Q700

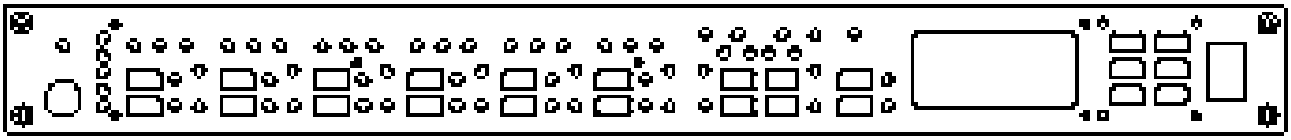
Wireless Intercom System
Owner's Manual

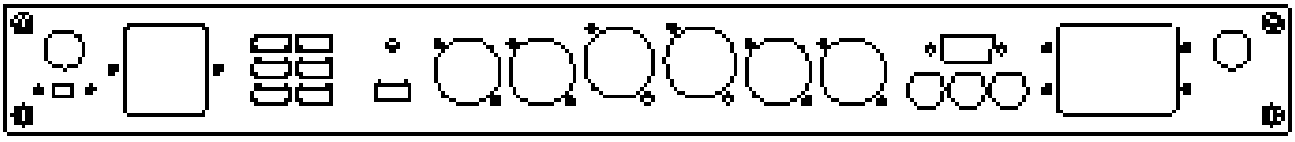
PRELIMINARY

VEGA™

Quick Setup

Some info about reading the detail section found later in the manual (indexing this section would be helpful!)



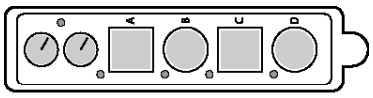


Quick Setup Procedure

Attach the two wire whip antennas to the BNC connectors on the back panel of the MS-700 master station.

Install the power cord and plug it into the AC source. Turn on the MS-700 with the front panel power switch.

Insert fresh batteries into the BP-700 bodypacks and turn them "on" via the power switch on the main volume control. The power indicator near this control should illuminate briefly.



BP-700 Beltpack

Plug a compatible headset into each BP-700.

Make certain that the operating frequency ranges of the MS-700 and BP-700 match. If there is any question, look at the frequency labels on the bottom of the MS-700 and inside the battery compartment of the BP-700's.

Verify that the frequency ranges and specific frequencies programmed into the MS-700 and BP-700's are those authorized for the location. If you are not certain that the currently-programmed frequencies are correct, verify each of them using the procedure on page 7.

Move the BP-700 beltpacks at least 6 feet (2 M) away from the MS-700 and separate them from each other by at least 10 inches (40 cm).

Observe the "RF" LED's on the receiver section of the front panel of the MS-700. The LED corresponding to each active BP-700 should be illuminated. If not, recheck that the BP-700 is turned on and that the frequencies are correct.

In turn, momentarily depress the "B" and "C" pushbuttons on each BP-700. The corresponding receiver "mode" LED's on the MS-700 should illuminate red for pushbutton "B" and green for "C".

Depress the "on" pushbutton on the front panel of the MS-700 for each active receiver channel. The adjacent LED should illuminate to indicate that the channel is selected.

Speak into the headset microphone for each BP-700 while alternately pressing and releasing pushbutton "A" on the unit. You should be able to hear your voice in the headset earpiece in one position or the other. If not, the headset microphone type may be set incorrectly. See page 8 for programming a BP-700 for dynamic or electret microphones.

Note: Whether audio is present when the pushbutton is pressed or when it is released depends upon the programmed operating mode of the BP-700. See page 8 for details.

While speaking into each of the BP-700 headset mics, select the corresponding monitor "MON" switch on the MS-700 front panel. Observe the bar-graph LED's on the left side of the MS-700 front panel. The "-2" LED should illuminate frequently on voice peaks, but

Quick Setup (continued)

the "+3" LED should illuminate only rarely.

If necessary, adjust the microphone gain for the BP-700 via the screwdriver adjustment on the top end of the unit. This is the adjustment to the right of the volume control as viewed from the end of the BP-700.

If applicable, connect the wired intercom system to the rear panel of the MS-700. Two intercom channels can be accommodated at the same time. For standard Clear-Com intercom lines, connect line one to the IC1/IC2 XLR connector, and line two to the IC2 connector. For "TW" and RTS systems, both channels are on the same connector, which should be plugged into "IC1/IC2".

Select "Clear-Com" on the rear panel (Clear-Com – TW/RTS pushbutton "in") for standard Clear-Com lines, or "TW/RTS" for Clear-Com two-wire or RTS intercom lines (pushbutton "out").

On the MS-700 front panel, select one or both intercom channels via the "on" pushbuttons in the intercom area on the panel. The incoming signal can be monitored by selecting the appropriate monitor "MON" pushbutton and observing the bar-graph LED's as described above.

Adjust the intercom input and output levels for the intercom lines as necessary with the front panel "in" and "out" trimmers. If the "null" control requires adjustment, see page 11 "Operational Features."

If applicable, connect balanced line-level program audio or IFB audio to the "PROG" XLR connector on the MS-700 rear panel. Monitor and adjust level with the corresponding controls on the front panel of the unit.

Introduction

Table of Contents

A word to Vega Users

In selecting a Vega intercom system, you are assured of the highest quality and performance. Vega has been the leader in wireless intercom systems for well over a decade. This experience insures you of a Vega Intercom System of quality, performance and reliability.

Unpacking

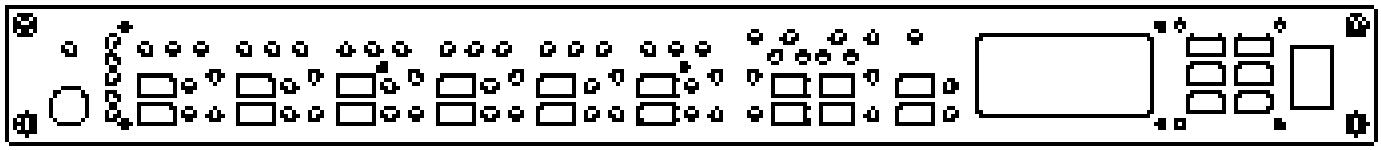
Verify the number of boxes shown "as shipped" and that all have been received in good condition. Unpack your equipment, saving all cartons for storage or reshipping. If, for any reason, you do not find the equipment to be completely satisfactory, please immediately contact your Vega dealer or the Vega factory.

Should service ever be required, remember you authorized Vega service dealer knows your equipment best. they have the training and test equipment necessary to restore your equipment to its' peak performance.

And of course, please feel free to contact either you authorized Vega dealer or the Vega factory for information or assistance at any time.

MS-700 Controls and Indicators

Summary: This section gives a brief overview of the controls and indicators of the MS-700 as found on the front and rear control panels.



Front Panel Controls and Connectors

Monitor Volume Control – Adjusts the volume of the headset monitor output. Used for aural monitoring of the output for: internal receivers, intercom input, program audio input, or transmitter audio signal as selected by one of the 10 monitor ("MON") pushbuttons. Any combination of these ten "MON" button functions can be simultaneously monitored. If additional MS-700's are connected via the rear panel 'monitor cascade' ("MON CAS IN" and "MON CAS OUT"), any combination of the ten monitor ("MON") button functions on any or all of the MS-700's can be monitored.

Monitor Output – Stereo 1/4" (6.35 mm) headset jack. Use only with stereo-wired headsets (25 ohm minimum impedance per side); connection of mono-wired headsets will short one side of the audio and cause distortion.

Monitor Bar-graph – Five segment LED bar-graph display, dB scaled, designated +3 dB (overload), -2 dB (normal peak), -7 dB (high normal), -12 dB (normal), -24 dB (active, low).

Receivers Controls and Indicators (identical for all six)

RF LED – Indicates that the associated receiver channel is receiving a valid RF signal, including the tone squelch/data subcarrier.

MODE LED –

- When off (when RF LED is on) indicates that the associated BP-700 beltpack is sending the "mode A" command (see below).
- When red, indicates that the associated BP-700 beltpack is sending the "mode B" command.
- When green, indicates that the associated BP-700 beltpack is sending the "mode C" command.
- When orange, indicates that the associated BP-700 beltpack is sending the "mode D" command.

BATT LED – When illuminated, indicates that the battery in the associated beltpack is low. When this indicator first illuminates, approximately 30 minutes of useful battery life remains.

ON - When selected (as indicated by the associated LED), enables the receiver audio and routes it to the other audio circuitry in the MS-700.

MON – When selected (as indicated by the associated LED), routes a sample of the receiver audio to the monitor amplifier and bar-graph. The audio may be monitored whether on not it is selected (ON).

LVL Control – Trims the level from the receiver channel to accommodate soft or loud speakers. Limited adjustment range.

SQ Control – Adjusts the signal level squelch circuitry in the associated receiver. Clockwise rotation will set the receiver such that a stronger signal is required to open the squelch gate in the receiver. The squelch adjust control does not affect the tone coded squelch function.

IC Controls and Indicators (identical for two intercom interfaces)

PWR – Indicates that the associated intercom line is powered. For Clear-Com lines, the LED's are independent and show status for each line individually. For the TW mode, both LED's will illuminate if the two-wire line has power on channel 2.

ON LED – Enables the associated intercom channel in the same manner as for the receiver channels.

MON LED – Operates in the same manner as the receiver monitor ("MON") switches.

IN Control – Trims the audio level coming from the wired intercom system (when ON).

OUT Control – Trims the audio level from the MS-700 to the wired intercom system

NULL Control – For Clear-Com and TW intercom interfaces, adjusts the different line impedances to control the sidetone level.

PROG MON – Enables the monitor function for the incoming program or IFB audio.

PROG IN – Adjusts the level of incoming program/IFB audio.

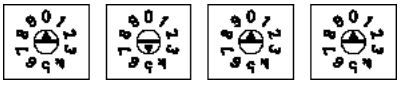
PROG TX MON – Monitors the audio input to the master station transmitter main audio channel.

Frequency Programming Controls (Behind front panel door, see detail drawing)

Function Select Switch – Selects the transmitter or receiver to be programmed, as follows:

- Position "0" – Accepts external programming input via the 2.5 mm connector.
- Position "1" – Programs receiver #1 frequency.
- Positions "2" through 6" – Programs receiver #2 through #6 respectively.
- Position "7" – Programs the master station transmitter frequency.
- Position "8" – With beltpack connected via 2.5mm connector, programs the beltpack receiver frequency.
- Position "9" – With beltpack connected, programs the beltpack transmit frequency.

MS-700 Controls and Indicators (continued)



Digital Frequency Switches - (four) use to program channel frequencies.

- Use the four digital switches to set frequencies for either receiver or transmit frequencies.
- 1200 frequencies available: "0001 - 1200." Example: To set a frequency to "500," set switches to "0500."
- Frequency channel settings dialed-in above "1200" will default down to "1200." Example: "2578" will be converted down and read as "1200."

Program Pushbutton – Programs the receiver or transmitter selected by the function switch. When pushed, the "program" LED will flash to signify correct programming of the associated device.

Verify Pushbutton – When pushed, verifies that the receiver or transmitter selected by the function switch is programmed to the channel selected by the digits switches. If so, the "verify" LED will flash. If not, there will be no response. In either case, the programming of the associated device is not changed.

Rear Panel Controls and Connectors

This section gives a brief overview of each of the controls and indicators of the MS-700 as found on the rear panel.

TX Antenna Connector – BNC antenna connector.

OFF-LO-HI (Transmitter Power) Switch – In the OFF position, disables the internal transmitter. In the LO position, enables the transmitter and sets power output to the LO or "normal" value (nominally 50 mw). In the HI position, sets power output to 250 mW maximum.

Clear-Com/TW Switch - In the depressed position, configures the two intercom interfaces to be compatible with the Clear-Com standard. In this mode, intercom channel #1 is connected to the IC1/IC2 XLR connector (beneath the "TW INTERCOM" designation) and intercom channel #2 is connected to the adjacent IC2 XLR connector. In the "TW/RTS" mode (pushbutton "out"), both intercom inputs are via the IC1/IC2 connector.

TW INTERCOM Connectors – See above.

4 W INTERCOM Connectors – Four-pin XLR connectors for balanced "four-wire" interface to the MS-700 for intercom channels #1 and #2. These interfaces are active at the same time as the "TW" connectors and either or both may be used simultaneously.

PROGRAM IN Connector – Standard 3-pin XLR connector for balanced line-level program audio or IFB input.

AUX OUT Connector – Standard 3-pin XLR connector for balanced line-level auxiliary audio output.

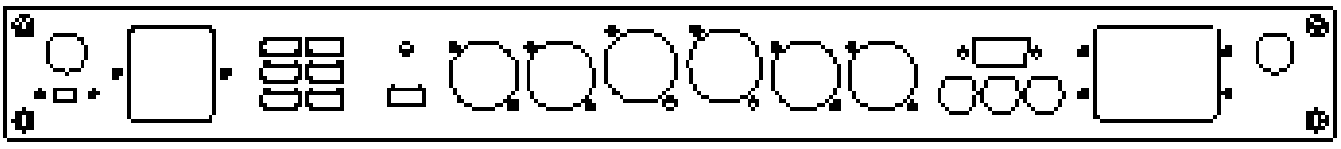
AUX RELAY Connector – Standard 9-pin "D" connector with the normally open auxiliary relay contacts.

MONITOR OUT Connector - 1/4" (6.35 mm) stereo phone jack with balanced line-level "monitor" output. This is a fixed level summed signal consisting of all currently-selected monitor sources.

MON CAS IN - This is a 1/4" (6.35 mm) stereo phone jack that accepts a summed monitor cascade input from other MS-700 master stations, allowing monitoring of multiple systems with one headset and volume control.

MONITOR CAS OUT - This is a 1/4" (6.35 mm) stereo phone jack that sends a summed monitor cascade output to other MS-700 master stations.

RX Antenna Connector - BNC antenna connector.



Programming System Frequencies

Summary: This section explains in detail the procedure for programming frequencies.

Programming System Frequencies

The Q700 is shipped from the factory on default receiving and transmitting frequencies. In order to operate the system, these frequencies must be reset to those authorized for the location where the system will be used. This may be accomplished via the front panel controls on the MS-700 master station, or via a laptop computer with the optional QPK-1 programming kit. The QPK-1 consists of an interface unit that connects to the serial port of the laptop and then to the MS-700 master station or BP-700 beltpack via standard 2.5 mm miniature stereo cables. Software for Windows™ 95 or 98, and Windows™ NT 4.0 or 2000 is included.

With the QPK-1 interface and software, complete frequency management via the laptop is available. Operating frequencies may be set, read from a system and stored as a disk file, or read from a file into the Q700 system. For additional information, see the QPK-1 instruction manual or the text help file included with the software.

In most cases, the frequencies of the Q700 will seldom be changed, and programming from the front panel of the MS-700 will be more than adequate. A 2.5 mm miniature stereo cable is included with the MS-700 and is required in order to program the BP-700 beltpacks. If this cable is lost, a replacement may be purchased at almost any electronics store.

All frequencies in the Q700 are based upon fixed frequency ranges, with the actual frequencies being determined by the starting frequency of the particular range, plus the channel number (0001 to 1200) multiplied by 0.025 MHz. For the US and Canada, the available frequency ranges are as follows:

470 – 500 MHz
500 – 530 MHz
530 – 560 MHz
560 – 590 MHz
590 - 620 MHz
620 – 650 MHz
650 – 680 MHz
680 – 710 MHz
710 – 740 MHz

Other frequency ranges will be available for international use; consult the Vega factory for more information.

Please also note that the operating frequency range of each transmitter and receiver is set at time of manufacturing, It is impractical to change this range at a later date. The operating ranges for a system are printed on the FCC labels on the master station and the beltpacks. When using the optional frequency management software, the assigned frequency ranges are downloaded by the software, and only frequencies within these ranges may be programmed. Frequencies may also be directly entered as numeric values in megahertz.

Important: In a particular system, the receive and transmit ranges must be separated by one range. For example, if the base transmitter operates in the 590 to 620 MHz range, the base receivers may not operate in the 560 – 590 or 620 – 650 MHz ranges. In this case, the receivers can operate in the ranges from 650 to 740 MHz. All master station receiving frequencies must be in the same range.

To program a specific frequency, first make certain that the desired frequencies are within the operating range of the unit. Then subtract the lower band limit frequency from the desired frequency. When this difference is divided by .025 MHz, the channel number is obtained.

For example, assume that the desired frequency is 674.775 MHz. Since the start of this band is 650.000 MHz, the arithmetic is:

674.775
-650.000
= 24.775

24.775 / .025 = 991

Therefore, the channel number is "991", and this should be entered into the front panel digit select switches as "0991".

To program one of the master station receivers or the master station transmitter, set the function select switch to the correct position. For example, set the function switch to "3" to program receiver number "3", or "7" to program the master station transmitter. Then set the channel digit select switches to the correct value, such as "0991" in the above example. Then momentarily press the "program" pushbutton. If programming was successful, the "program" LED will flash briefly to indicate successful completion. Once programmed, the frequency will be stored internally and the unit will go to this frequency each time the master station is turned "on".

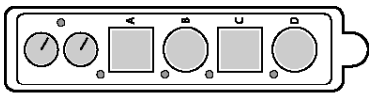
Frequencies may also be verified via the front panel controls without reprogramming the existing frequencies. Set the function select switch to the receiver or transmitter whose frequency is to be verified, and the digit select switch to the channel number corresponding to the desired frequency. Depress the "verify" pushbutton on the MS-700 front panel. If the programmed channel number matches the channel number stored in the receiver or transmitter, the "verify" LED will flash. If no LED flash is observed, then the channel numbers do not match.

To program the beltpacks, make certain that they are turned "on" and have good batteries. Then plug one end of the 2.5 mm cable into the 2.5 mm connector on the front panel of the MS-700, and the other end into the 2.5 mm connector on the first beltpack. This connector is on the top edge of the beltpack, above the external flexible antenna. Then set the function select switch to "8" to program the beltpack receiver, or "9" to program the beltpack transmitter. Set the channel switches in the same manner as for the master station and push the "program" pushbutton to set the operating frequency of the beltpack transmitter or receiver. Program both frequencies, then proceed in the same manner for the other beltpacks.

BP-700 Beltpack Operating Mode Programming

Summary: This section will include programming, battery type info and battery installation of the beltpack.

Programming the Beltpack



BP-700 Beltpack

The BP-700 has several functions that can be programmed from its control panel via the four pushbuttons:

1. Dynamic or electret microphone.
2. Pushbutton modes (each individually): Push-to-talk (PTT), Push-to-mute, Push-to-enable.
3. Button action (each individually): Momentary, alternate action, click-latch.
4. Return to default configuration.

Several advanced functions can only be programmed via an optional QPK-1 Programming kit, which includes Windows software, a programming adapter device, a 2.5 mm stereo cable, a RS-232 cable to attach to a 9-pin serial port and accessories. This software can also be used to preset the basic functions listed above. The advanced features are:

1. Default configuration.
2. Pushbutton disable (no action taken).
3. Pushbutton assignment/ reassignment ("A" = "B", "B" = "A", etc.).
4. Pushbutton duplication ("A" or "B" = "A", ALL = "B", etc.).

The software provided with the optional programmer offers a number of other useful functions. This includes the ability to directly enter and display frequencies in MHz (instead of channel numbers as in the MS-700 controls), assign descriptive names to the system and individual beltpacks, store and retrieve frequency information, create frequency sets offline for later use, graphically set BP-700 configurations via check boxes, and display system configuration in summarized form. For more information, consult the instruction manual for the QPK-1 or its help file.

The beltpack programming functionality is to be as follows:

Push and hold both "A" and "D" pushbuttons for more than 7 seconds to enter the programming mode: (Level 1)

- The beltpack transmitter will be inhibited during programming.
- All four LED's will rapidly flash three times to indicate that the unit is now in programming mode, then all LED's will go off.
- If no button is pushed for 10 seconds, the LED's will flash three times once again.
- This is repeated every 10 seconds until a button is pushed or 60 seconds has elapsed.
- If no button is pushed within 60 seconds, the beltpack will exit the programming mode.
- The programming mode can be exited at any time by again holding down "A" and "D" for more than 7 seconds, or by simply waiting more than 60 seconds without pushing a button.

Simultaneously push both "A" and "B" for more than 2 seconds to enter microphone-type programming mode. (Level 2)

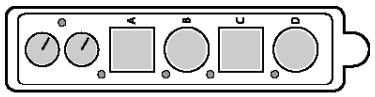
- "A" and "B" LED's will go on continuously.
- Push "C" for electret mic, "C" LED goes on continuously, "D" LED will go off.
- Push "D" for dynamic mic, "D" LED goes on continuously, "C" LED will go off.
- Simultaneously push both "A" and "B" for more than 2 seconds to exit mic type programming.
- All 4 LED's will flash three times to indicate that you are back in the top level programming mode. (Level 1)
- If no button is pushed for 10 seconds, the LED's will flash three times once again.
- This is repeated every 10 seconds until a button is pushed or 60 seconds has elapsed.
- If no button is pushed within 60 seconds, the beltpack will exit the programming mode.

Simultaneously push both "A" and "C" for more than two seconds to enter button mode programming: (Level 2)

- "A" and "C" will flash twice, then all LED's will go off for 2 seconds.
- Each of the four LED's will then display the current mode for the associated pushbutton, as described below.
- Push "A" once for the PTT mode, the "A" LED goes on continuously.
- Push "A" again for the push-to-mute (PTM) mode, "A" LED will flash continuously at a fast rate (noticeably faster that the rate of the triple flash when entering the programming mode).
- Push "A" a third time for the push-to-enable (PTE) mode, "A" LED will flash continuously at a slow rate (noticeably slower than the triple flash rate).
- "B", "C" and "D" are programmed in same manner.
- All four LED's indicate the current mode of the associated pushbutton by being on continuously, fast flashing or slow flashing, as programmed.
- Simultaneously push and hold "A" and "C" for more than 2 seconds to exit button action programming.
- All 4 LED's will flash three times to indicate that you are back in the top level programming mode. (Level 1)
- If no button is pushed for 10 seconds, the LED's will flash three times once again.
- This is repeated every 10 seconds until a button is pushed or 60 seconds has elapsed.
- If no button is pushed within 60 seconds, the beltpack will exit the programming mode.

BP–700 Beltpack Programming

Simultaneously push "B" and "C" for more than two seconds to enter the button action programming mode. (Level 2)



BP-700 Beltpack

- "B" and "C" flash twice, then all LED's will go off for 2 seconds.
- Each of the four LED's will then display the current mode for the associated pushbutton, as described below:
  - Push "A" once for the momentary mode, the "A" LED will go on continuously.
  - Push "A" again for the alternate action mode, the "A" LED will flash continuously at a fast rate.
  - Push "A" a third time for the click-latch mode, the "A" LED will flash continuously at a slow rate.
  - "B", "C" and "D" are programmed in same manner. All four LED's will indicate their current mode by being on continuously, fast flashing or slow flashing as programmed.
- Simultaneously push and hold "B" and "C" for more than two seconds to exit the button action programming.
- If no button is pushed for 10 seconds, the LED's will flash three times once again.
- This is repeated every 10 seconds until a button is pushed or 60 seconds has elapsed.
- If no button is pushed within 60 seconds, the beltpack will exit the programming mode.

Simultaneously push "C" and "D" for more than 7 seconds to restore defaults. (Level 2)

- The "C" and "D" LED's will flash alternately for 3 seconds to indicate restoration of the preset defaults.
- After a pause, all four LED's will triple flash to indicate return to top level programming mode. (Level 1)
- If no button is pushed for 10 seconds, the LED's will flash three times once again.
- This is repeated every 10 seconds until a button is pushed or 60 seconds has elapsed.
- If no button is pushed within 60 seconds, the beltpack will exit the programming mode.

Push and hold "A" and "D" for more than 7 seconds to exit programming mode. (Back to operational level)

- At the operational level when beltpacks are first turned on, or when leaving the programming mode, the following occurs:
  - The LED's do not flash.
  - The beltpack will go to the standby condition.
  - All pushbuttons will be in the inactive or deselected mode.
  - There will be no transmission in the PTT mode.
  - There will be no transmission in the PTM or PTE modes.
- At this point, you must push one of the beltpack buttons to activate unit, and to begin normal operation.

BP-700 Beltpack Batteries

BP-700 Batteries

The BP-700 operates from six "AA" batteries in a removable battery pack. Only alkaline or NiMH (nickel metal hydride) cells should be used. For non-rechargeable use, Duracell™, Eveready™ and other premium quality alkaline cells are recommended. Zinc carbon batteries generally cannot supply the required current and provide only very limited life. Off-brand alkalines also may provide only a fraction of the life available from premium batteries. Vega has determined that Duracell Ultra™ batteries provide longer life in the BP-700 than regular Duracell™ batteries and Eveready™ batteries. However, they are also more expensive.

Alkaline cells gradually lose capacity over time. When stored at room temperature (approximately 68 degrees F, or 20 degrees C), typical capacity loss is 30% to 40% over 4 years. However, if the storage temperature is higher or the storage location has high humidity, the rate of loss is much higher. Under poor conditions, more than 50% of initial capacity can be lost in as little as 18 months.

For rechargeable batteries, only NiMH "AA" cells should be used. NiCad batteries are subject to the "memory effect", which gradually reduces capacity and life if the cells are not fully discharged each time they are used. NiMH batteries do not have this problem and are not significantly more expensive. They also provide somewhat longer operating life in the BP-700 than NiCads of the same rated capacity. "AA" size NiMH batteries are available in several capacities ranging from as little as 800 milliampere hours to about 1600 milliampere hours for industrial-quality cells. Obviously, the higher capacity batteries will provide much longer operating life than low-capacity consumer cells.

All rechargeable batteries gradually lose capacity as they are repeatedly charged and discharged. The rate of loss depends upon a number of factors, including the recharging method and maximum charge rate, operating temperature, battery construction, depth of discharge and maximum discharge rate. Even quality NiMH cells can be expected to lose at least 25% of initial capacity after 400 to 500 charging cycles. Even if the reduced capacity is acceptable, their useful life will normally be no more than 750 to 1000 cycles.

One significant practical problem with using rechargeable batteries is simply making certain that fully-charged batteries are available when needed. It is all too easy to forget recharging, often resulting in embarrassing failures. Even fully discharged batteries will often work for only a few minutes if allowed to sit overnight, making it appear that they are ready for service. The best solution is to develop and maintain a regular routine for recharging batteries. However, this often worsens the "memory" problem for NiCad batteries. This is one of the reasons that NiCads are not recommended.

Mistakenly recharging alkaline cells can cause overheating, battery venting and even fire. To help avoid this problem, Vega provides two types of battery packs for the BP-700, one for use with alkaline cells and one for use with NiMH cells. The version for alkaline batteries does not have operational battery charging contacts, so inserting the pack into the optional changer will not cause any problems. The NiMH version is marked in red and the cells will be charged if the pack is inserted into the charger.

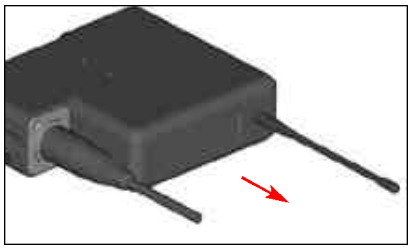
WARNING: Never install alkaline batteries in a red-marked battery pack.

The optional QBC-1 battery charger will fully charge multiple BP-700 battery packs in less than 4 1/2 hours. It is optimized for NiMH cells rated at 1500 to 1600 milliampere hours. Lower capacity cells may not be able to accommodate the high charging rate of the QBC-1, and their life may be shortened. This charger is a "smart" design that monitors the charging process to optimize results and maximize battery life. Simpler chargers can be used, but the charging process will take considerably longer and the number of usable charging cycles is likely to lower.

In the continuous transmit mode, you can expect battery life to be 9 to 10 hours for new, fresh Duracell™ or Eveready™ batteries. Battery life will usually be 1/2 to 2 hours less for cells that have been in storage for some time. Duracell Ultra™ batteries can be expected to last 1 1/2 to 2 hours longer. NiMH batteries rated at 1600 milliampere hours can be expected to last 7 to 8 hours when new and fully charged. However, the operating life will slowly decline as the batteries are repeatedly recharged. Battery life in the RF Push-To-Talk mode will be considerably longer, especially if transmissions are infrequent.

Battery Installation in the BP-700

1) Turn off the BP-700 via the main volume control on its top panel.
2) On the bottom of the BP-700, slide the battery compartment latch near the whip antenna towards the antenna.



3) Holding the latch open, grasp the battery pack grip on the bottom of the BP-700 and carefully pull it out of the unit.
4) For alkaline cells, remove the discharged batteries and replace with new, fresh ones.
5) Carefully note the polarity marking on the battery compartment to make certain the cells are correctly inserted. All cells on one side are inserted in one direction, and all cells on the other side are inserted in the opposite direction.

   Note: The compartment has spacers to prevent the battery terminals from touching the contacts if incorrectly inserted. For this reason, a reversed cell will prevent the pack from operating.
6) While holding the latch open, reinsert the battery pack. Then release the latch to lock in the pack.

   For NiMH cells, insert the entire pack into the QBC-1 charger. If spare packs are available, they may be used in the BP-700 while the other packs are recharging.

System Operation and Features

System Operation

Assuming that all active receivers are enabled, and that there are two separate active intercom lines, operation of the Q700 system in the standard configuration is as follows:

- Incoming audio from the primary wired intercom channel is always routed to the MS-700 transmitter main audio channel.
- Incoming audio from the secondary wired intercom channel is not continuously routed.
- Program/IFB audio is continuously routed to the MS-700 subcarrier audio channel.
- If no BP-700 beltpacks are transmitting, all MS-700 receiver audio outputs are muted.
- The BP-700 continuously sends a digital control signal when it transmits.
- The actual digital control signal transmitted from the beltpack depends upon whether pushbutton "A", "B", "C" or "D" is depressed.
- Audio routing of the receiver audio signals in the MS-700 is determined by the control signals from the BP-700's.
- If the beltpack is in the continuous transmit mode, the audio will be routed in accordance with the last control button pushed.
- If a specific beltpack user selects "A", the associated receiver audio will be routed to the MS-700 transmitter main audio channel and to the primary wired intercom channel. This is the basic operating mode.
- If the beltpack user selects "B", the receiver audio will be routed to the MS-700 transmitter main audio channel and to the secondary wired intercom channel. It will not be routed to the primary intercom channel. At the same time, audio from the secondary intercom channel will be routed to the transmitter main audio channel. This allows a beltpack user to communicate on the secondary intercom channel while still monitoring the primary channel, without mixing the two intercom channels.
- If the beltpack user selects "C", the receiver audio will be routed to the MS-700 transmitter main audio channel only. It will not be routed to either the primary or secondary wired intercom channel. However, incoming audio from the primary intercom channel will continue to be applied to the transmitter main audio channel. This allows the wireless beltpack users to have a private conversation while still monitoring the primary intercom channel.
- If the beltpack user selects "D", the receiver audio will be routed to the MS-700 transmitter main audio channel and to the auxiliary audio output connector. At the same time, the auxiliary control relay contacts will close. Receiver audio will not be routed to either the primary or secondary intercom channel. However, as above, incoming audio from the primary intercom channel will continue to be applied to the transmitter main audio channel.
- Operation of each beltpack is independent of each other, so more than one of the above modes can exist at the same time. Only in the case of mode "B", where the secondary intercom channel is applied along with the primary channel monitoring to the MS-700 transmitter, will the modes interact.

Operational Features

MS-700 Intercom Interfaces

The MS-700 master station will interface with two intercom lines simultaneously, as well as accommodate both four-wire inputs/outputs and conventional intercom inputs/outputs for each line at the same time. Standard Clear-Com, Clear-Com TW and RTS systems are accommodated via two 3-pin XLR connectors, while the four-wire interfaces appear on two adjacent 4-pin XLR connectors. All intercom interfaces are fully transformer isolated to reduce hum and noise.

A pushbutton switch is provided to allow easy selection of the Clear-Com and TW/RTS modes. This switch selects the input connector for intercom line two (IC1/IC2 or IC2) and adjusts the interface level to accommodate the differences between the two types of lines. The switch does not affect the four-wire interfaces.

Front panel enable switches are provided for each of the two intercom lines, as well as input and output level adjustment controls. These controls are for trimming levels, they do not have a wide adjustment range. A null control is also provided for each intercom line. This control allows adjustment of sidetone level of the lines to accommodate different cable lengths and wired intercom system configurations. It does not directly affect the four-wire output, but can introduce unwanted sidetone on the four-wire output if not adjusted properly.

To adjust this control, enable the intercom line and adjust the input and output level controls as necessary. Have a BP-700 user activate button "A" and then speak into their headset microphone. Enable this beltpack with the corresponding receiver "on" button. Monitor the intercom line via the headset jack on the MS-700 front panel.

Initially adjust the null control for minimum sidetone level on the intercom line. Then readjust the control slightly to increase the sidetone level and give it a natural sound quality. Try both sides of the minimum sidetone adjustment point.

Program Audio Input

The MS-700 accepts a line-level balanced audio input via a 3-pin XLR connector. The signal is normally routed to the second audio channel (subcarrier channel) of the MS-700 transmitter. The audio is then available to BP-700 users, where it can be adjusted by a second volume control. This capability provides built-in IFB or program audio capability in the BP-700, but may be used for other purposes such as connection to a remote ENG or production vehicle. The incoming signal may be monitored and adjusted from the front panel of the MS-700, but can only be completely disabled by disconnecting the source.

Auxiliary Output

The MS-700 also provides a fixed, line-level balanced audio output on a 3-pin XLR connector. Audio from one or more BP-700 beltpacks will be routed to this connector when the beltpack user selects pushbutton "D" on the beltpack control panel. Unless one beltpack user selects their mode "D", no audio appears on this output.

There is also an associated contact closure available on a 9-pin type "D" connector on the MS-700 rear panel. This contact closes when a BP-700 user

selects mode "D" and remains closed as long as any BP-700 transmits in this mode. The auxiliary output and associated relay closure can be used for public address announcements or connection to a remote ENG or production vehicle.

Monitor Inputs and Outputs

The MS-700 has a balanced line-level output derived from the monitor signal buss in the master station. This output appears on a 1/4" (6.35 mm) stereo jack and can be used for remote master station monitoring, local or remote monitor speakers and similar purposes. The level of this signal varies with the setting of the front panel monitor volume control. This output will be the sum of all signals selected by the "mon" pushbuttons on the MS-700 front panel. If the monitor cascade is connected, monitor audio from one or more additional MS-700 master stations may also be available.

The MS-700 also has fixed-level monitor cascade inputs and outputs on two 1/4" (6.35 mm) stereo jacks. One jack has a single-ended monitor input and the other a single-ended output. If the monitor cascade output of one MS-700 is connected to the monitor cascade input of another MS-700, both systems can be monitored from a headset plugged into the last master station in the chain. The cascade output jack in the last master station may also be used for external monitoring of the monitor cascade buss.

Transmitter Control Switch

A transmitter control switch is included on the rear panel of the MS-700. In the "off" position, the internal transmitter is disabled and no RF output will be present. This mode is sometimes useful to conserve frequencies when more than one Q700 system is in use at a location. In the "lo" position, the transmitter will be on with a power output of 50 mW, minimum. This is the normal operating mode. In the "hi" position, the transmitter will be on and the power output will be 250 mW, maximum. To minimize interference, the "hi" mode should be used with caution, and is most applicable to large outdoor events.

MS-700 Fan Control

The MS-700 has a small internal cooling fan. Normally, this fan is unnecessary and does not operate. However, if a MS-700 is rack mounted with a number of other units and the ambient temperature is high, additional cooling may be required. When the internal temperature of the MS-700 reaches about 105 degrees F (41 deg. C), the fan will begin to rotate at low speed. If the internal temperature continues to rise, the fan will reach full RPM when the internal temperature reaches approximately 150 deg. F (65 deg. C).

Rack Mounting the MS-700

The MS-700 master station may be rack mounted by means of the supplied rack mounting brackets. This method of mounting is adequate for fixed use. However, when the master station will be shipped while mounted in a rack, when in wheeled cabinets, or when rough handling is likely, additional rear support is necessary. Vega offers optional QRS-2 rear mounting brackets for the MS-700, which support the back of the unit to help the chassis resist shock and vibration. These brackets require the use of rear mounting rails in the rack or cabinet, which not all such devices have. Mechanical and electronic damage due to extreme shock and vibration is not covered by the Q700 warranty.

BP–700 Headset Compatibility

The BP-700 beltpack will accommodate headsets with dynamic and electret microphones. The beltpack may be externally programmed for either type of microphone as described on page 8. When the electret mode is programmed, microphone preamplifier gain is reduced and positive microphone bias is applied. The BP-700 accepts only positive-bias "two wire" electret microphones, with the audio and positive bias connections combined on one conductor. This is by far the most common configuration for available headsets with electret microphones.

The BP-700 headset driver has a balanced output and neither side can be connected to the microphone return lead or the connector shell without causing severe distortion and intermittent operation. The driver will supply approximately 200 mW into a 50 ohm headset, and roughly 20 mW into a 600 ohm headset. The use of headset impedances below 25 ohms is not recommended due to reduced battery life.

The BP-700 comes standard with a Neutrik™ 4-pin male XLR connector installed. This is the same type connector used for Vega's previous generations of wireless intercoms. The BP-700 can be optionally fitted with 4-pin or 5-pin female XLR connectors at additional cost. When using 5-pin dual muff headsets, both earpieces will receive the same audio.

Specifications

Q700 System

Frequency Range:	470 – 740 MHz in nine 30-MHz bands (U.S. and Canada)
Frequency Selection:	Synthesized; 1200 channels per 30 MHz band, 25 kHz steps
Transmission Modes:	Continuous or push-to-talk; full or half duplex
Frequency Stability:	± 0.0025%
Operating Range:	To 1500 ft (450 M) under good conditions
Modulation:	FM, 30 kHz peak deviation
Spurious Output:	-64 dBc, minimum
Harmonics:	-56 dBc, minimum
Frequency Response:	90 Hz to 10 kHz, ± 2 dB
Distortion:	Less than 1% THD at 1 kHz
SNR:	Greater than 90 dB (excluding wired intercom)
Audio Processing:	2:1 companding
Squelch:	Tone-coded plus signal level
Intercom Modes:	Normal, ISO 1, ISO 2, Aux
Program Audio/IFB:	Built-in, transmission via high frequency subcarrier

MS-700 Master Station

Transmitter Power:	Switchable, 50 mW or 250 mW
Receiver Channels:	Four standard, six optional
Receiver Type:	Dual conversion
Band Separation:	Receiver and transmitter bands must be separated by at least one 30 MHz band
Frequency Selection:	Front panel controls or external PC (via optional serial interface adapter and Windows™ software)
Antennas:	1/4 wave wire whips, one transmit, one receive; BNC connectors
Intercom Channels:	Two; simultaneous and independent
Intercom Interfaces:	Clear-Com® or RTS®, externally switchable, via two 3-pin XLR's; simultaneous four-wire via two 4-pin XLR's
Intercom Modes:	Controlled by individual beltpacks via subcarrier data
Program/IFB Input:	Balanced, line-level, 3-pin XLR
Auxiliary Output:	Balanced, line level, via 3-pin XLR, with auxiliary contact closure on DB15 connector
Auxiliary Relay Output:	SPDT (form "C") contacts, rated at 1 A, 24V max. The relay "common" is on pin 6 of the DB15, "NC" is on pin 4, and "NO" is on pin 8
Monitor Outputs:	Balanced line-level output and cascade in/out via three 1/4" (6.3 mm) stereo phone jacks
Controls:	Select, monitor and level adjust for receivers and intercom; intercom mode; frequency selection switches; monitor level, ac power switch; transmit power switch and additional controls.
Indicators:	Signal present, mode, beltpack low battery warning, select status and monitor status for each receiver; monitor LED bar graph; power present, select status and monitor status for intercom channels and additional indicators.
Size:	19" (48 cm) rack mounting, one rack unit, 14" (36 cm) deep (excluding connectors and controls)
Weight:	10 lbs. (4.5 kg)
Power:	100 – 260 vac, 50 – 60 Hz, 20 watts maximum, IEC connector

BP-700 Beltpack

Transmitter Power:	50 mW, minimum
Transmit Antenna:	Flexible 1/4 wave, insulated metal-coated Kevlar™ fiber
Receive Antenna:	Internal wideband helical
Headset Connector:	XLR, 4-pin male standard, 4- and 5-pin female optional
Microphone Types:	Dynamic or 2-wire electret, externally programmable
Microphone Gain:	Externally accessible control
Headset Power Output:	150 mW, minimum, into 50 ohms
Controls:	Main volume control with power switch, program/IFB volume control, four mode switches
Indicators:	Low Battery/Power, PTT, four mode LED's
Batteries:	Six "AA" alkaline, optional rechargeable NiMH cells
Battery Life:	10 – 12 hours for alkaline, 7 – 8 hours for NiMH, both longer in PTT mode
Battery Replacement:	Removable battery holder; optional charger available for NiMH version
Size:	Approximately 1.25 x 4 x 5 inches (3 x 10.2 x 12.8 cm)
Weight:	Approximately 20 ounces (570 gm) with batteries
Construction:	Molded high-impact reinforced ABS

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Model: BP-700 | FCC ID: BFDQBPI | CAN:

Receiver complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: This receiver may not cause harmful interference and this receiver must accept any interference including interference that may cause undesired operation.

Transmitter complies with Part 74 of the FCC rules.