OPERATION MANUAL
STATION MANAGER+
Model: SMPLUS

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STATION MANAGER+ MANUAL

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Features:

- A wireless microphone interface ideal for use with JABRA wireless telephone head set model GN9350E with built-in RJ22 interface connector
- Built-in microphone pre-amp improves audio dynamic range of wireless microphone
- ID'er, programmable CW rate, interval time and chromatic tones
- Talkometers, transmit time, squelch controlled receiver time and total lapsed time
- Voltage monitors, 150 volts AC and 20 volts DC with programmable calibrate
- Powers up from AC or DC inputs
- Dual transceiver control for dual diversity and dual watch operation, utilizing two transceivers
- Internal speaker for monitoring ID'er audio
- Gain controls for ID'er, Speaker and Mic audio
- Pulser for amplifier tuning purposes, programmable rate and duration
- Simple terminal connections for all inputs and outputs
- Stores settings for up to six different configurations
- Attractive two color dual injection molded case

Description:

The Station Manager+ (SM+) is a combination of functions and operations, analog and digital, that have been put together in one enclosure for amateur radio operators. This eliminates the need for an assortment of separate devices such as a wireless microphone/telephone, phone patch, audio mixer, and CW ID'er which all require individual wire interfacing. The SM+ minimizes wiring requirements by sharing some of the same connections of the separate devices.

The Station Manager+ has a microcomputer to control the operating environment with a simple menu system that is used to store and retrieve setup data as well as display selected modes and operations.

A two channel mixer combines the microphone audio and ID'er tone before going to the mic input on a transceiver. This eliminates the need for an additional mixer. This mixer also has a provision for a wireless telephone interface, such as a Jabra, microphone (telephone) to be plugged directly into it eliminating the need for a special interface cable. You use the one provided with the Jabra unit. To use the SM+ wireless telephone interface effectively, the user needs to operate in the VOX keying mode, preferably SSB but other modes may be used. You may use a manual PTT switch but this unfortunately defeats the advantage of the wireless headset.

The SM+ includes: A chromatic CW ID'er for periodic identification of a radio station”s call sign; a Talkometer which tracks the amount of transmit time the operator accumulates during a period of time, as well as open squelch time from the their receiver, in respect to total radio receive time. A programmable auto reset feature keeps accurate talk time to lapse time ratios; An AC and DC monitor to monitor local AC line voltage and local DC battery voltage or power supply. The unit is powered by either an AC wall wart at 9 volts AC or a 10-15 volt DC source.

Also included is a master control switch for controlling two transceivers in tandem for use in situations such as dual watch or dual diversity reception. It allows the user to key the secondary transceiver in a way that prevents it from receiving RF energy from the primary antenna which may damage the secondary receiver input if not disconnected or protected.

All of the settings can be stored and recalled in 6 memory locations for future use.

A 2 by 16 character back lighted LCD display is used to display all user information.

This Station Manager+ utilizes an Atmel ATmega328 microprocessor and is Arduino compatible. The unit is capable of being software upgraded. A RS232 interface is provided for connection to a IDE such as the Arduino.

All the connection requirements are handled by a simple terminal system that simplifies wiring.

Each feature is described in detail later in this manual.

Audio and ID'er mixer controls:

There are three potentiometers on the front panel of the SM+. One for the ID'er level. The CW signal is generated in the microprocessor and passes through a Sallen Key filter to clean up the tones. The CW tones then go to the ID'er level control and on to the audio summing amp.

The MIC level control is between the mic audio pre-amp and the audio summing amp, It is used to adjust the mic input level. When using a Jabra wirelesss telephone as a wireless mic, set the Jabra audio level settings as low as possible. This will provide the most dynamic audio range and fidelity. Adjust the SM+ MIC gain for proper audio level to the transceiver. The output of the summing amplifier in the mixer goes to an isolation transformer before going out to the transceiver to prevent ground loops in the mic audio circuit.

The SPEAKER level control adjusts the level from the CW generator filter before the CW level control and passes it to the audio amplifier out to the SM+ speaker. The CW SPEAKER level setting doesn't affect the CW level at the audio output line. This control also adjusts the ID'er audio level in the wireless earphone of the headset.

Switches:

There are two slide switches on the SM+. One is the POWER switch which switches both the AC input power and the DC input power on and off. When powering on, the SM+ loads the data memory from memory set 1. To reset to factory defaults hold down the INC button when switching power on.

The second switch is the MASTER transceiver switch. This switch controls which of two transceivers is the master transmitter when more than one transceiver is used such as in dual diversity/dual watch mode. The non-selected transceiver is the slave.

Buttons (See Display & Set up menus)

Interfacing Connections:

Power Source
The basic set up requires the connection of power, either from a 9 volt AC wall wart, required for the AC line voltage monitor, or 10 to 15 volt DC source. The power switch has to be in the ON position for the unit to operate. Once it is powered on the user can monitor the supply voltage in either the AC or DC monitor modes as per the source of power. When powering up, the unit automatically restores the setting from memory set location 1. These are preset at the factory and can be reset for the user's own requirements, i.e. radio call sign, tones, ID'er interval, etc.

The power connections are on the terminal connector on the inside of the enclosure. Removing the four screws on the bottom of the enclosure allows access. Remove the bottom section to expose the signal and ground terminals.

To make a connection to the terminals, press the small button just behind the terminal hole to release the spring tension and insert the stripped wire into the slot. Release the button and that completes the connection. Test the connection by pulling slightly on the wire so it has a firm grip to be sure you have a secure connection. Shielded cable wire is recommended for all audio and signal connections. Alpha cable P/N 2254 or equivalent is recommended.

AC1-AC2 - AC input
The terminals marked AC1 and AC2 are for the included 9V AC power adaptor. Cut off the power plug on the AC adaptor. Strip and connect these leads to these two connections.

DC IN - DC input
If you power the device from a DC source, connect the positive DC lines to the terminal marked DC IN and the negative lead to the ground terminal across from it. All the larger terminal holes are ground terminals except the one marked AUDIO-. All of the terminal connections work the same way.

SPKR - Speak in
The Speaker input is connected to either the transceiver speaker output circuit or the audio line output as found on accessory jacks on many transceivers. This is where the receiver audio is connected to the wireless headset earphone via the Station Manager+. When using the speaker output line, the speaker gain controls the audio level to the wireless headset as it does the speaker. If you use the fixed level audio line from the back of a transceiver, the audio level to the wireless headset can be controlled by the wireless headset volume control or the RF gain control on the transceiver.

AUDO / AUDIO- - Audio output, isolated
The Station Manager+ audio output connections are required for audio signals to be sent to the selected transceiver. This connection should be to the microphone jack or the auxiliary audio input found on many transceivers. **The line input found on many transceivers is not connected to the VOX circuit, therefore should not be used.** The Station Manager+ audio output is isolated via an isolation transformer (600 ohm) to minimize ground loops in the audio line. The two connections for standard interface are the AUDO connection, going to one side of the isolation transformer winding for the non ground audio line and AUDIO- to the other side of the isolation transformer winding for the other ground lead or shield. If using a balanced audio input, use 2 conductor cable with shield. Connect the two audio wires to the transformer connections, AUDO and AUDIO-, and the shield to one of the ground connections on J9. Note, AUDIO- is on terminal 4 of J9 terminal block.

APTT - See APTT/ASECS below

+7.5 V - +7.5 volts source
The 7.5 volts source connection is used for external devices, such as the Jabra (wireless telephone). The Wireless telephone can be powered from its own AC adapter or the 7.5 volt connection on the SM+. The advantage of using the 7.5 volt supply in the SM+ is when you need to operate on emergency power. If the AC power fails when using the AC adapter, there is no power to the SM+. If you use the DC power connection (DC monitor input) connected to a battery or auxiliary DC source, the SM+ will provide the power to the wireless telephone mic. The Jabra unit draws about 150 ma under nominal operating conditions. Use a ground connection from J8 terminal block to minimize any potential AC hum.

MICIN - Microphone input
The Mic in connection is for a standard wired mic, (no PTT). If using an electret mic, you may use +7.5 volts to provide power for it.

BSECS - Timer/Counter B
The BSECS connection is an input, that when pulled to a low level activates the B counter, if enabled. This input can be connected to a receiver squelch line to indicate the accumulated open squelch time. This way you can keep track of another station or stations transmit time.

TXKEY - Transmit Key
The transmit key output is required to key the transceiver when the ID'er is ready to send a CW ID. Connect the PTT line from the transceiver to the SM+ terminals marked TXKEY and ground respectively. The SM+ keys the transceiver when the ID'er time has elapsed and a transmission is initiated. With normal VOX operating levels the ID'er might not key the transceiver depending on the level of the ID'er. Most users set the ID'er to a lower audio level than their voice level and it may not be enough to trip the VOX. The SM+ pulls the TXKEY line down during the transmission of each CW character to ensure it is being transmitted regardless of the CW audio level setting. This input also pulls down (enables) the ASECS input to run the ASECS counter, if enabled.

The following six connections are used primarily with the dual transceiver setups for use as dual diversity/dual watch reception. Two antennas, one for each transceiver, is the ideal arrangement. A relay may be added to the antenna circuit for single antenna use. The APTT connection is also used with the A seconds counter.

APTT/ASECS - Transceiver A PTT or A seconds timer
The APTT/ASECS connection is an input, that when pulled to a low level, enables the A counter. The APTT and ASECS connections are in parallel. In some wiring cases the user

may need two connections to the APTT line. Pulling either input down enables the ASECS counter. This counter is used to keep track of the operator's transmit time accumulation. This input is also connected to the TXKEY output so that when the ID'er sends, it pulls this input line down to enable the ASECS counter, if it is enabled.

AXCVR - A transceiver relay
This connection is connected to the A transceiver transmit relay. The one that normally goes to an amplifier. It is used when connecting two transceivers together for dual diversity/dual watch.

AMPA - Amplifier A
This output connection goes to the A amplifier when used. It is used when connecting two transceivers together for dual diversity/dual watch.

BPTT - Transceiver B push to talk
This connection goes to transceiver B push to talk (PTT) input. It is used when connecting two transceivers together for dual diversity/dual watch.

BXCVR - B transceiver relay
This connection is connected to the B transceiver transmit relay. The one that normally goes to an amplifier. It is used when connecting two transceivers together for dual diversity/dual watch.

AMPB - Amplifier B
This output connection goes to B amplifier when used. It is used when connecting two transceivers together for dual diversity/dual watch.

RJ22 (4p-4c) - Jabra connection:
This connector is used to send the wireless microphone/telephone mic and speaker signals to and from the SM+. The Station Manager+ is wired for a Jabra wireless telephone so you can plug the phone handset cord directly into the RJ22 jack on the Station Manager+. To utilize the Station Manager+ wireless mic input, VOX operation is required. The RJ22 jack is located on the printed circuit board. Remove the bottom cover to access.

ICSP - (In circuit serial programming port)
This connector is used for high level programming of the SM+.

RS232 - Serial programming port
This port is used to load the program code to the SM+. It can be used as a general serial port with user written code.

Display and Set Up Menus:

Each mode and sub mode is labeled with its function and an optional data field shown in the LCD display, also referred to as menu window.

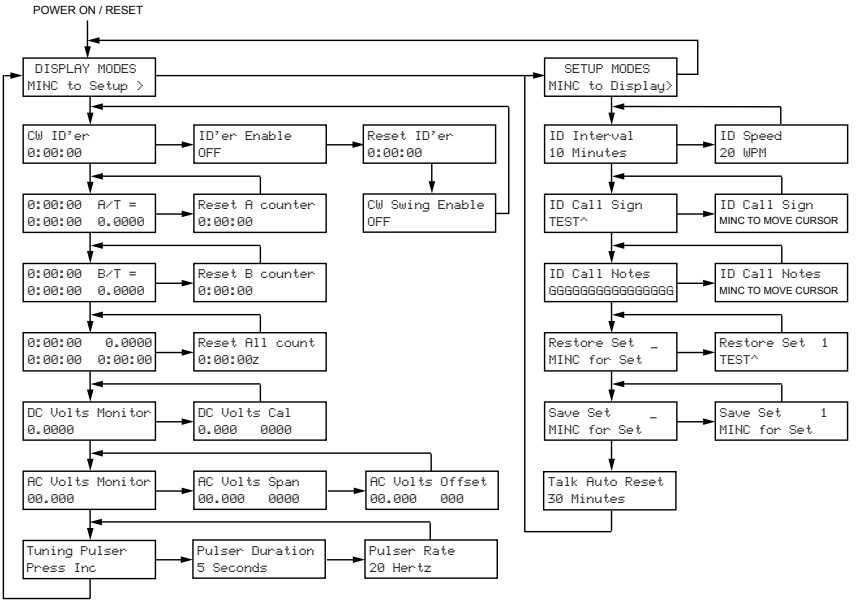
Button Controls
Setting up the Station Manager+ for your particular requirements is accomplished through a menu array that is accessed through three buttons, much like a digital wrist watch. The MODE, INC and DEC buttons are used to move through the menus and set ups. The menus are set up into two loops, one is primarily for display and the second is primarily for set up. In each mode loop are a number of modes, each having its own display data. Some modes have sub modes for setting or enabling features. Pressing the MODE button moves the mode menu down to the next menu. Repeat pressing the MODE button and it will move through all the modes in the particular loop until it gets to the bottom and returns to the top of the loop. To access the sub mode in each menu window, you will have to press and hold the MODE button and then press the INC button to move to the sub mode, think of moving to the right. This version of the SM+ does not use the DEC button.

For the sake of brevity we'll call the button combination of holding down the MODE button then pressing and releasing the INC button, a 'MINC' operation.

When in any particular mode window, i.e CW ID'er, Do a MINC and you will see the ID'er enable menu appear in the display window. Release the Mode button and the press the INC button to enable or disable the ID'er. Do a MINC again and you will see the ID'er Reset

menu window. Let up on the MODE button and press the INC once and you reset the ID interval counter to zero. You may want to use this to synchronize the counter with WWV or some other time reference. MINC again and see the ID'er swing menu, this controls the ID'er speed as a function of the ID note tone. Depending on the mode or sub mode menu window you are in, the INC button may operate differently. Some modes, such as the A, B and Lapse timers, are stopped or started with the INC button with the LED indicating if they are running or not. Press INC once to enable, press again to disable. LED on = running, LED off = stopped. In other menus such as the CW call letters set up menu window, one tap of the INC button will increase by one or, hold INC down for fast increment.

Menu Flow Chart



Menu navigation: See Menu Flow Chart

Being that there are a number of different settings the SM+ requires, it is best to become familiar with them one at a time. Start with the set up menu to set up your ID'er send speed, ID'er interval time, call letters for the ID'er and the CW tones you want it to send. Once powered up, the SM+ will be in the startup display window 'Station Manager+' momentarily then 'DISPLAY MENUS'.

SET UP MODES
Do a MINC from the startup "DISPLAY MODES" menu window. This will take you to the Setup menu window which displays, 'SETUP MODE'.

ID Interval and ID Speed
Press MODE once and you will see 'ID Interval' in minutes. Press the INC button to advance the interval. Holding the INC button down you will see the count rollover at 60 minutes back to 1. Set the minutes value to the ID interval time that you want your ID'er to set the ID ready to send flag. Every ID interval time that lapses will set the ID'er ready to send flag. It is reset when the ID'er is manually activated with the INC button in the CW ID'er menu window or when a transmission is initiated by the operator. Do another MINC and you are in the 'ID'er Speed' menu window. As before, use the INC button to set the CW send speed in words per minute, 5-30 WPM.

Doing another MINC will take you back to the 'ID Interval' window, or press MODE and go directly to the next Mode.

ID Call Sign
In the menu window you will see 'ID Call Sign'. In the data field displayed below, you can change or select a new set of letters for the call sign. Use the INC button to scroll through the available characters. All morse code letters and symbols are available for use. See specs for complete list of available characters and delimiters. Use the MINC to move the cursor right and repeat for the next characters. The '^' character is used as an end of string symbol. The ID'er will not send any characters past the '^' . The underscore character '_' is used for a space. Any characters to the right of the '^' are not sent and may be used as notation in the 'Restore Set' mode to identify each ID string uniquely.

ID Call Notes
Press MODE and you will see the 'ID Call Notes' menu window. In the data field displayed below you can select a note on the chromatic music scale from C up to B to be generated for the corresponding call letter on the previous menu, 'ID Call Letters'. The notes audio frequencies are from 523 hz for C to 987 hz for B. You may set them all the same or set to create a melodic ID'er call transmission. Upper case letters are natural notes and lower case letters are sharps.

Restore and Save Set
The next two menu windows are for restoring, 'Restore Set', and saving, 'Save Set', the setup data to or from memory. There are six sets of settings, the first set, Set 1, is the boot up set which is loaded at power up. Do a MINC until you get to the memory set selection you desire, 1-6, press INC to restore or save memory set. When the SM+ is powered on, and the INC button is held down simultaneously, the factory default settings are loaded into memory set 1. Otherwise at power on the memory data is load from memory set 1

Talk Auto Reset
The next menu is the 'Talk Auto Reset' menu. This allows the user to set the talk over time period (1-180 minutes) from the user's last transmission, to automatically stop the talkometer counters. After this period, the talk over time is subtracted from the ASECS timer. Once transmission resumes, the counters restart at zero and start a new talk time period. This is useful as it eliminates the need to reset the counters each time the operator starts a new transmitting time period, such as the next day or another QSO. Setting this value to zero disables this function. To manually restart the talk time counters, use the Reset All Count menu.

Press MODE again and you are back to the SETUP menu. Do a MINC and it will take you back to the display menu window, 'DISPLAY MODES'.

DISPLAY MODES
The 'DISPLAY MODES' menu window is the top of the display loop menus.

CW ID'er
Press MODE and you will see the 'CW ID'er' menu window. In the data field displayed below you will see the lapsed time since the last ID. Also, in this window an 'ON AIR' will come on whenever the APTT line is pulled to ground or the ID'er sends. Do another MINC and you will see 'ID'er Enable' menu window. In the data field you see ON or OFF, Use INC to select ON or OFF. Press MINC again and you will see the 'Reset ID'er' menu window. Pressing the INC button resets the ID'er interval counter to 0. This is used to sync up the ID'er counter with a clock such as WWV. Do another MINC and you will see the 'CW Swing Enable' menu window. When enabled, 'ON', the CW speed will vary with the CW notes selected. The higher the tone pitch, the faster the CW speed. This is what creates the CW tone swing.

Talkometer
The next three Modes are Talkometer counter/timers to keep track of the talk time of the operator, the squelch and total lapsed time since resetting the talk time counters. These are displayed as a ratio of A timer over T, B over T and A over B. The A counter/timer tracks the APTT/ASECS control line, B counter/timer tracks the BSECS control line and the T timer/counter tracks the Total lapsed time. The TIMER ON/OFF function for all the timer/counters is the INC button, pressing it toggles the timers ON or OFF. The TIMER LED will turn on or off respectively. The reset function for all the timer/counters is the sub menu of each timer respectively. Do MINC to see the 'Reset (X) Timer' display menu window.

DC and AC Volts Monitors
The next two modes are the ‘DC Volts monitor’ and the ‘AC Volts monitor’. Each of these has sub menus for setting the span and offset for calibration purposes. To calibrate the voltage monitors, apply a known voltage to the AC and/or DC inputs and scroll through the calibrate setting until the display matches your reference voltage measurement. Ideally, use the supplied AC wall wart for the AC source. It supplies the optimal AC voltage for the AC voltage monitor calibration. The DC volts monitor measures the voltage at the DC in terminal.

Tuning Pulser
The last mode is the ‘Tuning pulser’. It is used to assist in tuning up an amplifier when the user wants to minimize the plate dissipation at the maximum peak current. The duration and rate of the pulser can be set by entering the sub menus ‘Pulser Duration’ and ‘Pulser Rate’ by doing a MINC. The duration can be set from 1 to 20 seconds and the rate can be set from 10 to 50 hz by using the INC button. Pressing the INC button while in the ‘Tuning Pulser’ display menu will activate the pulser and key the transmitter. The pulser pulls the TXKEY/PTT line down at the rate and duration set in the SM+. You may need to put the transmitter in the AM or FM mode to get the required carrier to drive the amplifier.

Use the MODE and MINC to look at or change the settings of any of the menus. This completes the menus.

Using the Station Manager+:

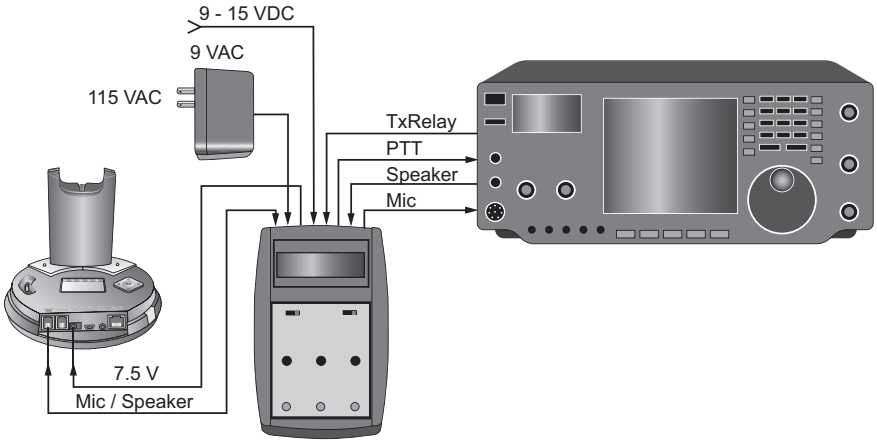
ID'er:
Once you have the SM+ setup you will need to ensure that the functions you want to operate are enabled, such as the ID'er. Be sure you turn the ID'er Enable to "ON". When ever the ID'er time interval lapses it sets the ID'er ready to send flag and waits for the operator to transmit. Once the operator keys down for at least one second the ID'er will activate and send the ID Call Sign, and reset the ID'er flag for the next interval flag set. If the operator doesn't key down at exactly the end of the ID interval time period, it waits till they do and sends the ID. The SM+ then subtracts the ID interval time from the ID'er counter and puts the remainder back in the ID counter so that ID flag is always set exactly on the ID interval time setting. If you reset the ID'er at exactly the top of the hour, for example, and you have the ID interval set at 10 minutes. If you don't key the transmitter till 12 minutes after the hour, the ID'er will subtract 10 from 12 minutes lapsed and put the remaining 2 minutes back in the ID counter. This way the next ID will be at 20 minutes after the hour, and so on.

Talkometer:
All the Talkometer timers are enabled or disabled by the INC button in any timer menu window. Once enabled they will count when their respective input control lines are pulled to ground. When they are active, the A or B counters will accumulate the time for up to 12 hours then they roll over to zero. The Lapse time counter is used to measure the total time from the beginning of transmission when the timer counters are reset so you may derive the A or B counter time as a ratio to the total Lapse counter time or to each other, A/B. The Total Lapse Time counter is controlled by the INC button to start or stop it or the talk over time timer used with the Talk Auto Reset mode.

Voltage Monitors:
The AC and DC Monitor menu windows display the voltages of the AC and DC power inputs. The AC input voltage uses the 9 volt AC power adaptor as a reference to the AC line. If the 120 VAC line voltage that the power adaptor is plugged into varies up or down, the AC power adaptor voltage will vary proportionally. The 9 volts AC is rectified and used to power the SM+ and the AC Monitor input voltage. There are two menus to calibrate the AC Monitor voltages. The Span and Offset adjustments are used to calibrate the display by using a Digital Volt Meter (DVM) to measure the line voltage while setting the calibration adjustments. Factory default for the Offset should not need to be changed.

The DC Monitor menu has one adjustment, It is the DC Volts CAL menu. In a similar fashion to the AC calibration, Connect your DC source to the SM+ and use a DVM to measure this voltage, use the INC button till the SM+ display matches the DVM as close as you can adjust it. The voltage monitors are about +/- .5% accurate at full scale.

Typical Wiring Diagram:



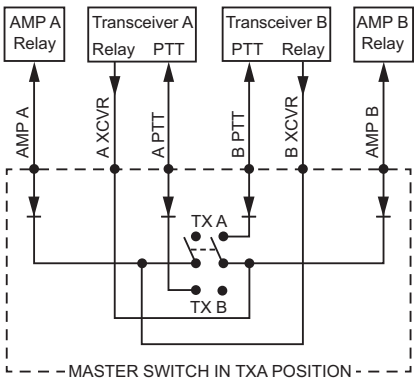
Dual Diversity/Dual Watch:
Using dual diversity/dual watch feature in the SM+ allows operators to emulate more elaborate and expensive transceivers employing dual watch or dual receiver configurations. If you have two transceivers at your disposal than you may implement this scheme with the SM+.

One purpose of the SM+ dual diversity/dual watch circuitry is to keep your master transceiver from damaging your secondary transceiver, the slave, with too much RF energy on the receiver front end. The ideal situation is to have two separate antennas employed, one for each transceiver. Although good antenna isolation may minimize RF coupling to the slave transceiver antenna, the easiest way to do this is to key the slave transmitter while transmitting on the master transceiver.

It is necessary to use a transceiver rather than a receiver as a slave because the transmitter section of the transceiver can handle any residual power on its antenna derived from the transmitting master transmitter, where as a simple receiver may not protect the RF front end effectively. Also, it mutes the secondary transceiver to eliminate any noise or feedback that might be emitted from its speaker during a transmission.

By connecting the master transceiver amplifier relay to the slave transceiver PTT line and connecting the slave transceiver amplifier relay to the amplifier associated with the master transceiver. The master transceiver amplifier can not key-on unless the slave transceiver is keyed. While the slave transceiver is keyed to transmit, its receive section is disconnected

Dual Transceiver Wiring Diagram:



from the slave antenna. This is what protects the slave transceiver from the possibility of too much RF on the receiver front end. Any RF on the slave antenna appears as reflected power during the transmit of the master transmitter. The slave transmit section should be able to tolerate a number of watts from its antenna without any damage, especially with the slave transmitter power output adjusted to zero.

It is important to control the master amplifier, that may be connected to the master transceiver, via the slave transceiver, especially when operating in a high power situation.

To keep any audio signals form being transmitted by the slave transceiver, adjust the mic gain to zero and/or disconnect the microphone.

When the MASTER switch is switched to the other position, the roles of the two transceivers and amplifiers reverse. If one transceiver is only used for receiving there is no need to connect these cables.

To reiterate the serial process, it is as follows, for the A transceiver the master. The operator keys the A transceiver with his VOX or PTT. The control line from the A transceiver amp relay closes and keys the B transceiver PTT line. It then closes the B transceiver amp relay and it keys up the A amplifier. Of course the process reverses when the A transceiver is unkeyed, i.e. the VOX drops or the PTT line is lifted.

Using a direction loop antenna is a good choice for the slave transceiver. The operator can then use it to tune out interfering signals.

Shielded cable wire is recommended for all audio and signal connections. Alpha P/N 2254 or equivalent is recommended.

Jabra Wireless Microphone/Telephone:

Interfacing a Jabra wireless microphone/telephone is easily implemented with the SM+. Using the RJ22 connector in the SM+ allows the user to plug the Jabra audio speaker cord directly into the SM+ mixer. It is optimized for the best performance available from the Jabra unit.

Prior to using your Jabra wireless unit (model GN9350E), refer to the operating instructions in its manual and become familiar with the controls and connections. See interfacing connections section of this manual. The initial recommended settings as we use them are as follows.

Settings:

Clear tone adjustment = A, The Clear tone adjustment is on top of the base unit to the left of the display.

Transmit audio level = 1/12 to 4/12; Audio quality and dynamic range seems to be best when set at a low level, 1/12. This low level is made up with the microphone pre-amp in the SM+ and is able to activate the VOX easily.

Hook switch type = GN RHL, do not change for SM+ use.

Power/range level = LOW; Normal setting is longest range, 300 feet. You may want to increase or decrease the power setting. High power means longer range but shorter operating time.

Sound/tone = NORMAL, change this to alter the receive tone character, lower or high frequency compensation.

Noise reduction = LEVEL 0 or 1; User may want to experiment with this. It affects the back ground noise reduction characteristics of the Jabra unit. It's another level of noise reduction of the received signal.

Do not change the Hook switch Type setting

The Jabra is also able to interface to a standard telephone or computer to implement voice over internet communications. So when you are not using it with your radio system you may use it as a telephone. For more information on how to use the Jabra wireless headset go to http://www.jabra.com/support/jabra-gn9350e_9326-607-405

Firmware Programmability: Advanced User (Optional)

The SM+ has an Atmel ATmega328P-AU microprocessor which is user programmable for advanced users. The SM+ can be programmed in an Ardunio Integrated Development Environment (IDE). The program is written in C language. It has a RS232 port and an ICSP (In circuit serial programming) port for programming and serial control. Although there are no direct uses of the programming or serial interface with SM+ as it is for the user, one may upload software updates should they become available. It is also able to program the SM+ in the Arduino IDE from the user's own program code. If the user is able, i.e. a programmer, they may want to write their own software to operate the Station Manager+ in some other way. Beware, in doing this you will erase the SM+ code and it is not recoverable unless the original object code is reloaded. A copy of the program code may be acquired from Karas Technical and used to reload the Station Manager code. This process requires some knowledge of ICSP (In circuit serial programming). This can be accomplished with AVRdude ICSP software and the serial port.

Specifications:

Audio levels:Input 200 mv p-p max. Exceeding this level will drive the mic pre-amp into distortion.

Input impedance aux MICI = 10K , RJ22 input = 1Kohm

With MIC control set at max., input at 100 mv p-p; Output = 1500 mv +/- 100mv into 600 ohm impedance.

An input level higher than 100 mv p-p with the MIC gain at maximum will drive the mixer summing amp into distortion

Wireless telephone interface. RJ22 (4p-4c) telephone handset connector

Power supply: 9-15 VAC or 9-15 volts DC, 150 ma., with Wireless Jabra unit plugged in, current is approx. 350ma. +/- 50 ma

7.5 volt source: Current rating, 300 ma maximum

Case: Soft touch elastomer (TPU) edge grips created by multi-shot molding ABS/TPU, Size: L 6.102", W 3.779", H 2.165", color - black and cobalt gray

AC Monitor: Range, 100 to 150 vac, accuracy, +/- .5%. Calibratable. The AC volts monitor is not meant to be a precision meter. Because the load variations with the SM+ configurations, such as the Jabra wireless microphone being on, off or charging, the readings may vary with load on SM+. Use AC calibrate function to normalize.

DC monitors: Range, 0 to 15 vdc, accuracy, +/- .5%. Calibratable

CW ID'er Speed: 5-30 words per minute

CW ID'er interval: 1-60 minutes

CW ID'er code string: 16 characters, all standard morse code characters are available. '^' character is string end delimiter, '_' is a space;

Character list:_ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890.,?!/()&:;=+-$@^

CW ID'er tones: 16 notes, one each to corresponding ID'er code string character, 12 frequencies, each corresponds to a musical note, C at 523hz, C# at 554 hz, D at 587 hz, D# at 622 hz, E at 659 hz, F at 698 hz, F# at739 hz, G at 783 hz, G# at 830 hz, A at 880 hz, A# at 932 hz, B at 988 hz.

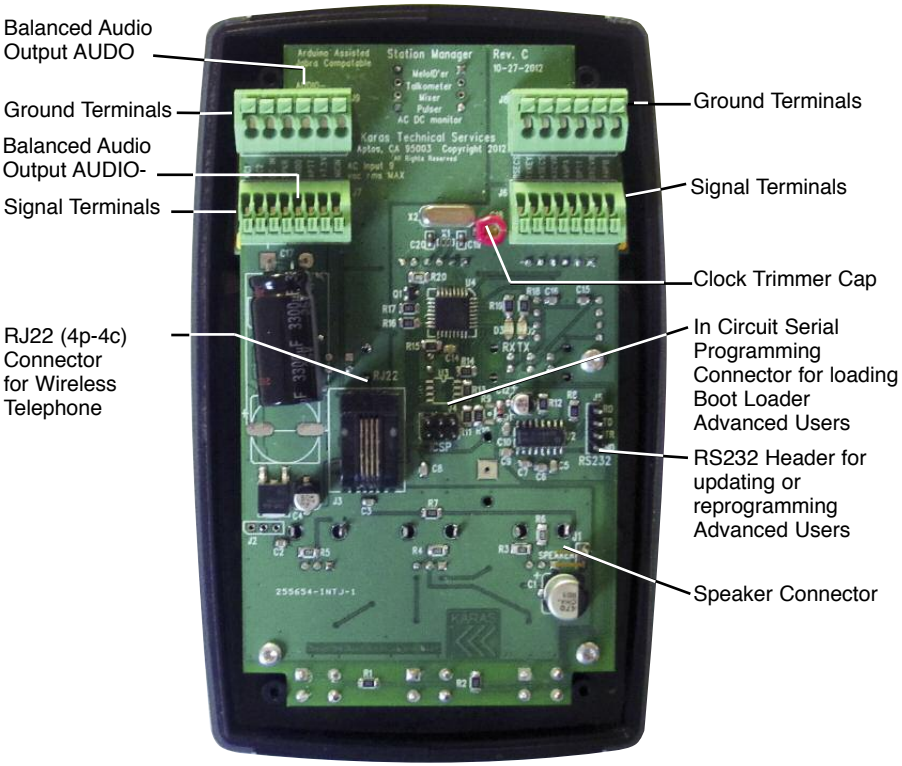
Pulser: Duration 1-20 sec, Rate 10-50 hertz

Talk Over Time: 1-180 minutes

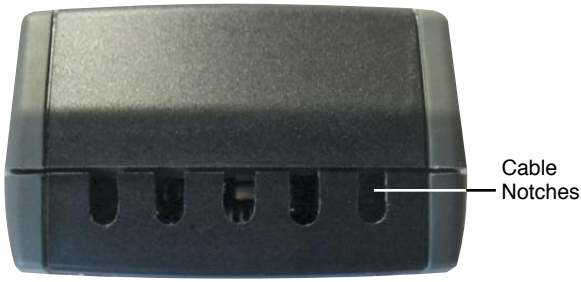
CPU oscillator clock frequency: 16 mhz, adjust to less than +/- 30 hz for best time keeping. The closer to 16.000 Mhz the better.

Terminal connections: There are 28 terminal connections, 11 ground and 17 signal and power. Signal connection terminals accept 20-24 ga wire. Ground connection accept 16-20 ga wire. Phoenix contact series PTSA. Interconnection cable recommendation, Alpha wire P/N 2254 or equivalent.

Display: LCD, 2 x 16 character, back lit yellow green



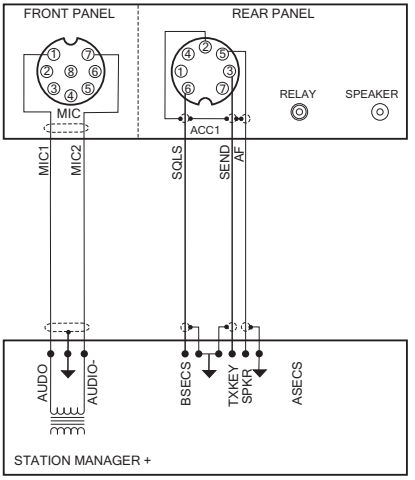
VIEW OF BOTTOM
Showing Speaker Holes



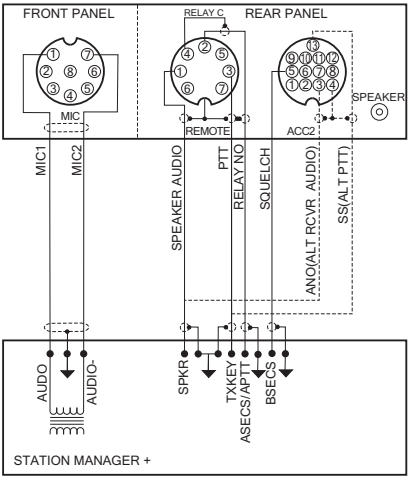
BACK VIEW
Showing Cable Notches

Wiring Diagrams

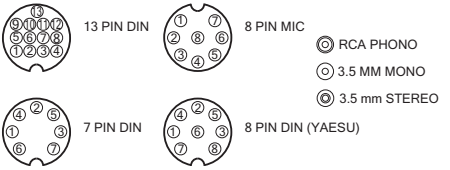
IC-746, IC-756, IC-7600, IC-7700, IC-7800



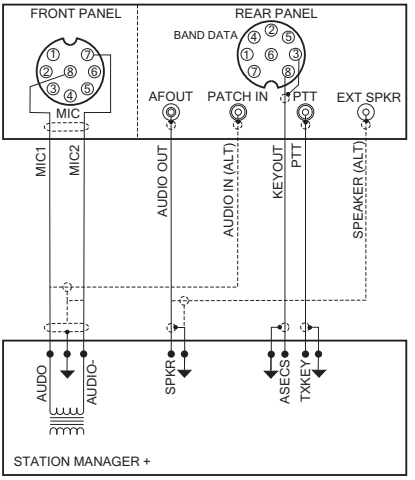
TS-450, TS-590, TS-2000



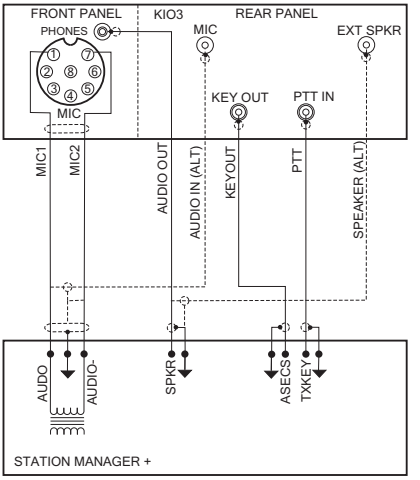
CONNECTOR KEY



FT1000D



ELECRAFT K3



Application Notes: Station Manager+ wiring diagrams for assorted transceivers.

This note describes wiring interfaces for many popular amateur radios. This is to help the user wire their own equipment to the Station Manager+ (SM+).

The basic interface to and from the SM+ to the transceiver requires the following:

1. Power, AC or DC is required to power the SM+
2. MIC input, required for mic and CW ID'er modulation to the transceiver.
3. TXKEY, to key the transceiver.
   Not using the TXKEY line requires the user to set the ID'er level high enough to trip the transceiver VOX circuit. This approach is not ideal because you may want to set the ID'er level at a lower audio level than the voice modulation and it may not be enough to trip the VOX. Using the TXKEY line to the transceiver PTT input ensures the ID'er will key the transceiver even at very low ID'er levels. The TXKEY line also controls timer ASECS to measure the user's transmit time.
4. Transceiver audio out to the SM+ for receiver audio to the wireless headset ear phone.
5. Squelch out to the SM+, when low, this is used to control timer BSECS which measure the receiver open squelch time.
6. Wireless headset base unit power, either wirelesss AC power adapter, DC supply or connect to SM+ accessory power (7.5 volts). Note: to minimize noise from the wireless headset, connect the 7.5 volt power supply ground wire to one of the ground connections on terminal block J8
7. Wireless base audio in/out, conducts the audio signals to and from the SM+ and wireless base unit.

Some radios such as the IC-756PRO have a SEND line which does both the PTT and the Transmit key functions. It is not necessary to use the AMP KEY line to active the SM+ timer ASECS in the Talkometer.

When using VOX, a signal has to be derived from the amplifier key relay or other SEND line to switch the ASECS/SPTT to activate the ASECS timer. If the transceiver has only one amplifier key contact, you may use it in parallel with the ASECS/APTT input and the amplifier key circuit. Do not use the Amplifier key line with voltages greater than 25 volts DC at no more than 100 ma. This may damage the SM+.

Note about the Wireless telephone headset.
If operate your wireless head set with transceiver speaker active, you may notice some distortion in the ear phone. This is usually caused by the speaker audio getting into the headset microphone. To minimized this distortion, turn down the earphone audio level to a lower level or reduce the speaker audio output level on the transceiver.

The gain controls on the SM+ are modified linear potentiometers. They have a resistor across the wiper to ground to simulate an audio taper pot. You may notice that there is more variation of adjustment for a given amount of rotation near the end of its range.

The AC volts monitor has two calibration settings. Span and offset. When shipped the SM+ is set for operation without a wireless base unit plugged into the SM+ power source. The Span is set at 1000 and the offset at 900 at the factory. The offset is used to account for the diode drop in power supply and is subtracted as a percentage of the peak voltage from the AC power adapter. The value of 900 is 90 percent of the peak voltage. In other words, if you have 14 volts peak at full scale and two diode drops (1.4 volts) in the full wave bridge rectifier the 1.4 volts diode drop is 10 percent of the peak DC. This peak voltage will change with the addition of the wireless base unit being connected to the SM+ power supply. You will still have 1.4 volt drop in the rectifier bridge but the peak volt will drop about ten percent to about 12.6 volts peak. Adjusting the offset to 888 will compensate for this change which is 11.2 percent of the peak DC supply voltage.

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