and Receiver cases and avoid pouring liquid on the Receiver while cleaning. Do not imerse the Transmitter.

Never use an abrasive material such as steel wool or metal polish.

Preventive Maintenance

The following should be routinely inspected (approximately every 12 months) by the user or biomedical engineer:

- Mechanical inspection of cables, loose/bent connectors
- Check and clean the Transmitter and Receiver housings.

For more details on service and maintenance, refer to the *HP M1310 Service Manual*.

D

Replacing Fuses and Batteries

Replacing the Fuses in the Receiver

The fuse values are printed beside the mains socket:

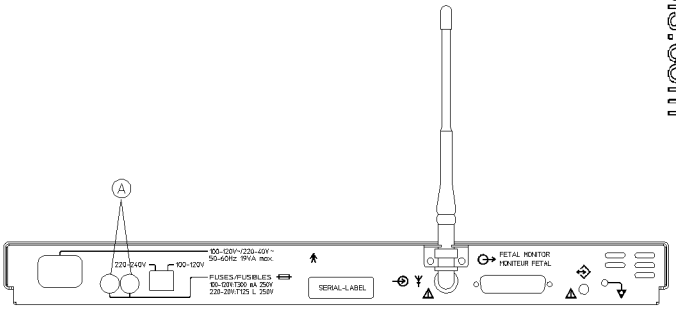
For 100-120V ~ Line Voltage — T300mA 250V ~ UL

For 220-240V ~ Line Voltage — T125 L 250V ~ IEC

(~ = alternating current)

To replace the fuses:

1. Switch off the Receiver and disconnect it from the main power supply.

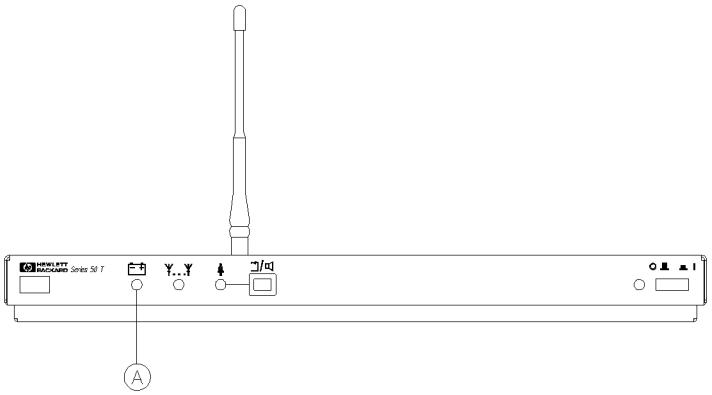


2. Using a flat-blade screwdriver, turn the fuse cover **(A)** anti-clockwise.
3. Pull out the fuse holder and fuse.

4. Remove the fuse from the holder and replace it with another of the correct type and value.
5. Slide the holder and fuse back into place.
6. Using a flat bladed screwdriver press in the fuse cover and simultaneously turn the cover clockwise.
7. Repeat steps 2 to 6 for the second fuse.

Checking the Batteries

When the batteries in the Transmitter are low, the Battery Low Light **(A)** on the Receiver is lit.



Battery Low Lamp

Remaining Battery Life (in minutes) after Battery Low Light

Battery Type	Monitoring Modes		
	US + TOCO(ext)	DECG + TOCO(ext)	DECG + IUP
Alkaline (1.8 AH)	180 min	100 min	80 min
NiCd accu (0.6 AH)	10 min	6 min	5 min
NiMH accu (1.2 AH)	20 min	12 min	10 min

The Transmitter uses three 1.5V (AA size, LR6 type) batteries. Three types of batteries can be used in the transmitter:

- Alkaline
- NiCd (rechargeable)
- NiMH (rechargeable).

Note

Use only high quality batteries. Zinc-carbon batteries (also known as "Leclanche")are not recommended as they have a low energy content, resulting in shorter operating times. They can also leak.

Remove the batteries if you do not intend to use the Transmitter for a long period of time.

The expected length of battery operating times are shown in the table below:

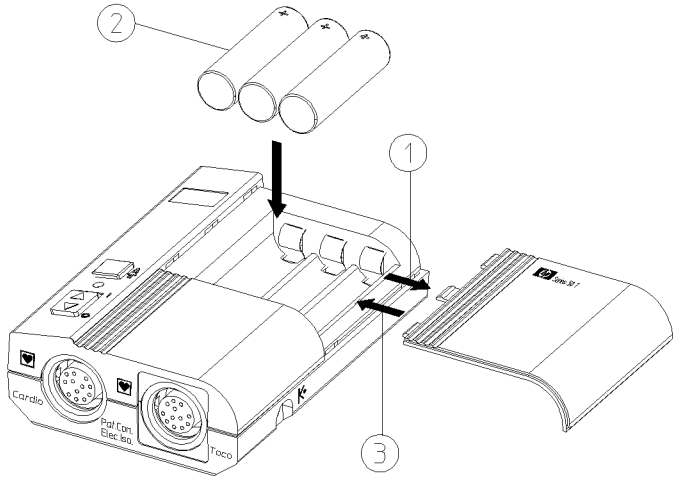
Typical Operating Times in hours

Battery Type	Monitoring Modes		
	US + TOCO(ext)	DECG + TOCO(ext)	DECG + IUP
Alkaline (1.8 AH)	40 hrs	16 hrs	14.5 hrs
NiCd accu (0.6 AH)	12 hrs	5.5 hrs	4.5 hrs
NiMH accu (1.2 AH)	22 hrs	11 hrs	9 hrs

Replacing the Batteries in the Transmitter

To replace the batteries:

1. Open the battery cover.



2. Replace the batteries (noting their polarity).
3. Close the battery cover.

E

Ordering Accessories

This appendix lists the accessories supplied as standard and as options, and describes:

- Types of gel.
- Transducers.
- Belts and buttons.

Standard Accessories

The following accessories are supplied as standard with the Series 50 T Fetal Telemetry System:

- A Receiver with:
  - Antenna.
  - Power Cable.
  - Interface Cable to the Fetal Monitor.
- A Transmitter with:
  - 3 Batteries.
  - Carrying Strap
- An Operating Guide

Optional Accessories

The following accessories can also be supplied when the appropriate option is ordered:

No.	Option
C11	Remote Event Marker.
0B3	Service Manual.
C99	Special Frequency Option.

The following accessories can also be supplied:

M1356A	Ultrasound transducer (with 2.5m/8ft 2in cable).
M1356A Opt. C03	Ultrasound transducer (with 70cm/28in cable).
M1355A	Toco transducer (with 2.5m/8ft 2in cable).
M1355A Opt. C03	Toco transducer (with 70cm/28 in cable).
M1357A	DECG transducer (with 2.5m/8ft 2in cable).
M1357A Opt. C03	DECG transducer (with 70cm/28 in cable).

Gels

40404A
Ultrasound transmission gel for use with ultrasound transducers.

- Available in Europe only.
- Water-soluble.
- Easy patient clean-up.
- Supplied in packs of 12 bottles (each 250ml).
- Shelf life: 24 months maximum; 6 months minimum.

40404B is a 5-liter refill container (with dispenser) to refill 40404A bottles.

40483A
Aquasonic transmission gel for use with ultrasound transducers.

- Available worldwide.
- Water-soluble.
- Easy patient clean-up.
- Supplied in packs of twelve 8oz (250gm) bottles.
- Shelf life: 24 months maximum; 6 months minimum.

40483B is a 5-liter refill container to refill 40483A bottles.

Caution

Using ultrasound gel that is not approved by HP may reduce the signal quality and may damage the transducer. This type of damage will not be covered by warranty.

Toco, Ultrasound and ECG Transducers

Transducers are not supplied automatically with the Series 50 T Fetal Telemetry System.

There are two types of transducer available, standard Series 50 Transducers with 2.5m/8ft 2in cables and Telemetry Transducers with 70cm/28in cables. Both are colored blue and are wateright complying with IEC 529 (IP68).

Standard Series 50 Transducers with a 2.5m cable.

- **Toco Transducer (M1355-69011)**
  Supplied singly.
- **Ultrasound Transducer (M1356-69011)**
  Supplied singly.
- **DECG Transducer (M1357-60001)**
  Supplied singly.

Telemetry transducers with a 70cm (28in) cable.

- **Toco Transducer (M1355-69013)**
  Supplied singly.
- **Ultrasound Transducer (M1356-69013)**
  Supplied singly.
- **DECG Transducer (M1357-60003)**
  Supplied singly.

Disposable Scalp Electrodes

15130A
Available in Europe only.

- Double spiral.
- Not sterilized.
- Supplied in packs of 3.

Use with applicator tool 15131A.

15133A
Available worldwide.

- Single spiral.
- Driven by inner drive tube.
- ETO sterilized.
- Supplied in packs of 50.
- Shelf life: 24 months maximum; 6 months minimum.

15133C
Available in Europe only.

- Double spiral.
- Driven by inner drive tube.
- Gamma sterilized.
- Supplied in packs of 25.
- Shelf life: 24 months maximum; 6 months minimum.

15133CF
Available in France only.

- Double spiral.
- Driven by inner drive tube.
- ETO sterilized.
- Supplied in packs of 25.
- Shelf life: 24 months maximum; 6 months minimum.

IUP Transducers

1290C Option J05
Reusable, fluid-filled pressure transducer (5μV/V/mmHg). Supplied individually.

When this transducer is ordered as M1353A Option C07, it is supplied with Transducer Holder 1292C and five disposable IUP Kits 14099C.

Related products:

- Disposable IUP Kits 14099C, D and E.
- Sterile domes 1295A-020 and 1295A-100.
- Sterile flared port domes 1295CK and 1295CK-020.

IUP Kits

13972A
Disposable IUP kit with disposable transducer. Preassembled. ETO sterilized. Contains: catheter, needle adapter, 20cc syringe, inserter, two stopcocks, drape and caps.

Shelf life: 24 months maximum; 6 months minimum. Supplied in packs of 20.

Related products:

- Connector for HP 8040A 1271 Option J05.
- Transducer holder 1272A.
- Pole clamp 1273A.

14099C
Disposable IUP kit. Unassembled. ETO sterilized. Contains: catheter, needle adapter, 20cc syringe, inserter, two stopcocks and drape.

Shelf life: 24 months maximum; 6 months minimum. Supplied in packs of 20.

Related products:

- IUP Transducer 1290C Option J05.
- Transducer holder 1292C.
- Sterile domes 1295A-020 and 1295A-100.
- Sterile flared port domes 1295CK and 1295CK-020.

14099D
Disposable IUP kit without drape. Unassembled. ETO sterilized. Contains: catheter, needle adapter, 20cc syringe, inserter and two stopcocks.

Shelf life: 24 months maximum; 6 months minimum. Supplied in packs of 20.

Related products:

- IUP Transducer 1290C Option J05.
- Transducer holder 1292C.
- Sterile domes 1295A-020 and 1295A-100.
- Sterile flared port domes 1295CK and 1295CK-020.

14099E
Disposable IUP kit with dome. Preassembled. ETO sterilized. Contains: catheter, needle adapter, 20cc syringe, inserter, two stopcocks, 1295C dome, caps and drape.

Shelf life: 24 months maximum; 6 months minimum. Supplied in packs of 20.

Related products:

- IUP Transducer 1290C Option J05.
- Transducer holder 1292C.

Domes

1295A-020 and 1295A-100
Sterile, disposable dome with parallel ports for use with IUP transducer 1290C Option J05, and IUP kits 14099C and 14099D. ETO sterilized.

Shelf life: 24 months maximum; 6 months minimum. 1295A-020 is supplied in packs of 20. 1295A-100 is supplied in cases of 5 boxes, each containing 20 domes.

1295CK and 1295CK-020
Sterile, disposable dome with flared ports for use with IUP transducer 1290C Option J05, and IUP kits 14099C and 14099D. ETO sterilized.

Shelf life: 24 months maximum; 6 months minimum. 1295CK is supplied in packs of 60. 1295CK-020 is supplied in packs of 20.

Transducer-Tipped IUP Catheters

13975B and 13995A
Disposable, transducer-tipped pressure catheters. Do not need to be filled with fluid. 13995A has amnioinfusion capability. Peel-away introducer. ETO sterilized.

Supplied in packs of 10.

Related products:

- Adapter cable 13981A.
- Zero saver M1835A.

Belts and Buttons

Abdominal Transducer Belt (M1561A)

- Roll of brown, breathable elastic.
- Buttonholes every 32mm (1.25in).
- Reusable.
- Washable.
- Width: 50mm (2 in).
- Length: 15m (50ft).
- Supplied in packs of one roll.

Abdominal Transducer Belt (M1562A)

- Pre-cut.
- Width: 50mm (2 in).
- Length: 1.3m (4ft 3in).
- Supplied in packs of 5.

Leg Transducer Belt (M1563A)

- Pre-cut
- Width: 50mm (2 in).
- Length: 0.8m (2.5ft).
- Supplied in packs of 5.

Belt Buttons (M1569A)

- Supplied in packs of 10.

Transducer Knob Adapter (M1356-43201)

- Supplied in packs of three.

F

CE Declaration and Technical Specifications (M1310A)

Receiver Power Requirements

Operating Voltage	100 to 120V or 220 to 240V (± 10%)
Line Frequency	50 to 60Hz
Power Consumption	19 VA max
Battery Type	3x1.5V (AA size)

Environment

Operating Temperature	0 to +45°C
Storage Temperature	-40° to +75°C
Relative Humidity	5 to 95%

Receiver Dimensions and Weight

Height	50mm (2in)
Width	425mm (16.7in)
Depth	392mm (15.4in)
Weight	6.5kg (14.3 lb)

Transmitter Dimensions and Weight
Without transducers and batteries

Height	120mm (4.8in)
Width	85mm (3.3in)
Depth	40mm (1.6in)
Weight	200g (8pz)

Input Sensitivity

Receiver	-118 dBm

Transmitter Output Power

USA	4 mW
Europe	2 mW
Japan	1 mW

Image Rejection

Image Rejection	>80 dB

CE 0366

Declaration of Conformity, according to ISO/IEC Guide 22 and EN 45014:

Manufacturer's Name	Hewlett-Packard GmbH
Manufacturer's Address	Herrenberger Strasse 110-130 71034 Boeblingen Germany

Declares that the product

Product Name	Series 50T Fetal Telemetry System
Model Number(s)	M1310A
Product Options/Revisions	all

to which this declaration relates is in conformity with the technical requirements of the following standard(s) or other normative document(s):

Safety, Performance	EN 60601-1 / 1988
EMC	EN 60601-1-2 / 1993

Supplementary Information

The product complies with the requirements of the Medical Device Directive 93/42/EEC. The product was tested in a typical configuration of a Hewlett-Packard Fetal Telemetry System.

Boeblingen, February 05, 1996

Erich Courtin
(Regulation Manager)

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