MSI9850

RF Remote Weight Indicator

a component of the CellScale® System

User Guide

Measurement Systems International

TABLE OF CONTENTS

SECTION 1 – INTRODUCTION & ORIENTATION 4
- Introduction 4
- MSI-9850 Front Panel 4
- Key Descriptions 4
- 9850 Information Display Symbols 6
- General Information 7
- Manual & 9850 Conventions 7
- Features 8
- 9850 Block Diagram 8
- The CellScale Family 9
- Unit Setup 10
- Battery 10
- 9850 Dimensions 10
- 9850 Connectors & Wiring 11
- Main Power Input 12
- Aux Power and Switches 13
- Serial Ports 14
- Set Points Output 16
- Antennas 19
- Standard Antenna 20
- Long Range OMNI 9dBi Antenna w/ Pipe Mount 20
- YAGI Antenna 21
- Corner Reflector Antennas 21
- Vehicle Mount Whip Antenna 21
- Standard antenna bulkhead extensions 22
- Other Antennas 22
- 2.4 GHZ Interference 22
- FCC's MPE Requirements 22

SECTION 2 – RF SCALE COMMUNICATIONS 23
- FCC Statement 23
- Network Description 23
- RF Network Setup 24
- Advanced Modem Settings 25
- Configuring for multiple networks 26
- Troubleshooting RF Connection Problems 27
- RF Site Testing 28
- CellScale Network Auto Scan 28

SECTION 3 – SCALE OPERATION 29
- Power 29
- Multiple Scale Channels 29
- Selecting The Active Channel 29
- Multi-Channel Systems 30
- To Select The Display Channel 30
- Zero 31
- Tare 32
- Setup Tare Menu 33
- Net / Gross 34
- Units 34
- Peak Hold (Function Key Option) 34
- Send / Print 34
- Display Test 35

SECTION 4 – FUNCTION KEYS 36
- Setup Function Keys 36
- Default Function Keys 37
- Default ENTER-Function Keys 38
- Default External (p2) Switches 38
- Default Comm Port Aux Inputs 38
- Default RF Remote Keys 38
- Default RF Remote Shifted Keys 39
- Available F-Key & Switch Functions 39
- Custom Function Key Labels 42
- Quick View of Function Keys 42

Go to Index

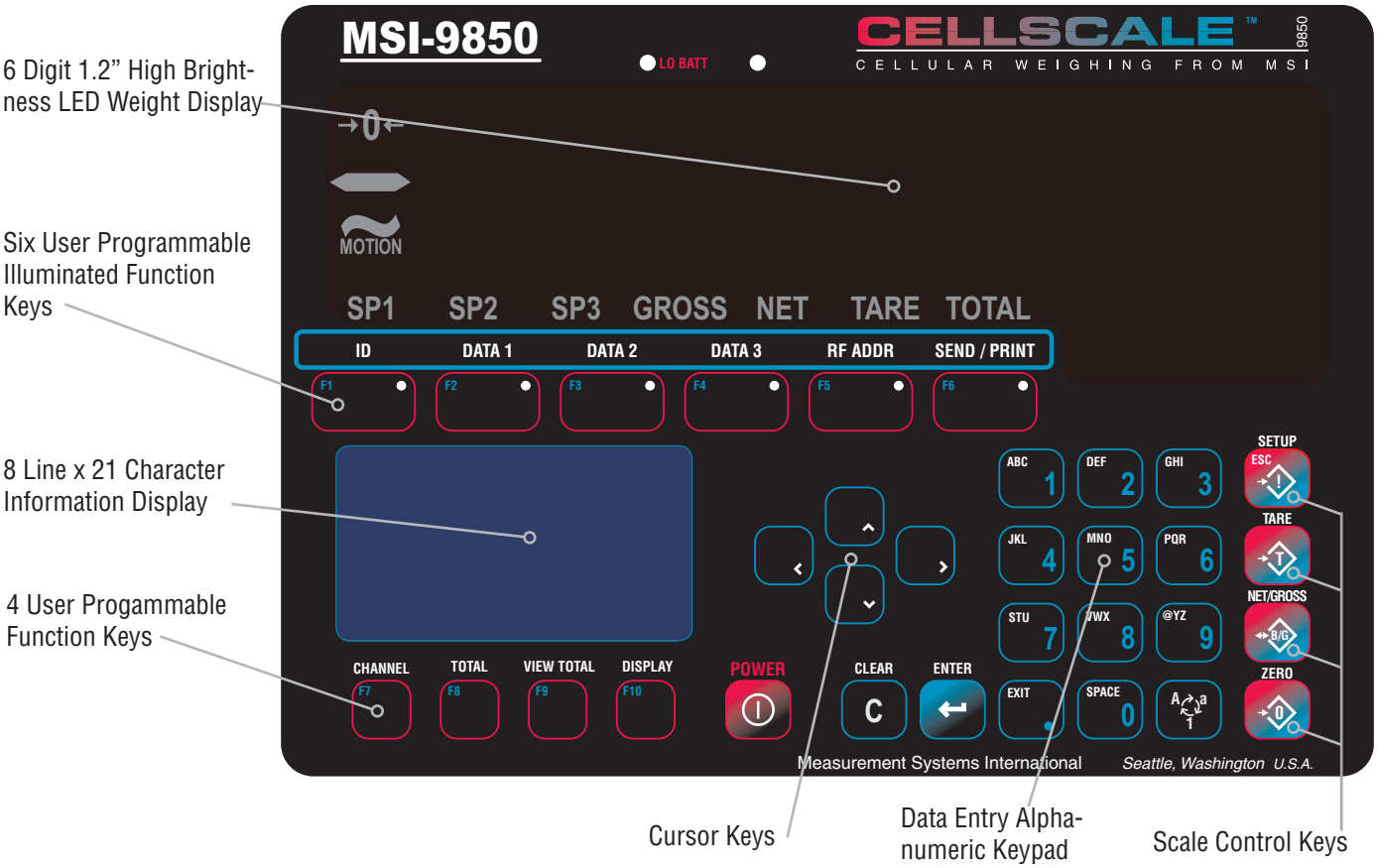
Section 5 – RF Remote Control Option....43
Description....43
Functions....43
Setting the Transmitter Address....43
Contention and Jamming Considerations....44
Battery Replacement....44
RF Remote Control FCC Statement....44
Section 6 – Id Codes....45
ID Code Organization....45
Setup ID Codes Menu....46
Using ID Codes....47
ID Code String 1 & String 2....48
Section 7 – Total / Statistics....49
Total....49
Auto Total....49
Setup Total Menu....50
View Total....51
Statistics....52
Section 8 – 9850 Setup....54
System Setup Menu....54
Password Locks....55
Keyboard Lock....56
LC Display Backlight & Contrast....56
Standard & Custom Display Setup....57
Scale Display Setup Menu – Preset Displays....60
Using Display Setup....61
Custom Display Setup....62
Custom Screen Setup Procedure....65
Custom Single Channel Display Setup Menu....66
Custom Multi-Channel Display Setup Menu....67
Section 9 – Set Points....68
Introduction....68
Set Point Setup Menu....69
Program Set Point Menu....70
9850 Response Menu....71
Optional External Alarm....71
Set Point Formula Menu....72
Section 10 – Communication Ports....73
Introduction....73
Electrical Conformance....73
Mating Cable....73
Data Configuration....73
Trigger Print....73
Comm Ports & Data Log Menu....74
Comm Port Setup Menu....75
General Text Entry....77
General Text Entry Menu....79
Printer / Output Formatting....80
Example Printer Formatting....80
Programming the End of Line or Start of Line Strings....80
Editing the Print String....80
General Text / Control Character Entry....81
Serial Output "@" Commands....82
Section 11 – Data Logging....85
Introduction....85
Data Logging Setup....85
Data Logging Control Menu....85
Data Logging Setup Menu....87
Section 12 – Text Messaging....88
Host Message Design....88
9850 to Host Messages....89
Section 13 – Bar Code....90
Bar Code Setup Menu....90
Section 14 – Channel Setup & Calibration....92
Channel Setup Menu....92
Calibrate General Information....93
Enable Calibration....93
To Calibrate....93
To Enable / Disable AZM (Auto Zero Maintenance)....95
Motion Band....95
Center-of-Zero (COZ) Indicator....96
Reset All....96
Installing Firmware Updates....97
Appendix A – Menu Maps....99
Setup Select Menu....99
Total Settings....99
Password Locks....99
Function Keys....100
Comm Ports & Data Logging....101
Display Function Keys....101
Comm Ports Setup & Strings....102
Data Logging Setup & Strings....103
Product ID Codes....104
Bar Code Setup....104
Tare Settings....105
RF Modem Settings....105
Scale Display Setup....106
Scale Single Channel Custom Display Setup....107
Scale Multi-Channel Custom Display Setup....108
Channel / Calibrate Settings....109
System Settings....110
Display Test....110
Monitor Batteries....110
Calibration....111
Reset All or Reset RF Modem....111
General Text Entry....112
Set Points....113
Appendix B – ASCII Chart....114
Appendix C – Specifications....116
The MSI Limited Warranty....117

SECTION 1 – INTRODUCTION & ORIENTATION

INTRODUCTION

The Measurement Systems International MSI-9850 Advanced RF Remote Indicator is an accessory component of MSI's CellScale® System. Combined with 1 or more CellScales, the 9850 provides complete control over all scale and data functions. The 9850 serves as a remote terminal for any CellScale and has no internal measurement capability. One 9850 can read the output of many CellScales, and 1 CellScale can also provide data to many 9850's. The backlit, alphanumeric graphic display provides precise, unambiguous indication of operating modes such as Net, Gross, or Total. The 9850 can calibrate a CellScale remotely and provides a user interface to the advanced features of the CellScale. The CellScale system is digitally calibrated from the MSI-3750CS RF Indicator, the MSI-9850, a MSI-9750A Handheld Indicator, or with a terminal program hooked directly to the CellScale model MSI-9000. The MSI-9850 combined with a CellScale is designed to meet or exceed the requirements of all regulatory agencies.

MSI-9850 FRONT PANEL



KEY DESCRIPTIONS

The **POWER** key turns the 9850 On and Off. The **POWER** key must be held for 1 second to ensure startup.

The **ZERO** key is used to zero out residual weight on the scale.

The **TARE** key is used to zero out the weight of containers, trucks, or carriers and to place the scale in the Net weight mode.

The **NET/GROSS** key allows the operator to alternate the weight display from Net (Tared) weight to Gross weight. In some Legal-for-trade jurisdictions, the Gross weight display is limited to 3 seconds.

The **SETUP** key allows entry into the setup submenus. Use this to find menus for setting the Date and Time, setting up the function keys, controlling the display mode and backlight, password locks, calibration, etc.. The key is also used for **ESC**ape. Use **ESC** to return to the previous menu, or display mode.

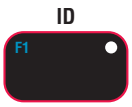
The **ENTER** key finalizes the entry of numeric or alphanumeric text entries. It also provides an alternate way to navigate through menus combined with the cursor keys. Pressing **ENTER** before certain keys takes you directly into various modes. Pressing **ENTER** before a Function key enacts the alternate Function key mode.

The **CLEAR** key is used for deleting entries and editing. In data entry screens, pressing CLEAR deletes the character in front of the blinking cursor.

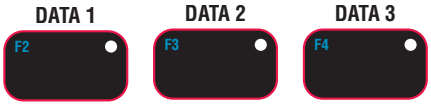
The **ALPHA** key is used during text entries to select upper case, lower case or numbers. Also used for negative number entry in numeric entry screens. When multiple channels are displayed, the Alpha Key performs Next Page function.

The numeric keypad provides all numerals and letters for data entry. Submenus provide punctuation and control characters.

The Decimal Point key is used in numeric entries. The **EXIT** function is used to exit out of setup screens. **EXIT** will cause the 9850 to exit out of all levels of menus and return the LCD to the last weight display. This differs from the **ESC** key which only backs up one menu level. The **EXIT** key duplicates the function of the **DISPLAY** key when the 9850 is in the weight display mode. This allows Single to Multi channel display switching when the function of **F10** has been changed.



F1 defaults to **NEXT ID**. Pressing **F1** will change you to the next defined ID. Any data field or 9850 function can be assigned to this key. The blue light will illuminate when the button is pressed to indicate the 9850 is waiting for Data (when the key is assigned a Data field type).

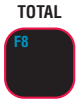


F2, F3, and F4 are for user defined Data entry. Any data field or 9850 function can be assigned to these keys. When these keys are programmed for Data entry, the blue light will illuminate when the button is pressed indicating the 9850 is waiting for data. These default to Get Barcode 1-3.

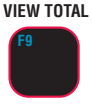
F5 defaults to **RF ADDR** (Address). The **RF ADDR** key is used to log on to other CellScale Networks. Pressing the **RF ADDR** key alone will change the active network to the next defined Network. Preceding the **RF ADDR** key with a Network number (0-63) will cause the 9850 to log directly on the entered Network, if it exists and is active. If changing the network is not necessary, any data field or 9850 function can be assigned to this key.

F6 defaults to **SEND/PRINT ALL**. The action of this key is dictated by the Function key menu, but is usually used to send data to the CellScale or one of its hosts. If the Send/Print function is not necessary, any data field or 9850 function can be assigned to this key. The blue light will illuminate until the Send/Print function is completed and acknowledged.

F7 defaults to **NEXT CHANNEL**. When the CellScale has more than 1 channel defined in its Scan List, the **F7** key will select the next active channel in the list. Precede the **NEXT CHANNEL** key with a numeric entry (1-32) to switch directly to a channel scan list position. Press **SETUP-CHANNEL** for a shortcut to the "Channel Setup Menu". If changing the channel is not necessary (as in single channel scale systems), any data field or 9850 function can be assigned to this key.

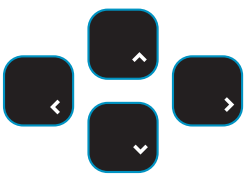


F8 defaults to **TOTAL**. Pressing this key will cause the current weighment to be added to the total register (Manual Total mode). In Auto-Total modes, the **TOTAL** key turns Auto-total off and on. If the Total function is not necessary, any data field or 9850 function can be assigned to this key.



F9 defaults to **VIEW TOTAL**. When pressed the information display will show the Totals screen with links to the statistics and grand total screens. Press VIEW TOTAL again to return to the previous screen. LFT 9850's default F9 to the **UNITS** function. Pressing this key will change the operational units (if enabled) of the current focus channel. If the View Total function is not necessary, any data field or 9850 function can be assigned to this key.

F10 defaults to **DISPLAY**. The **DISPLAY** key is used to alternate between single channel displays and multiple channel displays. While in the multiple channel display, highlight the desired channel using the UP/DOWN Cursor keys, then press **DISPLAY** to bring up the single channel display. This selected channel is the "Active" or "Focus" channel to which all subsequent actions will be applied. Provides the overwrite cursor (the cursor defaults to insert mode) function in text and data entry screens.



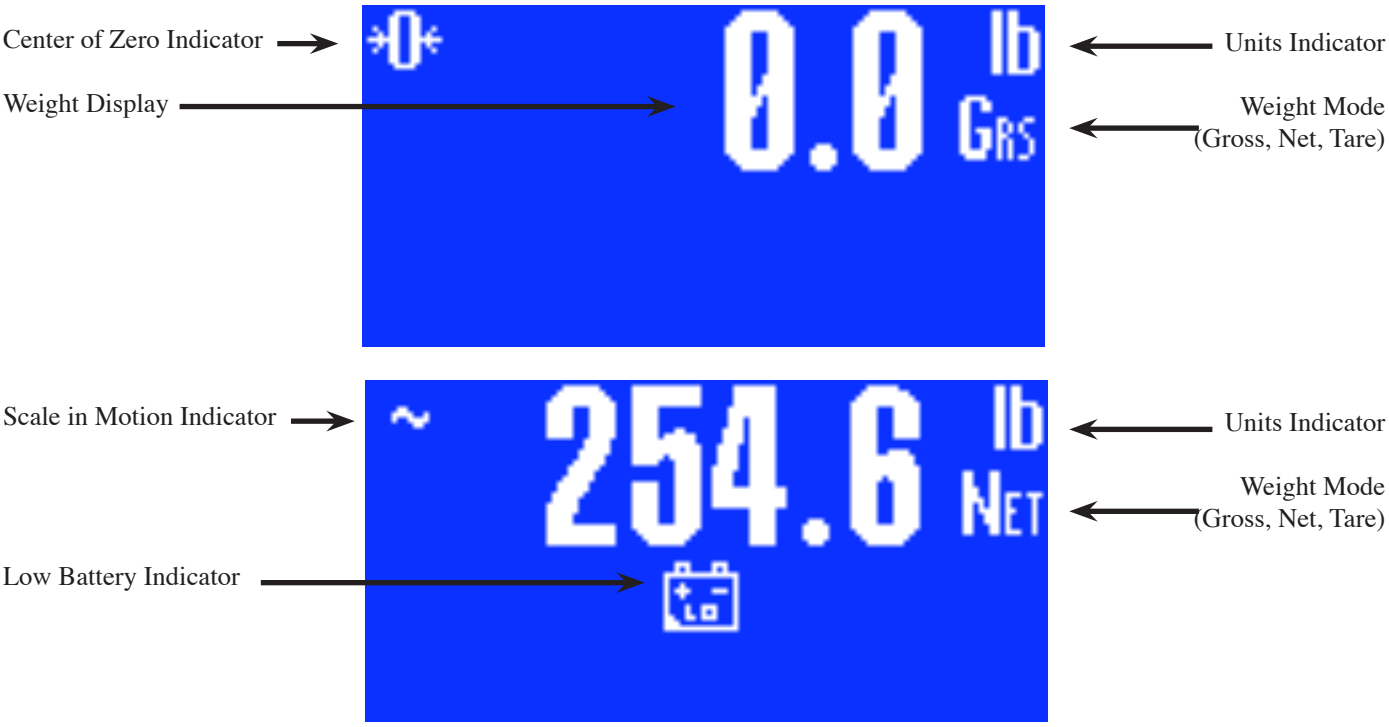
The Cursor keys are used to select the active channel while in multiple display modes. The active channel is displayed on the LED display. While in setup menus, the cursor keys are used to navigate menu choices and to control the text editing cursor.

9850 INFORMATION DISPLAY SYMBOLS

The 9850 uses a full dot matrix graphics LC display which allows 3 sizes of fonts and full use of graphic symbols. On standard single channel and multi-channel displays, certain symbols are used for scale specific indications.

~	The motion symbol indicates that the weight has not settled within the motion window (usually ±1d). While this symbol is illuminated, the scale will not zero, tare, or totalize.
→0←	Center-of-Zero – Indicates the weight is within 1/4d of zero. In the small font it appears as “>0<”.
Σ	The Sigma symbol is used to indicate a total weight
GRS	GRS – Abbreviation for Gross Weight
LO	Low Battery Symbol – Appears when approximately 10% of battery life remains. The 9850 places the indicator in various locations depending on the display mode
ton	ton– Indicates US short tons equal to 2000 lb.
tne	tne – Indicates metric tons equal to 1000 kg.
daN	daN – Indicates the force measurement unit dekaNewtons.
------	Dashes indicate data not yet received from the CellScale Host, or the RF network is disconnected.

Typical LCD weight displays showing the use of common symbols



Go to Index

GENERAL INFORMATION

The 9850 is a versatile indicator capable of displaying many data items. As a member of the CellScale family the 9850 does not stand alone. It is a slave device to a CellScale host device. All data displayed on the 9850 is received via RF from a master CellScale. Many menus in the 9850 depend on information from the CellScale. Therefore, turn the CellScale on before using the 9850.

Due to the high data rates in the CellScale system menus usually respond instantly. However there are times when the CellScale is busy and it will not "service" the 9850 instantly in all circumstances. At these times you may see the word "Pending" or dashes, or data placeholders which will indicate the CellScale has not yet sent the required information. Weight displays have priority and are sent before all text strings are updated (such as channel name, ID name, etc.).

The majority of CellScale installations have only a single scale input. In this case the Multiple Display modes are not needed. However, even with only a single scale input, Math Channels are available which can be applied for specialized applications.

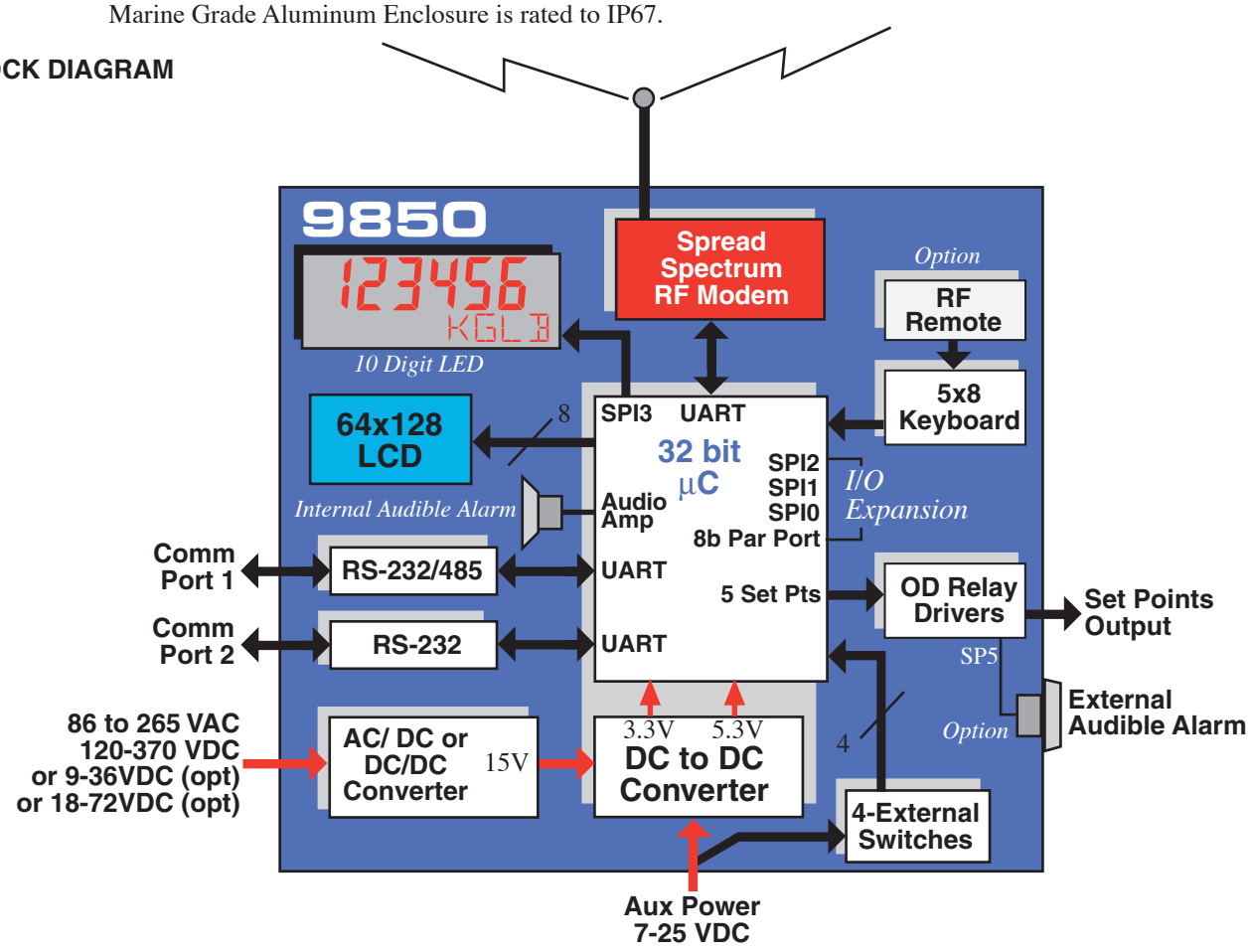
MANUAL & 9850 CONVENTIONS

1) Keys used in operations are printed in **BLUE** and capitalized. Numeric keys are bracketed (e.g. **[5]**).
2) Setup procedures are usually shown with the shortcut method of reaching the menu. All menus can also be reached through the "Setup Select Menu". Use the **[7]** key to see all available menu choices.
3) Screen shots are shown for example. Many screens provide additional information to orient the user to the scale channel, or ID, or selections made. For example, the Function Key Setup menu will show you the current selection for each key. When you change the function, the previous menu changes to reflect your choice.
4) If a function key does not work, it is probably because the CellScale is not setup to support the key. For example, if only one channel is defined in the CellScale, pressing the **CHANNEL** key will have no effect. This also applies to the **RF ADDR** key. If only one Network has been defined, the **RF ADDR** key has no other Network to log onto.
5) Menu Titles are shown at the top of the LCD screen in reverse (Blue on White) and are fully capitalized.
6) When space permits, selected parameters are shown at the right side fully capitalized.
7) Submenus with multiple choices use a highlighted arrow " ▸ " to indicate current choice(s). Multiple choice menus require the **ENTER** key to save changes.
8) When in menus, the **ESC** key drops back one menu level.
9) When in Setup Menus, the **EXIT** key returns you directly to the Weight Display.
10) Cursor Keys function in menus and in multi-channel display modes. Use the DOWN (**v**) cursor key to enable the cursors then use the UP (**^**) or DOWN (**v**) cursor to select line items or change the focus channel in the multi-channel weight display mode. Channel selection using the cursor keys also picks the channel that is copied to the large LED Weight display. When in setup menus, use **ENTER**, LEFT (**<**), or RIGHT (**>**) cursor keys to rotate through menu choices or select the associated submenu.
11) If a submenu is associated with a menu choice, either highlight the menu choice with the cursor keys and press **ENTER**, or press the numbered key corresponding to the desired menu item.
12) If a menu applies to any channel, pressing the **CHANNEL** key will select the next channel in the CellScale's scan list.
13) If a menu applies to any ID, pressing the **ID** key will select the next ID in the CellScale's ID list.
14) To input, for example, an 'E', first use the **ALPHA** key to change to alpha mode, then press **[2]** twice. If you need two 'E's, pause briefly until the display cursor has moved to the next position, then press **[2]** twice.
15) In single display modes, pressing the **ENTER** key highlights the whole LC Display to indicate the next press of a Function key will use the alternate mode (Enter-Function Key).
16) From any weight mode, press the **ENTER** key twice to display the current Function Key, Enter- Function Key, External Switch, and RF Remote Control Switch assignments. Press **ENTER** to see each screen. Press **ESC** to return to the previous display or wait 20 seconds for the display to return to the previous weight display.

FEATURES

- Designed to meet or exceed all US and international standards.
- Multiple Customized Display Modes, single channel or multiple channel modes
- Reliable 2.4 GHz Frequency Hopping RF communications. Highly immune to interference and multi-path problems. Range in excess of 500 feet indoors (LOS).
- Each 9850 can act as a terminal for any CellScale. A 9850 can monitor multiple scale channels on a single CellScale, or multiple scales tied to multiple CellScales.
- Store up to 32 ID Codes with separate Alphanumeric Names, Tare, Mode, and Totals. ID Codes are addressed by any customer given name or number. Two user entered ID data strings are available for each ID code. Support for up to four Bar Code entry strings.
- Easy to read annunciation of ID Names and Menu Prompts are provided on the fully customer defined display screen.
- Full RS-232 output formatting offers exceptionally versatile data output. Weight data can be printed in any desired way. The customer can add any alpha characters and/or printer formatting commands; including formatting for Bar Code printers. Bar Code readers can also be attached to the Comm Port.
- Manual or Automatic Data Logging into battery backed memory. Any data can be stored for later downloading into a computer.
- Display illumination uses rugged, long life, LED backlighting coupled with a transflective LCD to provide optimum display contrast under all ambient conditions from full sunlight to total darkness. When the 9850 is powered by batteries, the backlight automatically turns off and on when needed to conserve battery life.
- Selectable for lb., kg, g, tons, metric tons, ounces, and daN for force measurement (some units and/or units switching may be prohibited in legal for trade units).
- Multi-mode automatic or manual weight totalizing with multiple ID registers.
- Weather resistant sealing ensures reliable operations under harsh industrial conditions. Rugged, gasketed, Marine Grade Aluminum Enclosure is rated to IP67.

9850 BLOCK DIAGRAM



Go to Index

THE CELLSCALE FAMILY

1) Model MSI-9000 CellScale – Rugged unit for interfacing any scale and converting it to RF networking.
2) Model MSI-9008 Multiplexer – Allows up to eight scales with independent calibrations, to share a single CellScale input channel.
3) Model MSI-9020 CellModem – For interfacing peripheral devices to a CellScale.
4) Model MSI-3750CS – Fixed mount indicator for CellScales. Capable of control and calibration.
5) Model MSI-9750A – Portable remote indicator for CellScales. Capable of control and calibration. Can display multiple channels.
6) Model MSI-9300 – CellScale based Crane Scale with local LED display.
7) Model MSI-6260CS – CellScale based Crane Scale. Available in standard capacities up to 100000 lb (50000 kg) and by special order up to 250 tons
8) Model MSI-9850 – Advanced Capability Fixed mount Remote Indicator.

Model MSI-9260 – (Not pictured) Motion Compensated Crane Scale used in scrap metal weighing.

Model MSI-9002 Summing Box – (Not pictured) Single or Dual Channel summing of up to 4 load cells.

Model MSI-9300HT – (Not pictured) High Torque version of the MSI-9300 for fixed hook, rotating load applications.

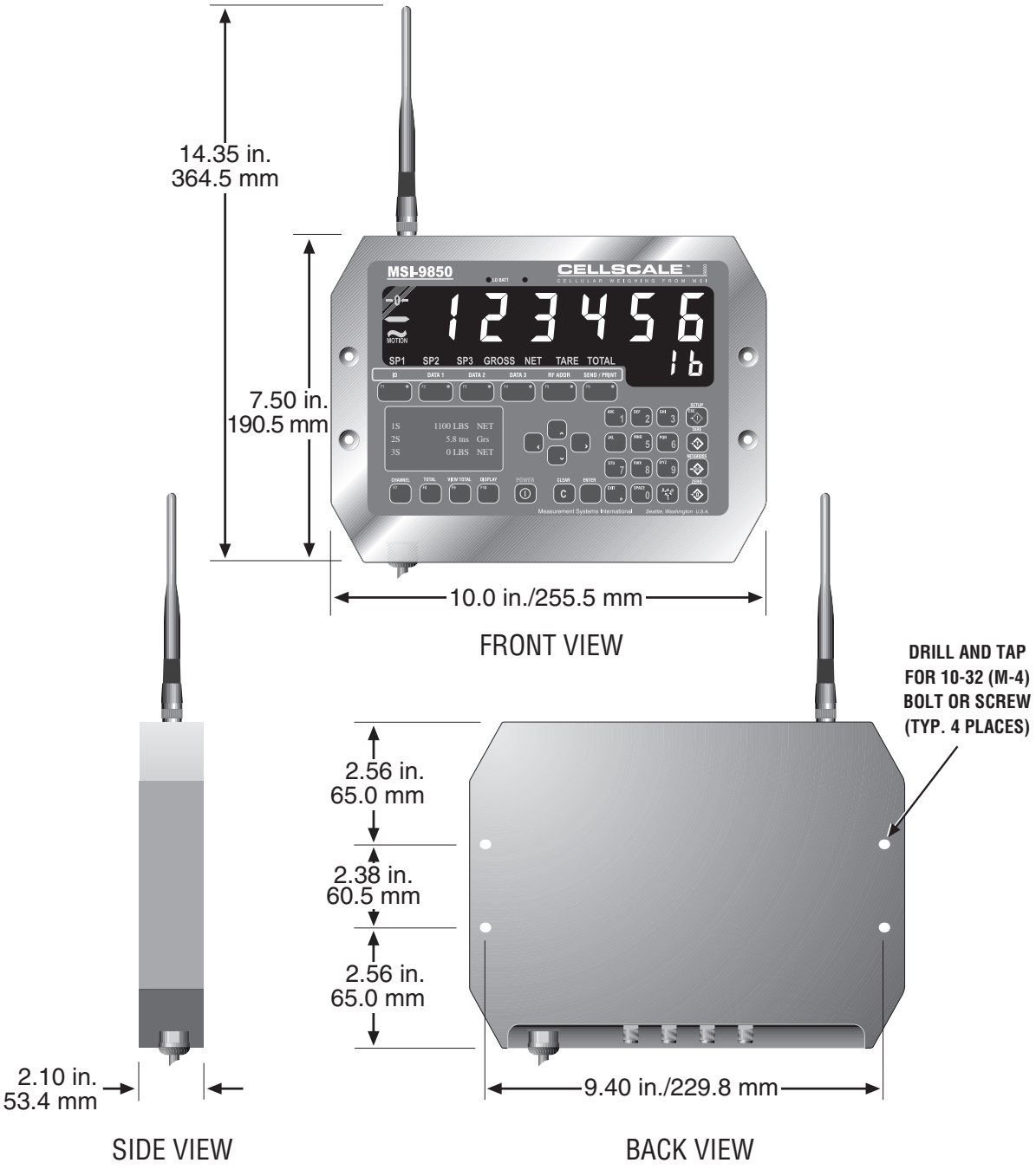
UNIT SETUP

The 9850 is simple to setup and use. If there are no peripheral devices such as a printer or bar code scanner, setup consists of applying power, and setting the modem controls to talk to a 9000 CellScale.

BATTERY

Future Option - Contact MSI for information

9850 DIMENSIONS



9850 CONNECTORS & WIRING

The standard configuration of the 9850 has the following connectors:

1) Main Power Input – Usually a heavy duty cable for power input. Available also with a connector by special order. AC and DC power modules are available for all industrial voltage sources.
2) Aux Power and Switches (P2) – Provides a means to attach external user programmable switches for foot-switches, joy stick mounted switches, etc. The Auxiliary Power input can be used for battery backup to ensure continuous operation. Recommended Power Source is a 12V Sealed Lead Acid Battery.
3) Set Points Output (P3) – Provides a relay driver for up to 5 external relays, lamps, or alarms.
4) Comm Port 2 (P4) – RS-232 Serial I/O.
5) Comm Port 1 (P5) – RS-232/422/485 Serial I/O with programable termination.
6) Antenna – Standard TNC Coaxial. Fits all MSI Antenna Options. In outdoor or washdown applications, the antenna connector must be sealed with adhesive heat shrink to ensure sealing.

Accessory Connectors AUX1, AUX2, and AUX3 are for system expansion. If not occupied, the mounting holes are covered with a seal plate.

Contact MSI for information on available and planned expansion option modules.

MAIN POWER INPUT

The 9850 is powered by AC or three choices of DC inputs.

Universal AC Supply

The universal AC Supply is suitable for mains inputs from 86 to 265VAC, 47-440 Hz. The 9850 can be ordered with a standard US Cord (NEMA 5-15 Plug) or an unterminated AC Cord for direct panel wiring or adding a country specific AC Plug. Always connect the ground wire (Green or Green/Yellow Stripe) to an Earth Ground. The 9850 Chassis is connected to earth ground.

Color Code, International Cord:

Brown	Connect to Hot (L)
Blue	Connect to Neutral (N)
Green/Yellow Stripe	Connect to Earth Ground

Color Code, US Cord (SJOOW):

Black	Connect to Hot (L)
White	Connect to Neutral (N)
Green	Connect to Earth Ground

The universal AC Supply can also be used for High Voltage DC inputs. In this mode it is rated from 120VDC to 370VDC. The ground wire must be connected to earth ground. When connecting to high voltage DC sources, MSI suggests a line conditioner to filter large spikes generated by motors and contactors. Use the Hot wire to connect to the positive high voltage terminal. Use the Neutral wire for the DC return.

For installations that might have intermittant power interuptions (such as bridge cranes), we suggest a battery is connected to the Aux Power input to provide uninterrutible power. The battery should output less voltage than the main supply, so that it will not drain in normal use. With the internal AC supply (15V), a 12V Sealed Lead Acid is a good choice. However, the Aux Power input will take over when the main power is shut down, so the user must turn off the 9850 (or use the auto power down modes) to prevent discharging the backup battery.

The 9850 Contains Hazardous Voltages. Always disconnect power before opening the enclosure. In operation, the chassis must be properly grounded through the power cord safety ground.

The 9850's internal AC Supply is fused. Panel fusing, if necessary, can be as small as .25A @115VAC or .125A @ 230V. Due to power on surge currents, slightly increased fuse ratings might be needed, or use a slow or medium blow fuse type. Total input power consumption of the 9850 is below 15 watts, and is typically 7-8 watts.

Direct DC Supply, 7-25V

The direct DC supply is not isolated and is primarily intended for battery or 12V vehicle power. It is NOT suitable for 24V batteries or vehicles due to charging voltages that exceed the maximum input voltage. However, 24VDC industrial supplies are suitable, as long as they are well regulated.

The DC input cord, in order to have suitable environmental ratings, uses AC cordage (SJOOW). Do not wire to any AC source.

Color Code:

Black	Connect to 7-25Vdc Positive Terminal
White	Connect to 7-25Vdc Negative Terminal
Green	Connect to Earth Ground.

The negative input and earth ground are shorted internally in the 9850.

The 9850's Direct DC Supply is protected with self-resetting Polymer Fuses. Panel fusing, if necessary, shoud be 1.5A @12Vdc or 3/4A @ 24V. Due to power on surge currents, slightly increased fuse ratings might be needed, or use a slow or medium blow fuse type. Total DC input power consumption of the 9850 is below 12 watts, and is typically 7-8 watts.

Isolated DC Supply, 9-36Vdc or 18-72Vdc

The Isolated DC supply is available in two ranges. Choose the 9-36Vdc range for 24Vdc Vehicles. Choose the 18-72V range supply high voltage vehicles and 48V systems. The DC input cord, in order to have suitable environmental ratings, uses AC cordage (SJOOW). Do not wire to any AC source.

Color Code:

Black	Connect to Supply Positive Terminal
White	Connect to Supply Negative Terminal
Green	Connect to Earth Ground.

The negative input and earth ground are isolated internally in the 9850. However, the negative output of the Isolated DC supply is common to the chassis ground. Some systems may require isolating the chassis of the 9850 to avoid ground loops. In this case, the Green wire should be insulated and not connected to earth ground.

The 9850's Isolated DC Supply is protected by an internal Fuse. Panel fusing, if necessary, shoud be 1.5A @12Vdc, 3/4A @ 24V, or 3/8A @ 48V. Due to power on surge currents, slightly increased fuse ratings might be needed, or use a slow or medium blow fuse type. Total DC input power consumption of the 9850 is below 12 watts, and is typically 7-8 watts.

Power On/Off Modes

The 9850 remembers the last state it was in when power is removed. If the 9850 is on when the input power is removed, it will turn on when the input power is restored. If the 9850 is off when the input power is removed, it will be off when power is restored.

AUX POWER AND SWITCHES

Auxiliary Power is supplied through a pre-assembled cable (MSI P/N 13195). It provides for DC power in (7-25Vdc), up to four switches, and a remote LED indicator. The LED indicator provides a remote indication that the 9850 is on and functioning. The switches and LED are supplied by the end user. In combination with the Set Points Cable, the switch inputs can also be used with standard Isolated Input Modules.

Blue — Connect to Battery Negative or supply ground. It is generally best to connect this directly to the battery or Power Supply negative terminal, or where the negative terminal is attached to the chassis.

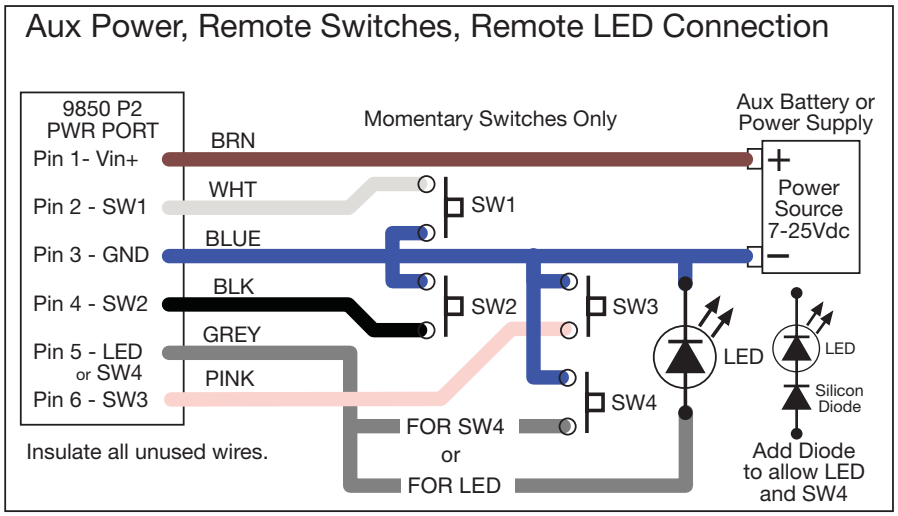
Brown — Connect to Battery or Power Supply Positive (7-25VDC). Again, a direct battery connection is usually best to avoid interference with vehicle electrical systems. The CellScale is internally fused. If connected to a breaker or fuse panel, use 2A at 12V, 1A at 24V. Fast blow or medium blow fuses are acceptable.

White — Switch 1 input. Connect to a Normally Open push-button switch. The other switch terminal must connect to the Blue wire (ground). If this feature is not used, insulate the end of the wire to prevent it from shorting.

Black — Switch 2 input. Connect to a Normally Open push-button switch. The other switch terminal must connect to the Blue wire (ground). If this feature is not used, insulate the end of the wire to prevent it from shorting.

Pink — Switch 3 input. Connect to a Normally Open push-button switch. The other switch terminal must connect to the Blue wire (ground). If this feature is not used, insulate the end of the wire to prevent it from shorting.

Gray — Switch 4 input and/or Remote power indication. Connect to the anode of a remote LED. The LED cathode must connect to the Blue wire (ground). No current limit resistor is required, current drive is provided by the 9850 (~15mA). Suitable for LEDs with VF 1.6V to 2.4V@ 20mA. Not suitable for Blue or White LEDs due to their VF >3V. If a fourth switch input is needed, connect to a Normally Open push-button switch. If this wire is not used, insulate the end of the wire to prevent it from shorting. It is possible to have the external LED in parallel with SW4. To do this, place a silicon diode (1N4148 or equivalent) in series with the LED and place the Diode LED assembly across the switch. The current to the LED will reduce to ~ 9mA (using a AlGaAs Red LED).



SERIAL PORTS

Comm Port Cables

The 9850 comes standard with one Comm Port Cable wired for RS-232 (MSI P/N 502513-0001) following the AT standard for 9 pin serial cables (DCE). An unterminated cable is available (MSI P/N 10084) if you wish to wire your own serial cable for RS-232 or RS-422 or RS-485. Comm Ports 1 and 2 are wired identically. Comm Port 1 functions as an RS-232, 422, or 485 port. Comm Port 2 is RS-232 only, but provides an option for powering a Bar Code Reader. Both ports also offer an optional Auxiliary input that is used with a user supplied momentary switch.

Comm Port Cable Color Code RS-232

Brown Transmit output from 9850, connect to receive of DTE.

Black Receive input to 9850, connect to transmit of DTE.

Grey CTS Input to 9850. Connect to RTS or RTR output of DTE.

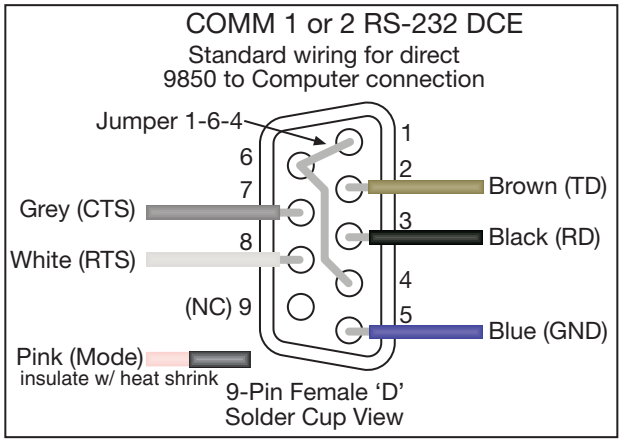
White RTS output from 9850. Connect to CTS input of DTE.

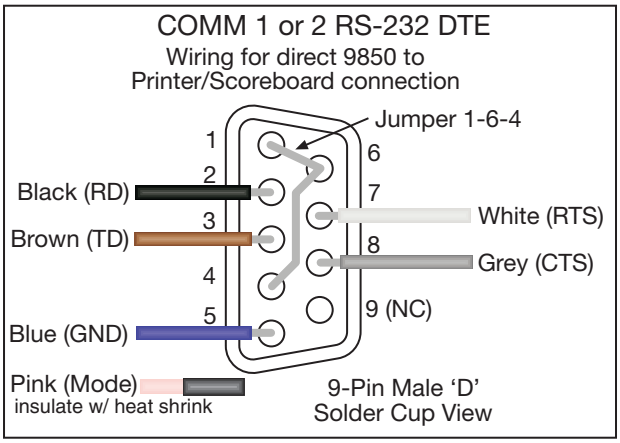
Blue Signal Ground

Pink Comm 1: Auxiliary Input to 9850. When Comm 1 is set to the Auto mode ("COMM 1 AUTO" in the Setup Menu), floating the Pink wire (insulated) sets up the RS-232 Mode. Grounding the Pink wire (to the blue wire) sets up the RS422/485 mode.

Comm 2: +5Vdc (500mA max) Accessory Power, for powering peripheral devices such as Bar Code Readers. This is the default function. Comm 2's Pink wire can also be configured as an auxiliary digital input as determined by the position of JP2. *JP2 is a surface mount Zero Ohm Jumper. Altering the position of JP2 requires surface mount repair skills. JP2 positioned from 1-3 connects the +5V Accessory Power Supply to the pink wire (P4 pin 6). JP2 open (removed) sets up the Aux Input. Also note that the Set Points Output Power pin shares the available 500mA.*

Drain Wire – Connect to metal shell.

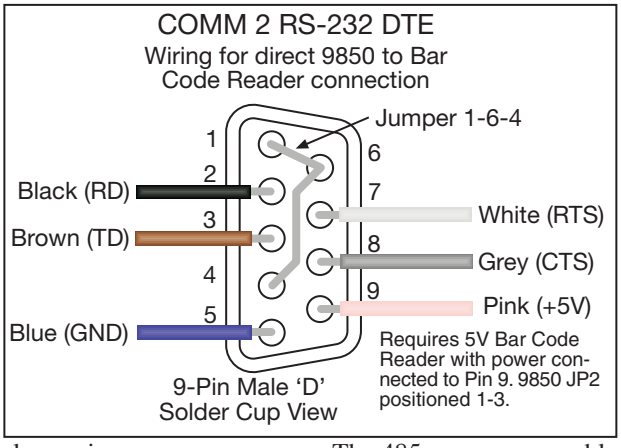




Comm Port 2 RS-232 w/ Bar Code Reader Option

The 9850 can supply 5Vdc up to 0.5A for powering a Bar Code Reader. The 5V supply is fused and reverse polarity protected. Most Bar Code Readers can be supplied with power from Pin 9 of the D-9 connector. The 9850 in its default configuration supplies 5Vdc on the Pink Wire unless the function of JP2 is altered. JP2 (9850 Motherboard) must be in position 1-3.

5V on pin 9 will be read by some programs as Ring Indicator Off. Having +5V on this pin will not harm any standard RS-232 Comm Port.

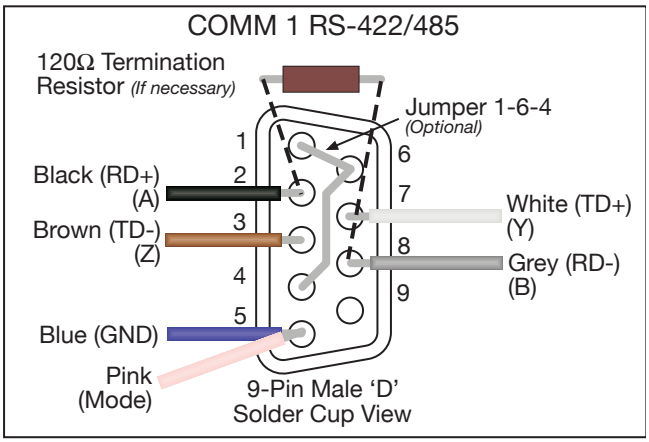


RS-422/485 Operation - Comm Port 1

RS-422 and RS-485 serial connections are used when long wire runs are necessary. The 485 spec covers cable runs up to 4000'. 422 and 485 are differential transmissions and require twisted pair wiring to achieve common and normal mode rejection. Although short runs of 422/485 cabling are often just two wires, a ground reference is required. Usually the ground reference is connected through resistors to prevent ground differential current flow. RS422/485 connections require a termination resistor to reduce reflections. See wiring diagrams for details.

The 9850 features a software switchable termination resistor.

Both RS-422 and RS-485 are multi-drop capable. The 9850 can drive up to 32 receivers on one twisted pair. Although the 9850 uses standard RS-485 drivers, the 9850 firmware does not have a half duplex protocol. Contact MSI for custom solutions for networking with RS-485.

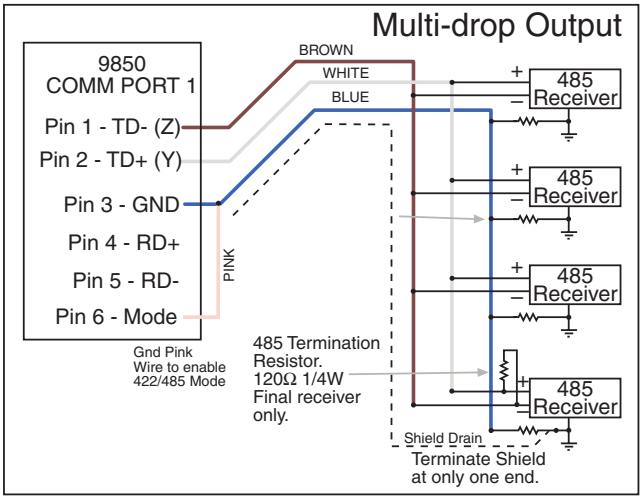


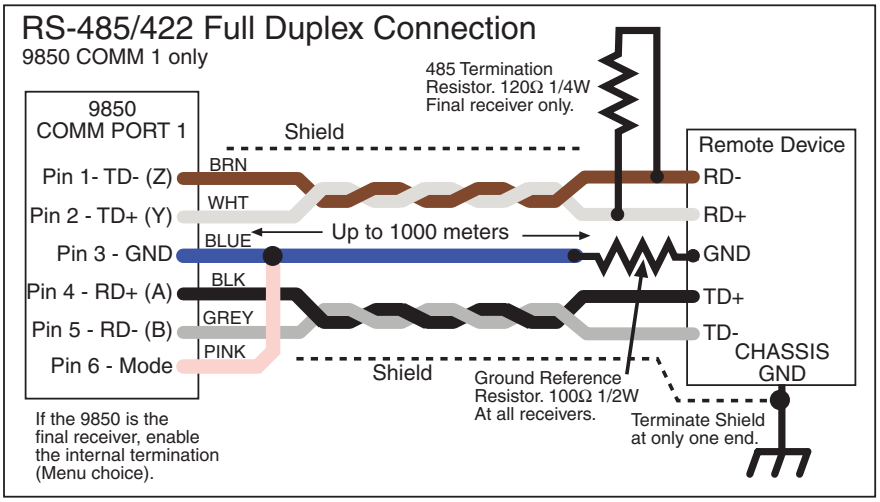
Comm Port Cable Color Code RS-422/485

Applies to Comm Port 1 Only

Brown	TD- (Z)
White	TD+ (Y)
Black	RD+ (A)
Grey	RD- (B)
Blue	Signal Ground
Pink	Ground (to Blue) to configure port for 422/485 (Comm 2 Auto Mode)
Drain Wire	Connect to metal shell.

If the 9850 is the final device in a chain, enable the termination resistor (see Comm Port Menus). On the final remote device in the line, install a 120Ω resistor at the end of the cable across RD+ and RD-.





Using the Aux Inputs

Applies to Comm Port 1. Also applies to Comm Port 2 if JP2 is configured Open.

The Auxiliary Inputs are designed to use with Normally Open Momentary Switches. Connect the switch between the Pink Wire (Port Pin 6), and Ground (Blue Wire, Port Pin 3). These inputs can be used for any programmable key function. However, when Comm 1 is set to "COMM 1 AUTO", the function "Switch 485" is forced. Comm 2's Auxiliary Input is available when JP2 is open. This pin, unless ordered special, is factory configured for powering Bar Code Readers (JP2 pos 1-3).

SET POINTS OUTPUT

Set Points Output Cable

The 9850 can directly drive up to 5 external relays which correspond to the CellScale system Set Points 1-5. The open drain MOSFET output lines are transient and inductive kickback protected so that no snubber network is needed for coil relays. The drivers are rated for 5-25Vdc relay coils up to 150mA. The Set Points Port provides a source of 5V, but limit drain from this source to 500mA total maximum.

Set Point outputs 1-4 are always available. Use of Set Point 5 requires that jumper JP6 on the Processor board is positioned 1-2. This modification requires SMD soldering skills. Normally the line is connected to circuit ground to allow a power return for use of the 5V supply. Set Point 5 is also shared with the Audible Alarm option regardless of the JP6 setting.

Brown — Provides a +5V source for driving relays or auxiliary devices. Fused with a self resetting Polyswitch device. Maximum output current is 500mA total. This output is polarity protected and not highly regulated as the regulated voltage passes through a Schottky diode. Since V-forward of the Schottky diode varies with current drain, the voltage will vary from a low of ~4.9V at 500mA to a high of 5.2V lightly loaded. *If a Bar Code reader is being powered by Comm 2, its current drain must be taken into account. Subtract the maximum current drain of the Bar Code Reader from 500mA to determine the remaining current available for driving devices from this wire.*

White — Open Drain Relay Driver, Set Point 2

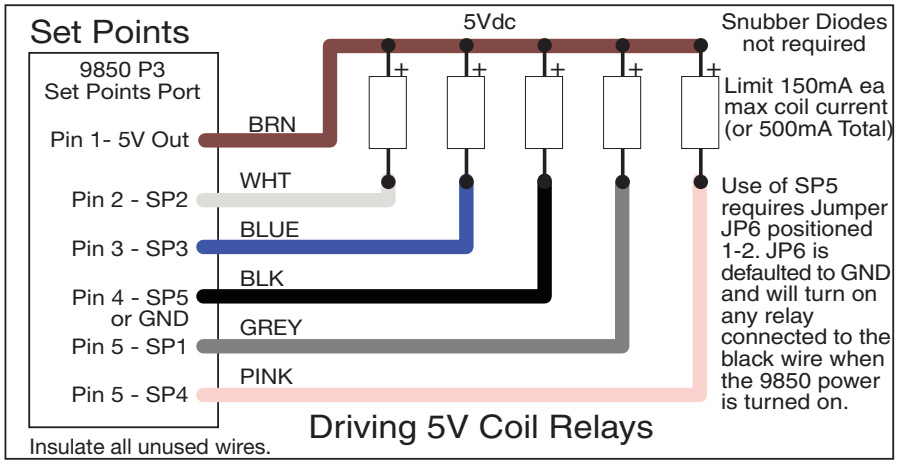
Blue — Open Drain Relay Driver, Set Point 3

Black — Defaults to circuit ground. Power return for the 5V supply. This line can be used to drive a master relay that turns on when the 9850 turns on. Or by moving JP6 to poisition 1-2, provides an Open Drain Relay Driver, Set Point 5

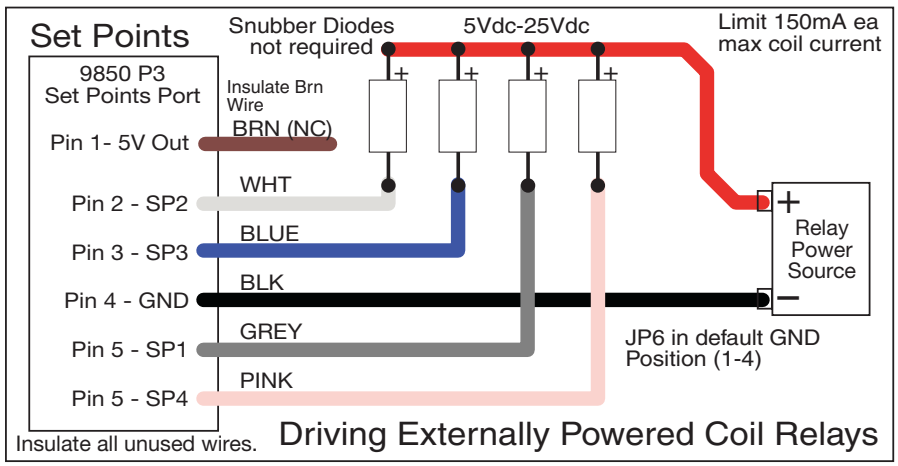
Grey — Open Drain Relay Driver, Set Point 1

Pink — Open Drain Relay Driver, Set Point 4

With 5V relays, no other power supply is required for driving relay coils. Other 5V devices such as lamps or alarms can also be powered by these lines as long as the maximum current rating is observed.

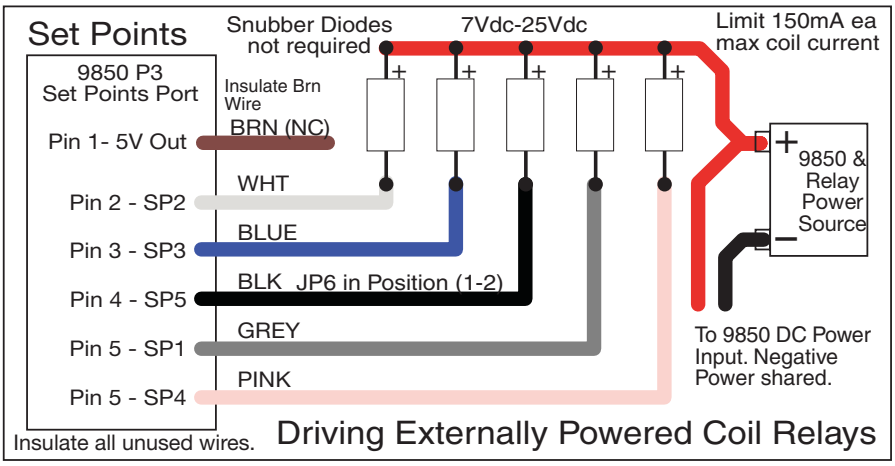


Driving higher voltage devices (up to 25V) requires the use of an external supply. JP6 should be in its default position 1-4 to provide a ground reference to the relay power source. Therefore only 4 outputs (SP1-4) are available.

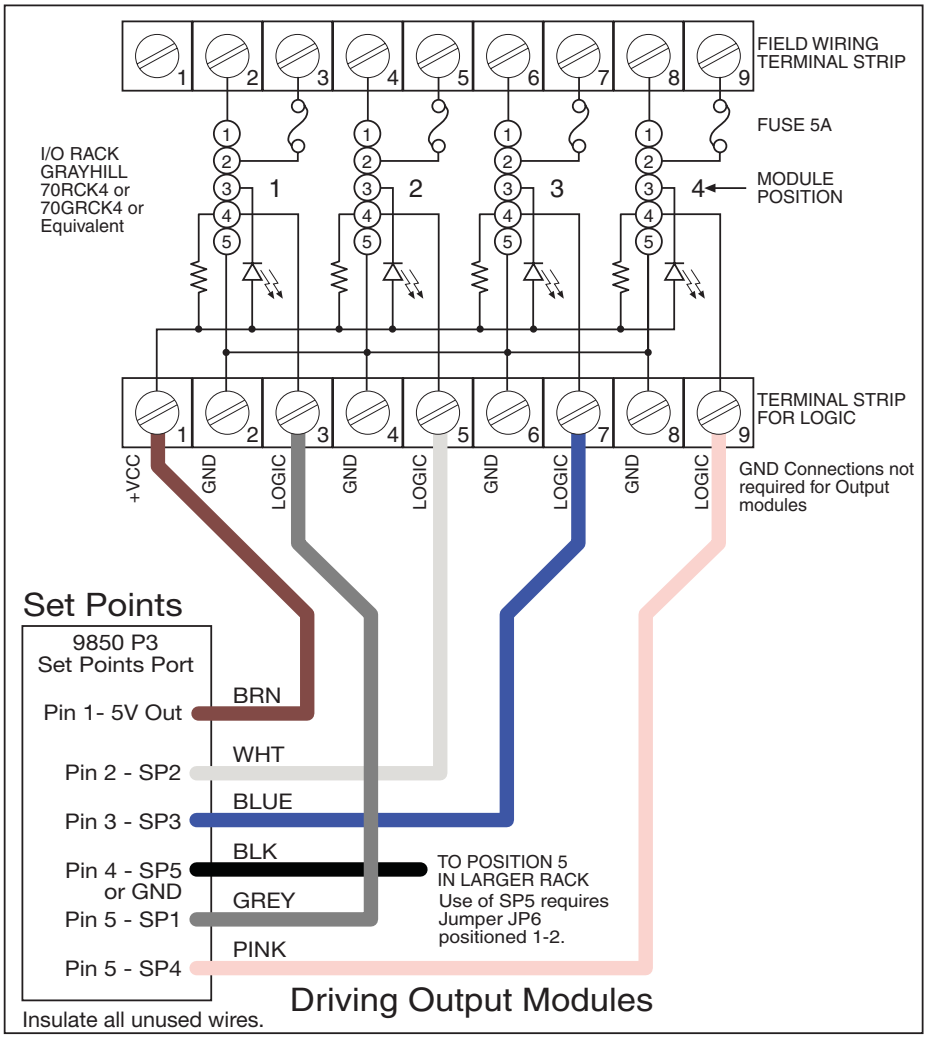


Go to Index

When the 9850 is DC powered, SP5 can be used since the ground reference is provided through the power input.



Interfacing Industry Standard I/O Modules



Standard Opto-isolated Output modules are easily driven by the 9850 Output port. MSI provides a 4 port I/O rack prewired with the Set Points Output Cordset (MSI P/N 10082 + 13186). Hooking up the GND wire (Black) is optional when driving output modules. Any 5V input compatible Output Module can be used. For reference, the following Output Modules have been tested with the 9850 and fit Grayhill's I/O Rack 70RCK4:

Grayhill AC Output Modules

70M-OAC5, 120VAC@3A, Normally-Open Zero Voltage Turn-on

70M-OAC5A, 240VAC@3A, Zero Voltage Turn-on

70M-OAC5A-11, 240VAC@3A, Random Turn-on

Grayhill DC Output Modules

70M-ODC5, 60VDC@3A, Normally-Open

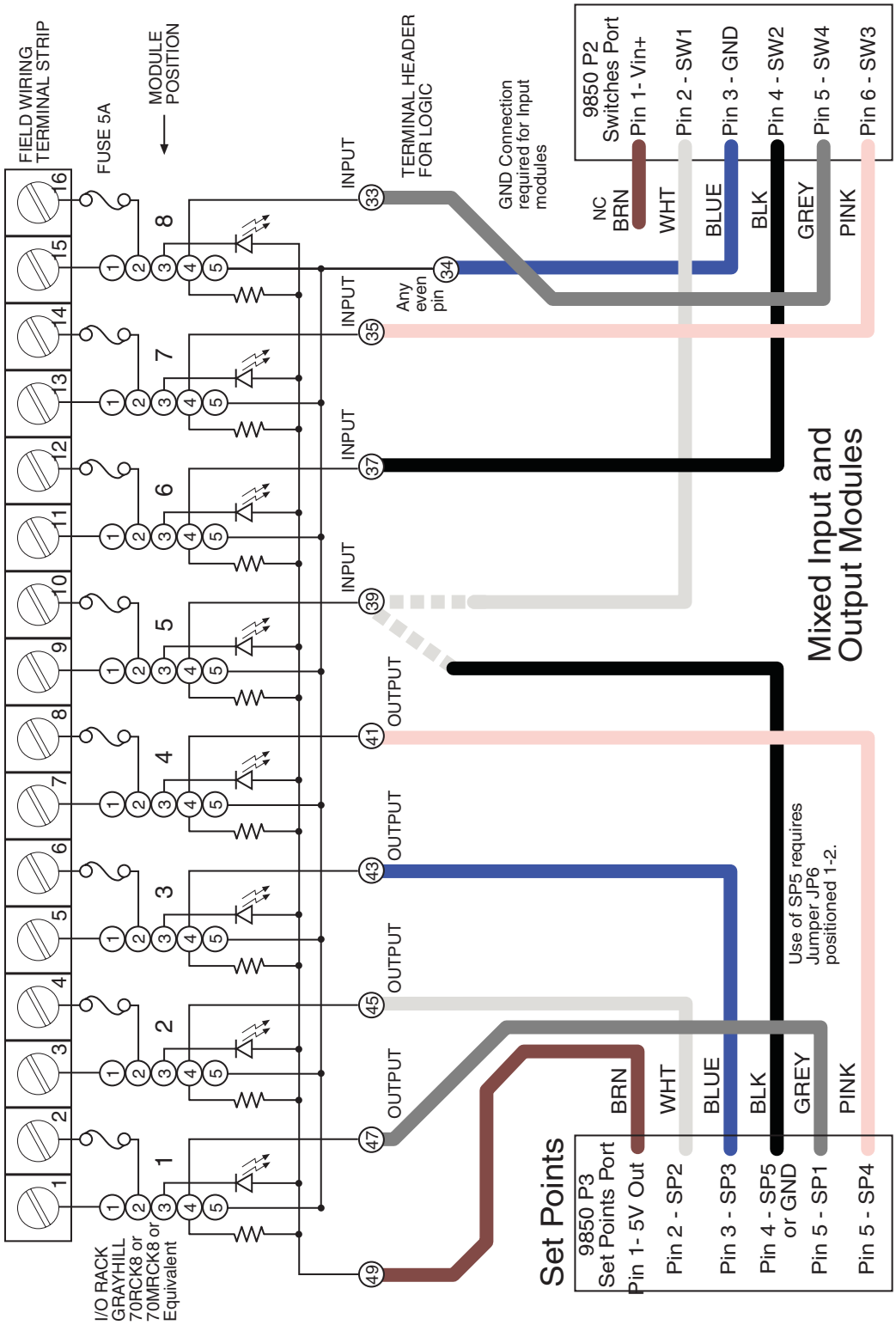
70M-ODC5A, 200VDC@1A, Normally-Open

70M-ODC5B, 60VDC@3A, NO Low off leakage

This list represents only a small number of compatible Output Modules.

By combining the Set Points Port P3 with the Switch Input Port P2 a complete I/O interface can be realized. Up to 5 Outputs and 4 inputs can be serviced by the 9850 as illustrated.

Although not illustrated here, you can still use the Aux Power Input (Brown Wire on P2) to provide backup power for the 9850. Connect the backup power between Brown (+) and Blue (-).



Go to Index

ANTENNAS

To meet FCC licensing rules, you must use only antennas supplied or recommended by MSI. MSI offers the 9850 with six antenna choices: 1) Standard Antenna – This is a small 1/2 wave antenna that mounts directly on the 9000 CellScale enclosure and is suitable for most short to medium range applications. 2) Long Range Antenna – A high gain antenna that is remotely mounted from the 9850 with a low loss coaxial cable. This omnidirectional antenna increases the range up to 4 times. The 10' cable allows placement of the antenna above the 9850 for ease of clearing possible obstacles to data transmission. 3) Vehicle Mount Whip Antenna – This antenna mounts directly to the roof of mobile vehicles and is weatherproof. 4) For maximum range, a 15dBi Gain Yagi Antenna is available by special order. Please contact MSI for details. 5) Corner Reflector – Often the best choice for a wall mounted antenna. MSI offers a 14dBi and a 9dBi Corner Reflector. 6) Patch Antenna – For applications where the standard antenna is vulnerable to physical use or outdoor applications. The Patch antenna is mildly directional which requires more care in antenna placement for long range applications. Patch Antennas are available by special order only.

Antenna placement is critical to problem free use of your CellScale system.

1) Be sure a relatively clear transmission path exists between the 9850 and associated CellScale master devices. The radio signals travel primarily by line of sight (LOS), and obstructions between stations will degrade the system performance. LOS is less important as distances decrease.

2) When using the long range antenna, mount the antenna on a tower or other elevated structure to ensure that you have a clear LOS transmission path. This will raise the antenna to a level sufficient to clear surrounding terrain and other obstructions. It is not necessary or desirable to provide a ground plane for the antenna.

3) Never use a directional antenna (e.g. a Yagi, or a corner reflector) on a mobile system. However, fixed station locations can often benefit from directional antennas when the location of the other components of the RF network are always in the same general direction.

4) If using the meter mounted standard antenna, ensure that the antenna is not blocked by any metal. Transmission is good through most kinds of glass so mounting a meter next to a window should work fine. If there is no clear line of sight place to mount the 9850, consider switching to a coax connected antenna so the antenna can be remoted. MSI offers bulkhead Coax kits for extending the antenna cable through a wall or enclosure.

5) The standard and long range antennas are vertical plane devices. Do not mount them sideways. They should always point up (mounted vertically). It also works to point them down, when high off the ground (such as on the underside of a large bridge crane). The long range 9dBi Antenna is particularly sensitive to off axis mounting. Use a carpenters level to ensure the antenna is exactly 90° perpendicular to the earth.

6) Do not mount an omnidirectional Antenna next to a metallic or concrete surface. This can result in reflections and undesired RF characteristics. For this application, use a Corner Reflector.

7) After installation, you must seal the Antenna connection with an Adhesive Heat Shrink Boot. Failure to seal the Antenna may result in liquid destroying the Antenna, or the 9850.

MSI does not recommend extending the coaxial cable beyond 3 meters. At 2.4GHz more loss will result from coax losses than are gained by raising the antenna. If you must extend the antenna, use a very low loss 50Ω coax such as RG-214, RF-195, or other low loss varieties. For very short extensions (<1m), cables made with RG-316 are suitable.

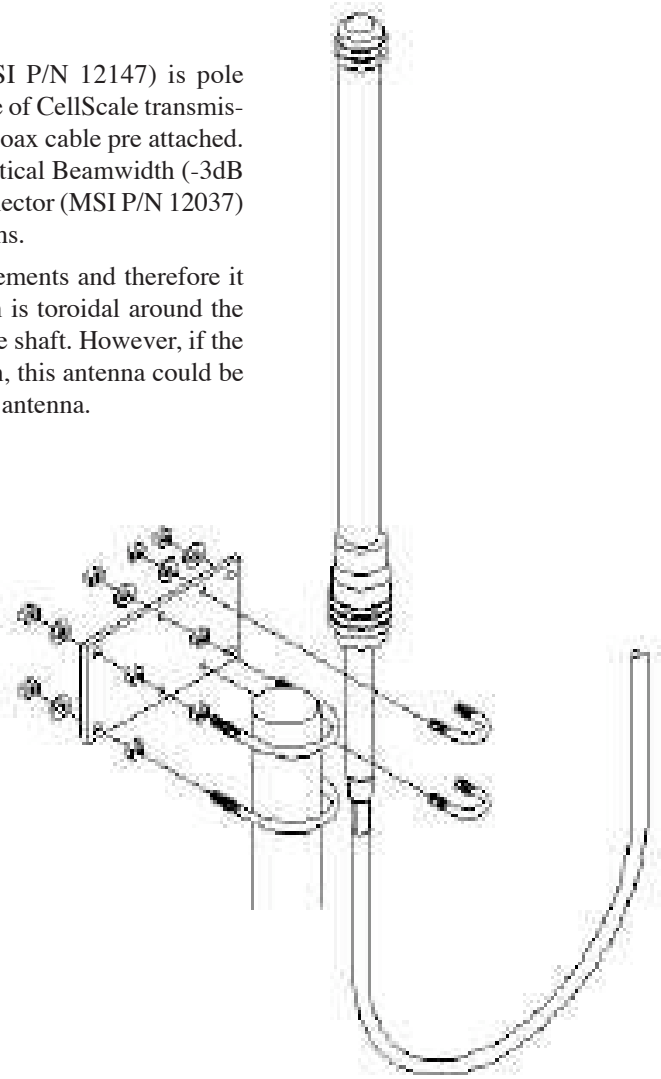
STANDARD ANTENNA

The Standard Antenna (pictured here) is an articulated 1/2 wave 2dBi gain design with a standard TNC connector. This antenna and Coax connector, though resistant to water, is not water-proof. Seal the TNC base with an adhesive heat shrink boot if this antenna is exposed to water. This Antenna should be vertically oriented.

LONG RANGE OMNI 9dBi ANTENNA W/ PIPE MOUNT

The Long Range Omnidirectional antenna (MSI P/N 12147) is pole mounted (up to 2" diameter) and extends the range of CellScale transmissions. MSI supplies this antenna with a 10' (3m) coax cable pre attached. This antenna must be vertically mounted. The vertical Beamwidth (-3dB point) is 14 degrees. Also available with an N connector (MSI P/N 12037) for applications requiring longer coax cable lengths.

This antenna consists of a stack of directional elements and therefore it must be mounted vertically. The beaming pattern is toroidal around the shaft and it has little sensitivity above or below the shaft. However, if the receiving antenna is at a higher or lower elevation, this antenna could be tilted to direct more energy towards the receiving antenna.



YAGI ANTENNA

A highly directional YAGI Antenna is available by special order. This antennas offers both high gain (15dBi) and controllable transmission patterns. This antenna must be carefully aligned for long distance applications. The Beamwidth of the Yagi is 30° Elevation, and 34° Azimuth. The Yagi is mast mounted for masts up to 2-1/8" (5.4cm) in diameter. The Yagi is connected to CellScale equipment with adapter coax P/N 12751 (6', 1.8m) or P/N 13209 (10', 3m) Longer lengths available by special order. Longer lengths must be evaluated by application due to coax loss. It is usually preferable to run serial cables longer and keep the Coax short.

14 dBi Yagi

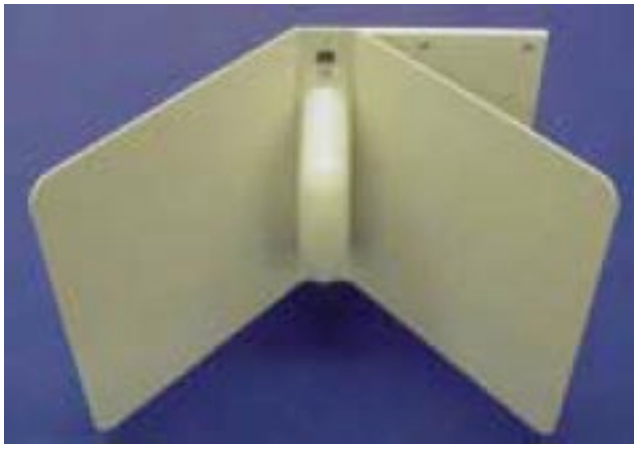
CORNER REFLECTOR ANTENNAS

Two Corner Reflector Antennas are available by special order. These antennas offer both high gain and controllable transmission patterns. These antennas are the best choice when antenna placement is against a wall or other surface. These antennas come with a Pipe mount for pipe up to two inches (5cm) in diameter.

The 14dBi Model (MSI P/N 13204 + 13209 Coax) features a Beamwidth of 44° Elevation, and 35° Azimuth.

The 9dBi Model (MSI P/N 13205 + 13209 Coax) has a Beamwidth of 75° Elevation, and 65° Azimuth.

Both Corner reflectors must be used with 'N' Plug to 'TNC' Plug adapter coax P/N 12751 (6'0) or 13209 (10'), longer lengths available by special order). This is special Low-loss coax suitable for use at 2.4GHz. Do not substitute standard coax varieties.



14 dBi Corner Reflector

9 dBi Corner Reflector

VEHICLE MOUNT WHIP ANTENNA

A vehicle mount whip antenna is approved for use with MSI CellScale equipment and is available by special order. This 5 dBi gain whip is rugged and waterproof and mounts in a 3/4" (19mm) hole on the roof of mobile vehicles. MSI P/N 13206 (Antenna) and P/N 13207 (mount). The mount includes 17' of low loss coax teminated in a TNC Connector.

5 dBi Vehicle Whip

STANDARD ANTENNA BULKHEAD EXTENSIONS

MSI offers short Coaxial cable assemblies to extend the antenna connector when the CellScale equipment is mounted in an industrial enclosure or to penetrate a metal wall. These Coaxial assemblies are designed for 2.4Ghz use and have TNC Male connectors at both ends. These mate with a through panel TNC to TNC Bulkhead Adapter.

TNC to TNC Flange Mount Bulkhead Adapter – MSI P/N 13140

TNC to TNC Jam Nut Mount Bulkhead Adapter – MSI P/N 13141

Extension Coax Cable Assemblies –

1' (30cm) P/N 13142, 2' (61cm) P/N 13143, 3' (.9m) P/N 13144, 4' (1.2m) P/N 13145

OTHER ANTENNAS

Other antennas are available for special applications. One antenna MSI often uses is a small Patch antenna. This antenna is suitable for rugged applications where standard antennas will often be destroyed. This is the antenna used in our Crane Scales. Special antennas for rugged applications, or long range transmission are available. Contact MSI for more information.

2.4 GHZ INTERFERENCE

Co-Existing with 802.11b Networks

In some cases, if a CellScale network is located in close proximity to an 802.11b network, the CellScale network can interfere with the 802.11b network. To avoid causing this interference, the CellScale radio supports a selection of hopping patterns that avoid the various 802.11b direct sequence channels. These limited band hopping patterns allow CellScale networks to be used with 802.11b networks without impacting the performance of the 802.11b networks. Settings for 802.11b avoidance are found in the Comm Port 2 modem menus. See page 25 for details.

FCC'S MPE REQUIREMENTS

Information to user/installer regarding FCC's Maximum Permissible Exposure (MPE) limits.

Standard 1/2 Wave Dipole, Patch Antenna, Vehicle Whip, or Long Range 9dBi Omni: The field strength radiated by any one of these antennas, when connected to MSI RF products, may exceed FCC mandated RF exposure limits. FCC rules require professional installation of these antennas in such a way that the general public will not be closer than 20 cm from the radiating aperture of any of these antennas. End users of these systems must also be informed that RF exposure limits may be exceeded if personnel come closer than 20 cm to the apertures of this antenna.

Corner Reflectors or 15dbi Yagi: The field strength radiated by any one of these antennas, when connected to MSI RF products, may exceed FCC mandated RF exposure limits. FCC rules require professional installation of these antennas in such a way that the general public will not be closer than 2 m from the radiating aperture of any of these antennas. End users of these systems must also be informed that RF exposure limits may be exceeded if personnel come closer than 2 m to the apertures of either of these antennas.

SECTION 2 – RF SCALE COMMUNICATIONS

The 9850 is a component of the MSI CellScale System. The CellScale system uses frequency hopping spread-spectrum RF Modem technology transmitting in the 2.4 GHz ISM band.

RF Modems have been problematic as the RF bands are very hostile, corrupted by noise, path loss and interfering transmission from other radios. Even in a pure interference-free environment, radio performance faces serious degradation through a phenomenon known as multipath fading, a problem particularly prevalent for indoor installations. Multipath fading results when two or more reflected rays of the transmitted signal arrive at the receiving antenna with opposing phase, thereby partially or completely cancelling the desired signal. Spread spectrum reduces the vulnerability of a radio system to both interference from jammers and multipath fading by distributing the transmitted signal over a larger region of the frequency band than would otherwise be necessary to send the information. This allows the signal to be reconstructed even though part of it may be lost or corrupted in transit.

Spectrum has been set aside at 2.4 GHz in most countries for the purpose of allowing compliant spread spectrum systems to operate freely without the requirement of a site license. In the USA, there are absolutely no site licensing requirements. The CellScale system is also programmable for use in most European countries. Please contact MSI for worldwide compliance information.

FCC STATEMENT

FCC ID: HSW-2450M

Note: This unit has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their expense.

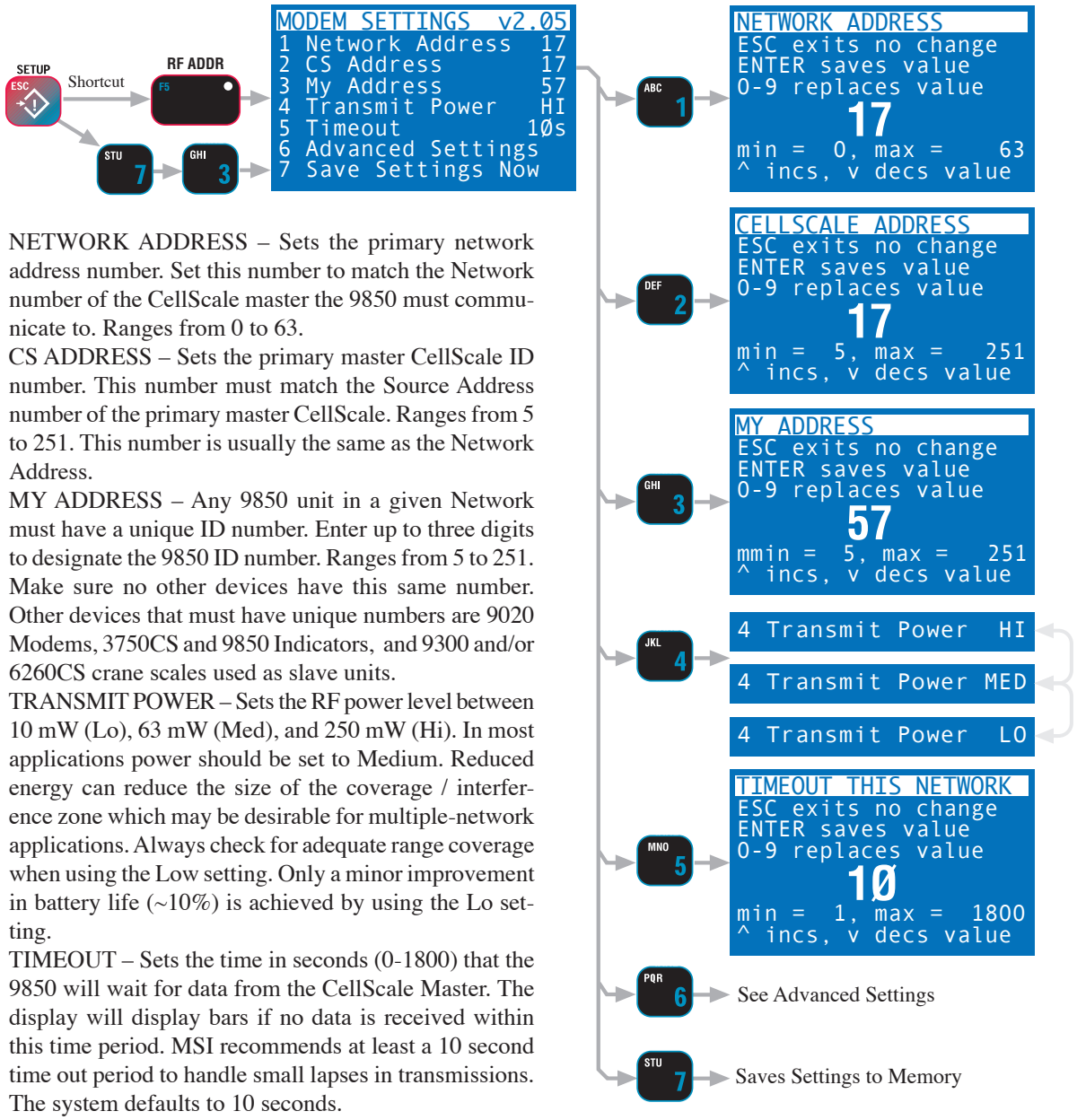
NETWORK DESCRIPTION

The CellScale system uses frequency hopping which is produced by transmitting the data signal as usual, but varying the carrier frequency rapidly according to a pseudo-random pattern over a broad range of channels, in this case 86 discreet frequencies. These 86 frequencies are combined in different “hopping patterns” to provide 64 (0-63) separate networks. The CellScale network uses a ‘Star’ network topology. One unit, usually the CellScale, is designated a ‘Master’. The Master transmits a sync pulse on a regular basis, providing synchronization of all remotes in the designated Network. Thus it forms the center of a cell. MSI provides five products capable of being the master unit: the CellScale, the Smart CellModem 9000 (not 9020), the MSI-9260 ruggedized Crane Scale, the MSI-9300 Porta-Weigh+ Crane Scale (with local display), or the MSI-6260CS Trans-Weigh CS Crane Scale. Up to 15 slaves can access the master unit. The 9850 is always a ‘Slave’. Multiple 9850 units can coexist on one network, or can be easily switched to other networks as required.

The CellScale system uses TDMA (Time Division Multiple Access) to arbitrate between multiple remotes. Each remote is assigned a specific time slot thus guaranteeing data throughput. For more on setting up CellScale networks, please refer to the MSI-9000 CellScale User Guide.

RF NETWORK SETUP

The 9850 is a RF Modem connected device. The RF Modem requires setup to connect to one or more CellScales. The 9850 stores information for all 64 possible networks. Each network setting can be modified with the "Modem Settings Menu".



[1] NETWORK ADDRESS – Sets the primary network address number. Set this number to match the Network number of the CellScale master the 9850 must communicate to. Ranges from 0 to 63.

[2] CS ADDRESS – Sets the primary master CellScale ID number. This number must match the Source Address number of the primary master CellScale. Ranges from 5 to 251. This number is usually the same as the Network Address.

[3] MY ADDRESS – Any 9850 unit in a given Network must have a unique ID number. Enter up to three digits to designate the 9850 ID number. Ranges from 5 to 251. Make sure no other devices have this same number. Other devices that must have unique numbers are 9020 Modems, 3750CS and 9850 Indicators, and 9300 and/or 6260CS crane scales used as slave units.

[4] TRANSMIT POWER – Sets the RF power level between 10 mW (Lo), 63 mW (Med), and 250 mW (Hi). In most applications power should be set to Medium. Reduced energy can reduce the size of the coverage / interference zone which may be desirable for multiple-network applications. Always check for adequate range coverage when using the Low setting. Only a minor improvement in battery life (~10%) is achieved by using the Lo setting.

[5] TIMEOUT – Sets the time in seconds (0-1800) that the 9850 will wait for data from the CellScale Master. The display will display bars if no data is received within this time period. MSI recommends at least a 10 second time out period to handle small lapses in transmissions. The system defaults to 10 seconds.

[6] ADVANCED SETTINGS – Advanced features settings of the Modem. See "ADJUST MODEM MENU" on the following page.

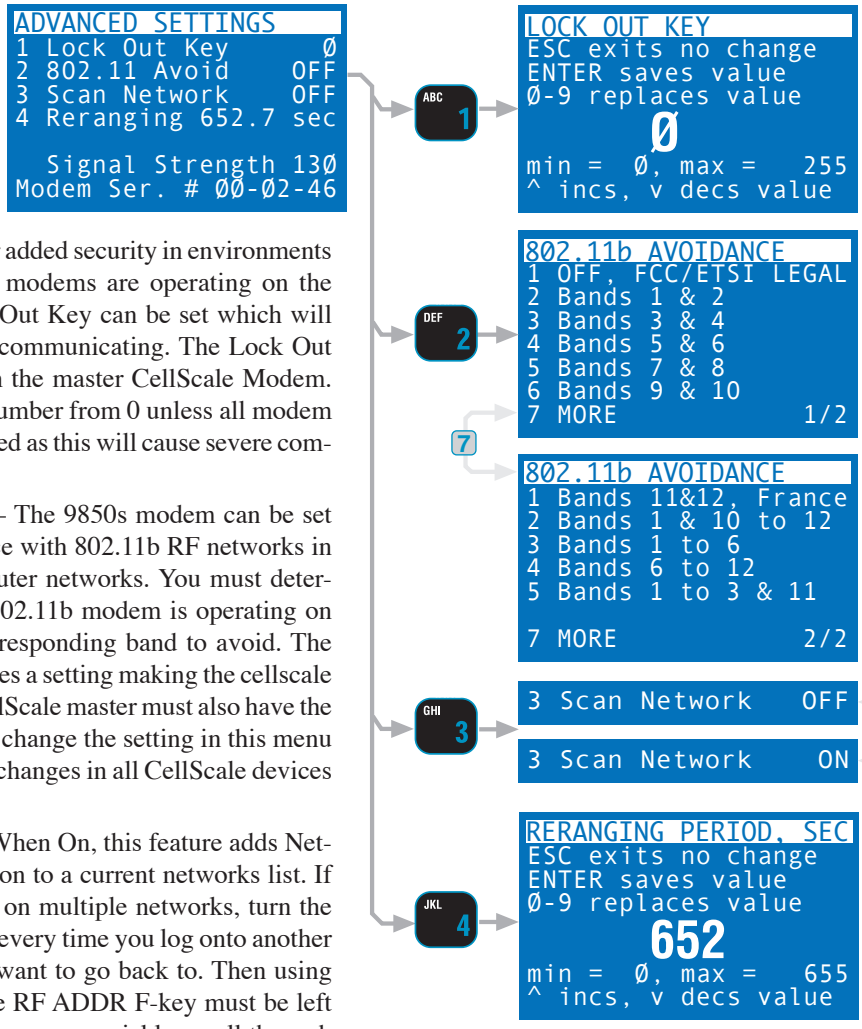
[7] SAVE SETTINGS NOW – Commits the settings to the Modems Memory. The Modem settings will be automatically saved at power down if changed. Writing the Modem registers can take a few seconds. When the SAVE SETTINGS NOW line changes to white background. The settings have been stored.

After changing the Modem Network, you press **ESC** twice to return to weight modes. There may be a delay when acquiring a new Master CellScale. If the weight does not appear in 10 seconds, recheck your modem settings at both the 9850 and the master CellScale (or embedded CellScale in a crane scale).

The Modem Firmware version is displayed in the Title area. At press time the modem was at v2.05.

ADVANCED MODEM SETTINGS

The "ADVANCED SETTINGS' menu provides access to some of the advanced features of the 9850's RF Modem. These features are not usually needed and should be left to defaults.



[1] LOCK OUT KEY – For added security in environments where other CellScale modems are operating on the same network, a Lock Out Key can be set which will prevent modems from communicating. The Lock Out key must also match in the master CellScale Modem. DO NOT change this number from 0 unless all modem elements are also changed as this will cause severe communications problems.

[2] 802.11 AVOIDANCE – The 9850s modem can be set to minimize interference with 802.11b RF networks in common use for computer networks. You must determine which band the 802.11b modem is operating on and then select the corresponding band to avoid. The second page also includes a setting making the cellscale legal in France. The CellScale master must also have the same setting. DO NOT change the setting in this menu without corresponding changes in all CellScale devices in the network.

[3] SCAN NETWORK – When On, this feature adds Network address information to a current networks list. If this 9850 is to be used on multiple networks, turn the "Scan Network" "ON" every time you log onto another network that you may want to go back to. Then using the **RF ADDR** key (the RF ADDR F-key must be left in its default function), you can quickly scroll through all stored networks.

[4] RERANGING – This feature sets the interval in which the modem requests recomputation of the distance compensation. The default is suitable for standard operation and usually should not be altered. If, however, the distance the Master and the 9850 is going to change more than 1km while connected, the reranging time should be set just shorter than the fastest this move can happen. For example, a fast moving vehicle approaching the master at 60 miles per hour should rerange every 30 seconds.

The next line below Reranging gives a relative receive signal strength. This value reports the relative signal strength averaged over the last 10 hops. Larger values indicate stronger signals. This display is not updated in real time. You must exit this display and reenter to update the reading.

The next line indicates the RF Serial Number of the embedded modem.

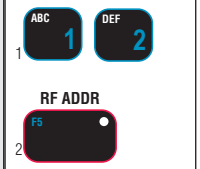
CONFIGURING FOR MULTIPLE NETWORKS

The 9850 can access multiple CellScales by switching Networks. A press of the **RF ADDR** key will change the network allowing the 9850 to monitor and control different scales. Because each CellScale has both a network and a CS address, these must be set up with the "SETUP RF NETWORK" menu and made active. The 9850 can access up to 64 CellScale based Networks. It takes the 9850 from 4 to 8 seconds to switch networks, as it has to sync with a new hopping pattern. Networks that are inactive but were set up can be reached by typing the Network Address (0-63) followed by the **RF ADDR** key. New networks not previously set up can also be reached this way, but the modem configuration will set to defaults.

Setting the Network Address (shortcut method)

Uses Defaults for every setting, and assumes the master CellScale's ID is matches the Network Address.

1) Enter the number of the CellScale network.
   In this example we'll use network 12. Use the appropriate numbers for your CellScale master. It is not necessary to enter a '0' for networks below 10.
2) Press the **RF ADDR** key. The Network Address Changes to the new Address and is added to the Network Scan List.
   It can take up to 8 seconds to log on to a new network, and for the weight data to appear. If the 9850 is unable to locate a Master CellScale at the entered address, the message "NO NETWORK" will appear.



Setting the Network Address (standard method), and RF Modem Configuration

Access to all user configured parameters in the RF Modem.

1) Press **SETUP**. From the "SETUP SELECT MENU" , select "MORE" **[7]**.
2) Select "RF Modem" **[3]**.
   Steps 1 and 2 have a shortcut. Press SETUP followed by RF ADDR.
3) Select "Network Address" **[1]**. This calls the Network Address data entry screen.
4) Using the keypad, key in the desired Network Address (0-63). The Address used must match the Network address of the CellScale master. Press **ENTER** to store the address.
5) *Steps 5 and 6 can be skipped if you use our recommended settings in the master.* Select "CS Address" **[2]**. This calls the CellScale Address data entry screen.
6) Using the keypad, key in the desired CellScale Address (5-251). The Address used must match the ID address of the CellScale master (2nd number, e.g. 23-**23**). Usually CellScale masters are usually configured with the ID Address number set to the same number as the master. Networks 0-5 usually are set to the Network number +64 (e.g. Net 4, CS address 68). DO NOT use a CS Address below 5.
7) *You can skip steps 7 and 8 if the self generated address is unique in the network.* Select "My Address" **[3]**. This calls the My Address data entry screen.
8) Using the keypad, key in the desired My Address (5-251). The Address used must be unique within all possible networks this 9850 is to contact. Press **ENTER** to store the address.
9) Select HI, MED, or LO transmit power using the **[4]** key. Usually this should be set to Med for the best tradeoff between range and RF Power. Extended exposure to a 9850 set to High requires precautions when a human is closer than 20cm from the emitting antenna. Observe the FCC MPE limits.
10) Select Timeout **[5]**. The Timeout period is the time the 9850 will wait before reporting loss of updated data from the Master. When the timeout period is completed without new data transmitted, the weight display will change to dashes.
11) Using the keypad, set the Timeout in Seconds. A timeout from 5 to 20 seconds is recommended (10 seconds is the default). Press **ENTER** to store the timeout.
12) Set this network active by pressing **[6]**. From the ADVANCED SETTING menu, choose **[3]** ON. This places the Network in the 9850's active network list, allowing use of the **RF ADDR** key to switch the 9850 to this and other stored Modem settings. Resturn to the Modem settings menu by pressing **ESC**.
13) Store the Modem settings by pressing **[7]**. The unit will pause with a key tone while the settings are stored. You can test your enabled network scan list by pressing the **RF ADDR** key to cycle throught the ones you have enabled.
14) Return to weight reading (assuming there is a CellScale at the address you just set) by pressing **DISPLAY** or press **ESC** to return to the Setup Menu. There may be a delay while the new address request is processed by the CellScale.

Modem Defaults

CS Address equals Network number (e.g. 12-12, 1-65, 9-9, etc.), unless the network number is below 5, then the CS address equals the Network number + 64. Transmit power set to MED. Time out set to 10 seconds. My Address remains unchanged and is the same in any network.

TROUBLESHOOTING RF CONNECTION PROBLEMS

Most connection problems are caused by improperly set up RF Networks. Both the 9850 and the master CellScale unit must have identical Network numbers. In addition, the CS Address must match on both units. If the Network and/or CS Address of the CellScale is in question, you might have to connect a terminal to the CellScale to determine its exact settings. See the CellScale manual for this procedure. Verify the 9850 settings are proper by using the "CONFIGURE RF MODEM" procedure. Each slave device (9850s, 3750CS, and 9020s) must have unique "My Address".

It is of equal importance that all Slave units (9020's, 3750CS, 9850's and 9850's) that are on the same network, must have unique remote addresses (usually referred to as "My Address").

A common cause of perceived problems is the "Phantom Network". This occurs when there is a conflicting Network within broadcast range. Multi-CellScale sites must be planned carefully so that there are never two master CellScales on the same Network within range of each other. Since the CellScale can broadcast for miles with good LOS (line of sight) conditions, this consideration is very important. If you suspect your 9850 has locked on to a distant (Phantom) network, try switching both the master CellScale and the 9850 slave to another unused Network. MSI advises avoiding Network #0 when possible, as this is the Modem default, and therefore most likely to be found on units that were left in default settings.

Display Reads "CARRIER, BUT NO CS RESPONSE!!"

This display may show briefly when the CS Address is changed, while the Master Modem registers the 9850. If this display persists, it is a result of changing the CS Address in the slave 9850 so it no longer matches the master CellScale. The modem is still registered by the master CellScale, but control codes are not received because the master assumes the codes are intended for a different device. Change the CS Address in the 9850 back to the number that matches the master CellScale. Sometimes cycling power in the Master CellScale will clear up this problem.

Unit goes in and out of communication

This is usually a result of being in or near an "RF Null" zone. Because of multiple echoes of signals there is sometimes locations that are particularly problematic even for Frequency Hoppers. Usually moving the antenna location even a small distance can clear up this kind of problem. Avoid placing the antenna up against large metal walls. Concrete walls can also be problematic due to their high moisture content. The antenna should be at least 4 inches away from large metal or concrete surfaces. Mounting the antenna too close to a wall has the effect of making the Antenna directional and can attenuate the output.

Range is Inadequate

Antenna placement is the most common cause of poor range. Check that the RF power level of the master and slave units is on "High". Radio signals in nearby bands that have significant power can also reduce range. Longest range will always be achieved by Line-of-sight (LOS) antenna placement. Any obstacle that interferes with LOS will reduce the range. Significant blocking is caused by metal buildings, solid concrete walls, and any other object that has fairly high electrical conductance. Raising the master antenna higher can help. Just moving the relative antenna placement a short distance might find an RF "path" that will improve distance. The CellScale can sometimes take advantage of reflecting surfaces to get around obstacles. CellScale device antennas should always be placed in vertical polarization; that is the shaft of the antenna should be perpendicular to the earth, not parallel. It is OK to mount the Antenna upside down. This is a good solution when an antenna is mounted on the ceiling for communication with CellScale components in the building. The 9850 internal antenna is mildly directional. Aim the end of the 9850 towards the CellScale master for longest range. In short range applications (LOS and <500 feet) the 9850 is essentially omni-directional.

Some CellScale master units can take advantage of higher gain antennas.Yagi or Corner reflector Antennas can greatly improve the range of a CellScale system when installed on the master CellScale. These multi-element antennas are directional and must be aimed towards the 9850 area of operation.

The CellScale system is designed using state of the art RF Modems. However there will be conditions and environments where communication of telemetry is sporadic or impossible. Jamming of FHSS systems is difficult, but not impossible. Bear in mind that the most likely source of jamming will be other CellScale systems on the

same network, within transmission range. The new breed of wireless phones (not Cell Phones) operating in the 2.4GHz bands will not jam a CellScale. However the CellScale may be received on the wireless phone and will sound like a background ticking noise. Standard Cell Phones do not operate in the same bands as the CellScale and will not interfere with CellScale components. However, a Cell Phone repeater tower nearby might have enough out of band interference to reduce the range of CellScale equipment.

RF SITE TESTING

The 9850 provides a means to check the efficiency of RF transmissions using the RF Site Testing function. Program a function key (use the procedure in Section 4) to "RF Site Testing" to run the test.

1) Place the 9850 in close proximity of the master CellScale unit. Make sure communications are good (weight is on the display, all data types have been reported).
2) Press the function key programmed for "RF Site Testing". The bottom right side of the display will read "RF xx%". The per cent reading indicates the ratio of successful transmissions. It will start low at first, then creep up. It should approach 100%, with an average reading of >96%.
   If the reading does not achieve >96% within 1 minute try changing the CellScale Master device (MSI-9000, MSI-6260, MSI-9300, etc.) to a new network. Usually the only thing that will interfere with a CellScale is another frequency hopping modem nearby. Also check your antenna connections on the master.
3) Now start walking around the site with the 9850. If the RF% reading starts down, stop and wait. Aim the antenna of the 9850 towards the CellScale master and see if the RF% reading begins to rise again. If the display suddenly reads "NETWORK", you have lost communication. Return to the last place that communications were working and wait for the 9850 to reconnect. In this way you can establish the range of adequate communications, and note any areas with severe RF dropout. The location and height of the CellScale master also plays a big part in range so be sure to run the site test with the CellScale in typical locations used in your application.
4) Cancel the RF Site Test by pressing the function key again. If needed for some other function, reprogram the function key.

CELLSCALE NETWORK AUTO SCAN

For installations where multiple CellScale systems are present, the 9850 can scan every network and determine if a CellScale master device is broadcasting. Found CellScales can be copied directly into the RF Scan List at the end of the test. Turn on all CellScale masters (MSI-9000, 6260CS, 9300, etc.) that your 9850 will be used with. Ensure that each CellScale master is on unique network addresses (see product User Guides).

1) Press **POWER** followed quickly by **ESC**.
   It doesn't matter if the 9850 is on or off.
2) Press **NET/GROSS** to start the scan. The 9850 will begin a progressive scan of all 64 (0-63) networks.
   The scan can take as long as 15 minutes. If the backlight times out, press any number key to turn it back on.
3) Every CellScale master found will display along with its address. The end of the test will be indicated by the display reading "ENTER Copy to Scan".
4) If you want to store the found CellScale addresses, push **ENTER**. The display will read "COPYING RF SCAN".
5) Press **EXIT** to return to weight reading.
   You can also press SETUP which will bring up the Setup Menu, or POWER which will turn the 9850 off.

SECTION 3 – SCALE OPERATION

POWER

To Turn On the Power

1) Press and hold **POWER** for 1 second. The LCD should light and show the MSI Logo. The LED will light all segments for a display test.
2) The LCD then displays "MSI-9850-5", the Network currently loaded as the active Address, and the software version number. The display will read "Searching Add*ress* XX" while establishing communications with the master CellScale.
3) Next the RF network is contacted. If the network is functional, the display switches to normal weight display mode. This usually takes 4-8 seconds. If the Network is not available, the screen will continue to display the desired Network. Either change the Scan Network with the **RF ADDR** key or turn on the proper CellScale Master. Use of the **RF ADDR** key assumes that multiple networks have previously set up. See "Setting the Network Address" on page 12.

If the system fails to connect in 8 seconds or less, press the RF ADDR key to select a different Network, or enter the number of a working network and press RF ADDR. If this fails check RF network setups, or decrease the range between the CellScale Host and the 9850.

MULTIPLE SCALE CHANNELS

Each CellScale is capable of hosting up to 32 independent scale inputs. Since any 9850 can communicate with any CellScale, theoretically hundreds of scales can be controlled by a single 9850. Because of the complexities of multiple channel setups, the 9850 is designed to access channels that have been previously setup in the CellScale through its terminal interface or virtual meter interface.

Channels in the CellScale are organized by the A/D input channel followed by a Mux sub channel value. The standard CellScale has two A/D inputs, but can be ordered with four A/D inputs with the addition of a second A/D Converter module. Each A/D channel can be further divided by the use of external multiplexers into eight additional inputs per channel, providing a total of up to 32 independent scale inputs. The channels are designated like this:

Channel (A/D 1-4) → 1-1 ← Sub channel (mux 1-8)

The channel will vary from 1-4 and the sub channel from 1-8. In addition the CellScale provides channel 5 for slave CellScales, and channel 6 for math channels. Math Channels allow the user to add or subtract channels from each other or perform other mathematical manipulations of the data. Channel 7 is used for Temperature displays for CellScales with the temperature option. All calibration data for the 32 channels is stored in the CellScale and is independent of the 9850. Therefore any 9850 can receive calibrated data from any CellScale provided the RF network is set up properly.

It should be noted that sub channels are useful even when the multiplexer option is not used. For example, channel 1-1 could be calibrated as a 1000 x 0.5 kg scale, and channel 1-2 as a 2000 x 1 kg scale, making a dual range platform (of course this assumes the platform is capable of handling 2000 kg). This will work as long as the main channel remains constant. So, in theory, 1 platform could be calibrated as 8 independent scales. This works because the CellScale does not know or care if a Multiplexer is actually present. It treats the input as a separate scale.

The 9850 reads multiple channels by using the Scan list index. The "Scan list" is stored in the CellScale, with up to 32 channels present in the list. The first number in the scan list is called the Scan List Index number. The CellScale can have up to 32 Scan List indices. A scan list can include "Math Channels" which provide a means to digitally add the results of multiple scales.

When dealing with multiple channels it is recommended that you set up the display to always show either the Channel Number or the Channel Name or both. This will help in identifying which scale you are observing.

SELECTING THE ACTIVE CHANNEL

Before standard scale functions are performed, you must select the "Active Channel". The "Active Channel" is the channel that commands such as Zero, Tare, Total, etc. will be performed on. On single channel display screens, the channel shown is the active channel. On Multiple channel displays, you must highlight the desired channel. This is done with the Cursor Keys. Once highlighted you can perform all the standard scale functions (except Total and View Total, these only work from the single channel display). You can also switch to the single channel display by pressing the **DISPLAY** key. The Active channel is always displayed on the LED Weight Display.

See the "DISPLAY MODE SETUP" section 7 for information on multiple and single channel weight display modes. For more information on Scan Lists and multiple scale channels, please refer to the CellScale MSI-9000 Users Guide.

TO SELECT THE DISPLAY CHANNEL

As mentioned above, the 9850 will access any channels setup in the CellScale. It does this with the "CHANNEL" function. Use the **CHANNEL** key to step from channel to channel as dictated by the Scan list stored in the CellScale. If the CellScale has only one scale channel defined, only 1 display mode is necessary. This is usually the case for MSI-6260CS, MSI-9300 Crane Scales, and other single load cell systems. However, even single load cell systems can have math channels defined to add functionality.

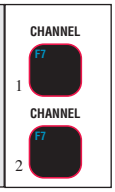
For systems with multiple scales attached to any given CellScale the setup procedure is:

1) Program the CellScale Scan List as required (see the CellScale Users Guide). It is recommended that each channel is assigned a channel name to aid in identifying the scale in various display modes.
2) Optional, but recommended so you can readily identify which scale you are monitoring and controlling – Program the display mode to show the Channel Name, or Channel Number, or both with the Display Setup procedures in Section 7.

To Change the Scale Channel (Single Channel Display)

This example assumes F7 is in its default mode CHANNEL.

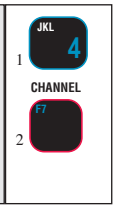
1) Press the **CHANNEL** key **[F7]**. The weight display will temporarily display dashes while it queries the CellScale for the next channel information.
2) Keep pressing the **CHANNEL** key as desired until the channel of interest is displayed.
   To go to the previous channel in the list, press the ENTER key followed by the CHANNEL key. (This assumes the default for E2 has not been altered)



To Change the Scale Channel Using Scan List Position (Single Channel Display)

Uses the CellScale's Scan List Index Number to determine which channel to display.

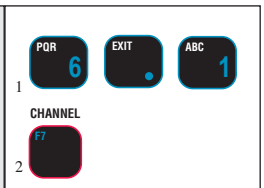
1) Using the numeric keys, input the number (1-32) corresponding to the desired channel in the scan list.
   This example finds the fourth entry in the scan list. If a requested channel does not exist in the scan list, this procedure is ignored by the CellScale.
2) Press the **CHANNEL** key **[F7]**. The weight display will temporarily display dashes while it queries the CellScale for the desired channel information.



To Change Scale Channel Using the Channel Number (Single Channel Display)

Uses the CellScale's Channel Number to determine which channel to display.

1) Using the numeric keys, input the number corresponding to the desired channel number. Use the decimal point as the channel-subchannel separator.
   This example finds channel 6-1, a math channel. If a requested channel does not exist in the scan list, this procedure is ignored by the CellScale.
2) Press the **CHANNEL** key **[F7]**. The weight display will temporarily display dashes while it queries the CellScale for the desired channel information.



MULTI-CHANNEL SYSTEMS

In CellScale systems with multiple channels, you can choose to see more than one channel at a time (See Display Setup in Section 7). In order to zero, tare, or totalize with channels in a multiple channel display, you must first select the channel to operate on. This is referred to as the "Active" channel, because this is the only channel that any scale function can be performed on. The active channel is automatically displayed on the LED Weight Display.

To Select the Active Channel (multi-channel display)

1) Highlight the channel you wish to make Active by pressing the UP (**^**) or DOWN (**v**) cursor keys.
2) Once highlighted you can Zero the channel, set and clear Tare, and switch between Net and Gross with the **NET/GROSS** key, just press the appropriate key. For Total, View Total, Statistics and other ID functions, you must switch the display to the single channel display by pressing **DISPLAY**.

To Change a Channel in the Multi-Channel Display

1) Highlight the channel you wish to change by pressing the UP (**^**) or DOWN (**v**) cursor keys.
2) Once highlighted enter the scan list position (1-32) or the channel number (1-1 to 6-32 using the decimal point for the sub channel entry). Then press **CHANNEL**.
   The new channel replaces the previous channel. If the channel is already on the display in another location, both will display the same information.

To Switch Between Multi-Channel Display and Single Channel Displays

1) Highlight the channel you wish to see in the single channel mode by pressing the UP (∧) or DOWN (v) cursor keys.
2) Once highlighted press **DISPLAY**. The highlighted channel will appear in the single channel mode.
3) Perform any scale function while in the single channel mode.
4) To return to the multi-channel display, press **DISPLAY**. **EXIT** works also to toggle between single and multichannel displays, even if **[F10]** has been reassigned so it is no longer **DISPLAY**.

Multi-Channel Page Display

When a multi-channel display mode is selected that shows fewer channels than are available from the CellScale, the user can view all channels with the page mode.

Any channel can appear on any page by changing the preset channel using the "To Change Scale Channel..." procedure. This allows a primary channel to show always, and secondary channels to change using the **ALPHA** key. This applies very well to the 3 channel preset display where one channel is large and the other 2 channels are small.

To Change to the Next Page

Press the **ALPHA** key. The next group of channels appears. The action of the **ALPHA** key is circular, returning to page 1 after the last page.

To Copy the Current Page

Sometimes it is advantageous to copy the current page and then make channel changes on the new page.

1) Press the **ENTER** key. The entire screen will reverse.
2) Press the **ALPHA** key. The new copied page will appear. Make modifications with the enter channel procedures as desired.

To Delete the Current Page

1) Press the **[0]** (SPACE) key.
2) Press the **ALPHA** key. The current page will be deleted and the display will revert to the first page.
   The 9850 will not allow the deletion of the last remaining page.

To Move Around in Pages

If you have many preset pages, you can move directly to pages by number entry.

1) Enter the number corresponding to the page you wish to see.
2) Press the **ALPHA** key. The new page will appear.

ZERO

Sets the zero reading of the scale. Use the **ZERO** key to take out small deviations in zero when the scale is unloaded. (See "TARE SET" for zeroing (Taring) package or pallet weights)

To Zero

1) In single channel mode, go to step 2. In multi-channel mode, highlight a channel with the up (∧) or down (v) cursor keys to make it active.
2) Press **ZERO**. The weight reading must be stable within the motion window for the zero function to work. The display temporarily reads "ZEROING" and then "ZEROED" after the CellScale acknowledges the command. The scale digits display 0 (or 0.0 or 0.00, etc..). The backup memory in the CellScale stores the zero reading, and can restore it even if power fails.
   The "ZEROING" and "ZEROED" messages may not be displayed on every zero request if the CellScale responds instantly, but the scale will zero.

Zero Rules for Use:

1) Works in GROSS mode or NET mode. Zeroing while in Net mode will zero the gross weight causing the display to show the negative Tare value.
2) The scale must be stable within the Motion window. The scale will not zero if the motion detect annunciator is on. The CellScale will "remember" that it has a zero request for 2 seconds. If motion clears in that time,

the scale will zero.

3) The scale will accept a zero setting over the full Range of the scale (NTEP and other Legal-for-trade models may have a limited zero range). Zero settings above 4% of full scale will subtract from the overall capacity of the scale. For example if you zero out 100 lb. on a 1000 lb. scale the overall capacity of the scale will reduce to 900 lb. plus the allowed over-range amount.

TARE

Tare is typically used to zero out a known weight such as a packing container or pallet and display the load in NET weight. A Tare value is entered in either of two ways:

1) PUSH BUTTON TARE – When the **TARE** key is pressed, the current weight is zeroed and Net Weight is displayed.
2) KEYBOARD TARE – Using the numeric keys, the operator keys in the desired Tare Weight then presses the **TARE** Key.

For Pushbutton Tare

1) In single channel mode, go to step 2. In multi-channel mode, highlight a channel with the up (∧) or down (v) cursor keys to make it active.
2) Press **TARE**. The current Gross Weight will be stored in the Tare register and the weight mode will change to NET (single display modes).

To Clear Tare and Revert to Gross Mode

If the goal is to see the Gross Weight, use the Net/Gross key instead.

1) In single channel mode, go to step 2. In multi-channel mode, highlight a channel with the up (∧) or down (v) cursor keys to make it active.
2) Press **[0]** followed by **TARE**. The Tare value will clear and the scale returns to the GROSS mode.
   Alternate method: Remove all weight from the scale (Gross Zero) and press TARE. The message display temporarily reads "TARING". Then the scale returns to the GROSS mode.

To Keyboard Tare

1) In single channel mode, go to step 2. In multi-channel mode, highlight a channel with the up (∧) or down (v) cursor keys to make it active.
2) Using the numeric keys input the value desired. In this example we'll use 0.5 lb. as a Tare Value. Press **[0] [.] [5]**. The Enter Line displays "0.5".
   You must place a leading zero if the Tare value is less than 1.
3) Press **TARE** to place the value in the Tare Register (Current Channel, current ID). The display reads "TARE SET" when the CellScale responds. All subsequent readings have the Tare value subtracted and are displayed in "NET" weight.

To View and/or Change the Tare Value

1) In single channel mode, go to step 2. In multi-channel mode, highlight a channel with the up (∧) or down (v) cursor keys to make it active.
2) Press **ENTER** followed by **TARE**.
3) The display shows the current Tare value for 5 seconds
   You can edit the Tare value from this screen by pressing number keys.

To View the Tare Value on the LED Display

The default function for ENTER-NET/GROSS is "View Tare". This function can also be assigned to any F-Key.

1) In single channel mode, go to step 2. In multi-channel mode, highlight a channel with the up (∧) or down (v) cursor keys to make it active and place it on the LED.
2) Press **ENTER** followed by **NET/GROSS**.
3) The LED display shows the current Tare value for 5 seconds

Tare - Rules for Use:

1) Only positive gross weight readings can be tared. Weight can be tared in both the NET and GROSS modes. When in the NET mode, the TARE is not cumulative, all the weight is tared off (to Net zero).
2) The motion annunciator must be off. The weight reading must be stable.
3) Setting or changing the tare has no effect on the Gross zero setting.
4) Taring will reduce the apparent over range of the scale. For example, taring a 10 lb. container on a 60 lb. scale, the scale will overload at a net weight of 50 lb. (60-10) plus any additional allowed overload (usually ~4% or 9d).
5) The scale stores the Tare value in the current ID Code memory until cleared. Each available ID Code can store independent Tare values.

Multiple Tare Memories

The 9850 is capable of storing Tare values through the use of the ID Codes. Each ID code stores an independent Tare. See Section 3 “ID Codes” for more information.

SETUP TARE MENU

Programs the automatic TARE Clear function (Auto Clear), and the various Tare Modes including a means to disable Tare.

1-3 AUTO TARE CLEAR

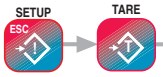
The Auto Tare Clear is intended to automate loading operations where packaging must be tared out, but there is a risk that the operator will forget to re tare each new package. It does this by automatically clearing the tare value and reverting the weight mode back to Gross. The Setup Tare menu permits three modes of Auto Tare Clear: 1) Disabled. 2) Set Clear on Minus - When the Net Weight goes negative (as it will when a tared package is removed), the Tare value is cleared and the weight mode reverts to Gross. 3) Set Clear on Total - When the Total function is enacted, the Tare value is cleared and the weight mode reverts to Gross.

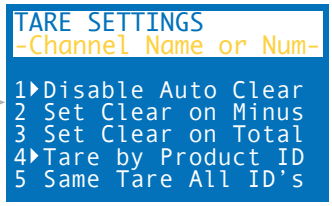
4-5 UNIVERSAL TARE

The Universal Tare feature allows a single Tare value to be shared by all ID Codes. With “Same Tare All IDs” enabled the individual Tares stored with each ID Code are ignored (but not erased). Selecting “Tare by Product ID” will restore the original Tare values. Universal Tare is intended for those applications where a common carrier or pallet is used, but multiple ID Codes are necessary for data collection. To select Universal Tare choose “Same Tare All ID’s” on the TARE SETUP MENU. This effects all IDs on any given scale channel, but not the IDs associated with other scale channels.

Tare Settings Menu

1) In single channel mode, go to step 2. In multi-channel mode, highlight a channel with the up (**∧**) or down (**v**) cursor keys to make it active.
2) Press **SETUP** followed by **TARE**.





Set Auto Clear Mode with the 1-3 keys. Only 1 item from 1-3 can be enabled at a time. Set the Universal Tare mode with the 4-5 keys.

1 Disable Auto Clear – Pressing the **[1]** key turns off the function (default).
2 Set Clear on Minus – When the Net Weight goes negative (as it will when a tared package is removed), the Tare value is cleared and the weight mode reverts to Gross.
3 Set Clear on Total – When the Total function is enacted, the Tare value is cleared and the weight mode reverts to Gross.
4 Tare by Product ID – Each ID has a unique Tare when this selection is chosen (default).
5 Same Tare All ID’s – Pressing the **[5]** key enables the Universal Tare Mode.

NET / GROSS

Switches the display between Net and Gross modes. Net Weight is defined as Gross Weight minus a Tare Weight.

To Switch Between Net Mode and Gross Mode press the **NET/GROSS** key.

The **NET/GROSS** key will only function if a Tare value has been established for the current channel. The Net/Gross function will affect all meters displaying this channel.

Switching back to Gross mode from Net mode will not clear the Tare value. This allows the operator to use the Gross Mode temporarily without having to reestablish the Tare value. Only manually clearing the Tare or setting a new Tare will change the tare value held before switching into Gross Mode. In displays that include the Net and Gross readings, the NET/GROSS key has no effect since both weight types are already displayed. However, other units displaying just one weight type will change, as well as print strings using @V1 or @W1 and Set Points programmed for NET/GROSS values.

OIML Legal-for-trade units only: *The NET/GROSS key is temporary action only. The Gross weight is displayed for 2 seconds and then the display returns to the Net Mode. The only way to return to permanent Gross readings is to clear the Tare (see Clear Tare procedure).*

UNITS

Allows easy weight units conversions. Up to 9 Units are available. See "SETUP UNITS" in the CellScale Manual for details on activating the available units. Since Units are stored with each ID Code, the menu item for changing units is found in the "Product ID Codes" Menu. See section 3. Alternately, if changing Units is a common operation, a Function key can be programmed for the task. For example, if **[F5]** is programmed for UNITS, then change the current unit by pressing **[F5]**. Each subsequent available unit will be found with repeated presses of the **[F5]** key.

Legal for Trade 9850's have F5 defaulted to the UNITS function.

PEAK HOLD (FUNCTION KEY OPTION)

Peak Hold is disallowed in Legal-for-trade systems.

Allows monitoring peak weight. Uses a special mode of the CellScale's A/D converter for capturing transient events.

To Capture Peak Weight Readings

1) Program a **FUNCTION** key for "Toggle Peak Hold" (See Section 4).
2) Turn on the Peak Hold mode by pressing the selected **FUNCTION** key. The display reads "PN" for Peak Net readings, or "P" for Peak Gross to indicate peak hold mode is enabled. The display will only update when a greater value than previously recorded is detected.

To Clear Peak Weight Readings

Turn off the Peak mode by pressing the **FUNCTION** key programmed as "Toggle Peak Hold". The display reverts to Gross or Net and clears the peak value from memory.

Peak Hold captures data at a reading rate set up by the CellScale A/D parameters. For High Speed Peak Hold, use a faster A/D rate. See CellScale Manual.

SEND / PRINT

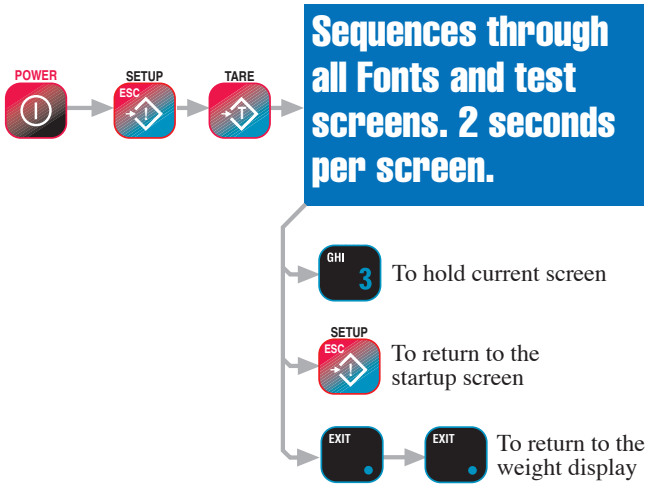
Sends the current displayed reading to the Comm Port, the Data Logging Memory, or to a remote RF Host. Any or all weight, time, date, and scale parameter functions can be printed as set in the Print Setup Mode (Section 10). The action of the **SEND/PRINT** key is controlled by the function key setup (Section 4).

DISPLAY TEST

Starts a display test to observe all display characters. The Info and Weight displays cycle through their character sets.

To Start the Display Test

1) Press the **POWER** key followed quickly by the **ESC** key. The MSI-9850 startup screen will appear.
2) Press the **TARE** key. The display test will start. Each test screen will last 2 seconds.
3) To freeze on any screen, press the **[3]** key. To continue the display test, press **[3]** again.
4) To return to the weight mode display, press **EXIT** twice.



Additional test are performed on the Weight Display by pressing the **Right Cursor [>]** key. Single segments of the weight display will light on each successive press. This is useful in finding bad segments or cross talking segments. Only one segment should be on at a time in this mode.

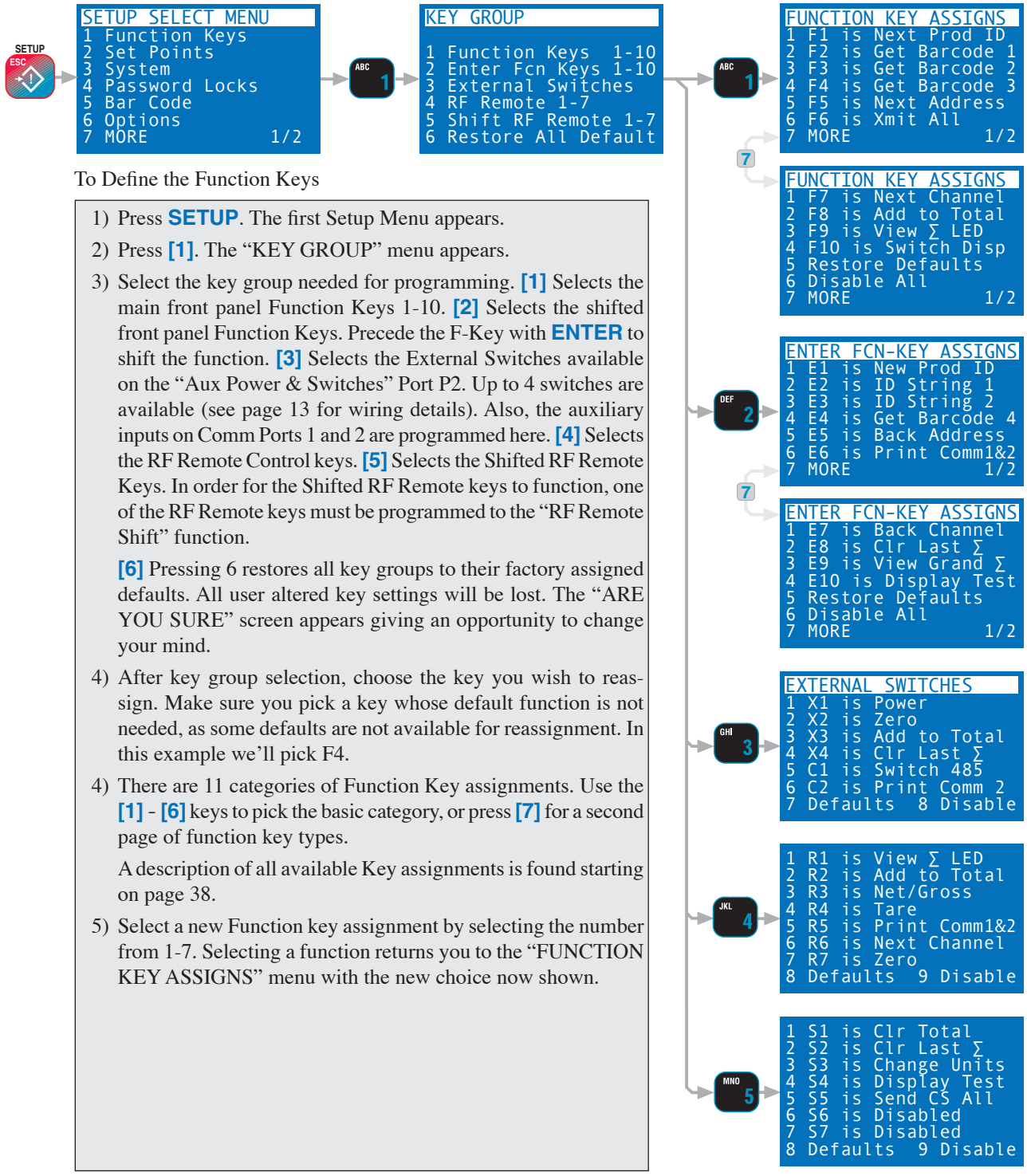
Display test is available as a function key choice and is the default function for ENTER-F10 (Display).

SECTION 4 – FUNCTION KEYS

SETUP FUNCTION KEYS

The 9850 has 10 FUNCTION keys that can be programmed to any of several functions. The default labels are: ID, DATA 1, DATA 2, DATA 3, RF ADDR (Address), SEND/PRINT, CHANNEL, TOTAL, VIEW TOTAL, and DISPLAY. These labels are printed on the front panel. Each key can be programmed for other functions. For example, the TOTAL key can be changed into a UNITS key. Also any of the ten keys can be disabled. Each of the ten function key can also be assigned a 2nd shifted function. This shifted function is enacted by first pressing the **ENTER** key, followed by the desired function key. F1-F6 are designed to make it easy to add a new label.

In addition to the Function Keys, the 9850 supports 4 External Switches located on P2 (X1-X4), an Aux Input on each Comm Port (C1 & C2), and an 8 Key RF Remote Control (R1-R8 and shifted functions S1-S7) (option required).



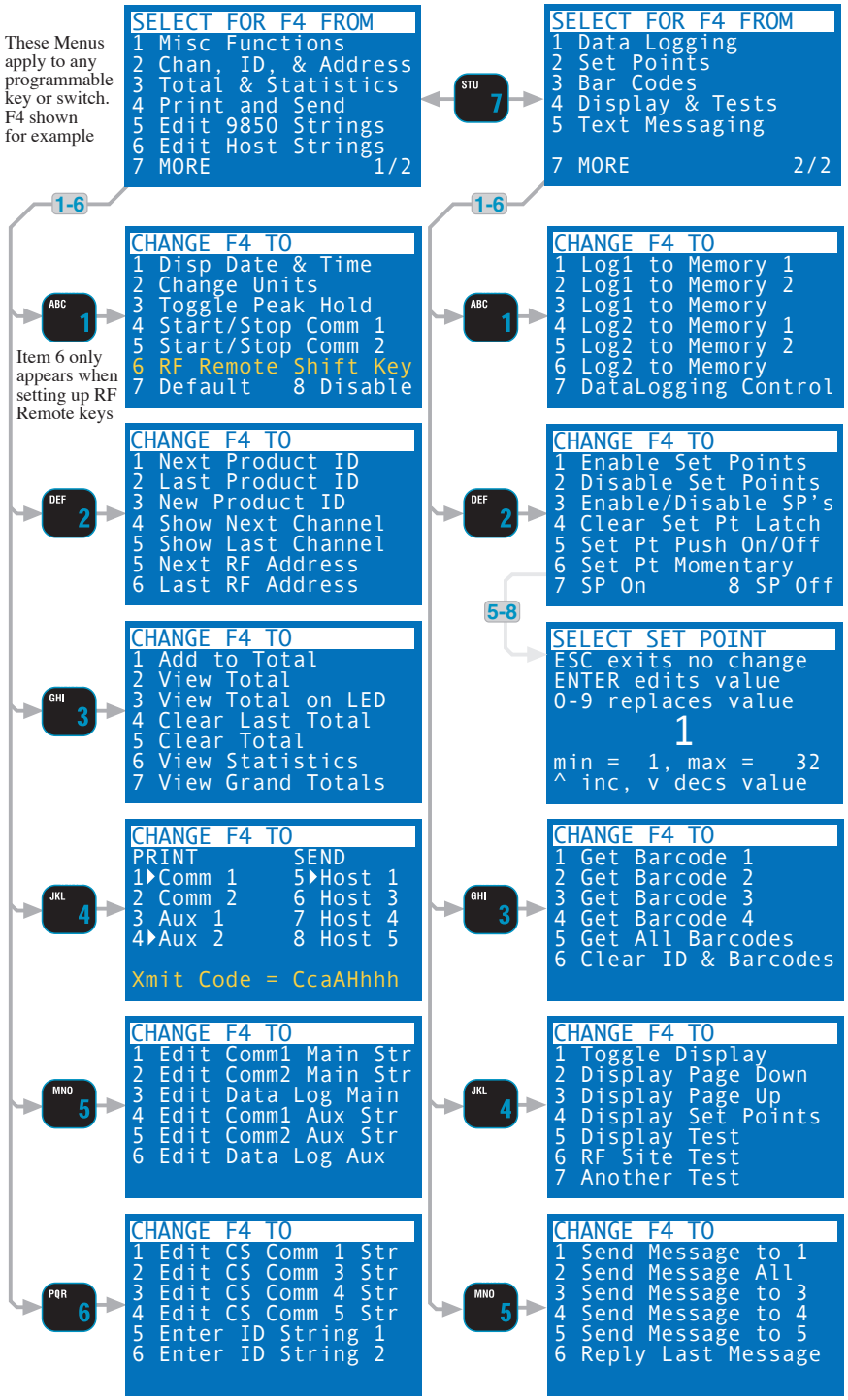
To Define the Function Keys

1) Press **SETUP**. The first Setup Menu appears.
2) Press **[1]**. The "KEY GROUP" menu appears.
3) Select the key group needed for programming. **[1]** Selects the main front panel Function Keys 1-10. **[2]** Selects the shifted front panel Function Keys. Precede the F-Key with **ENTER** to shift the function. **[3]** Selects the External Switches available on the "Aux Power & Switches" Port P2. Up to 4 switches are available (see page 13 for wiring details). Also, the auxiliary inputs on Comm Ports 1 and 2 are programmed here. **[4]** Selects the RF Remote Control keys. **[5]** Selects the Shifted RF Remote Keys. In order for the Shifted RF Remote keys to function, one of the RF Remote keys must be programmed to the "RF Remote Shift" function.

   [6] Pressing 6 restores all key groups to their factory assigned defaults. All user altered key settings will be lost. The "ARE YOU SURE" screen appears giving an opportunity to change your mind.
4) After key group selection, choose the key you wish to reassign. Make sure you pick a key whose default function is not needed, as some defaults are not available for reassignment. In this example we'll pick F4.
4) There are 11 categories of Function Key assignments. Use the **[1]** - **[6]** keys to pick the basic category, or press **[7]** for a second page of function key types.

   A description of all available Key assignments is found starting on page 38.
5) Select a new Function key assignment by selecting the number from 1-7. Selecting a function returns you to the "FUNCTION KEY ASSIGNS" menu with the new choice now shown.

Go to Index



DEFAULT FUNCTION KEYS

Next Product ID.....F1. When pressed, switches to the next available ID Code defined for the current channel. When preceded by a number, will switch directly to the numbered ID. This always works, even if F6 is programmed for another function.

DATA 1.....F2. Get Data for field Bar Code 1.

DATA 2.....F3. Get Data for field Bar Code 2.

DATA 3.....F4. Get Data for field Bar Code 3.

RF ADDR.....F5. When pressed, switches to the next available Network Address. When preceded by a number (0-63), will switch directly to the numbered network. This always works, even if F5 is programmed for another function.

Xmit All.....F6. Causes all programmed strings to Output, both local Comm Ports 1 and 2, and the Host Comm Ports 1, 3, 4, and 5.

Next Channel.....F7. When pressed, changes to the next channel in the Scan Index. Switch between selected scale channels. If preceded by a number (1-32), the display will show the chosen channel position from the Channel scan list. This always works, even if F7 is programmed for another function.

Add to Total.....F8. Add the current weight to the total, or Auto Total On/Off while unit is in Auto-Total modes.

View Total LED.....F9. Switches the LCD to display current ID Total values and shows the Total Weight on the LED Display for 3 seconds.

Display.....F10. Switches LCD screen between single channel and multi-channel displays.

DEFAULT ENTER-FUNCTION KEYS

(shifted functions)

New ID.....ENTER-F1. Brings up text entry screen for creation of a new ID.

User String 1.....ENTER-F2. Text entry screen for ID User String 1.

User String 2.....ENTER-F3. Text entry screen for ID User String 2.

DATA 4.....ENTER-F4. Get Data for field Bar Code 4.

Back RF Address.....ENTER-F5. When pressed, steps back one position in the available Network Address list.

Send to CS.....ENTER-F6. Tells the CellScale master to output its virtual Comm Port 3.

Back Channel.....ENTER-F7. When pressed, steps back one channel in the Scan Index.

Clear Last Total.....ENTER-F8. Deletes the previously totaled weight.

View Grand Total.....ENTER-F9. Switches LCD to Grand Total (of all IDs) display screen.

Test Displays.....ENTER-F10. Starts Display Test.

DEFAULT EXTERNAL (P2) SWITCHES

Power.....X1. Turns the Power On and Off.

Zero.....X2. Performs Scale Zero function (current focus channel).

Add to Total.....X3. Adds the current weight to the Total.

Disabled.....X4. No default function assigned. This line is often used to drive an external power LED.

DEFAULT COMM PORT AUX INPUTS

Switch to 485.....C1. Forces Comm Port 1 into the 422/485 Serial Port mode. “Switch to 485” is not found on any Function Key menu and is set by calling the default for C1.

Print Comm 2.....C2. Causes the 9850 Comm 2 Output String to transmit. Using C2 requires that 9850 Motherboard Jumper JP2 is open.

DEFAULT RF REMOTE KEYS

View Total (∑).....R1. Switches LCD screen to display current ID Total values. Shows Total on Large LED for 3 seconds.

Total.....R2. Add to Total. Also functions as Total On/ Total Off in Auto-Total modes.

Net/Gross.....R3. Toggles focus channel between Net and Gross displays. “Net/Gross” is not found on any Function Key menu and is set by calling the default for R3.

Tare.....R4. Tares current weight and displays Net weight. “Net/Gross” is not found on any Function Key menu and is set by calling the default for R4.

F2.....R5. Default function is “Print to Comm1&2”. Both programmed Comm Print strings will Transmit out their respective Comm Ports.

F1.....R6. Default Function is “Next Channel”. Switches the focus channel to the next active channel in the CellScale Scan List. This is the recommended key to change to “SHIFT” to enable the Remote Shifted Keys.

Zero.....R7. Zeros the scale (current focus channel). “Zero” is not found on any Function Key menu and is set by calling the default for R7.

Power.....R8. 9850 Power On/Off. This is the only RF Remote key function not changeable.

DEFAULT RF REMOTE SHIFTED KEYS

Clear Total (∑).....S1. Clears Current ID 's Total and Statistics registers.
Clear Last ∑ .....S2. Clears on the last totaled weighment. For use when the weighment was totaled in error.
Change Units.....S3. Changes weight units. Scrolls through all enabled units.
Display Test .....S4. Starts the Display Test. Cancel by pressing any key on the RF Remote
F2.....S5. Send CS ALL. Causes all programmed Comm Ports on the Host CellScale to output assigned print/data strings.
F1 .....S6. Disabled. This key defaults to disabled as it is anticipated that it is the most likely key to assign to the SHIFT function. It is possible to assign a function to the Shifted Shift key which would enact by pushing Shift twice.
Zero.....S7. Disabled. This key defaults to disabled as the danger of accidently Zeroing the scale if the shift transmission is missed is too high. However, if R7 is reprogrammed to some safer function, S7 can be assigned to any function.

AVAILABLE F-KEY & SWITCH FUNCTIONS

1A – Misc Functions Group

Disabled.....No function assigned.
Default.....Returns key to default function. The default function is printed above the key (F-Key and RF Remote Keys). Se the default charts for a complete list
Disp Date and Time.....Turns the LC display into a clock with date. Toggles.
Change Units.....1 button access to switching weight units. Available units are defined by the CellScale.
Toggle Peak Hold .....Captures maximum readings. Toggles on and off.
Start/Stop Comm 1.....If the Comm 1 print string is set to an automatic or continuous output mode, this function key will act as a start/stop print key.
Start/Stop Comm 2.....If the Comm 2 print string is set to an automatic or continuous output mode, this function key will act as a start/stop print key.
RF Remote Shift Key ...Use to make alternative functions of the RF Remote keys. This appears only on when programing the RF Remote keys.

2A – Channel, ID, and Address Group

Next Prod ID.....Default for F1.When pressed, switches to the next available ID Code defined for the current channel. When preceded by a number, will switch directly to the numbered ID.
New Prod ID .....Default for Enter-F1. Brings up text entry screen. When a name is entered, a new Product ID is created in the connected CellScale (limited to 32 total IDs).
Show Last Prod ID .....Steps current active Product ID back one position in the Product ID list.
Show Next Channel .....Default for F7. Steps current active channel forward one position in the scan list.
Show Last Channel.....Default for Enter-F7. Steps current active channel back one position in the scan list.
Next RF Address.....Default for F5. Steps current active Network Address forward one position in the Network Scan list.
Last RF Address .....Default for Enter-F4. Steps current active Network Address back one position in the Network Scan list.

Moved "Enter ID String 1" and "Enter ID String 2" to the Edit Strings Group. Moved "Clear ID and Bar Strings" to the Bar Code Group

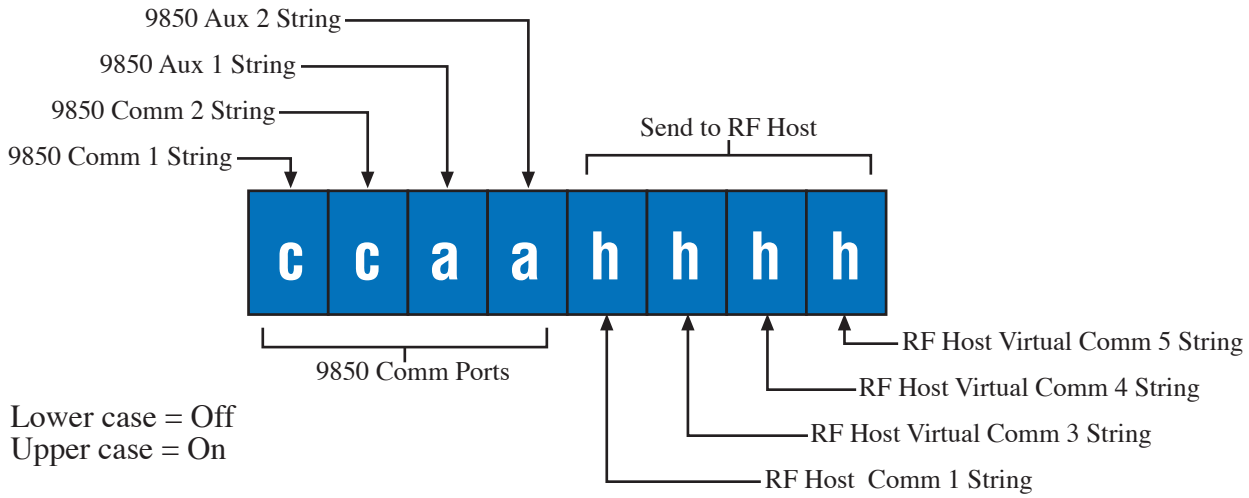
3A – Total & Statistics Group

Add to Total.....Default for F8. Add the current weight to the total, or Auto Total On/Off while unit is in Auto-Total modes.
View Total .....Default for F9. Displays Total on the LCD and temporary Total display on the LED.
Clear Last Total.....Default for Enter-F1. Clears just the last weight added to the total, and decrements the weighments counter.
Clear Total .....Clears the Total and statistics registers for the current ID.
View Statistics.....Toggles the Statistics display on and off.
View Grand Totals .....Default for Enter-F5. Toggles the Grand Total display on and off.

Moved "RF Site Testing" and "Display Test Codes" to the new Tests Group. Moved "Get Barcode 4" and "Get All Barcodes" to the new Bar Code Group.

4A – Print and Send Group

This group allows programming any combination of the 9850 Comm Ports (Print) and Host Comm Ports (Send). When the assigned F-Key is pressed, the selected (highlighted) ports will output their programmed strings. Selecting both the Comm 1 string and Aux 1 string, for example, will transmit the Comm 1 string followed by the Aux 1 string out the Comm 1 connector. The menu screen shows the combination via a binary representation. Some common combinations are named.



Print 9850 Comm 1.....Default for Enter-F3. Outputs Comm 1 print string to the Comm 1 connector.
Print 9850 Comm 2.....Outputs Comm 2 print string to the Comm 2 connector.
Print Aux to Comm 1 ...Sends the Aux 1 string directly to Comm Port 1.
Print Aux to Comm 2 ...Sends the Aux 2 string directly to Comm Port 2.
Send to CSRF Host 1...Tells the Master CellScale to output its Host 1 output string (CellScale local Comm Port)
Send to CSRF Host 3...Tells the Master CellScale to output it's Host3 print string.
Send to CSRF Host 4...Tells the Master CellScale to output it's Host1 print string.
Send to CSRF Host 5...Tells the Master CellScale to output it's Host5 print string.

5A – Edit 9850 Strings Group

Edit 9850 Comm1 Str...Allows direct entry into the 9850 Comm 1 print string edit screen. This is the print string used for Data Logging as well as printing out the 9850 Comm Port 1.
Edit 9850 Comm2 Str...Allows direct entry into the 9850 Comm 2 print string edit screen. This is the print string used for printing out the 9850 Comm Port 2.
Edit 9850 Aux1 Str.....Allows direct entry into the 9850 Comm 1 aux print string edit screen.
Edit 9850 Aux2 Str.....Allows direct entry into the 9850 Comm 2 aux print string edit screen.
Edit Data Log1 Main ....Allows direct entry into the 9850 Data Logging Main string used for storing data into memory.
Edit Data Log2 Aux .....Allows direct entry into the 9850 Data Logging Aux string used for storing data into memory. This string is used for alternate stored data.

Moved "Start/Stop Comm 1" and "Start/Stop Comm 2" to the SEND/PRINT Group. Moved all the Print choices to the SEND/PRINT group.

6A – Edit Host Strings Group

Edit CS String.....Allows direct entry into the Master CellScale Comm 1 print string edit screen. This print string outputs on the CellScale Comm Port 1 connector.
Edit CSRF Host 3.....Allows the 9850 to edit the CellScales RF Host Virtual Comm 3 string which is used to communicate with remote modems.
Edit CSRF Host 4.....Allows the 9850 to edit the CellScales RF Host Virtual Comm 4 string which is used to communicate with remote modems.
Edit CSRF Host 5.....Allows the 9850 to edit the CellScales RF Host Virtual Comm 5 string which is used to communicate with remote modems.
Enter ID String 1 .....Allows direct entry of ID String 1 which can be used for any text entries.
Enter ID String 2 .....Allows direct entry of ID String 2 which can be used for any text entries.

1B – Data Logging Group

Store to Memory 1.....Outputs Data Log 1 print string to data logging memory 1.
Store to Memory 2.....Outputs Data Log 1 print string to data logging memory 2.
Store to Memory.....Outputs Comm 1 print string to data logging memory 1 or 2 depending on the setting in the Data Logging Control menu.
Aux to Memory 1.....Outputs the Data Log 2 string to data logging memory 1.
Aux to Memory 2.....Outputs the Data Log 2 string to data logging memory 2.
Aux to Memory.....Outputs the Data Log 2 string to data logging memory 1 or 2 depending on the setting in the Data Logging Control menu.
Data Logging Cntl.....Brings up the Data Logging control menu for uploading and erasing data.

2B – Set Point Group

Enable Set Points.....Enables the Set Points by F-Key push. Used for Start.
Disable Set Points.....Disables the Set Points by F-Key push. Used for Stop.
Enable/Disable SPs.....Push On/Push Off control of Set Points. Used for single key Start/Stop.
Set Pt Momentary.....Enables remote Set Point Relay while being pushed. Sub-menu specifies which Set Point is forced on.
Set Pt On.....Turns remote Set Point Relay on (forced on). Specify Set Point in Sub-menu.
Set Pt Off.....Turns remote Set Pont Relay off (forced off). Specify Set Point in Sub-menu.
Set Pt Push On/Off.....Toggles Set Point Relay on/off (push on/push off). Specify Set Point in Sub-menu.
Clear Latched SP's.....Clears any latched Set Point. However, if the Set Point is still triggered this key will not turn it off. This key does not clear forced Set Points

3B – Bar Code Group

Get BarCode 1.....Opens Bar Code 1's input entry buffer to receive data from Comm Port 2.
Get BarCode 2.....Opens Bar Code 2's input entry buffer to receive data from Comm Port 2.
Get BarCode 3.....Opens Bar Code 3's input entry buffer to receive data from Comm Port 2.
Get BarCode 4.....Opens Bar Code 4's input entry buffer to receive data from Comm Port 2.
Get All BarCodes.....Programs key to open all enabled bar code buffers in order. All bar codes must be assigned a length in the autostart bar code menu. Can include ID print strings.
Clear ID & Bar Strings Clears all ID and Bar Code Strings.

Display & Tests Group

Toggle Display.....Toggles the LCD display between Multi-Channel and Single-Channel modes.
Display Page Up.....If multichannel displays have more than one page, pressing this key will switch the display to the next page.
Display Page Down.....If multichannel displays have more than one page, pressing this key will switch the display to the previous page.
Display Test.....Observe current status of Set Points. Configure set points.
RF Site Testing.....Used to setup CellScale networks and test for adequate range. Starts a packet counter that appears in the lower right corner of the display.
Display Test.....Tests the LC and LED Displays. Displays all programmed fonts and symbols.

5B – Text Messaging Group

Send Message to 1.....Sends Message String to CellScale Comm Port 1.
Send Message to All....Sends Message String to CellScale Comm Port 1 and to CellScale RF Host Virtual Comm Ports 3, 4, and 5.
Send Message to 3.....Sends Message String to CellScale RF Host Virtual Comm Port 3.
Send Message to 4.....Sends Message String to CellScale RF Host Virtual Comm Port 4.
Send Message to 5.....Sends Message String to CellScale RF Host Virtual Comm Port 5.
Reply Last Message....Send Reply to source of last received message. The 9850 stores the location of the port that sent a message and will reply to the same address.

CUSTOM FUNCTION KEY LABELS

The “Enter ID String 1” and “Enter ID String 2” function keys provide the user some additional capabilities. When designating a key for these text entry modes, the 9850 brings up a text entry screen that allows you to give a custom 8 character label for the ID String. Once the label is entered, when the Function Key is pressed, the resulting text entry screen will display the custom label. For example, you can program F1 as “Enter ID String 1” and on the text entry screen, type in “Operator”. Now, whenever F1 is pressed, the text entry screen will display “Operator” to show the user what type of data is expected.

In addition, the text entry screen allows you to preprogram what type of data, (numeric, upper case alpha, or lower case alpha) the string will default to, what font size (small, medium, or large), and the screen format (full screen, no menu items, or standard with menu items). Later, when the function key is pressed, the text entry screen will come up in the mode that was set when the label was programmed. This allows you to preset the text entry for numbers only or for text. See “General Text Entry” for details on how to enter strings.

QUICK VIEW OF FUNCTION KEYS

The 9850 provides a quick way to view the assigned function keys.

1) From any Weight Display press **ENTER** twice. The current assigned functions for F1-F8 are displayed.
2) Use the Down Cursor key or **ENTER** to see F9-F10 and the Enter (Shifted) Function Keys Ent F1-F6.
3) Press the Down Cursor key or **ENTER** again to see the remaining Enter F-keys, Ent F7-F10, and the assigned functions for SW1-SW4 (External cable switches found on P3).
4) Press the Down Cursor key or **ENTER** to see the assigned RF Remote keys, R1-R8. These correspond to the MSI RF Remote option.
3) Wait 20 seconds or press **ESC** to return to the weight display.

Abbreviations:

Fx = Standard Function Keys

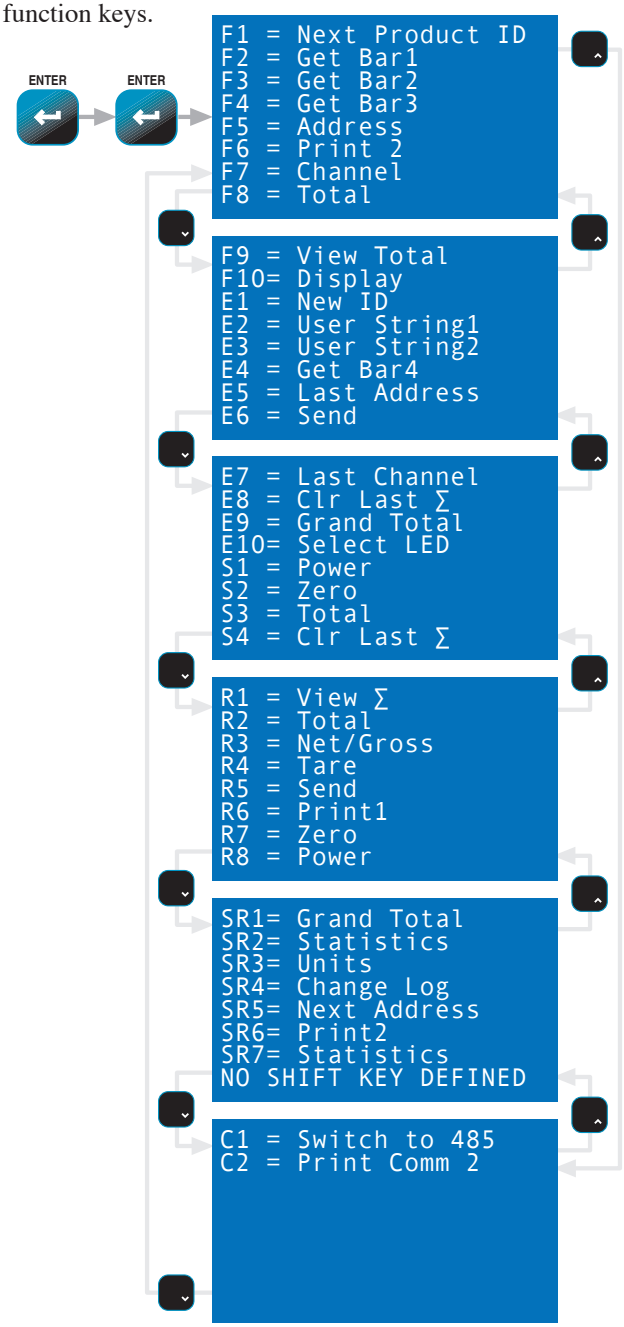
Ex = Enter (Shifted) Function Keys.

Sx = External Switches from Port 3.

Rx = RF Remote Keys

SRx = Shifted RF Remote Keys.

Cx = Comm Port Auxiliary Inputs



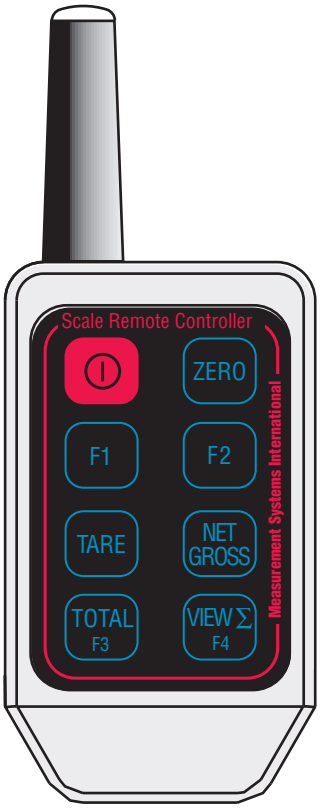
SECTION 5 – RF REMOTE CONTROL OPTION

DESCRIPTION

MSI-9850 Series RF Indicators can be equipped with an RF Remote Control (RFRC). The RFRC is a transmit only device that can be used to perform basic scale functions. The default switch functions can be changed in the Function Key menus and used for any 9850 programmble functions. It does not have the range of the Spread Spectrum modems built into the CellScale equipment and is intended for local control only. Range will vary from 25' to 100' depending on room conditions and line of sight to the display. The remote receiving antenna is behind the red lens of the meter and best range will occur when the display is visible to the operator using the RFRC.

One big advantage the RFRC provides is the ability to turn the 9850 on remotely. The RFRC is available in three versions differing only in transmit frequency. The standard version operates at 418MHz. Available alternative frequencies are 315MHz and 433MHz.

FUNCTIONS



The default functions of the RF Remote control duplicates the functions of the front panel keys on MSI-9850 RF Indicator. The POWER, ZERO, NET/GROSS, TARE, TOTAL, and VIEW TOTAL keys function identically. The TOTAL still needs to be enabled and configured in the Master CellScale before the Total features will function properly.

The F1 and F2 keys do not correspond to F1 or F2 on the 9850 and can be programmed independently. The default function of the RFRC F1 key is "Next Channel". The F2 key defaults to "Print Comm 1&2" which triggers a print at both ports of the 9850. This data string can be used in a variety of ways. For example, a remote printer can be connected to the 9850. When F2 is pressed, the remote printer could print the weight along with time, date, total weight, or any other data parameter available from the embedded CellScale. Another common use is to send the weight data to a computer configured to data log the information to a database.

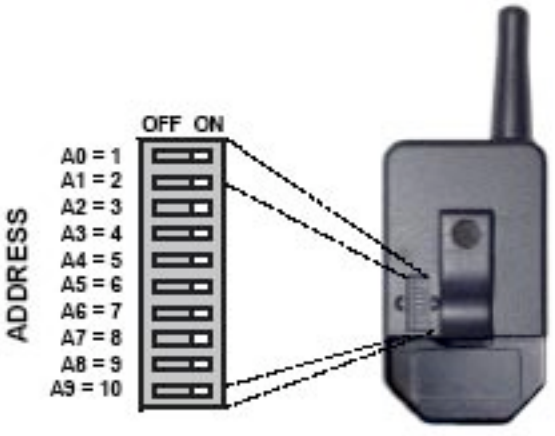
For information on Data Strings and the use of the hardwired and wireless Comm Ports, refer to the Comm Port strings info in this User Guide and the MSI-9000 CellScale Users Guide. Every key except Power on the RF Remote can be reconfigured for custom applications using the procedures in Section 4. More features can be controlled by setting the function of one of the keys to "SHIFT". This expands the total functions available from 8 to 15 (Power, Shift, and 6 other functions, plus seven shifted functions).

Using the Set Point On/Off features, the RF Remote can also be used to control remote relays.

SETTING THE TRANSMITTER ADDRESS

In order to allow the formation of up to 1024 unique Transmitter-Receiver relationships, the transmitter's address may be selected using internal DIP switches as shown. The switches are accessed by removing the DIP-switch access cover.

If the switch is on, the address line is connected to ground, otherwise it is floating. The receiver's address must match in order for the units to communicate.



MSI supplies the transmitter and receiver as a matched set with the DIP switches already configured. A replacement RFRC will only need to have the transmitter DIP switch set. To change the DIP switch in the receiver requires disassembly of the crane scale front casting.

Due to differing DIP switch styles, the receiver DIP switch appears opposite to that of the transmitter. On the receiver, the OFF position is on the right, and the ON position is on the left.

CONTENTION AND JAMMING CONSIDERATIONS

It is important to understand that only one transmitter at a time can be activated within a reception area. While the transmitted signal consists of encoded digital data, only one carrier of any frequency can occupy airspace without contention at any given time.

The RF Remote Control is a narrow band low power device and does not have the jamming immunity of the Spread Spectrum Modem used by the 9850 to communicate to the Host CellScale. Powerful sources of RF energy in the 418MHz region can jam the remote and prevent it from operating. In this circumstance, trying either of the two other available RF Remote frequencies (433MHz and 315MHz) might solve the problem. Before ordering the RF Remote Control option, some effort to research RF devices used in the immediate area would be useful in avoiding jamming the control signals.

In spite of the potential for jamming the Remote Control, the receiver is very immune from false reception due to the 10 bit encoding. Therefore no functions will be inadvertantly executed.

BATTERY REPLACEMENT

The remote unit utilizes a CR-2032 Button Lithium Cell. In normal use it will provide 1-2 years of operation. Access for replacement is accomplished by removing the battery access cover by pressing down firmly on the label area and sliding it off. Once the unit is open, remove the battery by sliding it from beneath the holder. Replace the cell with the same type while observing the polarity shown.

RF REMOTE CONTROL FCC STATEMENT

INSTRUCTION TO THE USER

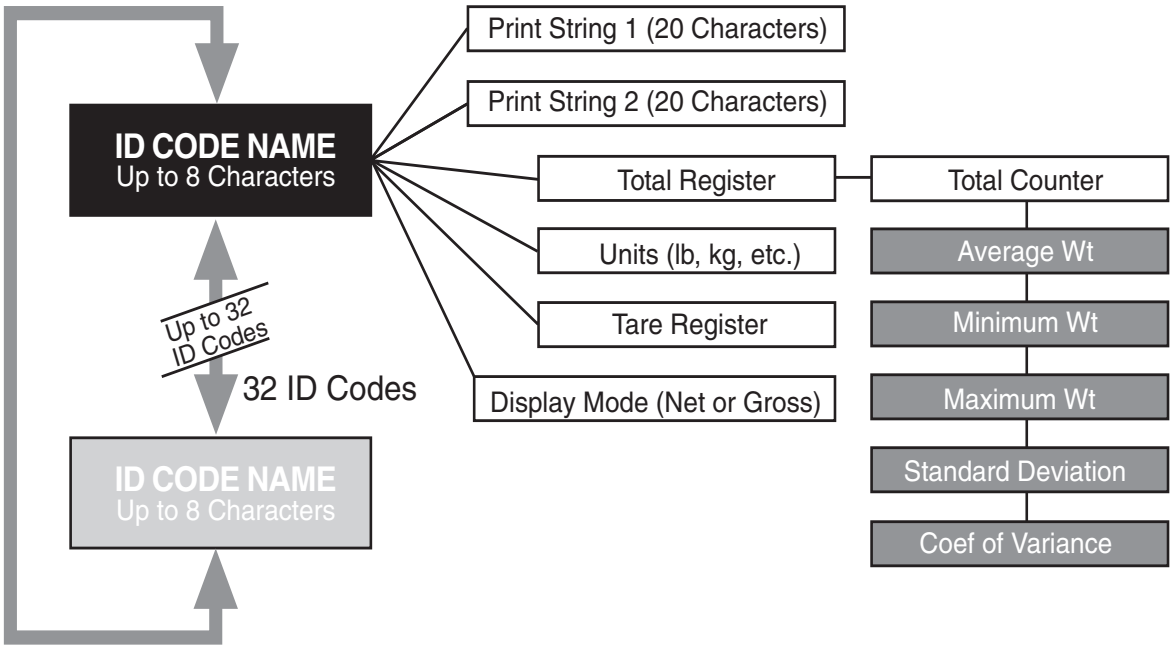
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Reorient or relocate the receiving antenna. Increase the separation between the equipment and receiver. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. Consult the dealer or an experienced radio/TV technician for help.

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to FCC Rules. In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment

SECTION 6 – ID CODES

- The CellScale can store 32 ID codes. The 9850 controls which ID Code is in use.
- Each ID Code stores a Tare Value, a Total Value, a weighment counter, display mode (Net, Gross, Peak, etc...), Unit (lb., kg, ton, etc.), and two 20 byte ID code strings. Each ID code also computes and stores statistics of Average, Min., Max., Standard Deviation, and Coefficient of Variance.
- ID Codes are created when a new name is entered by the user. The name can be all numbers, all letters, or a combination of numerals and letters. Once the name is entered by the user, the CellScale scans its memory to see if the ID Code already exists. If it does, all new totaled weighments are added to the previously totaled weighments, and any preexisting Tare value will be used for NET weight computation. If the name did not already exist, the CellScale creates a new ID Code.
- ID Codes are alphabetized when created using the standard ASCII convention.
- The 9850 uses the ID function key to scroll through all existing ID Codes as an alternate means of selecting an existing ID code.
- The ID Strings are directly accessible by programming a Function key. The function key label can be customized on the LCD screen to indicate the usage of the string. Use the ID Strings for operator IDs, customer ID, routing numbers, etc..

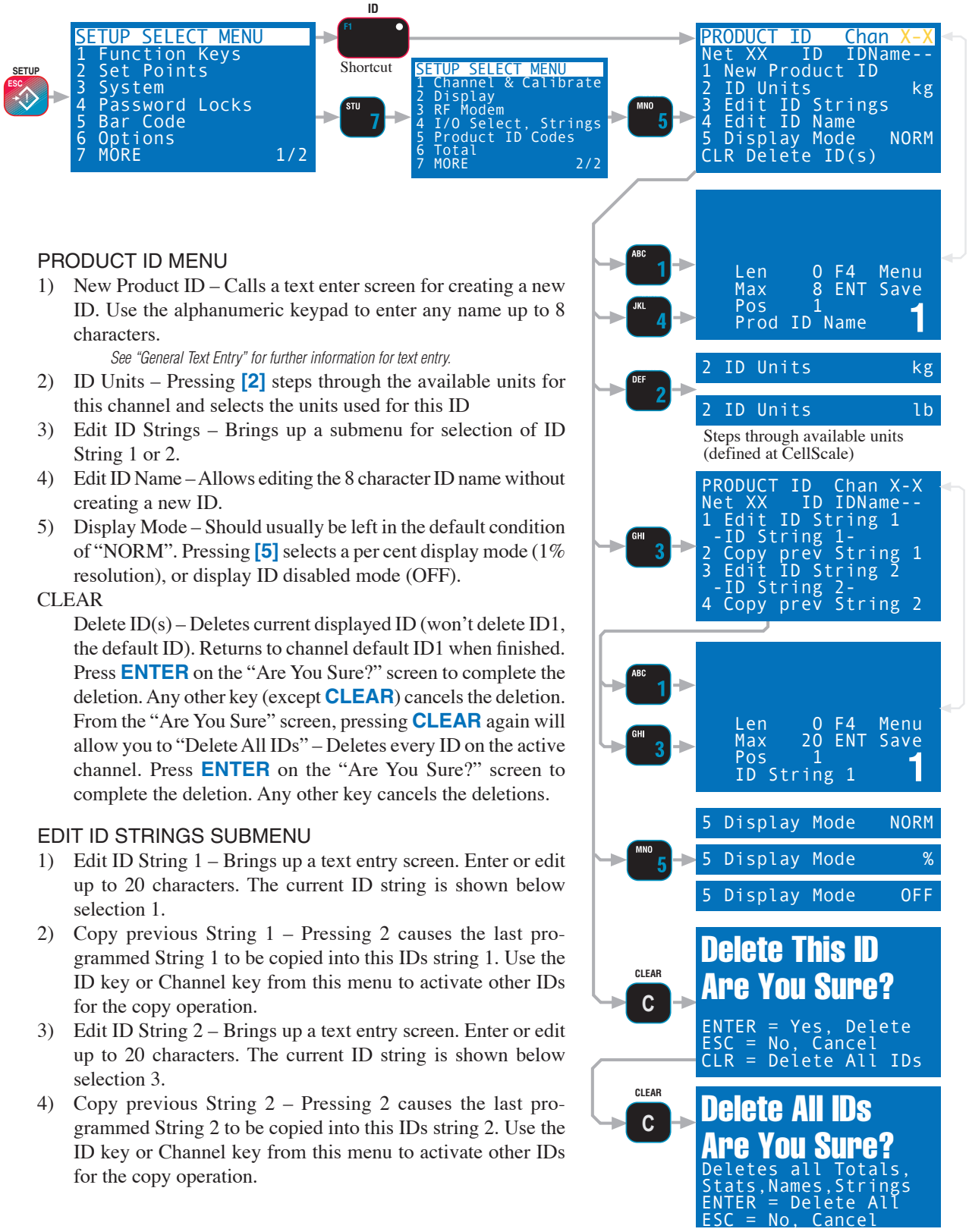
ID CODE ORGANIZATION



SETUP ID CODES MENU

Allows setup of ID Codes. A new ID can be created, the 8 character ID Name can be edited, two 20 character print strings can be assigned to each ID Code. Also any or all IDs can be deleted from this menu.

In the Product ID menus the **ID**, **CHANNEL**, and **RF ADDR** keys are active. This allows you to setup IDs for all channels on any programmed network without leaving the menu.



PRODUCT ID MENU

1) New Product ID – Calls a text enter screen for creating a new ID. Use the alphanumeric keypad to enter any name up to 8 characters.

   See "General Text Entry" for further information for text entry.

2) ID Units – Pressing **[2]** steps through the available units for this channel and selects the units used for this ID
3) Edit ID Strings – Brings up a submenu for selection of ID String 1 or 2.
4) Edit ID Name – Allows editing the 8 character ID name without creating a new ID.
5) Display Mode – Should usually be left in the default condition of "NORM". Pressing **[5]** selects a per cent display mode (1% resolution), or display ID disabled mode (OFF).

CLEAR

Delete ID(s) – Deletes current displayed ID (won't delete ID1, the default ID). Returns to channel default ID1 when finished. Press **ENTER** on the "Are You Sure?" screen to complete the deletion. Any other key (except **CLEAR**) cancels the deletion. From the "Are You Sure" screen, pressing **CLEAR** again will allow you to "Delete All IDs" – Deletes every ID on the active channel. Press **ENTER** on the "Are You Sure?" screen to complete the deletion. Any other key cancels the deletions.

EDIT ID STRINGS SUBMENU

1) Edit ID String 1 – Brings up a text entry screen. Enter or edit up to 20 characters. The current ID string is shown below selection 1.
2) Copy previous String 1 – Pressing 2 causes the last programmed String 1 to be copied into this IDs string 1. Use the ID key or Channel key from this menu to activate other IDs for the copy operation.
3) Edit ID String 2 – Brings up a text entry screen. Enter or edit up to 20 characters. The current ID string is shown below selection 3.
4) Copy previous String 2 – Pressing 2 causes the last programmed String 2 to be copied into this IDs string 2. Use the ID key or Channel key from this menu to activate other IDs for the copy operation.

Go to Index

USING ID CODES

To Create a New ID Code (Short method)

This procedure assumes the default for ENTER F6 has not been modified by the user.

1) Press **ENTER**, then **ID [F1]**.
2) Using the numeric keypad enter a name for the new ID Code. Use the **ALPHA** key to select letters as required.

To Create a New ID Code (Using the Setup ID menu)

1) Press **SETUP**, then **ID [F1]** or **SETUP**, "MORE" **[7]**, then "Product ID Codes" **[5]**.
2) Select "New Product ID" **[1]**. This brings up a text entry screen.
3) Using the numeric keypad enter a name for the new ID Code. Use the **ALPHA** key to select letters as required.

To Access an Existing ID Code (Scroll through available IDs)

Press **ID [F1]**. Each press of the ID key steps to the next programmed ID on this channel.

To Access an Existing ID Code (find existing ID)

The process of accessing an existing ID Code is identical to the process of creating a new ID Code. When the 9850 detects an ID Code entry it always checks to see if the Code already exists.

1) Press **ENTER**, then **ID [F1]**.
2) Using the numeric keypad enter the name for the desired ID Code. Use the **ALPHA** key to select letters as required.

To Access an existing ID Code (Using the Setup ID menu)

1) Press **SETUP**, then **ID [F1]** or **SETUP**, "MORE" **[7]**, then "Product ID Codes" (**5**).
2) Select "New Product ID" **[1]**. This brings up a text entry screen.
3) Using the numeric keypad enter a name of an existing ID Code. Use the **ALPHA** key to select letters as required. If the CellScale detects a match, the existing ID Code will appear. If not, it will create a new one.

Default ID Code

The 9850 maintains a default ID Code that functions identically to user entered ID Codes except that no name is required. Any totals taken in the default ID Code are included in the grand total. The best way to recognize that the default code is in operation is that it has no ID Code name. The default ID Code can be given a name using "SETUP ID CODES", but it will not be alphabetized, it will always be first on the list.

The default ID Code is number 1, therefore using the @C command (see section 7) will always start with #2 for user entered ID Codes.

To Scroll through Existing ID Codes

Press **ID [F1]**. All ID codes will appear in order for the selected channel.

To Delete an ID Code

This procedure will delete the current ID and all associated Totals and Statistics. Recall or scroll to the ID Code you wish to delete using either of the two methods detailed previously.

1) Using the **ID** key, find the ID Code you want to delete.
2) Press **SETUP**, then **ID [F1]**.
3) From the "PRODUCT ID" menu select "Delete ID" **CLEAR**.
4) From the "Are You Sure" screen press **ENTER** to delete the ID. The Channel will revert to ID1 and the previous ID is now gone. Cancel the delete operation by pressing **ESC** (**SETUP**) or any key other than **ENTER**.

The following procedure deletes all existing ID Codes and any totals and statistics stored in them.

To Delete all ID Codes

This procedure will delete all the product ID codes and all associated Names, Strings, Totals and Statistics for the current active channel. To delete all product IDs for all channels, you must select a channel using the CHANNEL key, then repeat this procedure for each Channel.

1) Press **SETUP**, then **ID [F1]**.
2) From the "PRODUCT ID" menu select "Delete ID" **CLEAR**.
3) From the "Are You Sure" screen press **CLEAR** to delete the all the product ID. The Channel will revert to ID1 (default ID) and all other IDs are now gone. Cancel the delete operation by pressing **ESC** (Setup) or any key other than **ENTER** or **CLEAR**.

Memory Full

When all 32 product IDs have been filled, the system will report Memory Full.

ID CODE STRING 1 & STRING 2

Each ID code can be further identified with one or two ID Code Strings. A string is simply a set of alphanumeric characters that can be displayed and/or printed. Each string can be up to 20 characters in length. The MSI "@ codes" can also be embedded in the string which provides an extremely versatile output capability. With @codes the result of the 20 character ID string may be greatly expanded. Also ID strings can be embedded in the main print string to combine them with other data. See Section 7 – Comm Ports, for more details on programming "@ codes".

Use the ID Code Strings to set up a print string that changes with every ID code. Combined with the standard Comm Port print strings, the ID strings can be used to design a very sophisticated bar code label with three fields that change with every ID Code – the ID Code Name, and ID String 1 and 2.

The Function keys can be programmed to allow one button access to 1 or both ID Strings. This can be used for Operator ID entry, or direct access to the label printer data when the ID string is embedded in the main Comm Port output. Programming a function key for ID String 1 or ID String 2 also allows a text entry to identify the string. For example, you could Label the key for ID String 1 "Operator" and ID String 2 "Customer". Then by enabling the function key labels, a clear identification of what the strings are for is on the LCD screen.

To Add or Edit an ID Code String

Select the ID Code you wish using the procedure "To Access an Existing ID Code" (previous page)

1) Press **SETUP**, then **ID [F1]** or **SETUP**, "MORE" **[7]**, then "Product ID Codes" **[5]**.
2) Select "Edit ID Strings" **[3]**.
3) Select "Edit ID String 1" (or 2). This brings up a text entry screen.
4) Using the numeric keypad enter the ID string (up to 20 characters). Use the **ALPHA** key to select letters as required.
   You can embed @codes in the ID string that will be interpreted when printed. However, when displayed on the LCD you'll only see the @code as entered.

To Access the ID Code Strings with the FUNCTION keys

For this procedure to function, a FUNCTION key must be programmed for "Product ID String 1" and/or "String 2". The key(s) used for this purpose can be labeled to suit your needs (e.g. "CUSTOMER" or 'OPERATOR", etc.) See Section 4– FUNCTION KEY PROGRAMMING for details.

1) Press the Function key assigned to the ID string. This brings up a text entry screen.
2) Using the numeric keypad enter the ID string (up to 20 characters). Use the **ALPHA** key to select upper case or lower case letters as required.

SECTION 7 – TOTAL / STATISTICS

TOTAL

- The 9850 can add independent weighments together and keep a counter of how many weighments were added (Totaled). The Weighments counter can be thought of as a box or palette counter.
- "TOTAL" always uses the displayed weight, so gross and net readings can be added into the same total.
- There are two modes of Totaling which are set in the SETUP TOTAL section. The Manual mode uses the **TOTAL** key to add the current weight to the previously totaled value. The Auto mode will automatically add the last, settled value to the total (or optionally the highest value). See "SETUP TOTAL" for instructions to enable the AUTO TOTAL modes.
- Both modes have a means to prevent the same load from totaling twice. Once totaled, the load must be removed from the scale before a new load can be added to the Total. Applied weight must be greater than the Total Threshold before it can be totaled. See "SETUP TOTAL" for instructions on how to set the Total Threshold.

To Total with the **TOTAL** Key
(Unit must be setup to Manual Total mode)

Place the weight to be totaled on the scale. When the weight has stabilized, press the **TOTAL** Key **[F8]**. The current weight is added to the total register. If the display is setup to display the total, the display gives an indication of how many weighments have been totaled. i.e. 6 #. There may be a small delay before the CellScale reports back to the 9850 the new Total and Total weighments.

Rules for use:

1) The motion annunciator must be off, the scale must be stable unless motion is disabled in the Setup Total menu.
2) Only readings above the High Threshold can be accumulated.
3) The scale adds the current reading (relative to the Net zero or Gross zero depending on mode) to the contents of the accumulate register.
4) After a weighment is totaled, the weight must go below the Total Threshold before another weight can be added to the total. This assures that a weight on the scale is only added to the total once.

AUTO TOTAL

SETUP Option, see "SETUP TOTAL" to enable Auto Total.

When the weight exceeds the Total Threshold the total function operates automatically.

There are 5 modes of Auto Total. Each mode is used in slightly different ways.

Mode 1, Autonorm: The displayed weight is held in a holding register and added when the weight returns below the Total Threshold. The last settled reading is what will be used for totaling when the scale returns below the Total Threshold. The user must make sure that while removing the load the scale does not stabilize enough for a new reading or an erroneous weighment addition could occur. The last settled weight is actually added to the total when the scale returns to below the Total Threshold.

Mode 2, Autopeak: The "AUTOPEAK" total mode works the same as Autonorm, except that the highest settled reading will be used for totaling on return to zero, rather than the last settled reading.

Mode 3, Autoload: totals the applied weight as soon as the weight is stable (Motion Indicator off). Additional weight cannot be totaled until the weight drops below the Total Threshold

Mode 4, Loaddrop: After pressing the **TOTAL** key, the CellScale starts a long term, motion compensated (if the motion compensation option is installed in the CellScale), average of the current weight that ends when the weight is dropped. This method is designed for commodity weighing of scrap metal, or other types of materials that are loaded into rail cars, trucks, hoppers, etc., usually with a crane.

On Autonorm, Autopeak, and Loaddrop modes, the Total is not recorded until the weight is removed (weight drops below the total threshold). When combining print modes with totals, this can cause the total to lag by one reading. Use the Autoload or Onaccept modes if an immediate current weight and totaled weight printout is required.

Mode 5, Onaccept: In conjunction with target weights set up in the set points menus, the Onaccept total mode will automatically total settled readings that fall within the preselected accept weight window. See Section 8 "Set Points" for information on setting accept limits.

Auto Total Operation

1) Enable the desired Auto Total mode in the "SETUP TOTAL" menu (see "SETUP TOTAL"). Select the "AUTONORM", "AUTOLOAD", or the "AUTOPEAK" mode. Exit from the setup menu.
2) Use the **TOTAL** key to disable ("TTL OFF") or enable ("TTL ON") Auto Total.
3) Place the weight to be totaled on the scale.
4) Remove the weight. The screen will read "TOTALING" briefly, then return to the weight display.

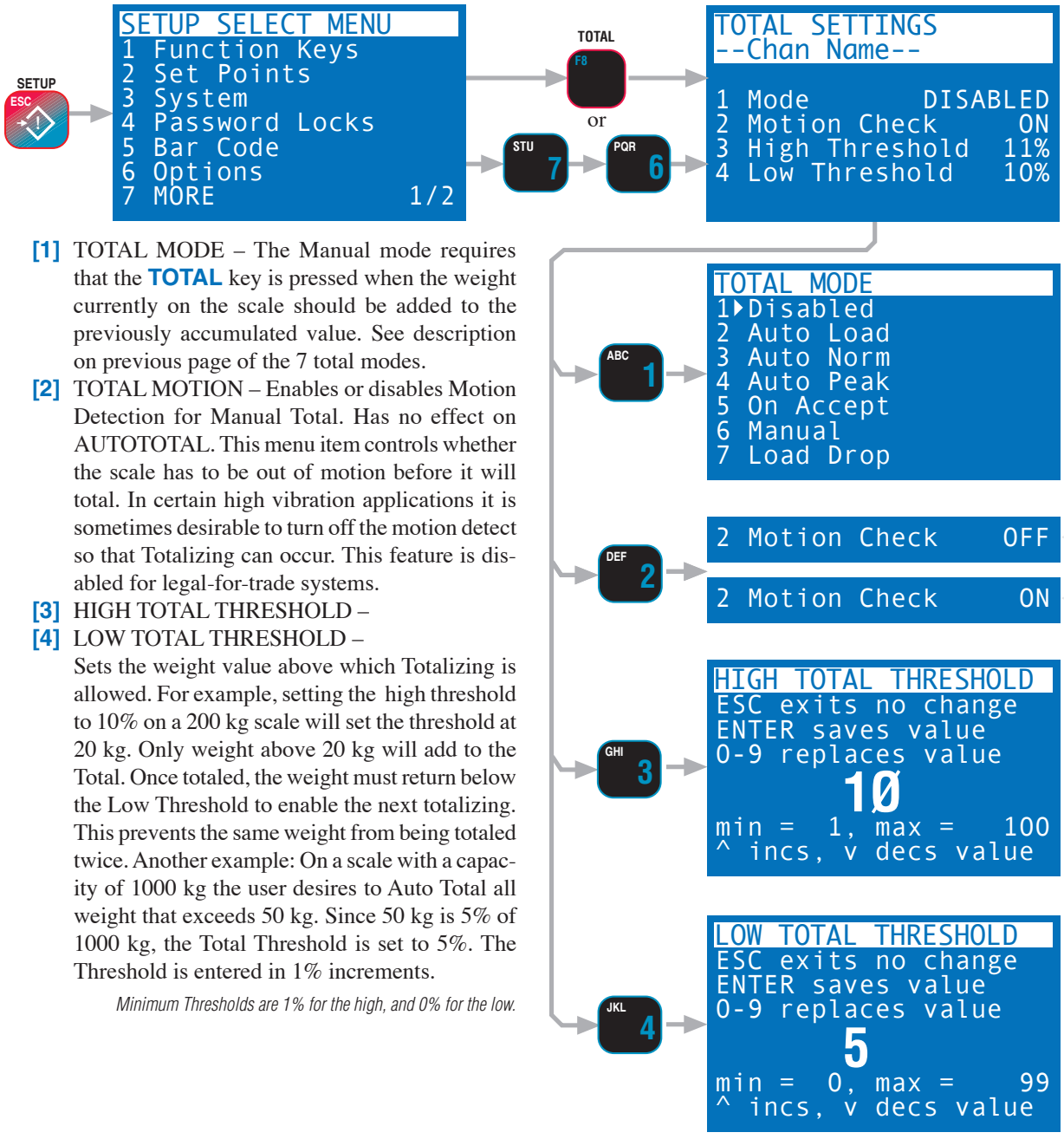
The total key is used as a Total On, Total Off, toggle key which is indicated briefly on the message display (i.e. "TOTAL ON" or "TOTAL OFF"). Auto Totaling will only occur in the TOTAL ON mode. This feature allows the user to turn off Auto Total for periods in which the scale needs to be used without adding to the total. Turning the Auto Total off does not erase the current total. See "To Clear the Total Value" to learn how to erase the Total.

Rules for Auto Total:

1) Cannot be in motion. The weight must settle within the motion window.
2) Weight readings must be greater than the set High Total Threshold.
3) Each reading added to total must be preceded by a return to net or gross zero (below the Low Total Threshold).

SETUP TOTAL MENU

Allows setting Totalizing parameters.



[1] TOTAL MODE – The Manual mode requires that the **TOTAL** key is pressed when the weight currently on the scale should be added to the previously accumulated value. See description on previous page of the 7 total modes.

[2] TOTAL MOTION – Enables or disables Motion Detection for Manual Total. Has no effect on AUTOTOTAL. This menu item controls whether the scale has to be out of motion before it will total. In certain high vibration applications it is sometimes desirable to turn off the motion detect so that Totalizing can occur. This feature is disabled for legal-for-trade systems.

[3] HIGH TOTAL THRESHOLD –

[4] LOW TOTAL THRESHOLD –

Sets the weight value above which Totalizing is allowed. For example, setting the high threshold to 10% on a 200 kg scale will set the threshold at 20 kg. Only weight above 20 kg will add to the Total. Once totaled, the weight must return below the Low Threshold to enable the next totalizing. This prevents the same weight from being totaled twice. Another example: On a scale with a capacity of 1000 kg the user desires to Auto Total all weight that exceeds 50 kg. Since 50 kg is 5% of 1000 kg, the Total Threshold is set to 5%. The Threshold is entered in 1% increments.

Minimum Thresholds are 1% for the high, and 0% for the low.

Go to Index

To Set the Total Mode

The following example assumes the F1 function key is in its default mode of "TOTAL".

1) Press **SETUP**.
2) Press the **TOTAL** switch **[F8]** or select **[6]** Total.
3) The current Total Mode is shown on selection 1.
4) Press the **[1]** key to bring up the "Total Mode Selection" menu.
5) Select the desired Total Mode with the numeric keys (**1**-**7**). You are returned to the "Total Status" with the new mode indicated on selection 1.
6) Motion Setting – If totals are allowed before the scale settles, disable Motion by pressing **[2]**. Disabling Motion should only be used in situations where the weight may never settle. Accuracy will suffer.
   Some AutoTotal modes require no motion to function (Auto Load, Auto Norm) and will ignore the setting here. ON means totals will not function until the weight has settled. OFF indicates that motion conditions are ignored.
7) Press the **EXIT** key to return to normal scale operation or the **ESC** key to continue in the Setup Menus.

To Turn On or Off Auto Total

Turn on or off Auto Totaling by pressing the **TOTAL** key **[F1]**. The display will read "TOTAL ON" along with the current total mode, or "TOTAL OFF".

To Set the Total Threshold

1) Press **SETUP**.
2) Press the **TOTAL** switch **[F8]** or select **[6]** Total.
3) Select "High Threshold" by pressing **[3]**.
4) Enter the desired high threshold with the numeric keys. Threshold is expressed in per cent of capacity.
5) Set the new high threshold by pressing **ENTER**.
   If the high threshold you entered was lower than the previous low threshold, the CellScale automatically adjusts the low threshold to be 1% less than the high threshold.
6) To change the low threshold, press the **[4]** key.
7) Enter the desired low threshold with the numeric keys.
8) Set the new low threshold by pressing **ENTER**.
   If the low threshold you entered was higher than the previous high threshold, the CellScale automatically adjusts the high threshold to be 1% more than the low threshold.
9) Press the **EXIT** key to return to normal scale operation.

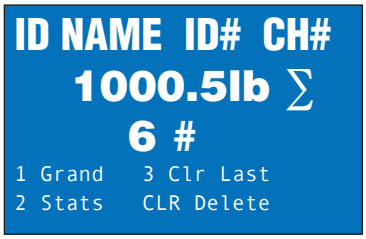
VIEW TOTAL

Displays the current Total value of the selected ID and allows the total(s) to be cleared.

The following procedures assume the F9 function key is programmed to its default "VIEW TOTAL" . In any View Total screen, you can change channels by pressing the CHANNEL key. You can change to the next ID by pressing the ID key.

To Display the Current ID#'s Totaled Weight and Statistics

1) Press **VIEW TOTAL [F9]**. The current IDs total appears on line two, the number of totaled samples on line three, and the ID name (if programmed) on line 1.
2) To return to the standard weight display, press **DISPLAY** or **ESC**.



To Erase the last Totaled Weight

If the last totaled (automatic or manual) weighment was a mistake, it can be erased with the following procedure. This erases only the last totaled weighment.

1) Press **VIEW TOTAL**. The current total is displayed.
2) Select "Clr Last" by pressing **[3]**. The "ARE YOU SURE" screen gives an opportunity to change your mind.
3) To complete the last totaled weight deletion, press the **ENTER** key.

To Clear the Total Value (Current ID Code only)

At any time during the following procedure the **EXIT** *key cancels the Clear operation. Clears ID's statistics registers as well.*

1) Press **VIEW TOTAL**. The current total is displayed.
2) Press **CLEAR**. The "ARE YOU SURE" screen gives an opportunity to change your mind.
3) To complete the totaled weight deletion, press the **ENTER** key.

To Clear All the Totals and Statistics of all ID Codes at once.

This procedure deletes every totaled weighment in every ID code of the current channel. Please make sure all data is recorded as necessary before proceeding.

1) Press **VIEW TOTAL**. The current total is displayed.
2) Select "Grand" total by pressing **[1]**.
3) Press **CLEAR**. The "ARE YOU SURE" screen gives an opportunity to change your mind.
4) To complete the totaled weight deletion of all current channel ID Codes, press the **ENTER** key.

Clear Last Total

The "Clear Last Total" function key (see Section 4) provides a means to clear just the last totaled data without clearing the entire total register. Use this when a weight is totaled inadvertently or a load drops outside the container, or any other circumstance where just the last total should be deleted from the overall total. "Clear Last Total" is the default mode for **ENTER**-**[F7]**.

STATISTICS

Statistics works in conjunction with the Total function and adds MIN, MAX, Average, Standard Deviation, and Coefficient of Variance. All these computations are kept for every ID Code independently. The number of samples that statistics can be calculated for is limited only by memory requirements and will vary from a few thousand to >100000 samples. Individual samples are not stored. If needed, individual samples can be logged through either the RS-232 port or into data logging memory using the "PRINT on TOTAL" function.

A "GRAND TOTAL" function is also included with the Statistics function. The Grand Total adds all the weight in all the ID Codes and provides the following information: GRAND TOTAL, Number of Totals, and the Overall Average (GRAND TOTAL divided by Number of Totals).

Statistics are viewed using the **VIEW TOTAL** key, then selecting "STATS" with the **[2]** key, or program a function key to "Show Statistics" .

Definitions and Formulas

AVERAGE – is computed by dividing the total by the number of samples.

MIN – is a single weight register that records the minimum weighment that was added to the total.

MAX– is a single weight register that records the maximum weighment that was added to the total.

STANDARD DEVIATION – is a measure of how widely values are dispersed from the average value (the mean). The 9850 uses the "non-biased" or "n-1" method that is based on sampling a portion of each available weighment. Standard Deviation uses the following formula where x is equal to the total, and n is equal to the number of samples:

$$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$

COEFFICIENT OF VARIANCE – is a relative dispersion calculated from the sample standard deviation and the mean with the following formula:

$$\frac{100(StdDev)}{Average}\ \%$$

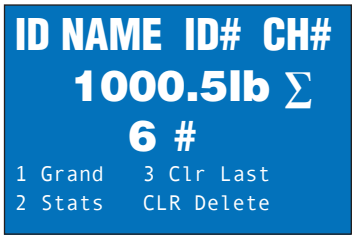
GRAND TOTAL – is computed by adding together the totals of all the ID Codes (adjusted to the default unit set in calibration if necessary).

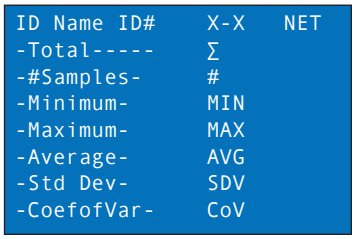
GRAND AVERAGE – is computed by dividing the Grand Total by the number of samples of all the ID Codes.

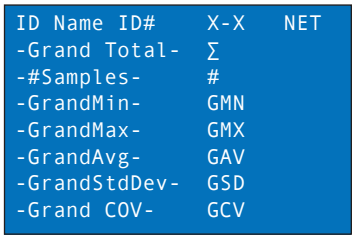
View Statistics and Grand Statistics

The View Statistics feature uses totaled data from the current ID code in the CellScale to compute statistics. Grand Statistics uses totaled data from all ID codes. Only weight that has been totaled will be used in computing statistics. This procedure requires that F9 is programmed as "VIEW TOTAL".

1) Press **[F9]**. The current IDs total appears on the top line, the number of totaled samples on line 2, and the ID name (if programmed) on line 3.
2) To see the statistics for the current ID, select "Stats" by pressing **[2]**. When in the Statistics display, return to the Total display by pressing **ESC**, or return to the standard weight display by pressing **DISPLAY**.
3) To see the grand total and statistics for all IDs on this scale channel, select "Grand" by pressing **[1]**. When in the Grand Statistics display, return to the Total display by pressing **ESC**, or return to the standard weight display by pressing **DISPLAY**.
4) To return to the standard weight display, press **DISPLAY**.

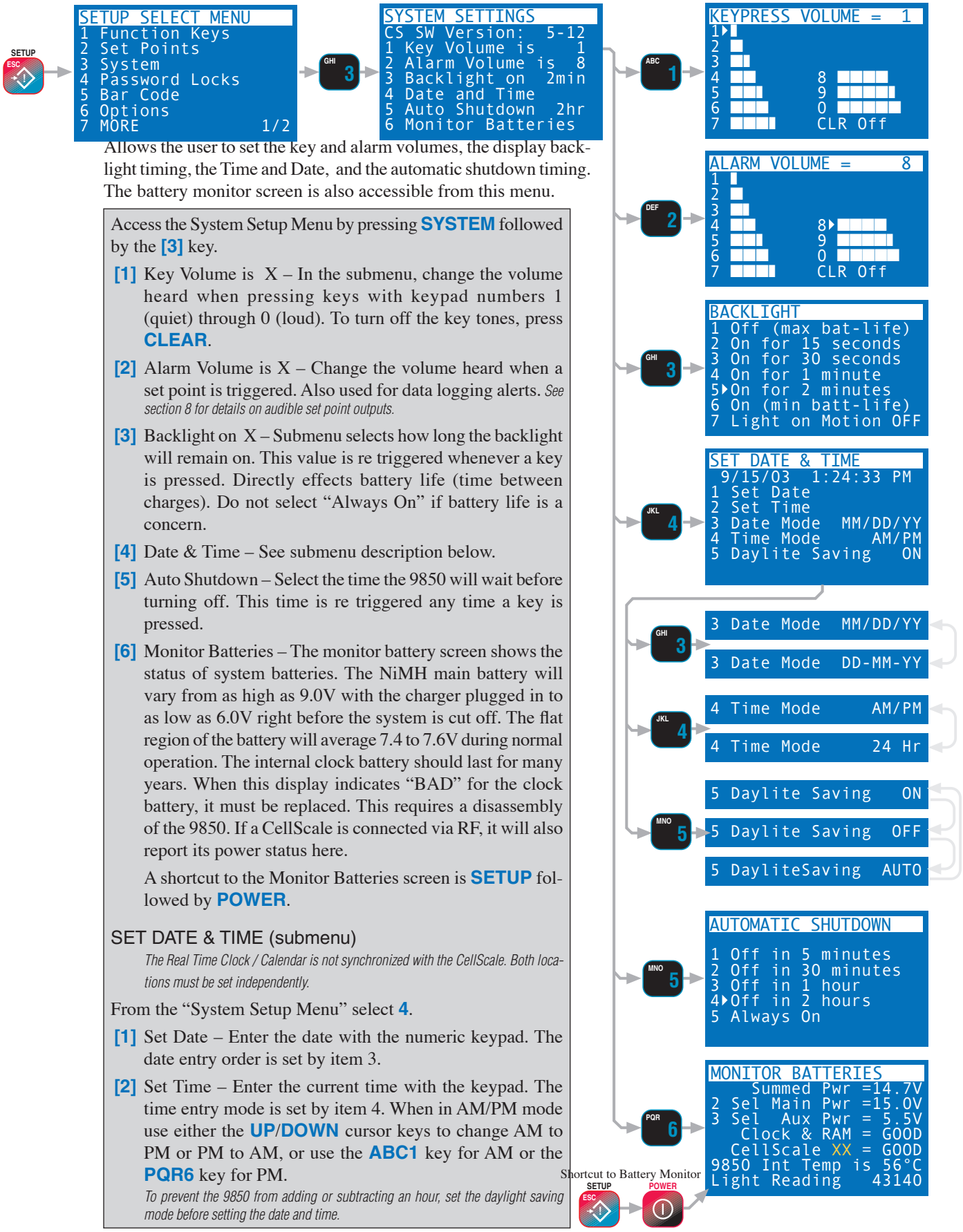






SECTION 8 – 9850 SETUP

SYSTEM SETUP MENU



Allows the user to set the key and alarm volumes, the display backlight timing, the Time and Date, and the automatic shutdown timing. The battery monitor screen is also accessible from this menu.

Access the System Setup Menu by pressing **SYSTEM** followed by the **[3]** key.

[1] Key Volume is X – In the submenu, change the volume heard when pressing keys with keypad numbers 1 (quiet) through 0 (loud). To turn off the key tones, press **CLEAR**.

[2] Alarm Volume is X – Change the volume heard when a set point is triggered. Also used for data logging alerts. *See section 8 for details on audible set point outputs.*

[3] Backlight on X – Submenu selects how long the backlight will remain on. This value is re triggered whenever a key is pressed. Directly effects battery life (time between charges). Do not select "Always On" if battery life is a concern.

[4] Date & Time – See submenu description below.

[5] Auto Shutdown – Select the time the 9850 will wait before turning off. This time is re triggered any time a key is pressed.

[6] Monitor Batteries – The monitor battery screen shows the status of system batteries. The NiMH main battery will vary from as high as 9.0V with the charger plugged in to as low as 6.0V right before the system is cut off. The flat region of the battery will average 7.4 to 7.6V during normal operation. The internal clock battery should last for many years. When this display indicates "BAD" for the clock battery, it must be replaced. This requires a disassembly of the 9850. If a CellScale is connected via RF, it will also report its power status here.

A shortcut to the Monitor Batteries screen is **SETUP** followed by **POWER**.

SET DATE & TIME (submenu)

The Real Time Clock / Calendar is not synchronized with the CellScale. Both locations must be set independently.

From the "System Setup Menu" select **4**.

[1] Set Date – Enter the date with the numeric keypad. The date entry order is set by item 3.

[2] Set Time – Enter the current time with the keypad. The time entry mode is set by item 4. When in AM/PM mode use either the **UP**/**DOWN** cursor keys to change AM to PM or PM to AM, or use the **ABC1** key for AM or the **PQR6** key for PM.

To prevent the 9850 from adding or subtracting an hour, set the daylight saving mode before setting the date and time.

Go to Index

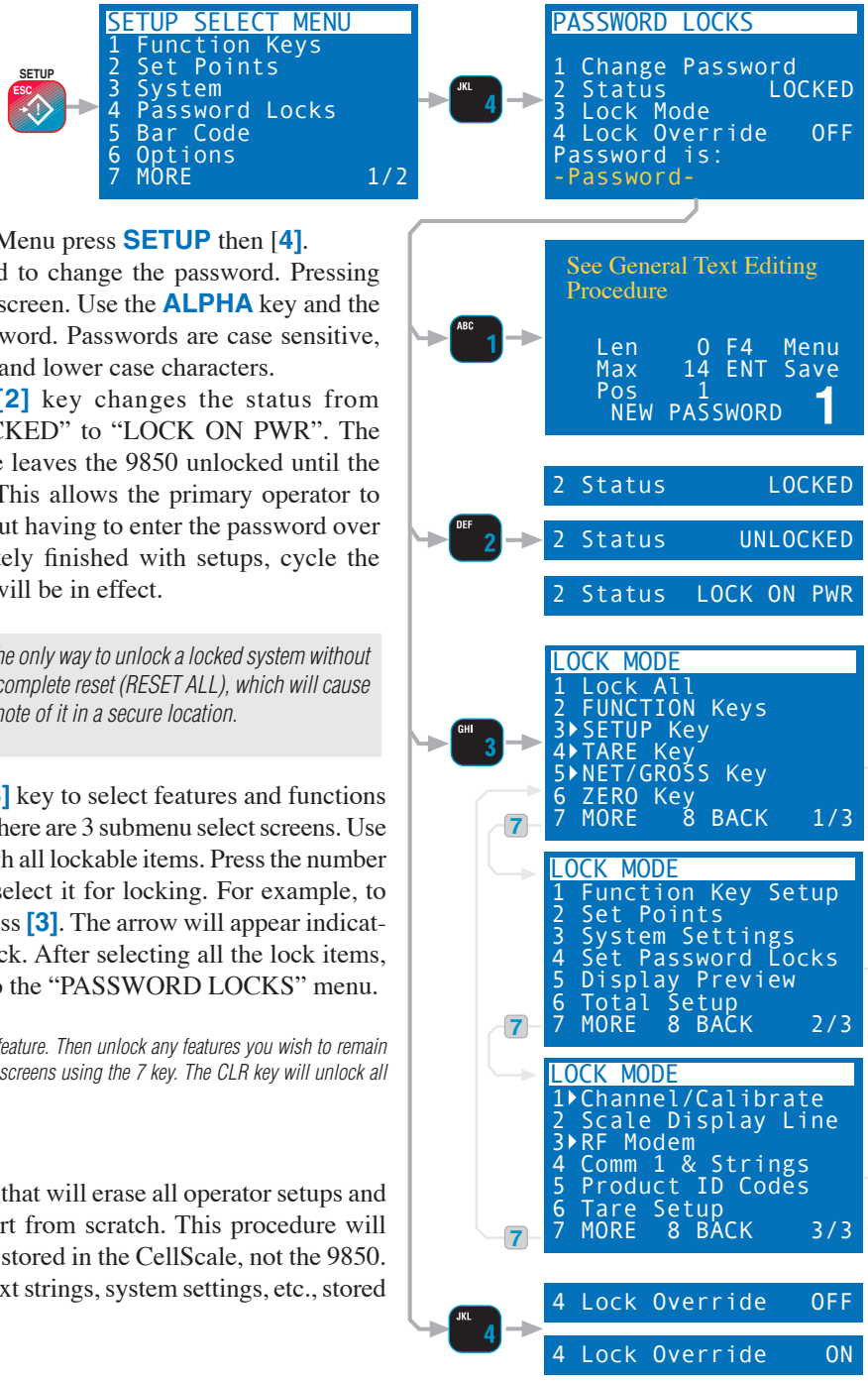
[3] Date Mode – Pressing **[3]** changes the date mode from MM/DD/YY to DD-MM-YY.

[4] Time Mode – Press **[4]** to change between 24 hour time or 12 hour time with AM/PM indication.

[5] Daylite (sic) Saving – Press **[5]** to select the Daylight Saving mode. Select "ON" when in Daylight Savings Time (adds 1 hour). Select "OFF" when not in Daylight Savings time. Select "AUTO" to allow the 9850 to automatically enter into and out of daylight savings time (follows US rules). Set the daylight saving mode before setting the date and time.

PASSWORD LOCKS

The Lock function allows the user to lock various setups and or functions to prevent unauthorized changing or erasing of scale functions, features and statistical data. For security a lock password (1-14 characters) is used. Once the MSI 9850 is locked the message "LOCKED" will appear whenever a locked function is tried. To temporarily unlock a function, press any locked key, press **ENTER**, then enter the password followed by the **ENTER** key. To lock or unlock all functions you must use the "PASSWORD LOCKS" menu.



To enter the Password Locks Menu press **SETUP** then **[4]**.

[1] Change Password – Used to change the password. Pressing **[1]** brings up a text entry screen. Use the **ALPHA** key and the keypad to input any password. Passwords are case sensitive, so pay attention to upper and lower case characters.

[2] Status – Pressing the **[2]** key changes the status from "LOCKED" to "UNLOCKED" to "LOCK ON PWR". The "LOCK ON PWR" mode leaves the 9850 unlocked until the power has been cycled. This allows the primary operator to complete all setups without having to enter the password over and over. When completely finished with setups, cycle the power and then the lock will be in effect.

Do not forget your password. The only way to unlock a locked system without the proper password is to do a complete reset (RESET ALL), which will cause you to lose all setups. Make a note of it in a secure location.

[3] Lock Mode – Press the **[3]** key to select features and functions for password protection. There are 3 submenu select screens. Use the **[7]** key to scroll through all lockable items. Press the number key beside each item to select it for locking. For example, to lock out the Setup key press **[3]**. The arrow will appear indicating the Setup Key will lock. After selecting all the lock items, press **SETUP** to return to the "PASSWORD LOCKS" menu.

Tip: Use "Lock All" to lock every lockable feature. Then unlock any features you wish to remain operational. Remember to look at all three screens using the 7 key. The CLR key will unlock all functions while in the Lock Mode menu.

If you forgot your password

MSI provides a master unlock that will erase all operator setups and require you to completely start from scratch. This procedure will not erase calibration, which is stored in the CellScale, not the 9850. However, all display modes, text strings, system settings, etc., stored in the 9850, will be lost.

RESET ALL: The following procedure will cause you to lose all setups and will return the 9850 to it's default settings. Use this procedure only as the last resort of having lost your password.

1) Press **POWER** followed immediately by **ESC** (**SETUP**). The startup screen will appear.
2) Press the **CLEAR** key. A password text entry screen will appear.
3) Using the keypad, input the number 7415369. Press **ENTER**.
4) The "ARE YOU SURE" display appears. Press **ENTER**.

Everything is reverted to defaults. Now you must setup the 9850 again.

KEYBOARD LOCK

Keyboard lock is provided to prevent casual or accidental pressing of the keys from changing any modes. This function works only from weight display modes.

To Lock the Keyboard

Press **[1] [2] [3] ALPHA**. The screen will read "KEYBOARD LOCKED" briefly.

While in Keylock mode, pressing any key will show the screen "KEYLOCK PUSH 123""

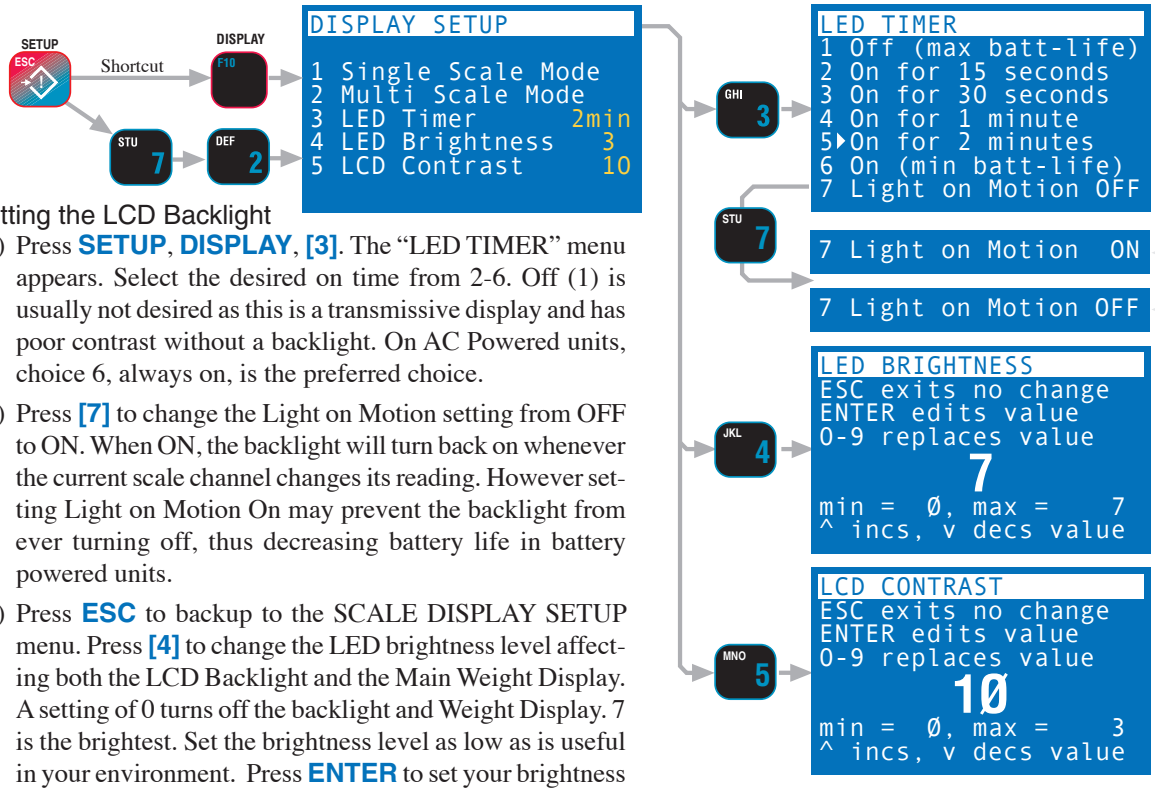
To Unlock the Keyboard

Press **[1] [2] [3]**. The screen will read "KEYBOARD UNLOCKED" briefly.

Now all keys should function normally.

LC DISPLAY BACKLIGHT & CONTRAST

The 9850 features a white LED Backlit Liquid Crystal Display. The LED Backlight is one of the highest power drain devices in the 9850. The Backlight can be set to turn itself off automatically after a user sepcified time. Once off, the Backlight will turn back on by pushing any key (except **POWER**). The first key press, no matter which key it is, will be ignored, except for turning the Backlight on. Then key function is restored. The Backlight can also be set to turn back on when the active channel scale changes its reading (goes in motion). There are 3 levels of brightness with a setting of 0 being another way to turn it off. AC or DC supply powered 9850's can and should choose to leave the backlight on at full (3) brightness. In battery powered units, battery life can be extended through the use of the power down modes and reduced brightness settings.



Setting the LCD Backlight

1) Press **SETUP**, **DISPLAY**, **[3]**. The "LED TIMER" menu appears. Select the desired on time from 2-6. Off (1) is usually not desired as this is a transmissive display and has poor contrast without a backlight. On AC Powered units, choice 6, always on, is the preferred choice.
2) Press **[7]** to change the Light on Motion setting from OFF to ON. When ON, the backlight will turn back on whenever the current scale channel changes its reading. However setting Light on Motion On may prevent the backlight from ever turning off, thus decreasing battery life in battery powered units.
3) Press **ESC** to backup to the SCALE DISPLAY SETUP menu. Press **[4]** to change the LED brightness level affecting both the LCD Backlight and the Main Weight Display. A setting of 0 turns off the backlight and Weight Display. 7 is the brightest. Set the brightness level as low as is useful in your environment. Press **ENTER** to set your brightness choice.

Go to Index

You can also change the Backlight settings using the UP/DOWN cursor keys to select the parameter, and the LEFT/RIGHT cursor keys to change the value.

Setting the LCD Contrast

LCD contrast is effected by Temperature, humidity, and viewing angle. The 9850's LCD is temperature compensated and usually does not require adjustment due to temperature variations. Only extremely cold (<0°C) or hot conditions (>50°C) might require manual contrast adjustment. Viewing angle, however, is a matter of taste. The 9850 sets its fine contrast adjustment at a setting of 15. Setting the contrast lower than 15 will cause the display to darken and turn more purple. Setting it higher than 15 will lighten the display. Set the contrast while observing the 9850 at your usual operational viewing angle.

Method 1 Cursor Keys

1) Press **SETUP**, **DISPLAY**.
2) Press the down cursor key 5 times to highlight "Contrast".
3) Press the right cursor key to lighten the display or use the left cursor key to darken the display.
4) Press **EXIT** to return to the weight display. Or press **ESC** to backup to the "SETUP SELECT MENU". Press **ESC** again to return to the weight display.

Method 2 Numeric Entry

1) Press **SETUP**, **DISPLAY**.
2) Select "Contrast" by pressing **[5]**.
3) Using the numeric keypad, enter a contrast value. Although the number entry screen takes numbers from 0-63, the usable contrast values are about 5 to 20.
4) You will not see the contrast change until you press **ENTER**. At this point you can use the Left/Right Cursors to fine tune the contrast.
5) Press **EXIT** to return to the weight display. Or press **ESC** to backup to the "SETUP SELECT MENU". Press **ESC** again to return to the weight display.

STANDARD & CUSTOM DISPLAY SETUP

The 9850 offers the user a great deal of flexibility in how weight and other information is displayed. There are five single channel preset displays and five multiple channel preset displays. These presets cover the majority of user applications. However, the 9850 also allows complete customizing of how scale data is presented on the display.

There are two basic weight display modes, Single Channel, and Multiple Channel. The single channel display is the primary weight display, and is used as the display mode when a channel is highlighted and switched out of the multiple channel display. If your CellScale is equipped with multiple channels, the display can be set up to show up to eight channels at once.

Preview Screens

When setting up Weight Displays, the 9850 shows a preview of how the screen will be formatted. Abbreviations for preview screens indicate what kind of data will be presented in each screen location. Dashes are used to indicate the maximum screen space the data will occupy.

Preview Screen Nomenclature

Weight ..... Current Weight in Net or Gross with Units, Motion, and Center of Zero (COZ) indicators.
Gross-Wt ..... Gross Weight only
Tare-Wt ..... Tare Weight only
CHN ..... Channel number in the form X-X. e.g. 1-1. The Channel number is determined by the CellScale Scan List.
ADR ..... Network Address in the form of XXA. e.g. 17A
Ch-Name ..... Channel Name. The Channel Name is programmed in the CellScale.
DateTime ..... Shows the Date and Time. When in the form "DateTimeEnter-Number" it may be overwritten when entering a number with the keypad.
Enter-Number ..... Field accepts keypad entry for assignment to various functions.
1-ID-String ..... Show ID string 1.
2-ID-String ..... Show ID string 2.

Total-Wt-ID..... Shows the Total weight stored in the current ID Code.
#-SamplesI ..... Shows the number of samples totaled and used for statistics for the current ID Code.
IDC..... The ID Code number in the form xxI. e.g. 2I is ID Code 2.
IDName-- ..... The ID Code name. The name must be programmed by either the CellScale or the 9850.
xS or xSL..... The Scan List Index position as stored in the CellScale where x is 1-8. Used on multiple display presets to show which scan list position is included on the preset display. These can be later altered to any scan list position 1-32.
SLI..... Scan List Index position displayed in the form xSL (positions 1-9) or xxS (positions 10-32).
x's-Weight ..... Current weight from scan list position x.
x's-Ch-Name ..... Channel name from scan list position x. Channel names are programmed at the CellScale.
x's IdNm..... ID Code Name from scan list position x.

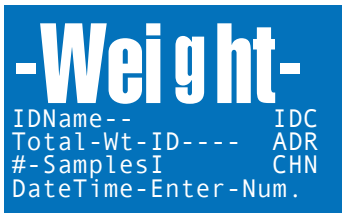
Single Channel Preset Displays

The 9850 utilizes a programmable full dot matrix display capable of multiple font sizes. The smallest font is a 5x7 dot count in a 6x8 cell yielding a maximum character count of 20 characters in 8 lines. The medium font is a 7x15 in a 8x16 cell which provides up to 4 lines of 16 characters. The large font allows up to two lines of 8 characters. When the weight is displayed in the large font, smaller characters for units, Net/Gross mode, COZ, and motion allow the large font to contain all necessary weight data. In the following preset display descriptions the data is located by lines 1-8 relative to the smallest font.

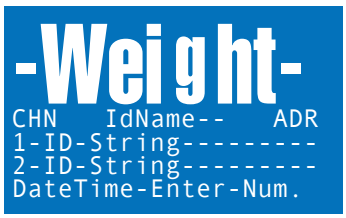
Standard Weight – Lines 1-4: Large Current Weight display (-Weight-). Line 5: Channel Number, and the Network Address. Line 6: the Channel Name (if programmed in the CellScale). Line 7: ID String 1 (if entered at the CellScale or by the 9850 functions). Line 8: The Date and Time. When entering numbers, the Time display will be overwritten temporarily.

Net Gross Tare – For applications that need to see the Net weight, Gross weight, and Tare weight simultaneously. Lines 1-4: Large Net Weight display (-Weight-). Line 5: Gross Weight and the Channel number. Line 6: The Tare Weight and the network address. Line 7: the Channel Name (if programmed in the CellScale). Line 8: the Date and Time. When entering numbers, the Time display will be overwritten temporarily.

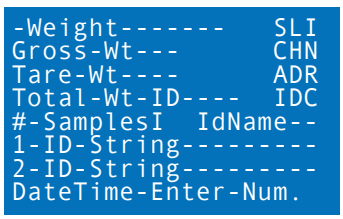
If no Tare value is set the Net weight and Gross weight will equal each other. While in this display the Net/Gross key will have no effect since both Net and Gross Weight are already shown. However, pressing the Net/Gross key will change the display mode for other devices connected to the master CellScale.



Standard & Products – This display shows ID Code data for Totalizing. Lines 1-4: Large weight display (-Weight-). Line 5: shows the ID Name and ID Code number. Line 6: the total weight and the Network Address. Line 7: shows the number of samples in the Total and the channel number. Line 8: the Date and Time. When entering numbers, the Time display will be overwritten temporarily.



Standard & Strings – This display shows ID Code Strings for user data entry. Lines 1-4: Large weight display (-Weight-). Line 5: shows the ID Name and ID Code number. Line 6: the total weight and the Network Address. Line 7: shows the number of samples in the Total and the channel number. Line 8: the Date and Time. When entering numbers, the Time display will be overwritten temporarily.



Maximum Data – This display shows all standard data available for any given scale channel and associated ID. Line 1: Net Weight and Scan List Index. Line 2: Gross Weight and Channel Number. Line 3: Tare weight and Network Address. Line 4: the Total Weight and the ID number (1-32). Line 5: number of totaled samples and the 8 character ID name. Line 6: ID String 1. Line 7: ID String 2. Line 8: the Date and Time. When entering numbers, the Time display will be overwritten temporarily.

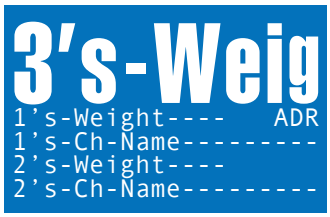
Go to Index

Multi-Channel Preset Displays

Multi-channel presets use the scan list position to assign channels to specific locations. After selecting the preset multi-channel display, the user can reassign any channel in the scan list to any screen location.

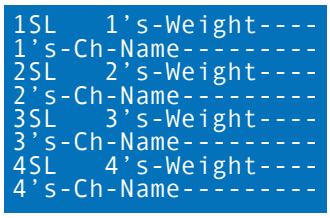
The Multi-Channel Preset Displays are described by line numbers 1-8 corresponding to the small font layout. The numbers in the sample screens and descriptions correspond to the scan list position index (SLI).

The 9850 reads the scan list out of the master CellScale. If a multi-channel preset is selected that allows more channels than the CellScale has in its scan list, the preset will show just the available channels. If space allows the Date and Time will appear on the bottom line (Line 8).



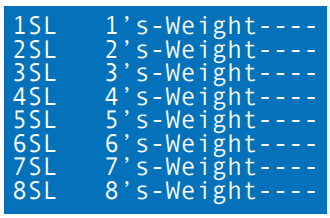
3 Ch -1 lg, 2 sm – This display is primarily intended for summing where scan list positions 1 and 2 are scale channels, and position 3 is a math channel that sums the two scale weights. However, any type of channel list can be used with this display and the list order can be changed after this preset is selected. Lines 1-4: SLI 3 large current weight display (-Weight-). Line 5: SLI 1 Current Weight and Network address. Line 6: SLI 1 Channel Name (if programmed in the CellScale). Line 7: SLI 2 Current Weight. Line 8: SLI 2 Channel Name.

2 Ch -2 med+ data – This display shows two channels along with each channels 8 character ID Name and 20 character ID String 1. Lines 1-2: SLI 1 Current Weight preceded by the scan list number. Line 3: SLI 1 Channel Number (e.g. 1-1), SLI 1 ID Name, and the Network Address. Line 4: SLI 1 ID String 1. Line 5-6: SLI 2 Current Weight preceded by the scan list number. Line 7: SLI 2 Channel Number (e.g. 2-1), SLI 2 ID Name. Line 8: SLI 2 ID String 1.



4 Ch - 4 sm + data – This display shows four channels along with each channels Channel Name. The Channel name must be programmed into the CellScale for it to appear. If less than four channels exist in the scan list, the bottom channel will be replaced with the date/time/enter number line. Line 1: SLI 1 Current Weight preceded by the scan list number. Line 2: SLI 1 Channel Name. SLI 2-4 follow the same format.

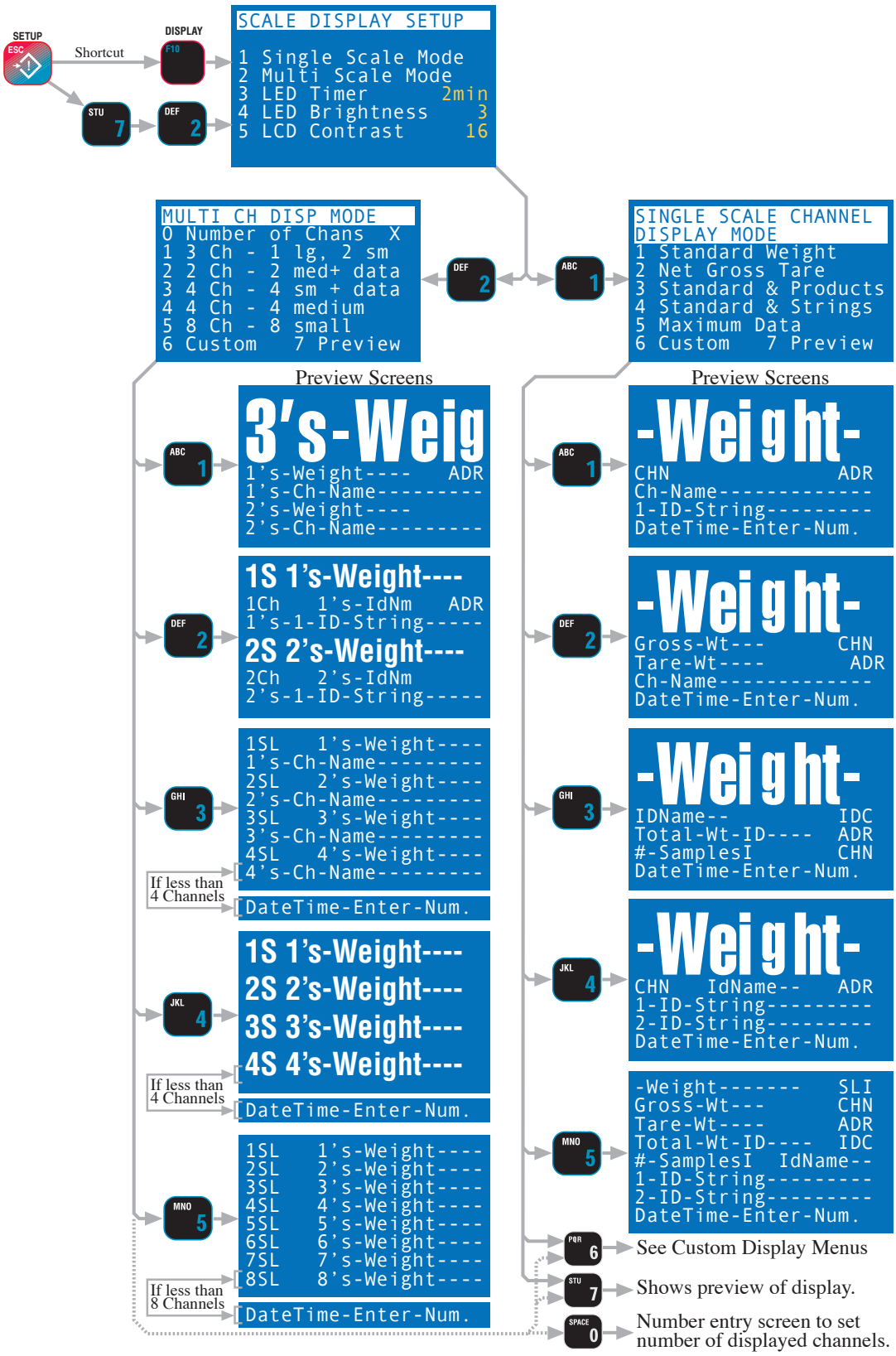
4 Ch - 4 med – Displays 4 channels in the 9850 medium size font. The weight data is preceded by the scan list position index number (1-32). If less than four channels exist in the scan list, the bottom channel will be replaced with the date/time/enter number line. Lines 1-2: SLI 1 Current Weight preceded by the scan list number. Lines 3-4: SLI 2 Current Weight preceded by the scan list number. Lines 5-6: SLI 3 Current Weight preceded by the scan list number. Lines 7-8: SLI 1 Current Weight preceded by the scan list number.



8 Ch - 8 small – Maximum channel count display of up to eight channels. Each channel is preceded by the scan list position index number (1-32). If less than eight channels exist in the scan list, the bottom channel will be replaced with the date/time/enter number line.

SCALE DISPLAY SETUP MENU – PRESET DISPLAYS

The Display Setup Menu provides access to all the display presets, backlight control, function key displays and full display customizing.



Go to Index

USING DISPLAY SETUP

The 9850 weight display is a primary means of getting and using CellScale data. The user should always select a single channel weight display mode that provides the information needed. When the CellScale is a multi-channel system, a Multi-Channel display mode should also be selected.

To Set the Single Channel Display Mode (Using Presets)

1) Press **SETUP**, then **DISPLAY**. This selects the "SCALE DISPLAY SETUP" menu.
2) Select "Single Scale Mode" **[1]**.
3) Select the desired preset with the **[1]**-**[5]** keys. See "Single Channel Preset Displays" on page 37 for a description of each display mode.
4) The display preview appears showing the type and location of data.
5) If the display is acceptable, press the **DISPLAY** key to go directly to the selected weight display. If not, press **ESC** and repeat steps 3 to 5.

To Preview the Single Channel Display Mode

1) Press **SETUP**, then **DISPLAY**. This selects the "SCALE DISPLAY SETUP" menu.
2) Select "Single Scale Mode" **[1]**.
3) Preview the current display setting by pressing the **[7]** key.
4) Return to the weight display by pressing the **DISPLAY** key.

To Set the Multi-Channel Display Mode (Using Presets)

1) Press **SETUP**, then **DISPLAY**. This selects the "SCALE DISPLAY SETUP" menu.
2) Select "Multi Scale Mode" **[2]**.
3) Select the desired preset with the **[1]**-**[5]** keys. See "Multi Channel Preset Displays" on page 38 for a description of each display mode.
4) The display preview appears showing the type and location of data.
5) If the display is acceptable, press the **DISPLAY** key to go directly to the selected weight display. If not, press **ESC** and repeat steps 3 to 5.

To Modify the Channel Arrangement

Since the presets use the scan list in ascending order, this procedure provides a means of changing the order or adding channels that don't appear in the first page.

1) From the multi-channel weight display, highlight the channel you wish to change by pressing the UP (**^**) or DOWN (**v**) cursor keys.
2) Once highlighted enter the scan list position (1-32) or the channel number (1-1 to 6-8 using the decimal point for the sub channel entry). Then press **CHANNEL**.
   The new channel replaces the previous channel. If the channel is already on the display in another location, both will display.

To Change the Number of Displayed Channels

Setup the display mode before limiting the channels displayed. For example, if you want to show 3 channels on the 4-medium display, select the 4 medium display first, then follow this procedure to reduce the displayed channels down to 3. The maximum number of display channels is set by the display mode.

1) Press **SETUP**, then **DISPLAY**. This selects the "SCALE DISPLAY SETUP" menu.
2) Select "Multi Scale Mode" **[2]**.
3) Select "Number of Channels" **[0]**.
4) Input the number of display channels with the **[1]**-**[8]** keys. Press **ENTER** to store.
5) Press DISPLAY to return to the multi-channel display with the number of channels reduced.

CUSTOM DISPLAY SETUP

The 9850 weight display is fully customizable. Both the single channel and multi-channel displays can be customized. All available data types plus custom text can be located anywhere on the screen in any of three font sizes: 1) Large Font – Used primarily for weight displays, the large font offers up to 8 characters in two rows. When used as a weight display the 9850 automatically fits in mode (Net, Gross, Tare), motion, COZ, and units in smaller characters. 2) Medium Font – Used for all data types, the medium font offers up to 16 characters in 4 rows. 3) Small Font – Used for all data types, the small font offers up to 21 characters in 8 rows.

Planning Your Custom Display

Decide what type of data you wish to see and what is the most important data. This important data could be displayed in the large or medium fonts, and other less important data should be displayed in the small font. Use the text mode to label function keys with custom titles to aid in the operation of your system.

For example, use text to label line 7 "F3 Customer" and place ID String 1 next to it. Then use text to label line 8 "F4 Operator" and place ID String 2 next to it. Program the F keys to match. Now you have an easy way to enter your required data.

If your system has multiple channels, make sure you provide both a single channel and multiple channel display setup. In multi-channel displays, it is usually best to supply the same data for each individual channel display similar to avoid confusion. However, if one channel is primary, it is easy to distinguish it by making it larger than other channels. In any multi-channel screen, you can display from 2 to 8 channels, assuming that the CellScale Scan List includes at least 8 channels. CellScales with more than eight channels use the page mode to observe all channels. Select a preset display that is closest to your needs, then edit it. If no preset display is close, use the "CLR Screen" command to start from a completely empty display.

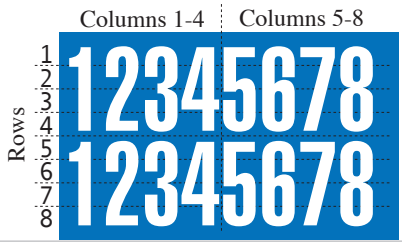
A space is reserved for the enter number field, which can be overwritten with other types of data.

Data Types & Sizes

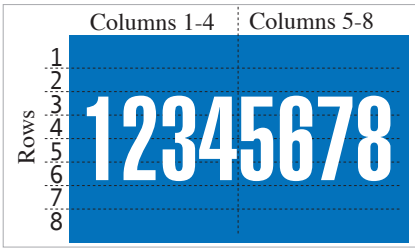
Type	Lg Font		Med Font		Sm Font		Description
	Min	Max	Min	Max	Min	Max	
Weight	-	8	-	14	-	14	Current Weight in Net or Gross with Units, Motion, and COZ indicators.
Gross-Wt	-	8	-	11	-	11	Gross Weight only
Tare-Wt	-	8	-	11	-	11	Tare Weight only
CHN	-	3	-	3	-	3	Channel number in the form X-X. e.g. 1-1. The Channel number is determined by the CellScale Scan List.
ADR	2	3	2	3	2	3	Network Address in the form of XXA. e.g. 17A
Ch-Name	2	8	2	16	2	20	Channel Name. The Channel Name is programmed in the CellScale.
DateTime	N/A		-	16	-	16	Shows the Date and Time. When in the form "DateTimeEnterNumber" it may be overwritten when entering a number with the keypad.
Date	5	8	5	10	5	10	Date in 5 characters does not include year. In 8 characters includes 2 digit year. In 10 characters includes 4 digit year.
Time	5	8	5	10	5	10	Time in 5 characters does not include seconds. Time in 7 Characters adds AM/PM. Time in 8 characters includes seconds (no AM/PM). Time in 10 characters includes seconds and AM/PM.
1-ID-String	-	8	8	16	8	20	Show ID string 1.
2-ID-String	-	8	8	16	8	20	Show ID string 2.
Total-Wt-ID	-	8	-	15	-	15	Shows the Total weight stored in the current ID Code.
#-SamplesI	-	8	-	10	-	10	Shows the number of samples totaled and used for statistics for the current ID Code.
IDC		2	3	2	3	2	3 The ID Code number in the form xxI. e.g. 2I is ID Code 2.
IDName--	2	8	2	8	2	8	The ID Code name. The name must be programmed by either the CellScale or the 9850.
xS or xSL	2	3	2	3	2	3	Scan List Index position displayed in the form xSL (positions 1-9) or xxS (positions 10-32).
Grand-Ttl-Wt	-	8	-	15	-	15	Grand Total Weight from all IDs on the active channel.
Gd-Samples	-	8	-	10	-	10	Grand Number of Samples from all IDs on the active channel.
BarCode-String	-	8	8	16	8	20	Bar Code Entry Display
Text	1	8	1	16	1	20	Generic fixed text. Does not change with channels or IDs.

Screen Formatting

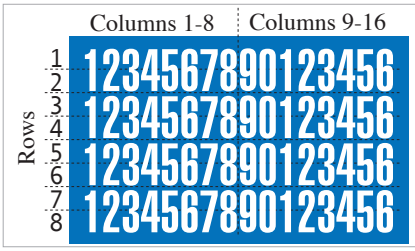
The 9850 LCD Screen allows a wide variety of scale display screen setups. The illustrations here demonstrate some of the possibilities. The custom display setup menus control the type and placement of available data types. The LCD is a graphics type organized in rows and columns. The row size is fixed at 8 rows of 8 pixels each for a total vertical size of 64 pixels. Column numbering depends on the font size chosen; 8 columns in the large font, 16 columns in the medium font, and 20 columns in the small font.



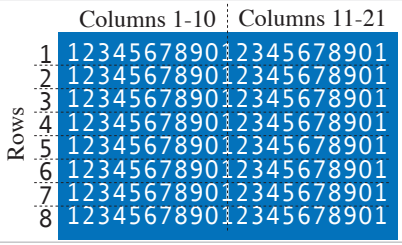
LARGE FONT – occupies 4 rows and is up to 8 columns wide. Shown here is the maximum characters that can be shown in large font - 2 rows of 8 characters. The full ASCII character set is supported in the large font. Weight displays in the large font add special characters for mode, units, COZ, and motion. All other types of data are limited to 8 characters maximum.
The large font can occupy rows 1-4 or 5-8.



Large font characters can also occupy rows 3-6 as illustrated here. However locating large font data on rows 3-6 prevents large font in other rows in the same column.



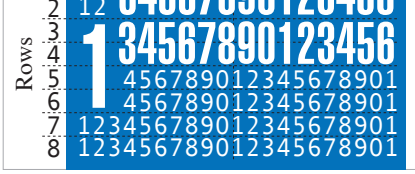
MEDIUM FONT – occupies 2 rows and is up to 16 columns wide. Shown here is the maximum number of medium characters possible.
The medium font must occupy rows 1-2, 3-4, 5-6, or 7-8. You cannot have a medium font that occupies, for example, rows 2 and 3.



SMALL FONT – occupies 1 row and is up to 21 columns wide. This allows the most information possible.
The small font can start on any row 1-8.

MIXING FONT SIZES – The custom display setup allows the user to mix font sizes as needed. Use the large font for the primary weight display and mix in medium and/or small fonts for less important data.
Here are examples of mixing font sizes on the screen. The first screen is an example of a viable weight display with current weight programmed in the large font, occupying rows 1-4. The Gross weight could occupy rows 5-6 in medium font. Other scale information could be placed in small font on rows 7 and 8.

This example shows using the large font in the middle rows 3-6 and then placing other information above in 2 rows of small font, and below in 1 row of medium font.

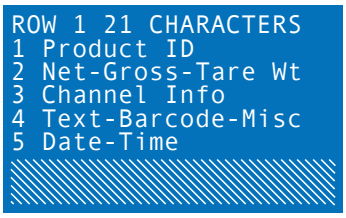


This final example shows the versatility of the setup menus. Here we have small and medium fonts mixed on the same lines, and 1 character of large font (perhaps used to identify the scale being used) placed at column 1 rows 3-6.

Line Preview

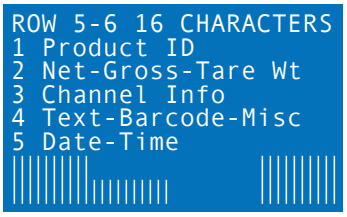
The bottom two lines of the Row Setup menu illustrate what the line has programmed into it. Data is displayed in row pairs. For example, while programming row 6, row 5 and 6 will be illustrated. When data from another line is present, as it will be with the large font, the preview area will show as lines. Diagonal lines are used for the large font (slanted left for top half and right for the bottom half), horizontal lines for medium font, and vertical lines for the small font. If space is available on the requested line, it will show as a blank area. If the occupying text is in the current font choice, you will be able to read the selected data type. In large font the display is in 1/2 scale so that two lines can represent the required 4 lines. In medium font, the double line is represented 1 to 1. In small font, two lines are shown (paired 1-2, 3-4, 5-6, or 7-8) so you see the line you are programming as well as the adjacent line.

When the line is occupied, you have three choices: 1) Pick another line. 2) Delete all data from the line by pressing **CLEAR**. 3) Delete just the data in the current font from the line by pressing **[0]**. This choice is needed only when there are mixed fonts in the line area.

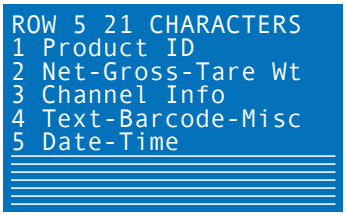


This is an illustration of the line preview indicating that the requested row (in this example, row 1) is already occupied by a large font field, and is not available. Pressing **CLEAR** will erase whatever is in the location, but it will erase 4 lines since the large font data occupies 4 lines. To identify what is in the location, go back and select the large font entry.

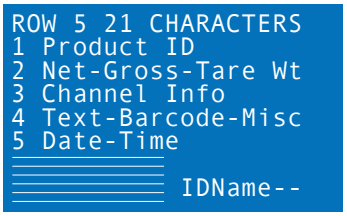
Line preview of a large font entry which identifies the data present. This shows (in 1/2 scale) that the current weight display in large font occupies rows 1-4. The left side preview area is equivalent to 1/2 of the whole LCD.



Line preview of a medium font entry. There are small font data items on lines 5 and 6, but a gap exist in the middle. This would allow a 4 character medium font entry with the start column at 9 to fit in. If you want to get rid of all data on lines 5-6, just press **CLEAR**.



Line preview of a small font entry to line 5. The horizontal bars indicate that a medium font data entry occupies both line 5 and line 6.



Line preview of a small font entry to line 5. The horizontal bars indicate that a medium font data entry occupies both line 5 and line 6, but in this case, only to the middle of the screen. Therefore a small font entry can be placed on line 5 with a start point at column 11, which allows data with up to 10 characters. This screen also shows, for example, that on line 6, the IDName field is there starting at column 12.

Selecting Items for Display

The custom display setup menus provide access to all the data the scale can provide. When an item is present on the display, it will have an arrow next to its selection number. The length of some data items are fixed, but many have variable lengths. When an item is selected for the first time, a number entry screen will appear (if it is a variable length data item) allowing you to decide the length of the data. Beneath each item is the "Column Start" selection which allows you to change the starting location. The 9850 adjusts the available start column range in order to allow the whole length of the field to fit. For example, picking ID String 1 as a data allows up to 20 characters in the small font. If you leave the field length at 20, the only available starting point is 1. However, if you shorten the ID String 1 length to 10, the start column can range from 1 to 11.

```
NET-GROSS-TARE WT
1▶Current Weight 14C
2▶ Start Column  1
3 Gross Weight
4  Start Column
5 Tare Weight
6  Start Column
```

This screen illustrates a typical data selection. In this case, the current weight selection. The start column line has an asterisk indicating that the current weight is already in the display set, but not found on the line you are currently programming. You can turn off the current setting by selecting the number, and then entering the parameters for the current line you are setting up.

```
NET-GROSS-TARE WT
1▶Current Weight 8 C
2▶ Start Column  1
3 Gross Weight
4  Start Column
5 Tare Weight
6  Start Column
```

This screen illustrates that the current weight is on the line you are now setting up, and it starts at column 1. Since only the large font will fit a weight display in 8 characters, the start column will not allow a change.

```
NET-GROSS-TARE WT
1 Current Weight
2  Start Column
3▶Gross Weight   14C
4▶ Start Column  6
5 Tare Weight
6  Start Column
```

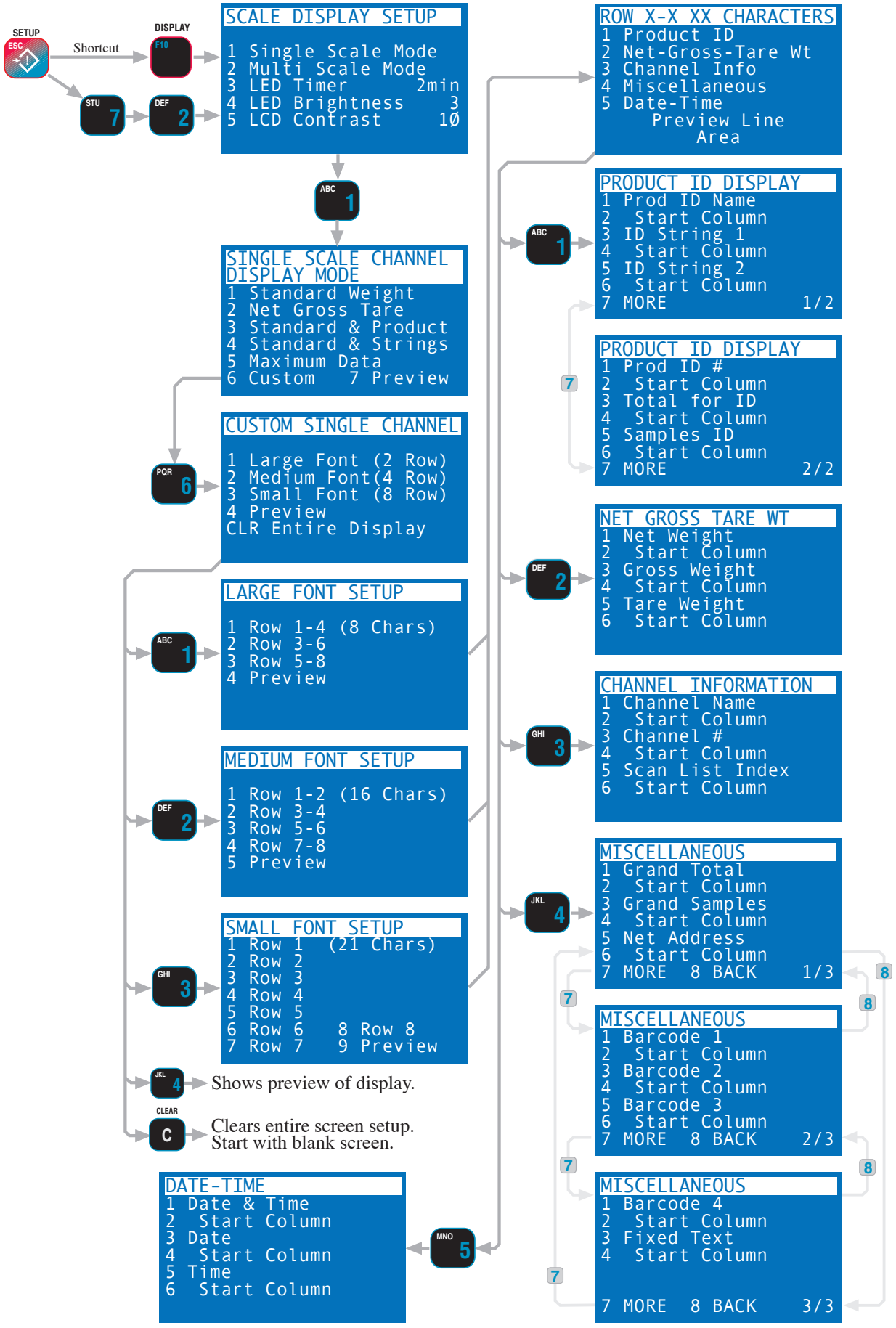
This screen illustrates a 14 character gross weight on a small font line, and it starts at column 6. If the line you are setting up is a small font line, the start column will range from 1 to 6. In the medium font, the start column will range from 1-3 (weight data lines are minimum 14 characters except for a special case large font mode which takes 8 characters.

CUSTOM SCREEN SETUP PROCEDURE

You should setup both a single channel and multiple channel custom setup (unless you only have 1 channel)

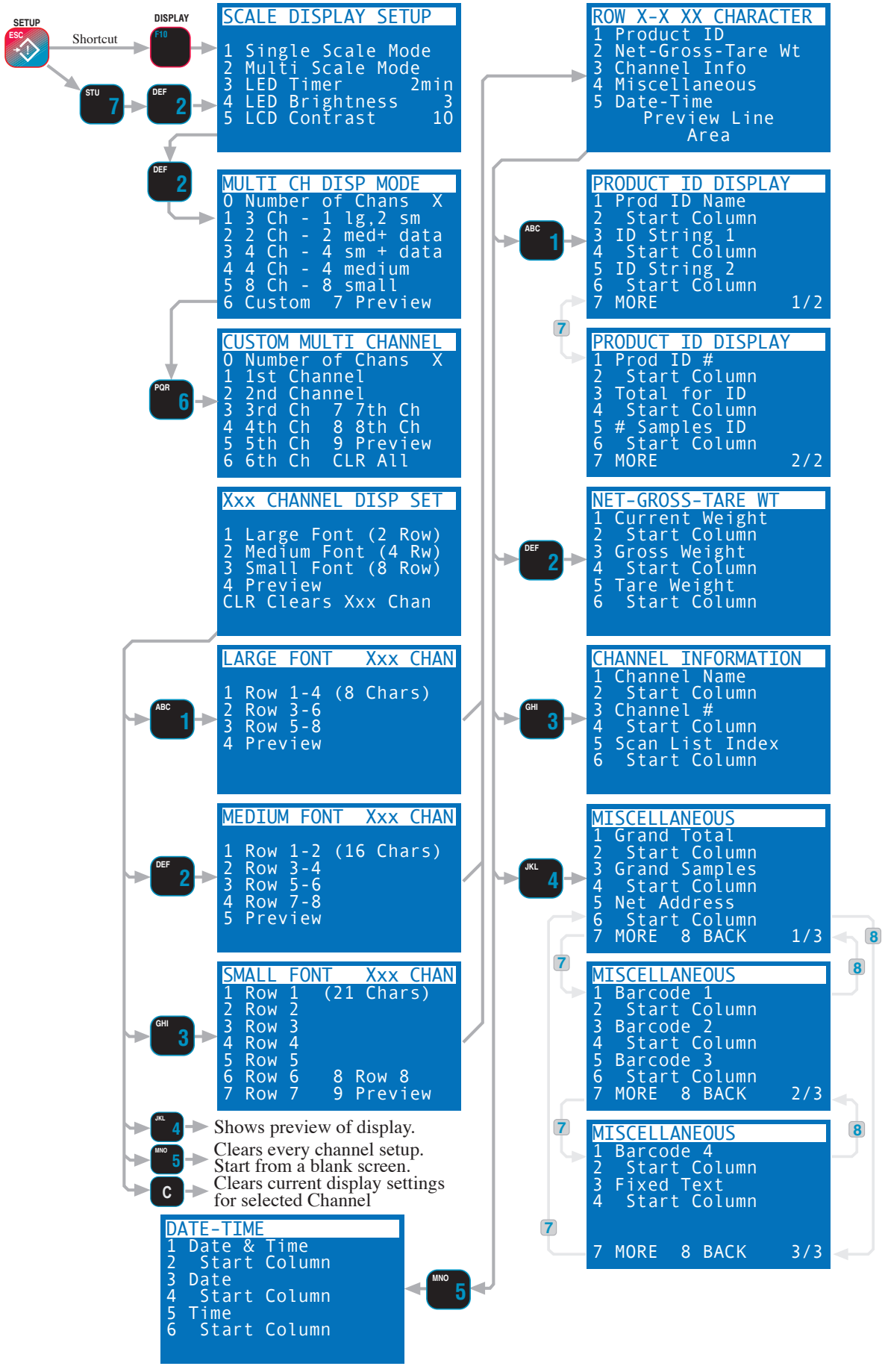
1) Press **SETUP**, then **DISPLAY** or **SETUP**, "MORE" **[7]**, then "Scale Display" **[2]**.
2) Select "Single Scale Mode" **[1]**, or "Multi Scale Mode" **[2]**.
3) Select "Custom" **[6]**.
4) Multi-channel setup only: Pick the scan list index to program (1-8). Keep in mind that you must use small fonts if you want to see all eight scales on one screen.
5) Select the size font you want to use.
   It is best to program from large font to small font so that you can see the impact of data location on other rows.
6) Select the row(s) for the data items.
7) Select the broad type of data you want to place on the selected row. Select **[1]** for product ID parameters including total and ID Strings. Select **[2]** for all weight types. Select **[3]** for Channel Info such as channel name, scan list index, and channel number. Select **[4]** for text and miscellaneous data such as grand totals and bar code data. Select **[5]** for date and time data placement.
   While in this menu, the line preview is displayed, use the CLEAR key to delete the current line setup. Use the [0 Space] key to delete only the data present in the current size font, while leaving other size data intact.
8) Select the exact data type. If the field is a variable type, a number entry screen will appear. Program the number of characters needed. The available range appears on the number entry screen.
9) Change the start column as necessary. If the line is full, the start location cannot be changed.
10) Press the **ESC** key until you are back to the font size selection menu. Repeat steps 6-9 until the screen is exactly how you want it. Use the Preview selections found on several menus to observe your work in progress.
11) When finished press the **EXIT** key to return to normal operation.

CUSTOM SINGLE CHANNEL DISPLAY SETUP MENU



Go to Index

CUSTOM MULTI-CHANNEL DISPLAY SETUP MENU



SECTION 9 – SET POINTS

INTRODUCTION

The CellScale system provides extensive Set Point capabilities. Up to 32 Set Points are available. The CellScale performs the A/D conversions and does limit checking for all the Set Points. The 9850 receives Set Point information from the CellScale and responds as programmed.

All 32 Set Points are setup from either the CellScale Terminal Interface, from a 3750CS, 9750A, or from the 9850. All Set Point value parameters are stored in the CellScale and are independent of any other device, including the 9850. When a Set Point is tripped (true condition) and when it resets, the CellScale transmits to all connected 9850's a message signifying which Set Point tripped and/or reset. The 9850 can display messages for both tripped and reset conditions.

The 9850 Meter can fill a variety of applications in control, batching, safety and informational warnings. Set points can be used to trigger RS-232 data transmissions (see "COMM PORTS"). All 32 Set Points can put an independent message on the display for both tripped and reset conditions.

Unique to 9850 Parameters

The 9850 can respond to the Set Point transmission in several ways:

1) Audible Alarm – 4 unique tones available for both set and reset conditions. This applies to the supplied internal audible alarm, not the optional External Alarm mounted on the rear panel.
2) Display a message on the alphanumeric display in 3 font sizes. Using the large font size, the whole display provides a set point indication. The medium font size takes over the bottom two lines with up to 16 characters. The small font size takes over the bottom line with up to 20 characters.
3) Send a message out the RS-232 port of the 9850. This message can include weight parameters, time, date, and any random text the user requires (using MSI @ codes).

These actions are independent of what the CellScale does, and are independent of other 9850's, 9750A's or 3750CS's that might be on the Network. These Set Point actions are stored only in the 9850 and must be programmed independently in all 9850's used in the system.

Parameters stored in the CellScale

All parameters related to the Set Point values are stored only in the CellScale, programmed by a 3750CS, 9750A, or a 9850 via RF, or by the Teminal Interface program directly into the CellScale. These parameters include the following:

1) One or two threshold values (Value 1 and Value 2).
2) An "Operator" for each value (Oper 1 and Oper 2) which specifies whether the Set Point is Less Than, Greater Than, etc..
3) An Operator Relationship (Op Relat) which specifies an "AND" or "OR" relationship between Value 1 and Value 2.
4) A "Trigger Type" for each value (Trigtyp1 and Trigtyp2) which specifies if the Set Point responds to Gross weight, Net weight, Total weight, or number of samples in the total (nSamples). "nSamples" can also be thought of as a box counter or load counter.
5) Preact, Postact, and Deadzone – These parameters modify the value of the Set Point for process control applications. The effect of these value modifiers is detailed below.
6) Input Source – This parameter relates the Set Point to a position in the Channel List. This allows any Set Point to be assigned to any input channel or Math channel in the Cell Scale.

   The Channel list must be configured in the CellScale. It cannot be programmed from the 9850.
7) Output Destination – The output destination list is also configured in the CellScale and is used to direct Set Point outputs at the CellScale end. See the CellScale manual for further information on this parameter.

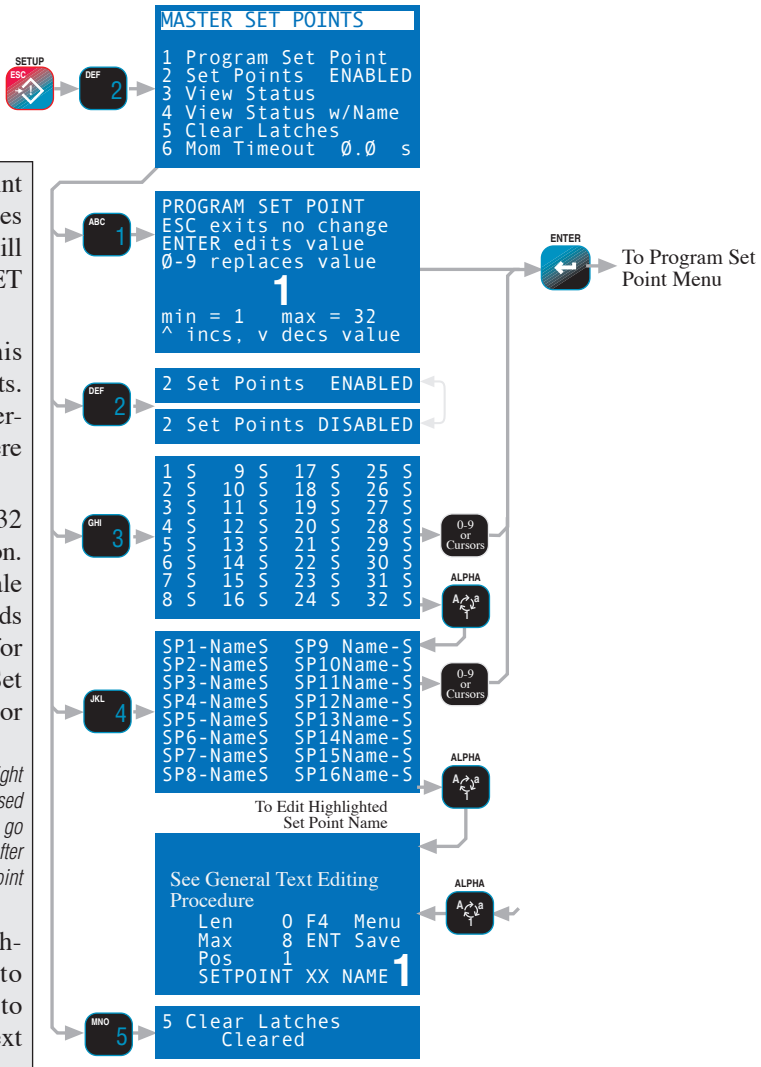
   The Output Destination list must be configured in the CellScale. It cannot be programmed from the 9850.
8) Latching – Any Set Point can be configured to Latch on when tripped so even when the set point is no longer true the output remains on.
9) Delay – Any Set Point can be delayed by up to 10 seconds (10000 ms). Often used to prevent spurious Set Point outputs.
10) On/Off – Any Set Point can be turned on or off independently from the rest without losing any programmed parameters.
11) All Set Points On/Off – Used to disable the operation of all 32 Set Points.

SET POINT SETUP MENU

There are four ways to program values, operators, and remote relays for Set Points. 1) Use the Terminal Interface Mode at the CellScale, 2) use a 3750CS, 3) use a 9750A, or 4) use the 9850.

To Enter the Set Point Setup Menus

1) Press **SETUP**.
2) Select "Set Points" by pressing **[2]**.
3) The "MASTER SET POINTS" menu appears. Menu items 1-5 are discussed next.



1) Program Set Point – Enter the set point number from 1 to 32. This determines the set point that subsequent menus will operate on. Go to "PROGRAM SET POINT" menu (next page).
2) Set Points Enabled/Disabled – This is the master switch for all set points. When disabled no Set Point will operate. You must Enable the set points here for any set point to operate.
3) View Status – The LCD displays all 32 Set Points along with a status indication. The 9850 queries the master CellScale for status. This can take several seconds to fully update (a low priority task for the CellScale). Select the desired Set Point to program with either the cursor keys, or key in the number.

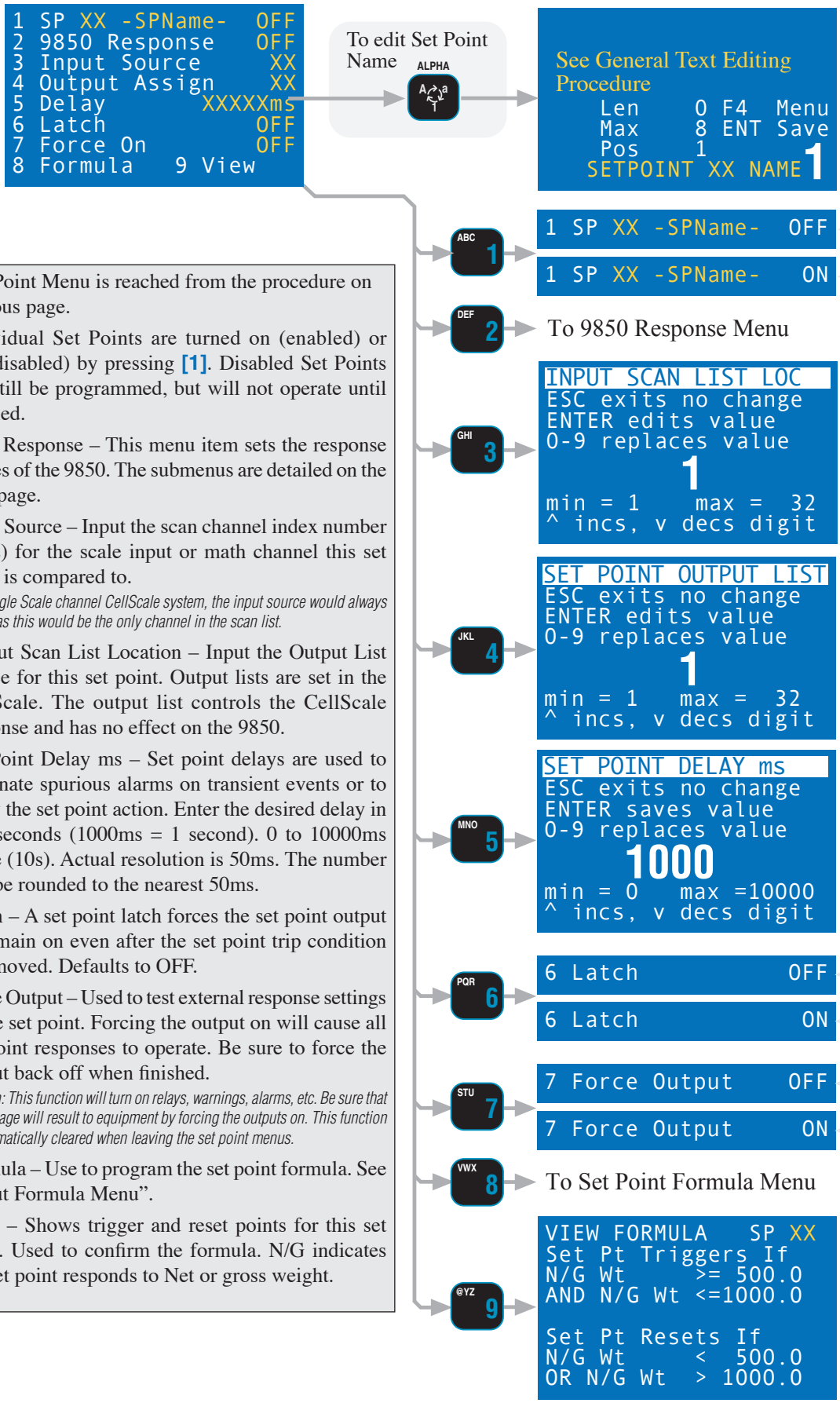
   Pressing a number from 1-3 will cause groups to highlight waiting for a second key. If no second key is pressed within 3 seconds, Set Point 1, 2, or 3 is selected. To go immediately to Set Points 1-3, press the ENTER key after pressing 1-3. Press the ALPHA key to see the Set Point names (if any) entered in the 9000.

   Once the desired Set Point is highlighted, press the **ENTER** key to set up the set point response. Go to "PROGRAM SET POINT" menu (next page).
4) View Status w/Name – Same as above except the Set Point name is displayed along with the Status. Press the **ALPHA** key to enter or edit a set point name. Use the Cursor keys to see the second half of set points (17-32).
5) Clear Latches – Any set point that is latched on is cleared with this selection. However, if the tripped condition still exists, the set point will remain on and latched.

Status Indicators

- U Unknown – the CellScale has not yet reported the Set Point Status
- O Off – All Set Points are off
- D Disabled – This Set Point is off
- I Inactive – Set Point not tripped (inactive state).
- A Active – Set Point active and tripped
- T Test – Test or Manual Mode forced on
- L Latched – Set Point tripped and latched

PROGRAM SET POINT MENU

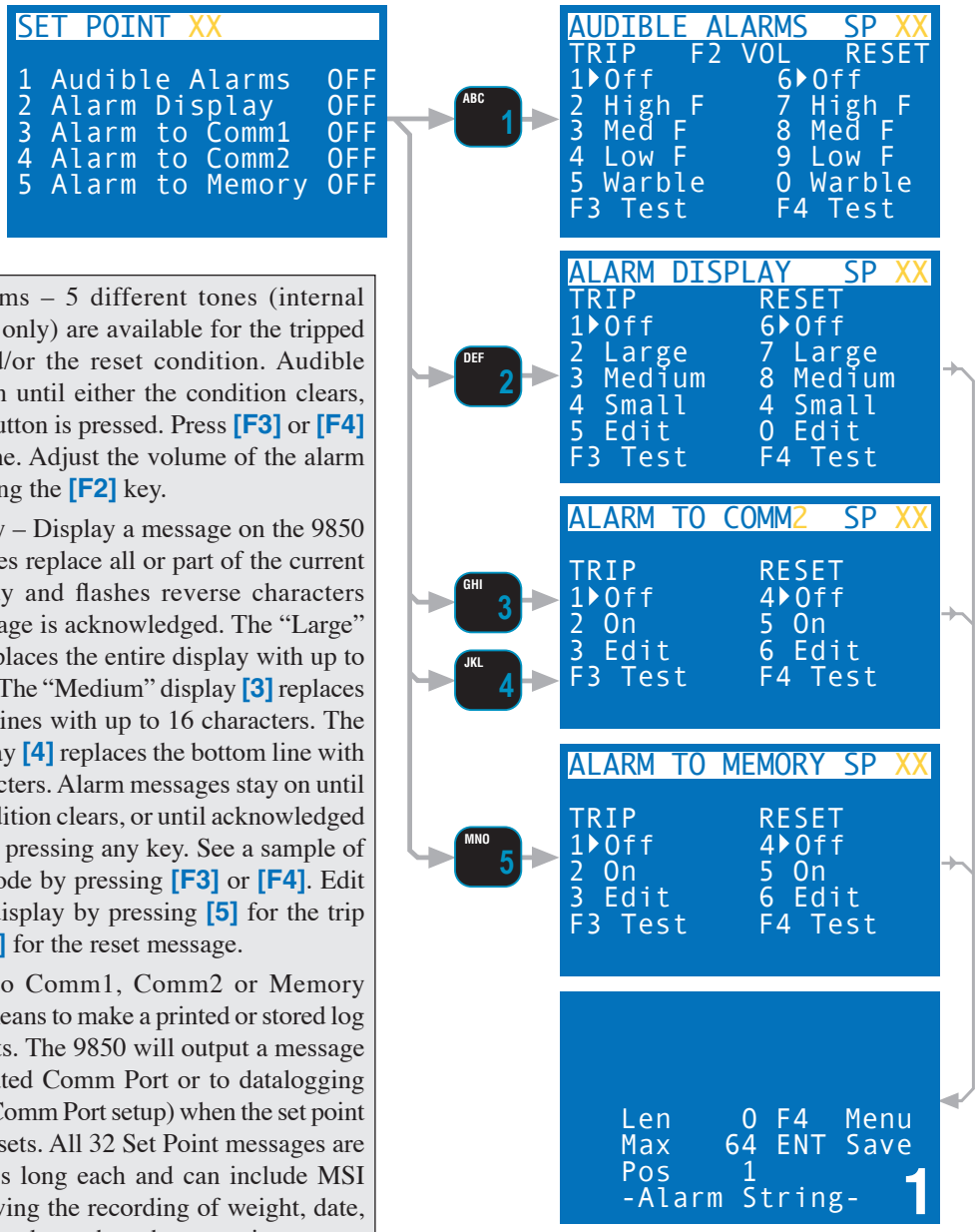


This Set Point Menu is reached from the procedure on the previous page.

1) Individual Set Points are turned on (enabled) or off (disabled) by pressing **[1]**. Disabled Set Points can still be programmed, but will not operate until enabled.
2) 9850 Response – This menu item sets the response modes of the 9850. The submenus are detailed on the next page.
3) Input Source – Input the scan channel index number (1-32) for the scale input or math channel this set point is compared to.
   In a single Scale channel CellScale system, the input source would always be "1" as this would be the only channel in the scan list.
4) Output Scan List Location – Input the Output List choice for this set point. Output lists are set in the CellScale. The output list controls the CellScale response and has no effect on the 9850.
5) Set Point Delay ms – Set point delays are used to eliminate spurious alarms on transient events or to delay the set point action. Enter the desired delay in milliseconds (1000ms = 1 second). 0 to 10000ms range (10s). Actual resolution is 50ms. The number will be rounded to the nearest 50ms.
6) Latch – A set point latch forces the set point output to remain on even after the set point trip condition is removed. Defaults to OFF.
7) Force Output – Used to test external response settings of the set point. Forcing the output on will cause all set point responses to operate. Be sure to force the output back off when finished.
   Caution: This function will turn on relays, warnings, alarms, etc. Be sure that no damage will result to equipment by forcing the outputs on. This function is automatically cleared when leaving the set point menus.
8) Formula – Use to program the set point formula. See "Input Formula Menu".
9) View – Shows trigger and reset points for this set point. Used to confirm the formula. N/G indicates the set point responds to Net or gross weight.

9850 RESPONSE MENU

The 9850 responds to set points in three ways: with an audible alarm, a message display, or a message sent to one or both Comm Ports. These menus program this response.



1) Audible Alarms – 5 different tones (internal audible alamr only) are available for the tripped condition and/or the reset condition. Audible alarms stay on until either the condition clears, or any 9850 button is pressed. Press **[F3]** or **[F4]** to hear the tone. Adjust the volume of the alarm tone by pressing the **[F2]** key.

2) Alarm Display – Display a message on the 9850 LCD. Messages replace all or part of the current weight display and flashes reverse characters until the message is acknowledged. The "Large" display **[2]** replaces the entire display with up to 16 characters. The "Medium" display **[3]** replaces the bottom 2 lines with up to 16 characters. The "Small" display **[4]** replaces the bottom line with up to 20 characters. Alarm messages stay on until either the condition clears, or until acknowledged by the user by pressing any key. See a sample of the display mode by pressing **[F3]** or **[F4]**. Edit the message display by pressing **[5]** for the trip message or **[0]** for the reset message.

3, 4, & 5) Alarm to Comm1, Comm2 or Memory – Provides a means to make a printed or stored log of alarm events. The 9850 will output a message to the designated Comm Port or to datalogging memory (see Comm Port setup) when the set point trips and/or resets. All 32 Set Point messages are up to 64 Bytes long each and can include MSI @Codes allowing the recording of weight, date, time, and other data when the set point occurs. Press **[3]** to edit the trip print string or **[6]** to edit the reset print string. Pressing **[F3]** or **[F4]** will cause the string to output to the comm port or memory (depending on the Comm Port settings).

Clearing Audible Alarms and Display Messages

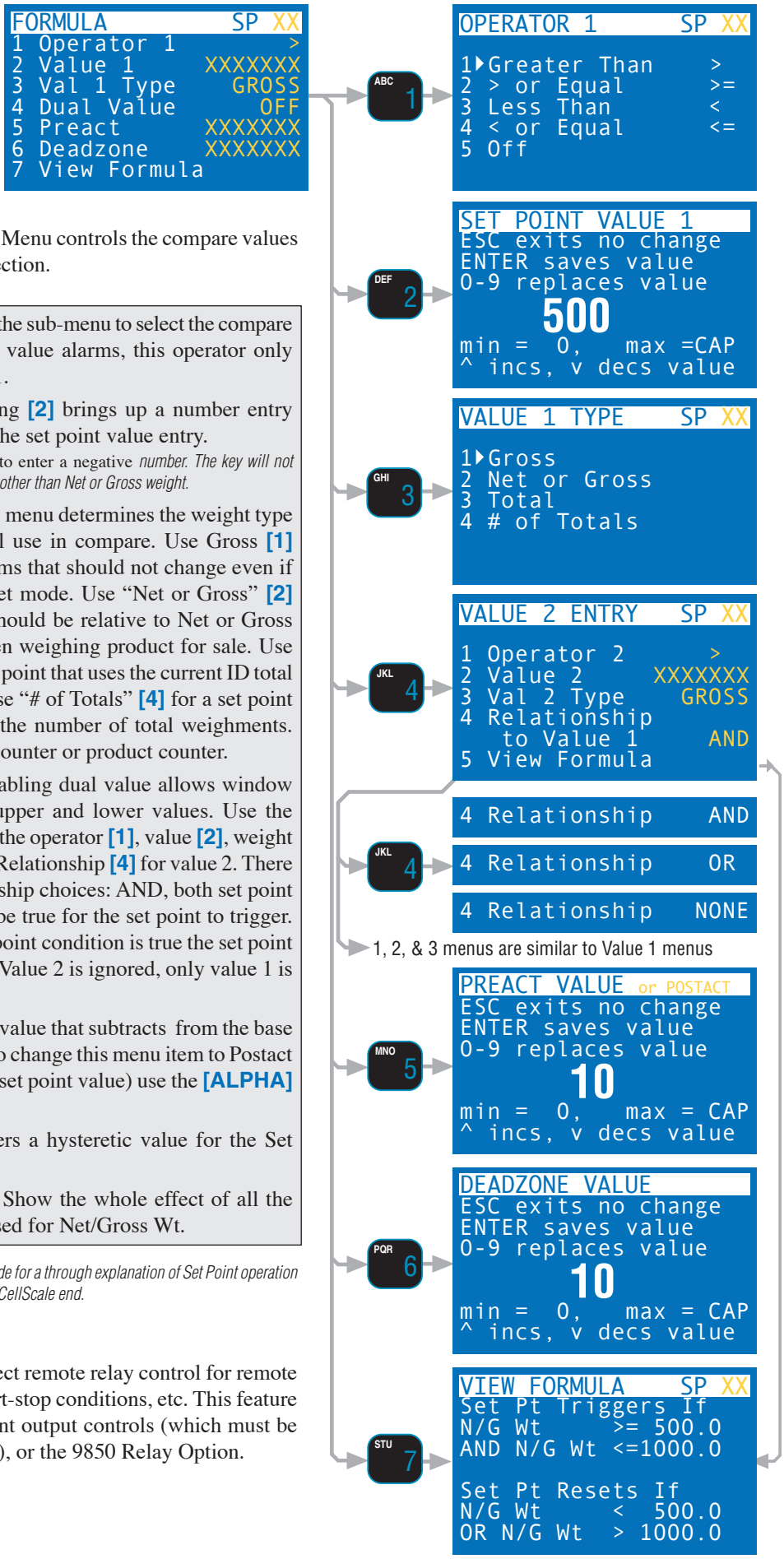
The audible alarm and display message will continue until the condition is cleared or you press any key. If multiple alarms occur, the display of alarms is prioritized by Set Point number. Set Point 1 has priority over all set points. Set Point 2 has priority over all set points except Set Point 1, and so on. This priortizing has no effect on relay outputs which behave solely on the basis of tripped and cleared set points.

OPTIONAL EXTERNAL ALARM

The optional, rear-panel mounted, audible alarm is driven by Set Point 5. This alarm is a loud (97dbA @ 1m) single frequency alarm that pulses at 5 Hz. You can still use the Set Point 5 output on P3 to drive an external relay as well.

To make Set Point 5 available on P3, the internal jumper JP6 must be connected 1-2. Moving JP6 requires surface mount soldering skills. The alarm can be converted to a steady tone output by tying its CP pin to its negative pin.

SET POINT FORMULA MENU



The Set Point Formula Menu controls the compare values and Set Point type selection.

1) Operator 1 – Use the sub-menu to select the compare operator. In dual value alarms, this operator only applies to value 1.
2) Value 1 – Pressing **[2]** brings up a number entry screen allowing the set point value entry.
   Press the Alpha key to enter a negative *number. The key will not respond on value types other than Net or Gross weight.*
3) Val 1 Type – This menu determines the weight type the set point will use in compare. Use Gross **[1]** for overload alarms that should not change even if the scale is in Net mode. Use "Net or Gross" **[2]** if the set point should be relative to Net or Gross zero such as when weighing product for sale. Use Total **[3]** for a set point that uses the current ID total register value. Use "# of Totals" **[4]** for a set point that responds to the number of total weighments. Useful as a box counter or product counter.
4) Dual Value – Enabling dual value allows window set points with upper and lower values. Use the sub-menus to set the operator **[1]**, value **[2]**, weight type **[3]**, and the Relationship **[4]** for value 2. There are three relationship choices: AND, both set point conditions must be true for the set point to trigger. OR, if either set point condition is true the set point triggers. NONE, Value 2 is ignored, only value 1 is used.
5) Preact – Enters a value that subtracts from the base set point value. To change this menu item to Postact (adds to the base set point value) use the **[ALPHA]** key.
6) Deadzone – Enters a hysteretic value for the Set point.
7) View Formula – Show the whole effect of all the entries. N/G is used for Net/Gross Wt.

See the CellScale 9000 User Guide for a through explanation of Set Point operation and how to control relays at the CellScale end.

Direct Relay Control

The 9850 provides direct remote relay control for remote control operations, start-stop conditions, etc. This feature uses either the Set Point output controls (which must be set up in the CellScale), or the 9850 Relay Option.

Go to Index

SECTION 10 – COMMUNICATION PORTS

INTRODUCTION

- The MSI-9850 is equipped with two serial input / output ports. The Comm Ports are intended for interfacing printers, data loggers, scoreboards, and computers to the 9850 Meter. The real-time clock allows the user to time and/or date stamp any data obtained from the 9850.
- The data output is fully format able. The 9850, under menu control will print control characters for easy interfacing to any label printer. An initialize string combined with start string, product labels, user programmable data, weight data, and end strings, provides complete control over printed data.
- Many scales and weigh meters suspend weighing operation while printing and will not function until a print job is completed. The MSI-9850 serial outputs use advanced DMA (direct memory access) techniques for transmitting the print strings. This prevents long print jobs from interfering with scale operation.
- Comm Port 1 is configurable as RS-232 or RS-422/485. When in RS-422/485 mode, Receiver termination can be enabled.

Comm Port Function

The RS-232 or RS-422/485 output is used in conjunction with the SEND/PRINT Key or settable Function Keys to output weight and total data to a computer, printer, scoreboard, or any other serial device. In addition there are several automatic print modes including print on Total, when there is a weight change, or when a set point is reached. Interval and continuous printing is available for data logging or interfacing Scoreboard displays. The SEND/PRINT key can also trigger remote data output to other devices on the CellScale network.

ELECTRICAL CONFORMANCE

Comm Port 1 (In RS-232 mode) and Comm Port 2: The electrical characteristics of the serial input / output conform to the EIA Standard EIA-232-D (downward compatible with RS-232C). The serial cable, as supplied, is wired DTE. Cable connections include RXD (input), TXD (output), Ground, CTS (input), RTS (output), and Shield Ground (also known as Frame Ground). CTS/RTS handshaking is optional and the lines do not need to be connected. On Comm Port 2, the 9850 has 5 Volts DC on pin 9 for powering Bar Code Readers. This voltage will not harm any standard PC ports and will be read as Ring Indicator off.

MATING CABLE

The 9850 uses IP-67 rated circular connectors (Pico) for both Comm Ports. To connect the 9850 to standard PC's use the supplied Pico to 9 Pin D female cable (MSI P/N 502513-0001).

DATA CONFIGURATION

The 9850 serial ports are configured with the "Com Select, Strings" Menus. Standard data configuration is:

Data Strings

A Data String is simply a collection of characters stored in memory, that are used to format the Comm Port output or Data Logging memory. Data Strings are defined by the user. The length of the formatting strings are limited to 512 characters. However, since 3 or 4 character commands can cause an output of up to 99 characters in length, the 512 limit does not represent the maximum size of the data output. The 9850 offers the programmer the ability to print or store any and all weight data, time and date stamp, and formatting controls suitable for even the most complex bar code printer.

Data Format

Each transmitted reading consists of a number of programmable character strings. Data is completely user programmable and can include formatting characters, Time and Date, and text in addition to all weight parameters. The End-of-Line string is used for Carriage Return or other end-of-line control characters. These are easily entered through the Comm Ports menu or downloaded through a computer.

TRIGGER PRINT

The MSI-9850 serial ports function in any of 10 Trigger Print modes:

1) Continuously – The Data String can be transmitted continuously at the rate set in the Interval Menu. How fast the weight data updates is determined by the transmission rate in the Master CellScale. "Motion Check" determines if printing is allowed (Motion Check Off) or disallowed (Motion Check On) when the weight is not stable.
2) Print F-Key – This is a print on command mode which works when a Print Mode Function key on the front

panel is pressed. The F-Key key is active in all modes unless disabled with the Function key setup or the Lock Function. **F6** defaults to "PRINT COMM PORT 2". **ENTER F6** defaults to "SEND". The "Motion Check" menu selection determines if printing is allowed or disallowed when the weight is in motion and/or not stable.

3) Print on CTS (Clear to Send, a RS-232 handshake line) – By toggling the CTS line from space to mark, the print string will be transmitted. If an interval is set, the string will continue to print as long as CTS is asserted. "Motion Check" determines if printing is allowed (Motion Check Off) or disallowed (Motion Check On) when the weight is not stable.
4) Print On Weight Change – Every time the weight changes 1 full display count or more, one transmission of data will occur. "Motion Check" determines if printing is allowed or disallowed when the weight is in motion and/or not stable. Interval has no effect in this mode.
5) Print on Stable Load – When the load weight exceeds the Total Threshold and motion ceases, one transmission of data will occur. Once transmitted, the scale must return below the Total Threshold to re-enable the transmission. Interval has no effect in this mode.
6) Print On Total – When the weight is totaled, one transmission of data will occur. Once transmitted, the scale must return below the Total Threshold (See Total Setup) to re-enable the transmission. Interval has no effect in this mode.

Using Print on Total with the Auto Total enabled should not be used with any weight print-out other than W5, W6, W7, or W9 (because the actual total doesn't occur until weight drops below the threshold, so the weight used for the Total would no longer be on the scale). Use "Print on Load" to print the weight used for the total.

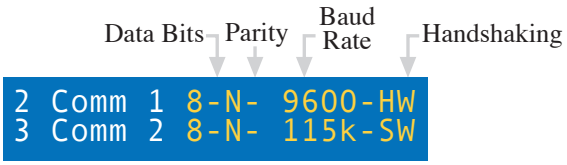
7,8,9,10) Print on Set-Point – Set point 1, Set point 2, Set Point 1 and 2, or Set-point 1 or 2 can be configured to trigger a data print. Once transmitted, the set-point must go off then on again to transmit again. Print on a set point can also be configured to print when two set-points are true (AND) or when either Set Point 1 or Set Point 2 are true (OR). This configuration allows printing when the weight is outside two limits or when the weight is inside two limits (windowed). "Motion Check" determines if printing is allowed (Motion Check Off) or disallowed (Motion Check On) when the weight is not stable.

In addition to the Control modes above, the master CellScale can also force formatted print strings out the Comm Port. See the CellScale manual for more information on Set Point messages and other types of remotely generated messaging.

There is also a special print mode used with the VIEW∑ key. Pressing **VIEW∑** (F-Key programmed for View Total) followed immediately by the F-Key programmed for **PRINT1** will output just the current ID Codes total and Total Count. See "@W7" for formatting information on this special output. Also choosing the Grand Total display or the Statistics display will print out the Comm 1 Port.

COMM PORTS & DATA LOG MENU

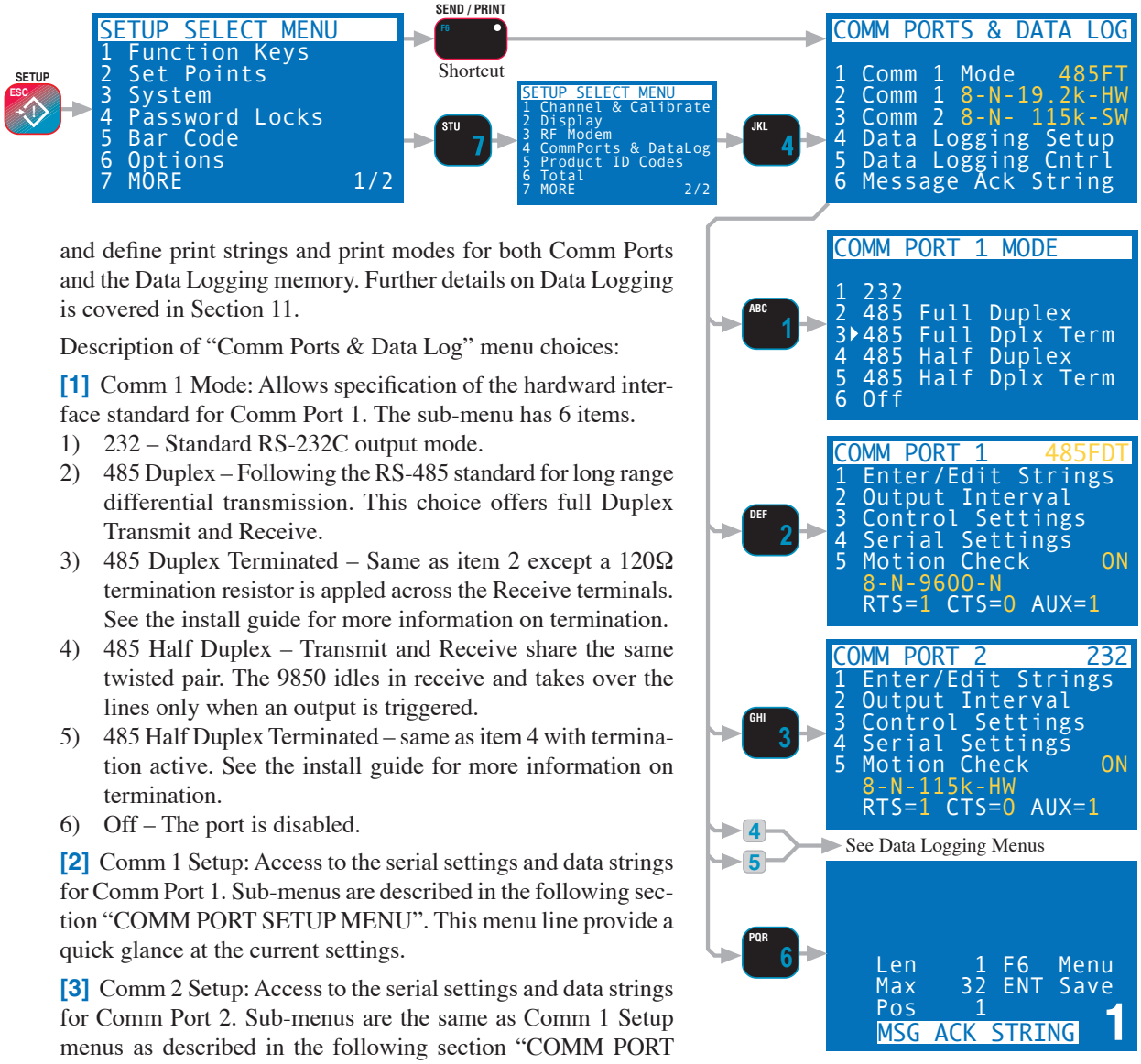
This menu is the entry screen into the two Comm Ports allowing the user to set baud rate, program the output strings, and to set up Data Logging. From this menu, you configure Comm Port 1's protocol (232 or 422/485),



Data Bits	7 or 8
Parity	'N' = None, 'O' = Odd, 'E' = Even, 'M' = Mark, 'S' = Space
Baud Rate	300-115k baud *115.2k and 230.4k baud selections are shortened to 115k and 230k*
Handshaking	'HW' = CTS/RTS hardware, 'SW' = XOn/XOff, 'N' = No Handshaking

Comm 1's current mode is shown on the right side of the line in an encoded form:

232	RS-232
485F	RS-485 Full Duplex
485FT	RS-485 Full Duplex with Termination on
485H	RS-485 Half Duplex
485HT	RS-485 Half Duplex with Termination on



and define print strings and print modes for both Comm Ports and the Data Logging memory. Further details on Data Logging is covered in Section 11.

Description of "Comm Ports & Data Log" menu choices:

[1] Comm 1 Mode: Allows specification of the hardward interface standard for Comm Port 1. The sub-menu has 6 items.

1) 232 – Standard RS-232C output mode.
2) 485 Duplex – Following the RS-485 standard for long range differential transmission. This choice offers full Duplex Transmit and Receive.
3) 485 Duplex Terminated – Same as item 2 except a 120Ω termination resistor is appled across the Receive terminals. See the install guide for more information on termination.
4) 485 Half Duplex – Transmit and Receive share the same twisted pair. The 9850 idles in receive and takes over the lines only when an output is triggered.
5) 485 Half Duplex Terminated – same as item 4 with termination active. See the install guide for more information on termination.
6) Off – The port is disabled.

[2] Comm 1 Setup: Access to the serial settings and data strings for Comm Port 1. Sub-menus are described in the following section "COMM PORT SETUP MENU". This menu line provide a quick glance at the current settings.

[3] Comm 2 Setup: Access to the serial settings and data strings for Comm Port 2. Sub-menus are the same as Comm 1 Setup menus as described in the following section "COMM PORT SETUP MENU".

[4] Data Loggin Setup: The Data Logging modes are very similar to Comm Port modes. Refer to Section 11 for details on setting up Data Logging.

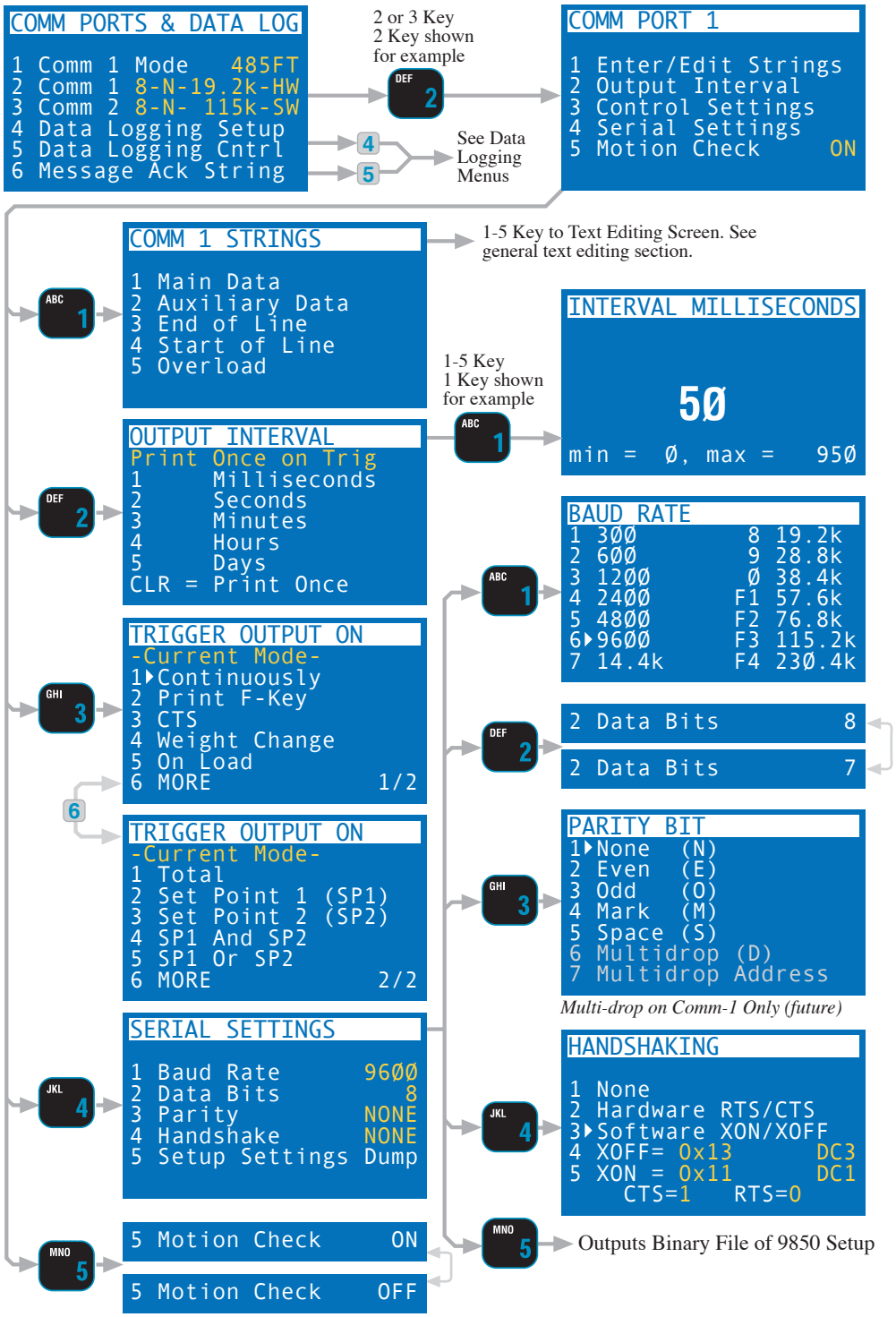
[5] Data Logging Control: Direct access to the control screen for outputting stored readings and controling the Data Logging memory banks.

[6] Message Acknowledge String: The default message acknowledge string is the ASCII "ACK". If your system requires a different control character or a more complex acknowledge string to messages, it is entered and edited here.The Acknowledge String is sent back to the Host port that sent a message to this 9850. See "Text Messaging" for more detail. Any message up to 32 bytes can be entered.

COMM PORT SETUP MENU

[1] ENTER EDIT STRINGS: is the heart of the communications system. It controls the data output generated by the 9850 Meter.

1) Main Data String: This is the main formatted output string. Any weight or other data can be included with the use of the MSI "@" codes. Up to 512 Bytes
2) Auxiliary Data String: The Aux String is an additional formatted output string primarily intended for use in the Data Logging feature to provide additional information embedded in the data stream.
3) End of Line String: The End of Line string can be 0 to 64 characters long. Most commonly used for Carriage Return (CR) or Line Feed (LF), or CR/LF. The EOL string defaults to Carriage Return / Line Feed. See "Programming the End of Line String for an example.



4) Start of Line String: The Start string can be 0 to 64 characters long. It is intended for commonly used commands that usually precede printed lines. Typically ESC codes are used on some printers to enable or format the print string. The start of line string is usually referred to as the "SOL string". The string defaults to empty.

5) Overload String: A string up to eight characters long is sent instead of weight when the scale is overloaded. Used when a scoreboard cannot display the alphanumeric string "OVERLOAD".

[2] OUTPUT INTERVAL: Selecting "Print Once" **CLR** means that after the trigger condition, a single transmission of data will occur. For continuous output, a print interval can be entered from 50ms to 50 days in 50ms increments. Used in conjunction with the Continuous Trigger mode, this can generate a time based data-logging system. An interval of 50 milliseconds means that the scale will output data at the highest rate possible (also limited by the transmission rate from the CellScale). However, a 50ms interval is not guaranteed to have new data on every data output. Interval used with other control modes can be useful for control and monitoring purposes.

[3] TRIGGER PRINT ON: The "Trigger Print On' menu designates the condition that causes the 9850 to output data. The Send / Print key will always work unless specifically locked out or the function key is reassigned. When the designated trigger condition occurs, the print string specified in the "Data Out String" will be output on Comm 2. If the "Motion Check" parameter is set to "ON", the weight must be stable before the 9850 will output data. If a valid trigger occurs, the 9850 will wait for the next settled (out of Motion) reading before it will output data. See descriptions of the Trigger Print modes in the "Trigger Print" section above.

[4] SERIAL SETTINGS: The Serial Settings menu is used to set standard Comm Port parameters. See "To Set The Baud Rate" for an example of how to use these setting menus.

STOP BITS: Stop Bits are not changeable and set to 1.

1) BAUD RATE: Standard Baud Rates available are 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 76800, 115200, and 230400. The 9850 defaults to 9600 Baud.
2) DATA BITS: Either 7 or 8 Data Bits can be set. If 7 bit mode is set, Data Characters above 127dec cannot be sent or received. The default is 8 bits.
3) PARITY: Parity mode is NONE, EVEN, ODD, MARK, or SPACE. The 9850 defaults to "NO Parity".
4) HANDSHAKE: Comm Port Handshaking is set in this menu. Use "Software XON/XOFF" **[3]** for software handshaking commonly used in communicating with computers. Use "Hardware RTS/CTS" **[2]** for interfacing with devices with an RTS output and CTS input. Use None **[1]** (default) for situations where no handshaking is required or possible. It is recommended that hardware handshaking is used for all high baud rate applications (>57600 Baud). Use selections **[4]** and **[5]** to change from the commonly used ASCII defaults for XON (DC1) and XOFF (DC3).
5) MODE: The MODE menu sets the communications mode for the port. Use "TALK" for outputting data to a printer that uses hardware handshaking or no handshaking. Use "DUPLEX" for printers with software handvshaking (XON / XOFF, etc.) or to talk and listen to a computer. Use "LISTEN" to only receive commands from a computer. Use "OFF" to disable the port (and save power on battery units).

[5] MOTION CHECK: When ON the scale will only print settled data, i.e. when the motion detection annunciator is off. Use "OFF" when it is necessary to send data out the Comm port while the weight is in motion. Driving a remote display is a good example of an application usually requiring the Motion Check off.

GENERAL TEXT ENTRY

The 9850 keypad supports full alphanumeric data entry. Numbers, letters, and ASCII control characters are easily handled through the use of the "General Text Entry Menu". While in any string entry screen, pressing **[F6]** will bring up the text entry menu providing access to special characters and font control. In addition, the full screen mode can be enabled which removes the information in favor of showing more characters. Even in full screen mode, F6 is still active.

For characters not in the standard ASCII table, the decimal entry mode is provided. This mode allows access to characters above 127 (decimal). Characters from 128d to 255d are used for special characters and graphics by many printers. Note that outputting characters above 127d requires that the serial setting for data bits is set to 8 (see serial settings menu).

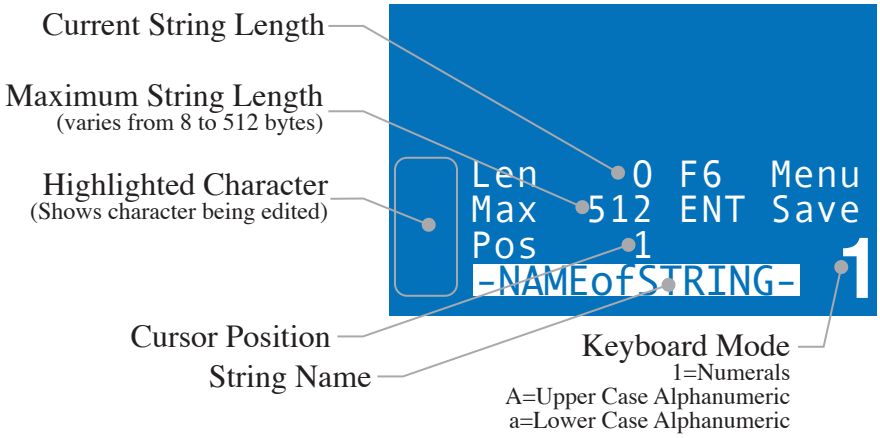
Text strings are edited using the cursor keys and the INS key (alternate function of the **[F3]** key). The INS key toggles between the insert mode (narrow cursor between characters) and the character edit mode (character is highlighted). When a character is highlighted, use the keypad to change the character. Also while the character is highlighted, a larger representative character is shown in the lower left corner of the screen. This allows the display of special characters which are held by placekeepers in the smaller fonts.

General Alpha-numeric Entry Procedure

1) Use the **Aa1** (ALPHA) key to switch between numeric "1", upper case "A", or lower case "a". The current mode is shown in the lower right corner of the display
2) Press the desired character key. If a "B" is needed, press the **ABC** key twice. While in alpha entry, if you need a numeric digit, press the key 4 times
3) If you need two letters off the same key, pause briefly until the cursor moves to the next position.
4) Save the string by pressing **ENTER**.

Text Entry Screen

The following illustration is representative of 9850 text entry screens. The string name is shown on the bottom line of the display. Pressing **[F6]** brings up additional menu items for adding punctuation, symbols, and control characters. An ASCII entry mode is also provided for special characters above 127d. You can also choose a full screen entry which takes away the text info, but allows more characters per screen.



Alternate Characters, Punctuation, Symbols, and Control Characters

1) While in the text entry screen, press the **[F6]** key. This enables the ASCII Characters Menu. This menu provides links to special characters.
2) For standard punctuation, press **[1]**. For other printable characters, press **[2]**. For ASCII control characters, press **[3]**. If a special character is needed, use the "Enter Decimal Char" **[4]** menu to put in the decimal equivalent value of the desired character. This is the only way to enter characters above 127d. These characters, if undefined in the 9850 character set, will be represented by a place keeper.

-OR-

Use this chart for alternate character entry using the Function keys.

It is usually more efficient to use the @E command, then to put in individual CR/LF characters as this is what the @E string is usually set to.

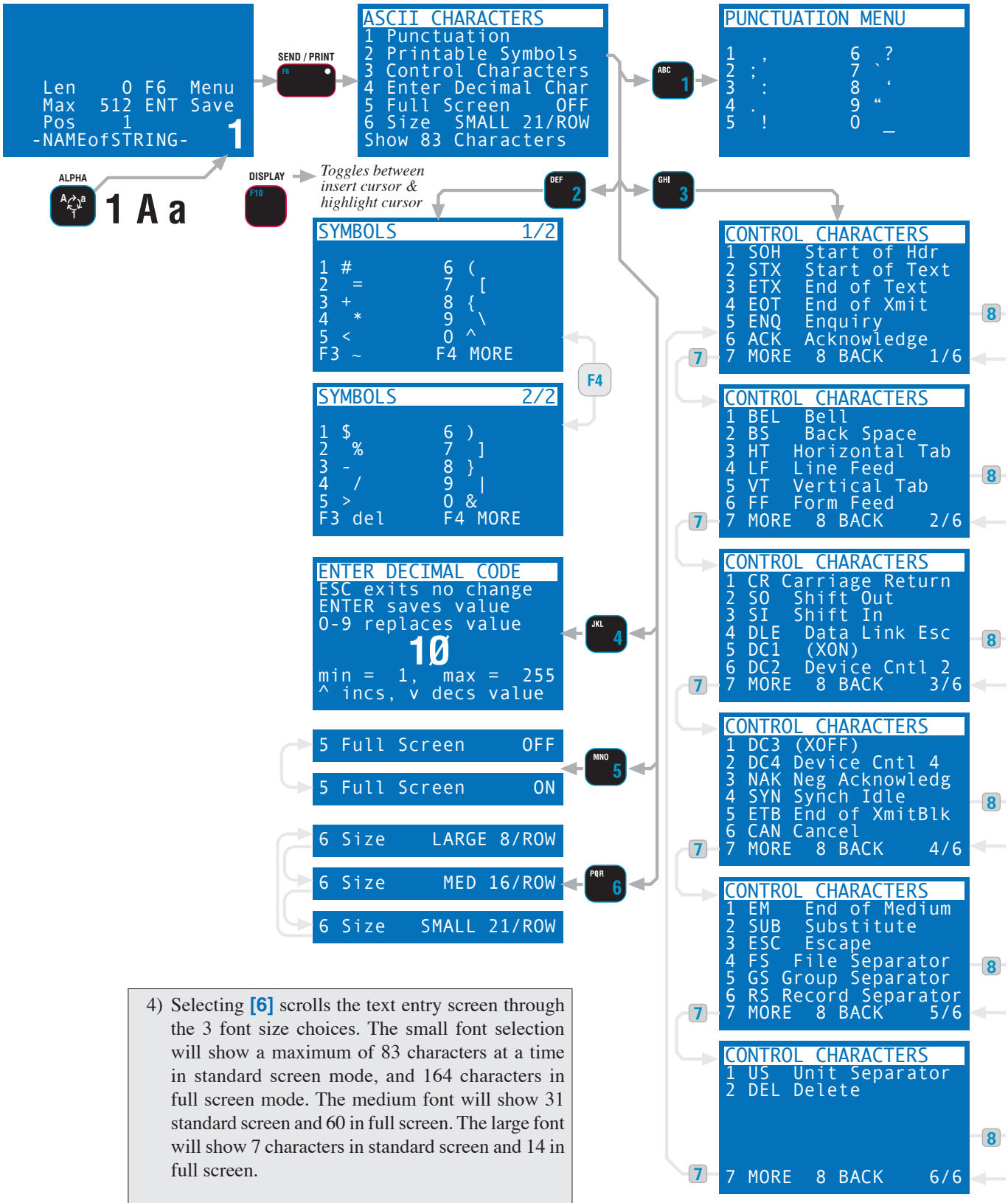
3) Selecting **[5]** toggles between the two entry screen modes. When "Full Screen" is OFF, the normal text entry screen shown on the previous page will appear. If "Full Screen" is ON, the screen will be fully available without the menu items and string navigation info. The F6 Menu selection is still available in Full Screen mode for recalling the full text control menu.

Alternate Key Characters for Text Entry

	Numeric "1"	Alpha Key "a" or "A"			
		1	2	3	4
EXIT	. (dp)	.	,	;	:
F1	+ (plus)	?	!	&	#
F2	- (minus or dash)	-	'	"	/
F3	* (multiply or asterisk)	HT	CR	LF	FF
F4	/ (divide or backslash)	SOH	STX	ETX	ESC
F5	% (per cent)	DC1	DC2	DC3	DC4
F7	(space)	SO	SI	BEL	DEL
F8	= (equals)	=	~	(	)
F9	^ (caret)	^	$	_	\

Go to Index

GENERAL TEXT ENTRY MENU



4) Selecting **[6]** scrolls the text entry screen through the 3 font size choices. The small font selection will show a maximum of 83 characters at a time in standard screen mode, and 164 characters in full screen mode. The medium font will show 31 standard screen and 60 in full screen. The large font will show 7 characters in standard screen and 14 in full screen.

PRINTER / OUTPUT FORMATTING

The 9850 can format virtually any Printer or Serial Data Device including complex bar-code label printers through the use of the built in string formatting. To use this versatile feature, the user must input command codes and data in a specific manner. Each command code consists of a 2 letter mnemonic. Some command codes also require a numeric suffix.

A simple example of this structure is the default print data string: @W1@E. The "@W" command code means to print weight. The "1" means print the current display mode. The "@E" will cause the End-of-line string to be printed. Entering these strings from the 9850 is usually easiest by placing the Alpha mode into upper case and pushing the keys 4 times to obtain numeric digits.

By combining the "@" commands with standard ASCII characters, control characters, etc., any data available from the scale, plus any additional text, can be printed in any order desired. Using formatting controls typical to modern bar-code printers is simply a matter of formatting the printer strings.

The MSI-9850 character set includes all upper case letters, lower case letters, numbers, and most of the rest of the standard ASCII set.

EXAMPLE PRINTER FORMATTING

The following diagram shows a typical print string format. The end result of this example produces a printout similar to this:

PEARS

4.500 lb NET 8/15/2002

In this example we'll use control characters to both print in red and expand the characters for "PEARS". Note: control codes used in this example are unique to a specific printer (a Star Micronics DP8340) and are used for example only. Non printing control characters (e.g. ESC, CR, LF, DC4, etc.) are represented by a dot pattern in the smallest font size. The necessary string will be:

ASCII	27		14						20	27										
String	ESC	4	SO	P	E	A	R	S	DC4	ESC	5	@	E	@	W	3	@	D	6	@	E
Notes	❶		❷						❸	❹		❺		❻			❼			❽	

1) The 27 is an ESC followed by a 4 which equals "Red Character Print instruction"
2) The 14 is an SO which turns on the Expanded character instruction
3) The 20 is an DC4 which turns off the Expanded character instruction
4) The 27 is an ESC followed by a 5 which turns off the Red Character Print instruction
5) @E causes the end-of-line string to be sent. In this example, the end-of-line string is programmed as CR/LF.
6) @W3 causes the current Net weight to be printed. If the scale was in the NET mode, @W1 would have worked as well.
7) @D6 causes the current date to be printed in MM/DD/YYYY format
8) @E causes the end-of-line string to be sent (CR/LF).

PROGRAMMING THE END OF LINE OR START OF LINE STRINGS

The End of Line String is used to terminate print strings and is printer dependent. The default string is Carriage Return (CR=ASCII 13d), Line Feed (LF=ASCII 10). The Start of Line String is often used for STX commands or other configuration control characters. The default SOL string is empty. Refer to the ASCII table in the Appendix for proper codes. Up to 64 characters can be included. You can also embed @ codes to expand the two strings. However, be careful not to include @E in the End of Line string, or @F in the Start of Line string.

EDITING THE PRINT STRING

During string text entry, the **DISPLAY** key **[F10]** changes the cursor from an insert cursor to a highlight and replace cursor. When in highlight mode a larger version of the character appears in the lower left corner of the entry screen (Full Screen Mode OFF).

To insert a character (narrow cursor)

Use the LEFT(◀), RIGHT (▶), UP (▲), and DOWN (▼) Scroll keys to move the cursor around in the print string. Insert new characters behind the cursor. Press **ENTER** to store the edited string.

To change a character (highlighted character)

Use the LEFT(◀), RIGHT (▶), UP (▲), and DOWN (▼) Scroll keys to move around in the print string. Change the cursor into a highlighted character by pressing the **[F10] DISPLAY** key. The flashing digit indicates the edit able character which is also shown in the lower left hand corner of the edit screen (unless you are in full screen mode). Once the desired character is flashing, use the keypad and the ALPHA key to input any character. If you need to change it to a character not in the 9850 keypad, press **[F6]** to bring up the alternate character entry screen. Press **ENTER** to store the edited string.

To delete a character

Use the LEFT(◀), RIGHT (▶), UP (▲), and DOWN (▼) Scroll keys to move around in the print string. Change the cursor into a highlighted character by pressing the **[F10] DISPLAY** key. The flashing digit indicates the edit able character which is also shown in the lower left hand corner of the edit screen. Press **CLEAR**. The remaining characters move over 1 space. Press **ENTER** to store the edited string.
Pressing the ESC key will exit out of the menu and restore the string as it was. The changes must be saved with the ENTER key.

To Erase the Entire Print String

Press the **CLEAR** key rapidly 4 times and the entire string will be erased.
Press the ESC key to restore the string as it was.
Press **ENTER** to store the empty string.

GENERAL TEXT / CONTROL CHARACTER ENTRY

Text or control characters are simply entered into the printer data strings. All ASCII characters from 1dec to 127dec can be entered with the exception of the "@" symbol which the 9850 uses for its control characters (enter "@@" to print a single "@"). If 8 bit data transmission is enabled additional codes 128 to 255 can also be assigned. These upper numbers are often used for graphics characters on printers. "@" Commands are case sensitive, only capital letters are used.

Input Data Form

With the exception of characters following the command "@" symbol, all characters are treated as printable text or control characters. The MSI-9850 represents characters that can't be displayed on the LCD with a checkered pattern. The "ASCII Characters" Menu is provided to input Punctuation, Symbols, Control Characters, or the decimal byte value for any other character not included in the standard 9850 character set. Use the ASCII table (Appendix B) to determine the decimal number equal to any desired character. Some serial devices will define special functions or characters for values above 127, the standard end of the ASCII character set.

SERIAL OUTPUT "@" COMMANDS

The printer formatting "@" commands and their data configurations are as follows:

Description	Cmd	Command Suffix	Input examples	Output examples & *comments* *= a space or place holder
Select Active Channel	@nn	*where "nn" is the channel list location 01-32*	@05 @26	*Selects Channel List location 5.* *Selects location 26* — All commands that are channel specific are directed to this Channel
Change to next channel w/ Labels	@+	*None*	@+	*Switches to next channel and outputs SC number, LC# and LC Name*
Change to previous channel w/ Labels	@-	*None*	@-	*Switches to previous channel and outputs SC number, LC# and LC Name*
Query for current scan list position	@?	1=Current Scan Index 2=Current Display Index	@?	*Outputs SC number, LC# and LC Name* SC 1, CH 1-1, Name of Scale**** *Name of scale up to 20 characters*
Change to next channel (no Label)	@#	*None*	@#	*Switches to next channel in scan list.*
Change to previous channel (no Label)	@!	*None*	@!	*Switches to previous channel in scan list.*
Output an "@" sign	@@	*None*	@@	@ *The 9850 uses the @ sign for specific embedded commands, this command allows the outputing of @.*
Output Annunciators	@A	7=9850 Battery Voltage 8=Batt normal or low 9=Int temperature	@A7 @A8 @A9	BAT 13.2 Volts BATTERY NORMAL *or* BATTERY LOW TEMP 30C *measures internal temp of 9850*
Output Spaces	@B	*# where "#" is the number of spaces from 1-255*	@B100	*100 spaces inserted in the string. Terminate with any non-numeric character or by using 3 digits.*
Output ID Code	@C	1=ID and code # 2=Code # only	@C1	ID CODE **1 *14 *Outputs the current ID number only.*
Output Date	@D	1=ddmmmyy 2=mm/dd/yy 3=dd/mm/yy 4=Day of Wk 5=ddmmmyyyy 6=mm/dd/yyyy 7=dd/mm/yyyy 8=yyyymmdd (ISO)	@D1 @D2 @D3 @D4 @D5 @D6 @D7 @D8	30SEP02* 09/30/06 30/09/06 SATURDAY** 30SEP2006* 09/30/2006 30/09/2006 20060930
Output End-of-line String	@E	*None*	@E	*Outputs End-of-line string. Up to 64 bytes.*
Output Start-of-line String	@F	*None*	@F	*Outputs Start-of-line string. Up to 64 bytes.*
Output Horizontal Tabs	@H	*# where "#" is the number of tabs from 1-255*	@H10;	*10 tabs inserted in the string. Terminate with any non-numeric character or by using 3 digits.*

Description	Cmd	Command Suffix	Input examples	Output examples & *comments* *= a space or place holder
Print Modem ID	@I	1	@I1	xxx where x is the modem ID from 1-254
Output ID String	@L	1=ID String 1 2=ID String 2	@L1 @L2	*String 1 from the current ID. ≤20 Bytes.* *String 2 from the current ID. ≤20 Bytes.*

Output a scale mode	@M	1=*Current*
		2=Gross
		3=Net
		4=Tare
		5=Total
		6=# Totals
		7=Total, #Ttls
		8=*reserved*
		9=Last Total
		%
			@M1
			@M2
			@M3
			@M4
			@M5
			@M6
			@M7
			
			@M9
			@M%
				GROSS* or NET
				GROSS*
				NET***
				TARE**
				TOTAL*
				T*CNT*
				TOTAL*T*CNT
				
				GROSS+ or NET+
				%G-CAP

Output Name	@N	1=Current Channel Name 2=Current ID Name 3= *reserved* 4=Scan List Position 5=Channel Number 6=Fkey Label Print Str1 7=Fkey Label Print Str2	@N1 @N2 @N3 @N4 @N5 @N6 @N7	SCALE PLATFORM 2 APPLES** *always 8 characters* WARNING1** *always 8 characters* SC 21 *always 5 characters* CH 1-1 *always 6 characters* OPERATOR *always 8 characters* CUSTOMER *always 8 characters*
Output Time	@T	1=HH:MM AM/PM 2=HH:MM:SS AM/PM 3=HH:MM 4=HH:MM:SS	@T1 @T2 @T3 @T4	04:22*PM 04:22:35*PM 16:22 16:22:35
Output Current units	@U	*None*	@U	LB** *pounds* OZ** *ounces* KG** *kilograms* G*** *grams* TON* *Short Tons* DAN* *dekanewtons* MTON* *Metric Tons*
Output Weight (Value only)	@V	1=current weight 2=gross 3=net 4=tare 5=total 6=# of totals 7= total, # of totals 8=*reserved* 9=last totaled weight	@V1 @V2 @V3 @V4 @V5 @V6 @V7 @V9	**20.002 *Length: 8, fixed. Leading zeros suppressed* **205.08 *Length: 8, fixed. Leading zeros suppressed* *1188.50 *Length: 8, fixed. Leading zeros suppressed* ****5000 *Length: 8, fixed. Leading zeros suppressed* *432534.85 *Length: 10, fixed. Leading zeros suppressed* 12345 *Length: 5, fixed. Leading zeros suppressed* *432534.85,12345 *Length: 16, fixed. Leading zeros suppressed* **200.05 *Length: 8, fixed. Leading zeros suppressed*

Description	Cmd	Command Suffix	Input examples	Output examples & *comments* *= a space or place holder
Output Weight Value and mode	@W	1=current weight	@W1	**20.002*LB***GROSS* *Length: 20, fixed. Leading zeros suppressed*
		2=gross	@W2	**205.08*KG***GROSS* *Length: 20, fixed. Leading zeros suppressed*
		3=net	@W3	*1188.50*G****NET*** *Length: 20, fixed. Leading zeros suppressed*
		4=tare	@W4	****5000*TNE*TARE** *Length: 20, fixed. Leading zeros suppressed*
		5=total	@W5	*432534.85*KG***TOTAL* *Length: 22, fixed. Leading zeros suppressed*
		6=# of totals	@W6	12345*T*CNT* *Length: 12, fixed. Leading zeros suppressed*
		7= total, # of totals	@W7	*432534.85*KG***TOTAL,12345*T*CNT* *Length: 34, fixed. Leading zeros suppressed*
		8=*reserved*		
		9=last totaled weight	@W9	**200.05*KG***GROSS+* or NET+ in NetMode *Length: 20, fixed. Leading zeros suppressed*
Output a statistics value	@X	1=Average weight	@X1	**13.350
		2=Minimum	@X2	***3.200
		3=Maximum	@X3	**16.650
		4=Standard Deviation	@X4	***2.392
		5=Coeff of Variance	@X5	***32.50
		6=Grand Total	@X6	4263285.55
		7=Grand Average	@X7	*****52.50
		8=# of Grand Totals	@X8	*123434
Output a statistics value and mode	@Y	1=Average weight	@Y1	**13.350*LB***AVG***
		2=Minimum	@Y2	***3.200*LB***MIN***
		3=Maximum	@Y3	**16.650*LB***MAX***
		4=Standard Deviation	@Y4	***2.392*LB***STDDEV
		5=Coeff of Variance	@Y5	***32.50*LB***CO-VAR
		6=Grand Total	@Y6	4263285.55*LB***G-TOTL
		7=Grand Average	@Y7	*****52.50*LB***G-AVG*
		8=# of Grand Totals	@Y8	*123434*G-CNT*

SECTION 11 – DATA LOGGING

INTRODUCTION

The 9850 has two battery backed memory locations for storing scale data. Predefined function keys are available for storing user configured data directly to either memory location. Data Logging uses the "Main Data String" and "Aux String" to store user defined data at the press of a button. Usually the "Main Data String" is programmed with the weight configured as desired. The "Aux String" will often be used to store operator data, production run information, or other data to start or end a data run. In addition, any data coming in Comm Port 2, usually produced by a Bar Code reader, can be assigned directly to Data Log memory.

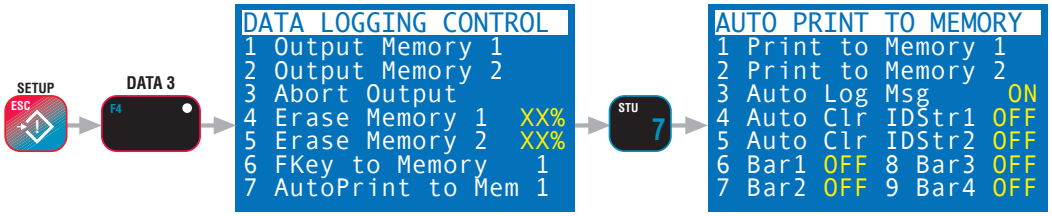
The Data Log memory is uploaded directly to a computer, serial printer, or other serial device through the use of the "Data Logging Control" menu. This menu allows you to upload either memory location and erase (clear) the memory.

DATA LOGGING SETUP

1) Determine the data content required for the main data storage. Using the "Data Logging Strings", set up the MSI @Codes to generate the required data. Most data base programs require comma or tab delimited data. Be sure to delimit the data as required to allow the receiving program to properly parse the incoming data. Typical data types used are @W to generate weight data with text or @V to produce the weight numeric value only. If more than 1 channel of data is required use the @# command preceding the weight value type. See Section 10 for details on string design.
2) To facilitate the data dump, use the Comm Port Serial settings to match the comm port settings of the receiving PC for baud rate (up to 230.4kbaud), data bits (7 or 8), parity (none, odd, even), Handshaking (hardware RTS/CTS or software XON/XOFF), and Mode (RS-232 or RS-485).
3) Program the "Aux String" if needed. Typical data types used here are @T and @D for time and date, @L to recall user entered ID Strings, or fixed text to indicate the start or stop of a run.
4) Assign the function keys required for the operation (see "Data Logging Group" in Section 4). A good choice for the Data Logging function key is **[F6]** since it is unlikely the Send/Print function is being used in a data logger application.
5) If user entered data is required, program a function key for the "Enter ID String 1" (or 2). Then embed the @L1 (or @L2) command in the "Data Out" or "Aux" string as desired. You can also program Bar Code inputs to trigger Data Log activities.
6) For single button access to the Data Logging control menu, program a function key for "Data Logging Control". However there is a shortcut to this menu that can be used that does not require using a function key: Press **SETUP** followed by **DATA 3 [F4]** for direct access to the Data Logging Control menu.
7) Have the appropriate cable ready for data transfers.

DATA LOGGING CONTROL MENU

The Data Logging Control Menu provides a means to upload stored data, and erase the data logging memory locations. The Data Logging Control Menu is reached by pressing **SETUP** followed by **DATA 3 [F4]**. Alternately



the menu can be reached through the "Comm Ports & Data Log" Menu.

Erasing the data logging memory is permanent. The data will be lost. Make sure the data is no longer needed before using the erase memory functions. Erasing Data Logging Memory does not effect any other 9850 memory functions.

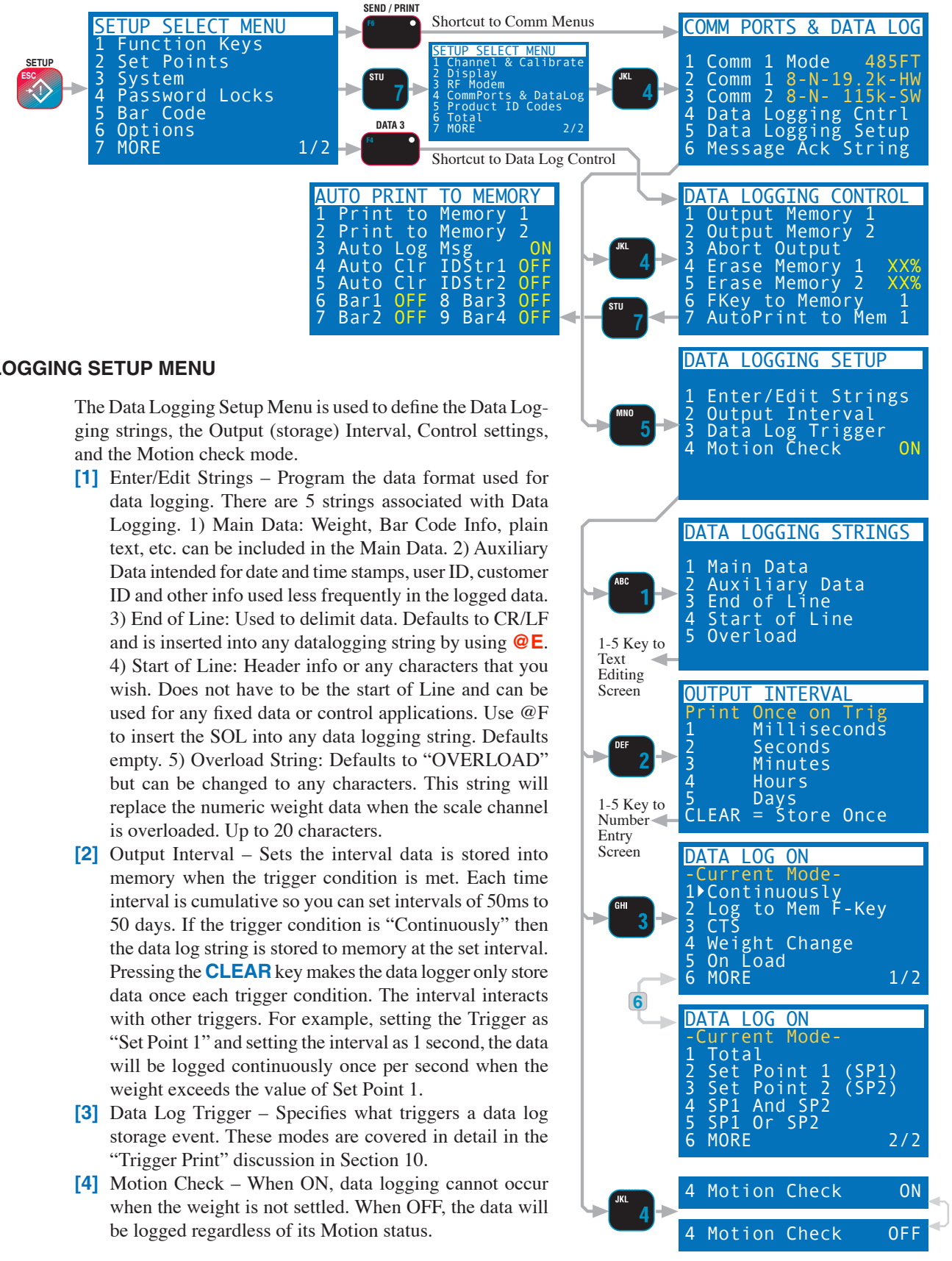
Menu Description

1) Output Memory 1 – Pressing **[1]** will output all data in Data Logging Memory 1 to Comm Port 1. Connect the 9850 to an appropriate terminal or computer before using this function.
2) Output Memory 2 – Pressing **[2]** will output all data in Data Logging Memory 2 to Comm Port 1. Connect the 9850 to an appropriate terminal or computer before using this function.
3) Abort Output – Press **[3]** to abort the output function. The data output will cease, and the data will be left intact, with the start of data pointer reset to the beginning of the memory file.
4) Erase Memory 1 – Press **[4]** to erase all data in Memory 1. A caution screen appears requiring confirmation before erasing the data. Once erased, the data is gone, so make sure that it has been transferred using the Output commands before erasing the data. The line indicates the per cent used capacity of memory 1. It will read "CLR" when empty.
5) Erase Memory 2 – Press **[5]** to erase all data in Memory 2. A caution screen appears requiring confirmation before erasing the data. The line indicates the per cent used capacity of memory 2. It will read "CLR" when empty.
6) FKey to Memory X – Use the **[6]** key to choose which memory the data is stored in when using the uncommitted "Save to Memory" function key. Toggles between Memory 1 and Memory 2.
7) AutoPrint to Memory – Use the **[7]** key to bring up the Auto Print to Memory sub menu. This feature allows Automatic data logging using the Trigger Print modes (See Section 9). By using, for example, "Print On Load", every time a steady weight is reached, the weight will be automatically recorded. Using the Continuous print mode combined with a user set interval, weight data can be recorded on any time interval. AutoPrint to Memory uses the main print string only. The Aux String is still available for manual data storage.

Auto Print to Memory

The "Auto Print to Memory" sub menu has nine choices:

1) Print to Mem 1 – Automatic print data is redirected to data logging memory 1. Only pressing the Print key will generate an output to the Comm Port.
2) Print to Mem 2 – Automatic print data is redirected to data logging memory 2. Only pressing the Print key will generate an output to the Comm Port.
3) Auto Log Msg – When using the auto data logging features, the default Auto Log Message is on to alert the user that data has been stored. Use this mode for "Auto Print to Memory" modes with data storage that doesn't occur very often. If using continuous printing to memory modes or other modes that happen rapidly, turn the "Auto Log Msg" off so that the message won't interfere with other screen functions.
4) Auto Clr IDStr1 – When ON, the ID String 1 is cleared after every stored weighment. This prevents unwanted duplication of data. When OFF the string is left intact until manually changed.
5) Auto Clr IDStr2 – When ON, the ID String 2 is cleared after every stored weighment. This prevents unwanted duplication of data. When OFF the string is left intact until manually changed.
6) Bar1 – When ON, data in the Bar Code String 1 will be saved along with the configured print string.
7) Bar2 – When ON, data in the Bar Code String 2 will be saved along with the configured print string.
8) Bar3 – When ON, data in the Bar Code String 3 will be saved along with the configured print string.
9) Bar4 – When ON, data in the Bar Code String 4 will be saved along with the configured print string.



DATA LOGGING SETUP MENU

The Data Logging Setup Menu is used to define the Data Logging strings, the Output (storage) Interval, Control settings, and the Motion check mode.

[1] Enter/Edit Strings – Program the data format used for data logging. There are 5 strings associated with Data Logging. 1) Main Data: Weight, Bar Code Info, plain text, etc. can be included in the Main Data. 2) Auxiliary Data intended for date and time stamps, user ID, customer ID and other info used less frequently in the logged data. 3) End of Line: Used to delimit data. Defaults to CR/LF and is inserted into any datalogging string by using **@E**. 4) Start of Line: Header info or any characters that you wish. Does not have to be the start of Line and can be used for any fixed data or control applications. Use @F to insert the SOL into any data logging string. Defaults empty. 5) Overload String: Defaults to "OVERLOAD" but can be changed to any characters. This string will replace the numeric weight data when the scale channel is overloaded. Up to 20 characters.

[2] Output Interval – Sets the interval data is stored into memory when the trigger condition is met. Each time interval is cumulative so you can set intervals of 50ms to 50 days. If the trigger condition is "Continuously" then the data log string is stored to memory at the set interval. Pressing the **CLEAR** key makes the data logger only store data once each trigger condition. The interval interacts with other triggers. For example, setting the Trigger as "Set Point 1" and setting the interval as 1 second, the data will be logged continuously once per second when the weight exceeds the value of Set Point 1.

[3] Data Log Trigger – Specifies what triggers a data log storage event. These modes are covered in detail in the "Trigger Print" discussion in Section 10.

[4] Motion Check – When ON, data logging cannot occur when the weight is not settled. When OFF, the data will be logged regardless of its Motion status.

SECTION 12 – TEXT MESSAGING

The MSI-9850 provides a means for sending messages from host computers directly to the 9850 display. The remote computer uses a host command to send data to any 9850 on the same network (0-63). Once the 9850 receives a text message, it is displayed until a key is pressed. By including the standard ASCII bell character (control G), the message can also send an alert tone that persists until the message is acknowledged.

HOST MESSAGE DESIGN

The 9850 display is limited to 168 characters maximum. Characters beyond 168 characters will not be displayed. The size of the message characters is automatic and based on the length of the message. Messages shorter than 16 characters will be displayed in the large font in one or 2 rows (2 rows by 8 characters). Messages from 17 to 56 characters will be displayed in the medium font in 2 to 4 rows (4 rows by 14 characters). Messages longer than 56 characters will be displayed in the small font (8 rows by 21 characters). Words that cross line boundries will be split.

In order for a host to send a message to an individual 9850, the host must know the address of the 9850. The string required for the host to transmit through a CellScale modem is:

MSGxxx*This is the transmitted text;

Where xxx is replaced by the address of the 9850. It is not necessary to use three digits if the address is smaller.

Example1

(ˆ is used to designate a space)

Target 9850 address is 52, message is intended to be in large font on the 9850 screen.

MSG52*ˆˆPOURˆˆ5000 lb.;

The spaces are included to center the wore “POUR” and to space the weight to the next line (8 total characters per line). This will result in a 9850 screen that appears like this:

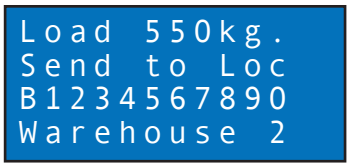
The message will flash to attract attention. This message will remain until any key is pressed on the 9850. Once any key is pressed, the 9850 will automatically send the “Message ACK String” (edited in the “Comm Ports & Data Log” Menu).

Example2

Target 9850 address is 150, message is intended to be in medium font on the 9850 screen.

MSG150*Load 550kg.ˆˆˆSend to Locˆˆˆ B1234567890ˆˆˆWarehouse 2;

The 3 spaces are included to pad the first two lines (14 total characters per line) to prevent words breaking on the screen. This will result in a 9850 screen that appears like this:



The message will flash to attract attention. This message will remain until any key is pressed on the 9850.

9850 TO HOST MESSAGES

Once a sent message is observed by the 9850 user, pushing any key will clear the message and return the 9850 to the last display mode. An acknowledgment string is automatically sent back to the modem that generated the message. The acknowledgment string is programmed in the "Comm Port & Data Log" menu. The string defaults to the ASCII "ACK" character but can be modified in the "Message ACK" choice of the "Comm Ports & Data Log" menu.

The acknowledgment string includes the address of the 9850 in this form:

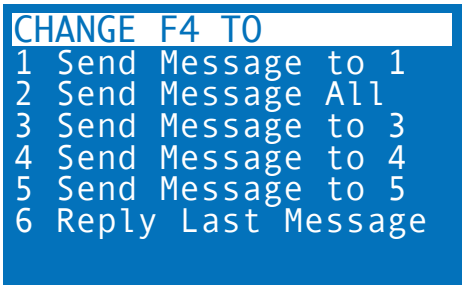
57:*ttttt* where "t t t t t" is the acknowledgment string.

9850 User Entered Message Reply

A function key can be designated to reply to Host messages in addition to the automatic acknowledgement. This allows the 9850 user to text message a reply or new message to any host computer. The 9850 can text message the host at any time, and can send to the last host that it received a message from. More than 1 Function key can be designated for messages and the user can choose to send to a specific CellScale RF or direct port or set it to reply to the last modem that sent a message.

To set up the 9850 to output a message:

1) Press **SETUP** followed by "Function Keys" **[1]**.
2) Select an unassigned or unneeded function key to program from the menu (**F1-F10**).
3) The "SELECT FOR Fx FROM" menu appears.
4) Press **[7]** to show the sccond screen of F-Key functions. Select "Text Messaging" (Choice **[5]** on screen 2).
5) The next menu allows you to designate where the message should go. To send a message to the CellScale Comm 1 select **[1]**. To send a message to all connected comm ports (direct and RF) on the CellScale, select **[2]**. To send messages to Virtual RF connected Comm Ports 3, 4, or 5, select **[3]**, **[4]**, or **[5]**. To reply to the specific host port that last sent a message, select **[6]**.
   If more than 1 modem is attached to a single virtual host comm port (3, 4, or 5), the message will be sent to all modems on the message origin port.
6) Return to normal scale operation by pushing **EXIT**.



SECTION 13 – BAR CODE

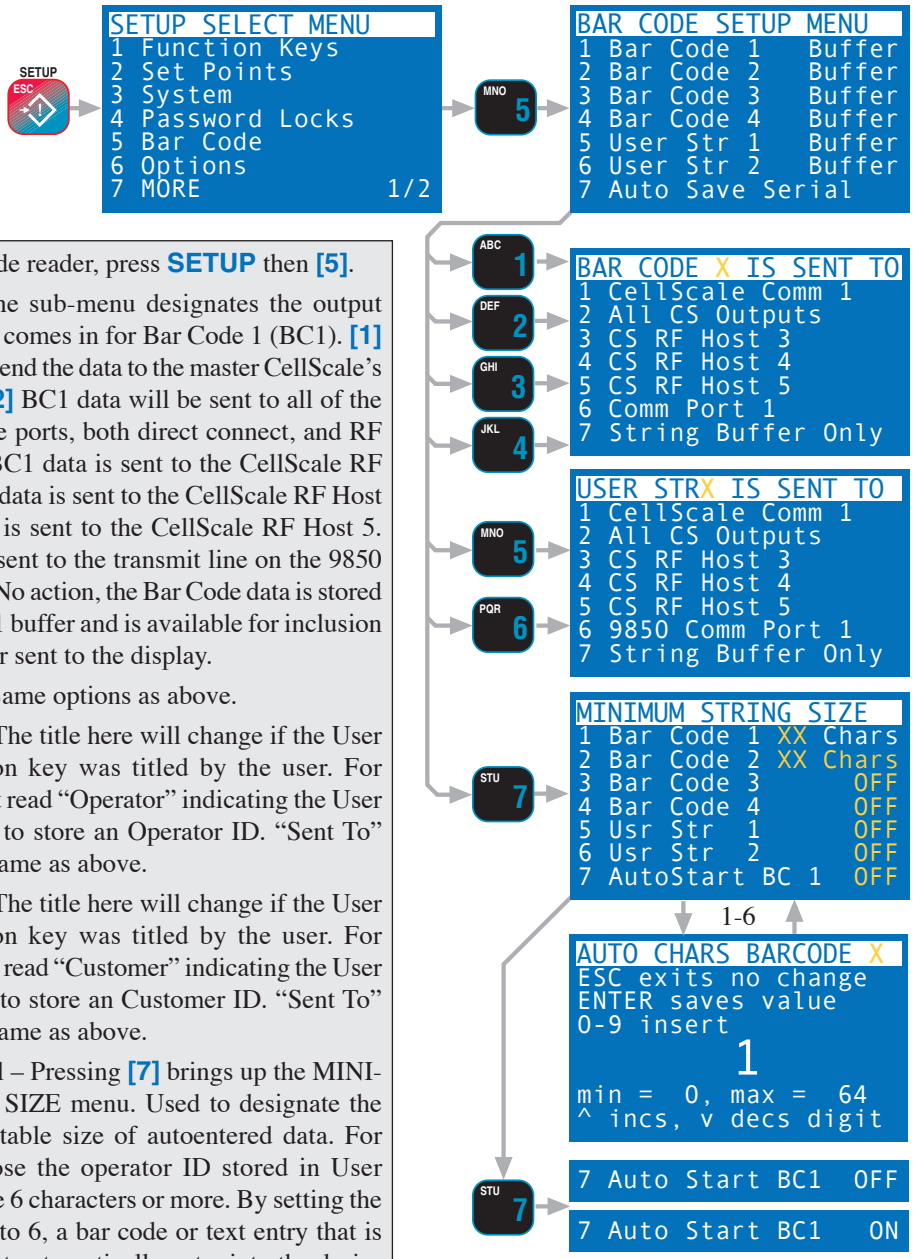
The Bar Code features of the 9850 allow the user to add scanned data to weight readings and trigger transmissions directly into RF connected computers. In combination with the Data Logging features, bar code scans can trigger data storage for uploading later.

Bar Code data is directed into text fields under user control. Four strings, K1 (Bar Code 1), K2 (Bar Code 2), K3 (Bar Code 3), and K4 (Bar Code 4) are sized to accept up to 64 bytes. In addition the bar code can be directed into ID Code strings 1 and 2 (20 bytes each) through the use of the function keys. Any string that can be entered via the keyboard can also be input via the bar code scanner. This degree of versatility allows such activities as operator ID, customer ID, product ID, etc., to be input via bar codes.

The MSI-9850 will interface directly to Bar Code scanners that use standard RS-232 output data. Power is supplied on pin 9 of the serial connector. The 9850 supplies a variable voltage output of 6 to 9 volts that is the switched output of the battery. Therefore a suitable bar code scanner must accept voltage over the stated range. The voltage output can be supplied as a regulated voltage (3.3 to 5V) by special order. Contact MSI for information on suitable scanners for your application.

BAR CODE SETUP MENU

The Bar Code Setup Menu is used to designate how Bar Code data is handled and sets minimum data size for each type of Bar Code string. Typically a function key is pressed to designate where the data is to go, then the Bar Code is scanned. By turning “AutoStart” on, any data coming in will go automatically into the Bar Code 1 buffer unless a bar code designated function key is pressed first. The typical operation will use Bar Code 1 for data that is scanned often, and designate function keys for additional data input. With AutoStart on hands free operation can be achieved just using the Bar Code scanner to initiate weight events with included Bar Code data. The Comm Port Setup Menu is used in conjunction with the Bar Code Menu to trigger remote printing/data storage events.



To set up the Bar Code reader, press **SETUP** then **[5]**.

1) BarCode 1 – The sub-menu designates the output mode when data comes in for Bar Code 1 (BC1). **[1]** Selecting 1 will send the data to the master CellScale's Comm Port 1. **[2]** BC1 data will be sent to all of the CellScales active ports, both direct connect, and RF connected. **[3]** BC1 data is sent to the CellScale RF Host 3. **[4]** BC1 data is sent to the CellScale RF Host 4. **[5]** BC1 data is sent to the CellScale RF Host 5. **[6]** BC1 data is sent to the transmit line on the 9850 Comm Port. **[7]** No action, the Bar Code data is stored in the Bar Code 1 buffer and is available for inclusion in print strings or sent to the display.

2-4) BarCode 2-4 – Same options as above.

5) User String 1 – The title here will change if the User String 1 function key was titled by the user. For example it might read "Operator" indicating the User String 1 is used to store an Operator ID. "Sent To" options are the same as above.

6) User String 2 – The title here will change if the User String 2 function key was titled by the user. For example it might read "Customer" indicating the User String 1 is used to store an Customer ID. "Sent To" options are the same as above.

7) Auto Save Serial – Pressing **[7]** brings up the MINIMUM STRING SIZE menu. Used to designate the minimum acceptable size of autoentered data. For example; Suppose the operator ID stored in User String 1 has to be 6 characters or more. By setting the Auto Enter size to 6, a bar code or text entry that is too small will not automatically enter into the designated string. The text entry screem will appear if the input code is too small, allowing the user to reject the data (press **ESC**), accept the data (press **ENTER**), or append to the data with the alphanumeric keypad.

MINIMUM STRING SIZE MENU

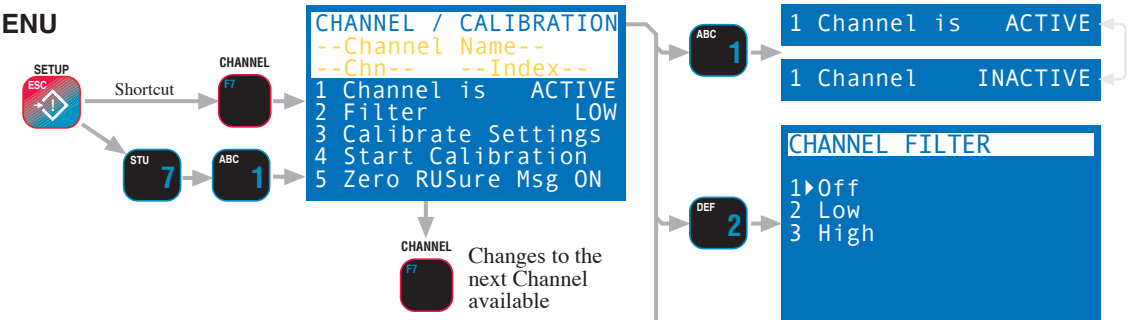
1-4) Pressing 1-4 brings up a numeric entry screen that allows you to set the minimum string size of the four available Bar Code Strings. Bar Code strings can be up to 64 characters in length.

5-6) Pressing 5 or 6 allows setting the minimum size of the ID User Strings. User Strings are limited to 20 characters.

7) AutoStart BC 1 – Turning "Auto Start Bar Code 1" on will designate any data coming in the Comm Port, while in the weight display mode, will automatically input into the Bar Code 1 buffer. This eliminates the need to first push a function key to tell the 9850 where to put the data.

SECTION 14 – CHANNEL SETUP & CALIBRATION

CHANNEL SETUP MENU



The Channel Setup Menu provides control of Channel settings in the CellScale. The CHANNEL / CALIBRATION menu screen will display the current channel name (if it was provided in the CellScale), channel number and scan list index number.

[1] Channel is ACTIVE / INACTIVE – The Channel is operating as part of the Scan List if ACTIVE. If set INACTIVE, the channel will not be available to any device in the Network, and will not be displayed on the 9850.

[2] Filter – Each A/D channel has independent filtering set by this menu. Set "Off" for normal scales, Low or High for scales that are subject to a lot of movement or vibration, or for very high resolution scales. This menu is locked out in Legal-for-Trade (LFT) systems until the calibration switch is enabled at the CellScale. Advanced settings for filtering must be performed in the Master CellScale.

[3] Calibrate Settings – See following submenu description. This menu is locked out in LFT systems until the calibration switch is enabled at the CellScale.

[4] Start Calibration – Starts the Calibration Procedure. This menu is locked out in LFT systems until the calibration switch is enabled at the CellScale.

CALIBRATE SETTINGS

[1] Motion Band – The motion band determines the range of weight variation that the indicator considers to be stable weight. Selecting "Motion Band" calls a numeric entry screen.

[2] Scale Cal Standard – The submenu has 4 choices: Industrial **[1]** No limits on settings. NIST NTEP **[2]** Settings limited to NTEP ranges, calibration is protected by the CellScale Sealed Switch. OIML R76 **[3]** Settings limited to R76 ranges, only metric units allowed. Industrial Metric **[4]** Same as 1 except only metric units allowed.

[3] Center of Zero ON/OFF – Enables the Center of Zero annunciator. The scale is within 1/4 d of center when the annunciator is on.

[4] Autozero (AZM) ON/OFF – Enables and disables Auto Zero Maintenance (AZM).

[5] Autozero Band – Calls a numeric entry screen to set up the range of weight in 'd' that is automatically zeroed. Typical settings for the AZM band are ±1d for most applications, ±3d for truck scales, and ±.6d for LFT applications (reached by setting the band to 0)

CALIBRATE GENERAL INFORMATION

The following sections are intended for qualified scale technicians. The CellScale can be calibrated either directly using the Terminal Interface mode, or by using a 9850, 9750A, or 3750CS. See the CellScale operators guide for information on direct calibration. This section details the calibration of a CellScale using the 9850 RF Remote Indicator. Calibrating a CellScale with a 9850 requires that adequate test weights (at least 10% of capacity) are available. The CellScale is capable of multi-point calibration with any combination of weights from zero to capacity.

Calibration constants are stored only in the CellScale. The 9850 serves only as a controller during calibration. Since a single CellScale is capable of hosting up to 32 independent scales, the scale channel to be calibrated must be selected first using the CHANNEL Key. To Calibrate multiple Scale Inputs, you must complete the first calibration. Then exit out of the Calibration Menus. Select the next scale with the CHANNEL Key. Then enable Calibration again.

ENABLE CALIBRATION

Calibration of a CellScale from the 9850 may be protected in either of two ways: 1) Legal-for-Trade systems are protected with a sealed push button switch on the CellScale. This switch must be pressed to enable the calibration menus. 2) The 9850 also offers password locks to prevent calibration. See the Password locks section for information on how to set passwords.

Industrial use scales are not required to have the calibration protected. However MSI recommends using the Password locks to prevent accidental calibrations.

To Enable Calibration (Legal-for-Trade CellScales Only)

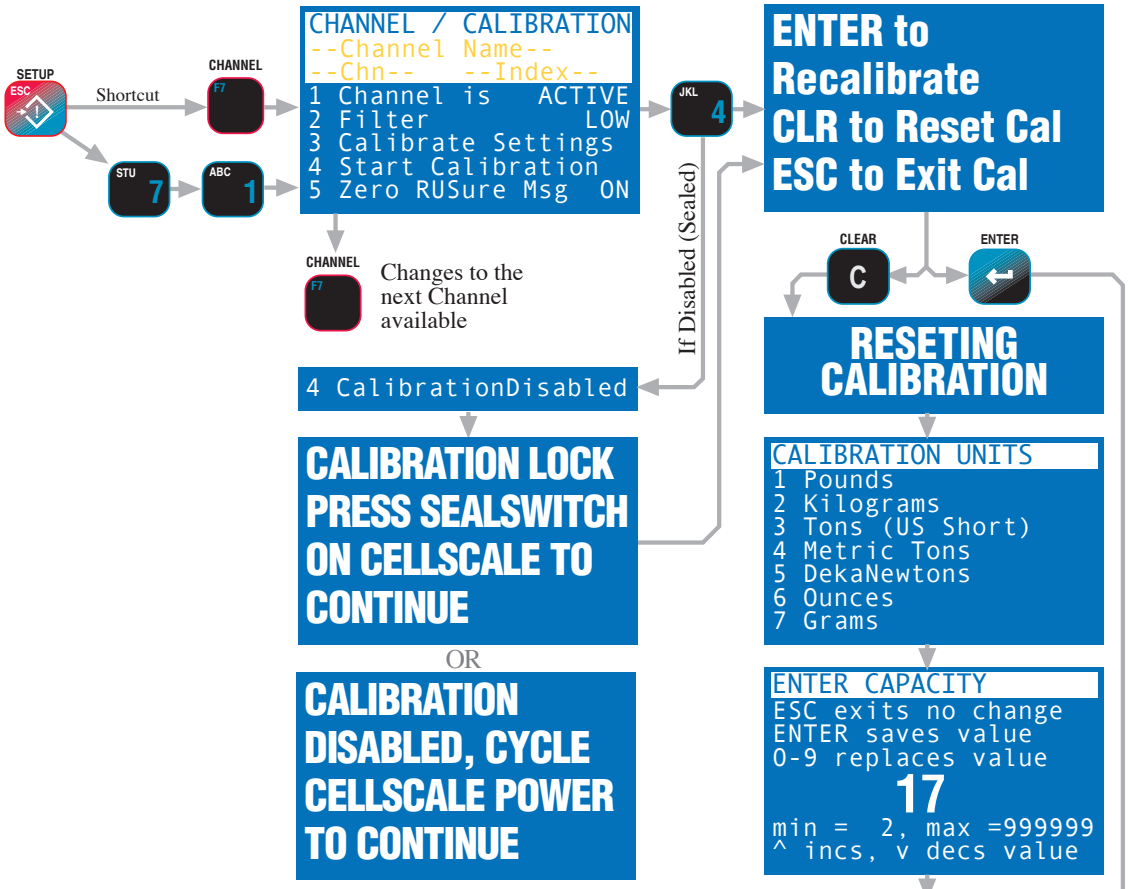
1) Expose the Calibration Seal Port by removing the seal screw on the CellScale with a Phillips Head Screwdriver. Seal Screw location can be found in the CellScale manual or the 9300 Crane Scale Manual.
2) Insert a small non-metallic screwdriver or the wooden stem of a "Q-Tip" and press and release the switch button in the hole. The CellScale will acknowledge the press button by flashing its LEDs.
3) Now you can proceed with calibration and calibration settings.

TO CALIBRATE

Use this Calibration procedure for calibration of the CellScale using the 9850. The CellScale supports 10 point calibration - zero and up to 9 points of span calibration. Zero and at least 1 span point are required for a successful calibration. The highest value test weight should be at least 10% of capacity, but 50% or more is preferable.

Calibration Procedure

1) Multichannel systems only - Using the **CHANNEL** key, step to the Scale channel you wish to calibrate. Only A/D channels can be calibrated (1-x, 2-x, 3-x, and 4-x). Do not attempt to calibrate a math channel (6-x).
2) Press **SETUP** followed by **CHANNEL**, or **SETUP**, "MORE" **[7]**, and select "Channel / Calibration" **[1]**.
3) Select "Start Calibration" **[4]**.
4) If this is a re calibration, press **ENTER** and jump to step 9. If this is a new installation, or you wish to change the capacity and/or scale division size, press **CLEAR**.
5) The screen displays "RESETTING CALIBRATION" a few seconds while the calibration memory is purged.
6) Select a calibration unit by pressing **1**-**7**. This should be in the units the scale is most commonly used in. However, sometimes it is desirable to use the units your test weights are cal'd in for convenience in number entry. You can always change the units for display later.
7) Enter the capacity of the scale (in the cal unit selected) using the numeric keypad. Press **ENTER**.
8) The CellScale calculates the appropriate scale divisions based on allowed resolution and then sends them to the 9850 as a list. The "SCALE DIVISIONS (d)" menu will vary depending on capacity and units. From 5 to 12 possible divisions will be shown. Pick the rated scale division for your scale.
   Avoid excess total divisions (capacity/d = total divisions) for the type of scale you are using. Crane scales should be less than 5000 total divisions and depending on usage sometimes less than 1000 divisions. Platform scales are rarely accurate above 10000 divisions. Lower resolution means faster settling time, and a more stable display in vibration and motion situations.
9) "ZERO CALIBRATION" – Unload the scale. When the scale is stable press **ENTER**. There will be a short delay while the A/D in the CellScale performs all its initializations.



10) "SPAN CALIBRATION 1" – The CellScale transmits back the capacity as a possible calibration weight (Cal Wt 1 =). Load the scale with the first calibration weight. If your cal weight is not equal to capacity, enter the cal weight with the keypad. When the weight is stable press **ENTER**.

Any calibration weight is possible. MSI recommends a cal weight of at least 10% of capacity for industrial systems. For Legal-for-trade systems MSI recommends using at least 50% of capacity, and consider multipoint calibration.

11) "SPAN CALIBRATION 2" – Now that the CellScale has 1 span point, it transmits back the current reading. If a single span point is adequate, press **ESC** (**SETUP**) to end calibration. If multipoint calibration is desired, load the next cal weight. If the displayed scale weight agrees with the cal weight, you do not need to calibrate the point. However if the weight displayed does not match the cal weight, use the keypad to enter the correct weight. When the weight is stable press **ENTER**.

12) Repeat step 11 up to a total of 9 span points. Span points can be in any order, low to high, high to low, jumping around...whatever. At any time, pressing the **ESC** (Setup) key will end calibration. Even non-linear transducers can be linearized with the judicious application of multi-point calibration.

TO ENABLE / DISABLE AZM (AUTO ZERO MAINTENANCE)

AZM is used to adjust out variations at zero caused by debris or water on the scale, temperature drift, and any other minor variation that affects the zero setting. Typically AZM is set to 0.5d or 1d, which is adequate for most modern scale systems. The CellScale allows for a much greater AZM range (non legal-for-trade scales only) for unique applications. Use this feature cautiously as it can zero out large weight amounts unexpectedly.

An example of where a large value AZM can be advantageous is when packing produce. Typically there is some variation in the weight of the packing boxes. By setting the AZM to equal the largest variation in box weight, the error in weight caused by the box variations can be eliminated automatically. The key to making this work is that the first amount of produce placed in the box has to weigh more than the AZM range so that the produce isn't also zeroed out.

The CellScale can also adjust the time interval of AZM, but only through the Terminal Interface (refer to the CellScale manual). AZM time interval defaults to 1/second.

To ENABLE / DISABLE AZM and set the AZM Capture Band

1) Press **SETUP**, then **CHANNEL**.
2) Select "Calibration Settings" **[3]**.
3) Toggle AZM on or off with the **[5]** key.
4) The AZM capture band is listed on the selection 6 line. If a different capture band is desired, press **[6]**.
5) On the "AUTOZERO BAND" screen, set the size in scale division of the AZM capture band. The number represents the positive and negative capture range. Entering 0 equals a capture range of ±0.5 d. Entering 5 represents a capture range of ±5 d. Press the **ENTER** key to store the AZM Band value.
6) Press **DISPLAY** to return to the Scale Display. Press **ESC** to return to the "CHANNEL / CALIBRATION" menu.

Do not disable AZM. The ability to disable AZM is only intended for regulatory agencies that conduct tests without AZM enabled. Disabling AZM will degrade temperature and drift performance of the CellScale. Also use caution in setting the AZM window too large. This can cause the scale to zero unexpectedly. MSI recommends keeping AZM below 5d for most applications.

MOTION BAND

The motion band determines the range of weight variation that the indicator considers to be stable weight. Since the CellScale will not zero or tare a value in motion, the motion band directly influences the accuracy of the scale system. The motion band in Legal-For-Trade systems is usually limited to ≤ 0.6d but sometimes up to ±3d in certain types of installations. In systems used for industrial applications, the motion band can be adjusted larger. Adjusting the motion band larger can help in medium accuracy applications where there is a lot of vibration or noise and it is difficult to hold the weight steady enough to tare, zero, or total. For example, setting the motion band to 5 d would allow a tare (or zero or total) to be as much as 5d off of its ideal value but it will make the indicator easier to use as you don't have to wait until the weight is completely stable.

The Motion Band ± range is limited to a maximum of ±255 `d`. If you exceed this range, the 9850 will set the value to 255 'd'. Setting the Motion Band to 0 is equal to a range of ±0.6d.

To Adjust the Motion Band

1) Press **SETUP**, then **CHANNEL**.
2) Select "Calibration Settings" **[3]**.
3) From the "CALIBRATE SETTINGS" menu, select "Motion Band" **[2]**.
4) On the "SET MOTION BAND" screen, set the size in scale division of the AZM capture band. The number represents the ± band of motion detection. Entering 0 equals a motion band of ±0.6 d. Entering 3 represents a motion band of ±3 d. Press the **ENTER** key to store the Motion Band value.
5) Press **DISPLAY** to return to the Scale Display, or press **ESC** to return to the "CHANNEL / CALIBRATION" menu.

CENTER-OF-ZERO (COZ) INDICATOR

The COZ indicator turns on when the scale is within 1/4 d of the last zero setting. Some legal-for-trade jurisdictions require its use.

To Enable/Disable the COZ Indicator

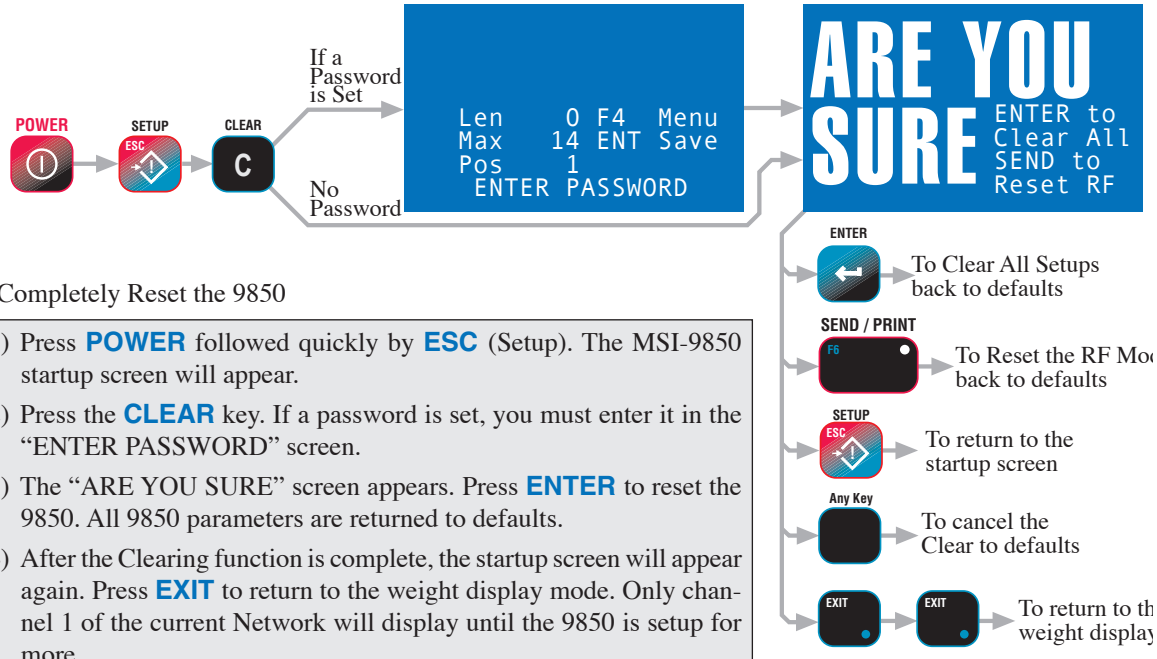
Before starting the following procedure, you must be in the Top Menu Level of Calibration.

1) Press **SETUP**, then **CHANNEL**.
2) Select "Calibration Settings" **[3]**.
3) Toggle the Center of Zero indicator on or off with the **[4]** key.
4) Press **EXIT** to return to the Scale Display. Press **ESC** to return to the "CHANNEL / CALIBRATION" menu.

RESET ALL

This procedure returns all registers of the 9850 to defaults. DO NOT initiate this function unless you are prepared and qualified to perform a complete setup of the 9850 system. This operation does not clear calibrations or affect any connected CellScales.

This process completely destroys 9850 setups and erases data logging memory. It does not affect CellScale calibration in any way.



To Completely Reset the 9850

1) Press **POWER** followed quickly by **ESC** (Setup). The MSI-9850 startup screen will appear.
2) Press the **CLEAR** key. If a password is set, you must enter it in the "ENTER PASSWORD" screen.
3) The "ARE YOU SURE" screen appears. Press **ENTER** to reset the 9850. All 9850 parameters are returned to defaults.
4) After the Clearing function is complete, the startup screen will appear again. Press **EXIT** to return to the weight display mode. Only channel 1 of the current Network will display until the 9850 is setup for more.

INSTALLING FIRMWARE UPDATES

The 9850 contains Flash memory that allows the firmware to be upgraded through the Comm Port. A "Boot Loader" program is used to load a new program file into the 9850. MSI will update and improve the 9850 feature set over time and provide program updates free of charge. Please contact MSI directly to obtain the most current 9850 firmware.

This process completely destroys 9850 setups and erases data logging memory. It does not affect CellScale calibration in any way.

1) Turn on the 9850.
2) Press **POWER** followed quickly by **ESC**.
3) Press **CLEAR**. The "ARE YOU SURE" screen appears. Ignore the choices here.
4) Press **DATA1**. Wait until the 9850 shuts off.
5) Set a terminal program to emulate an ASCII terminal.
6) Set the Baud rate to 9600 Baud, 8 data bits, 1 stop bit, and no parity. Set Handshaking to Software XOn/XOff.
7) Set the data transfer protocol to ASCII.
8) Connect the 9850 Comm Port 1 to the PC serial port with the supplied DCE wired serial cable.
9) Press **POWER** to turn on the 9850. The "MSI Software Installer" screen will appear on the 9850, and the Bootloader menu will appear on the terminal screen.

```
Bootloader built: Feb 28 2006 at 16:15:23
Version           : E0-00-16
Copyright (c) 2005-2006 Measurement Systems International

=============== MAIN MENU ===============

 (u) Update Software
 (s) Change Baud Rate
 (n) Get Flash ID
 (g) Run App Code

 (r) Refresh
```

10) Choosing a faster baud rate will decrease the amount of time required to complete the update. However, baud rates above 38400 usually require a buffered UART and an electrically quiet environment. Press **[s]** on the terminal keyboard to change baud rate.

```
=============== Serial Settings ============

(1) 9600
(2) 19200
(3) 38400
(4) 57600
(5) 115200
```

11) In this example, choose **[4]** 57.6K baud. This will immediately change the baud rate of the CellScale. It will transmit the MAIN MENU again, but until the terminal Baud Rate is changed, the transmission will be garbage. Change the baud rate of your terminal program to match. Then press **[r]** to refresh the display. If the baud rates match you be able to see the main menu as shown above.

12) Choosing "Update software" **[u]** will start with erasing the current program with the following screen on the terminal.

```
Please wait for complete erased of flash chip application sectors. TC58FVM5B2A
 Erasing Sector: ..................
```

13) When the Flash memory is completely erased, the 9850 will request that the new file be uploaded. Use the terminal upload utility (part of your terminal program) to send the MSI supplied S-Record file. Monitor progress on the terminal screen. Most terminal programs will display a downloaded bytes window.

```
 Please wait for complete erased of flash chip application sectors.
TC58FVM5B2A
 Erasing Sector: ........................
 Flash chip sectors erased successfully.

 Please send an application s-record hex file now.
```

During Bootloading, the 9850 will blink the LCD Backlight. This is the only external indication other than the terminal screens.

When the upload is complete the Bootload Menu will appear in the PC Terminal window.

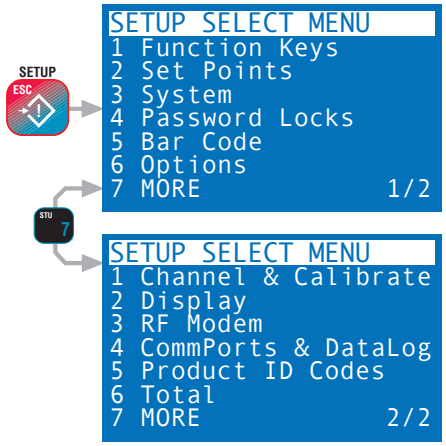
```
Bootloader built: Feb 28 2006 at 16:15:23
Version           : E0-00-16
Copyright (c) 2005-2006 Measurement Systems International

=============== MAIN MENU ===============

 (u) Update software.
 (s) Change baudrate.
 (n) Get flash ID.
 (m) Memory dump.
 (g) run App code.

 (r) refresh.
```

14) To start the new program, press **[g]** on the terminal program keyboard. The 9850 should start with its display test program. If the 9850 doesn't respond, unplug the power source, wait for 10 seconds and plug it back in. Turn on the power. If it still won't start, return your terminal to the default 9600 baud and repeat the process.

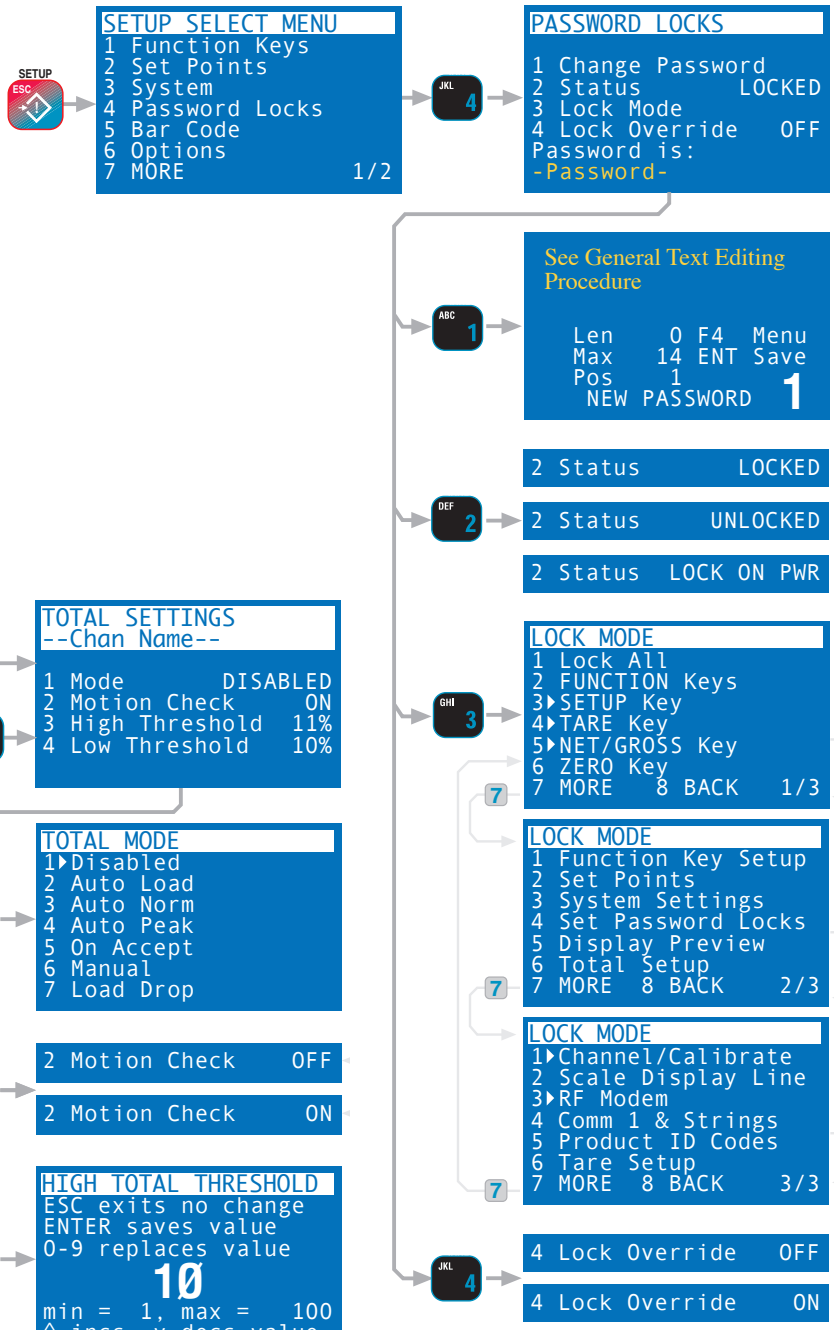
15) Restore RF Network settings, display and other system parameters as needed. *The first 9850 key press after completing a firmware update might be ignored.*

APPENDIX A – MENU MAPS

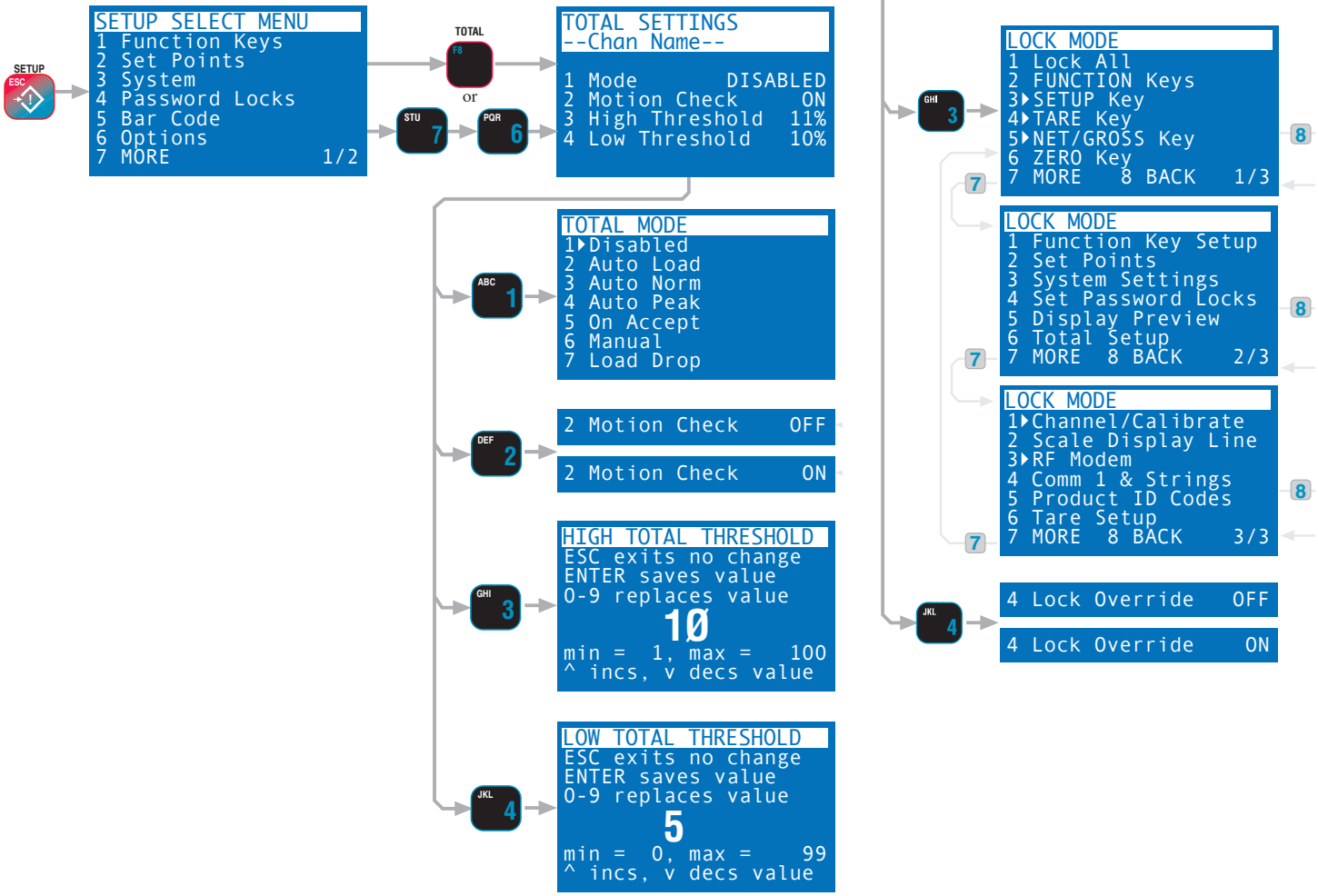
SETUP SELECT MENU



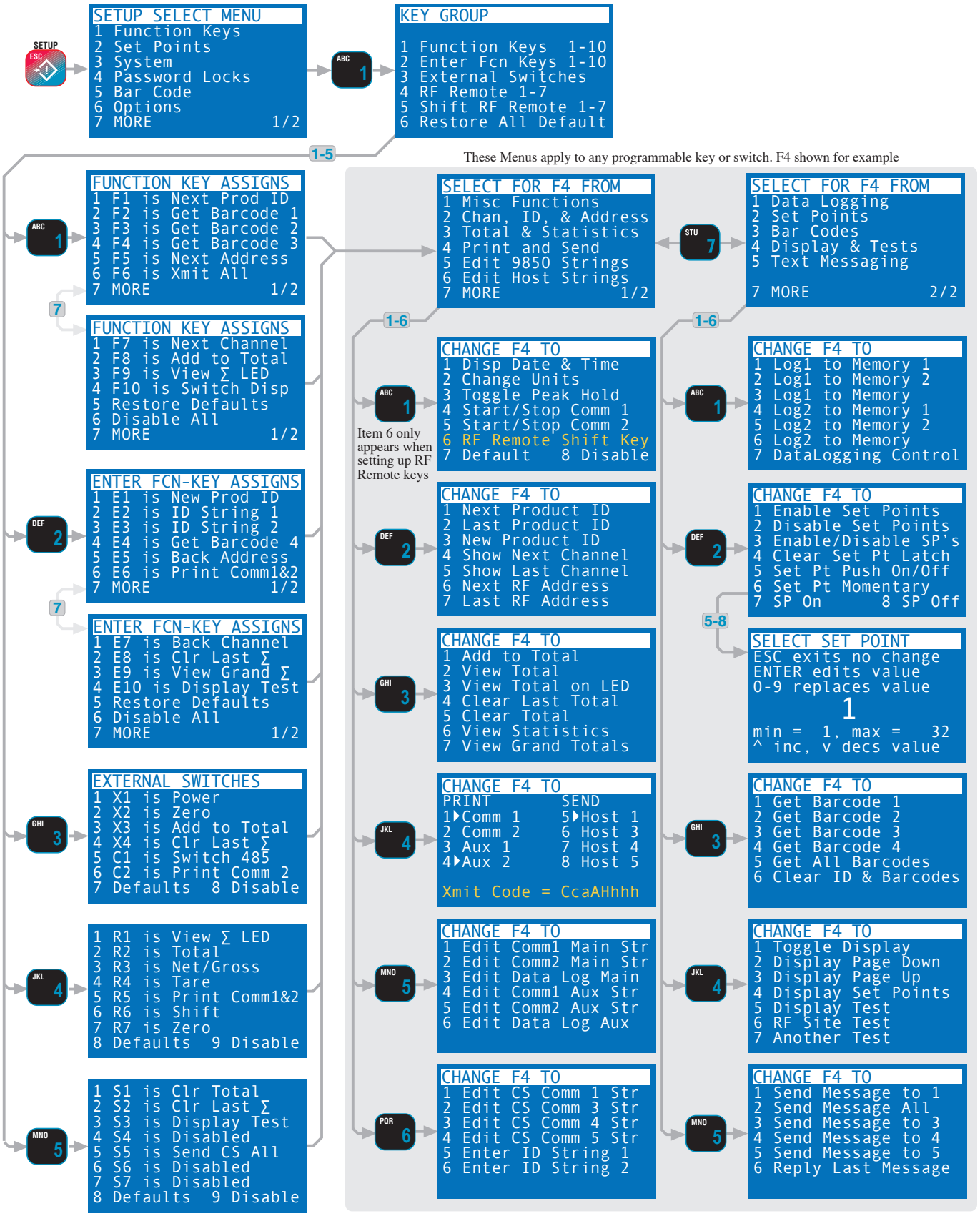
PASSWORD LOCKS



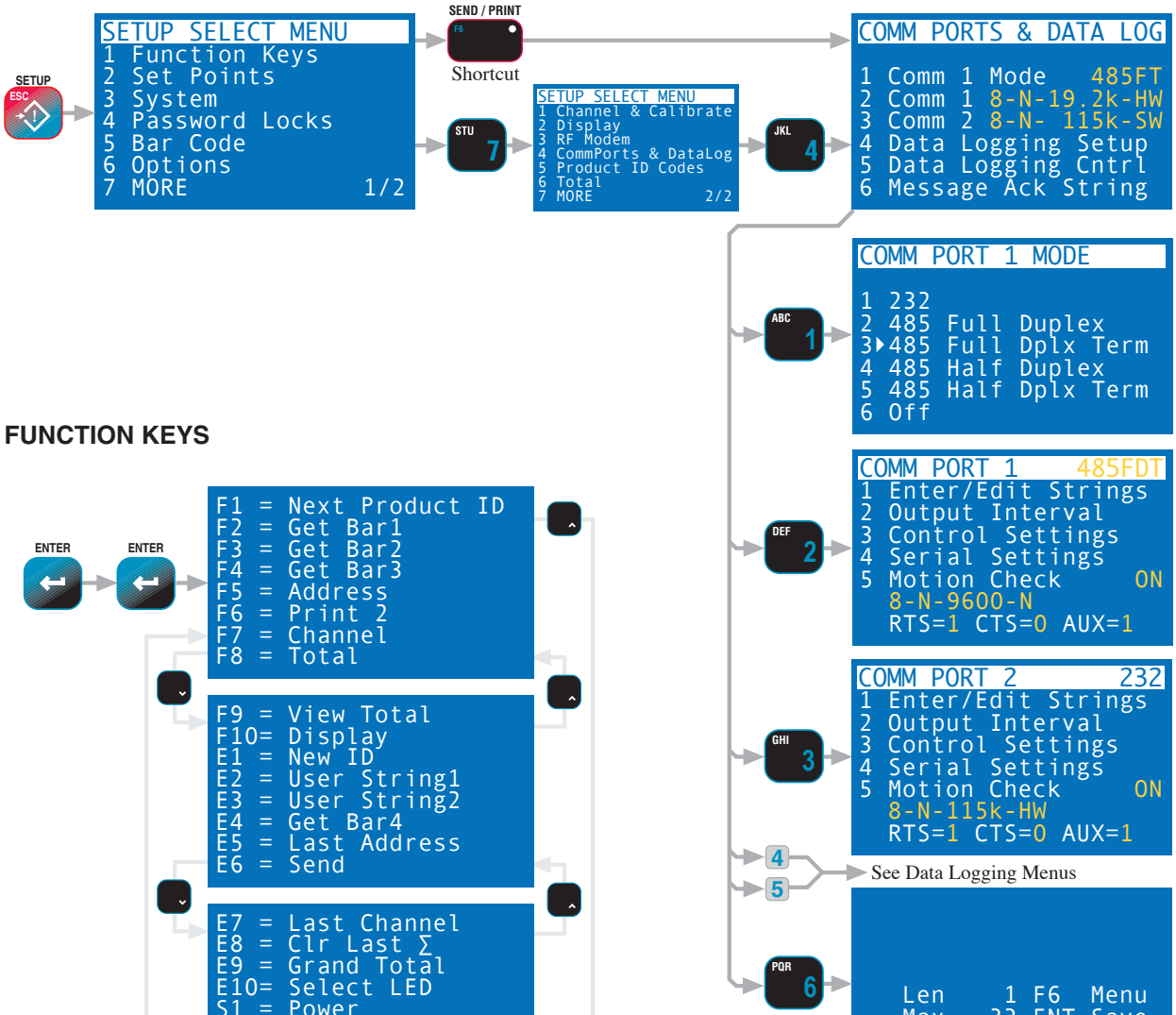
TOTAL SETTINGS



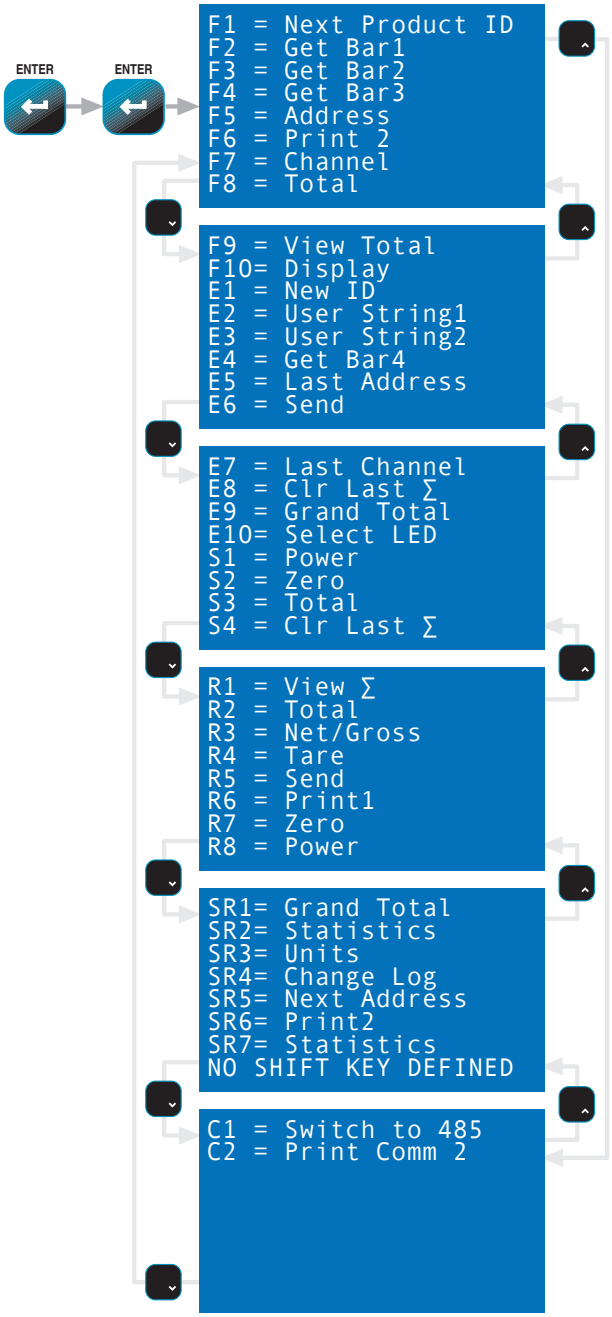
FUNCTION KEYS



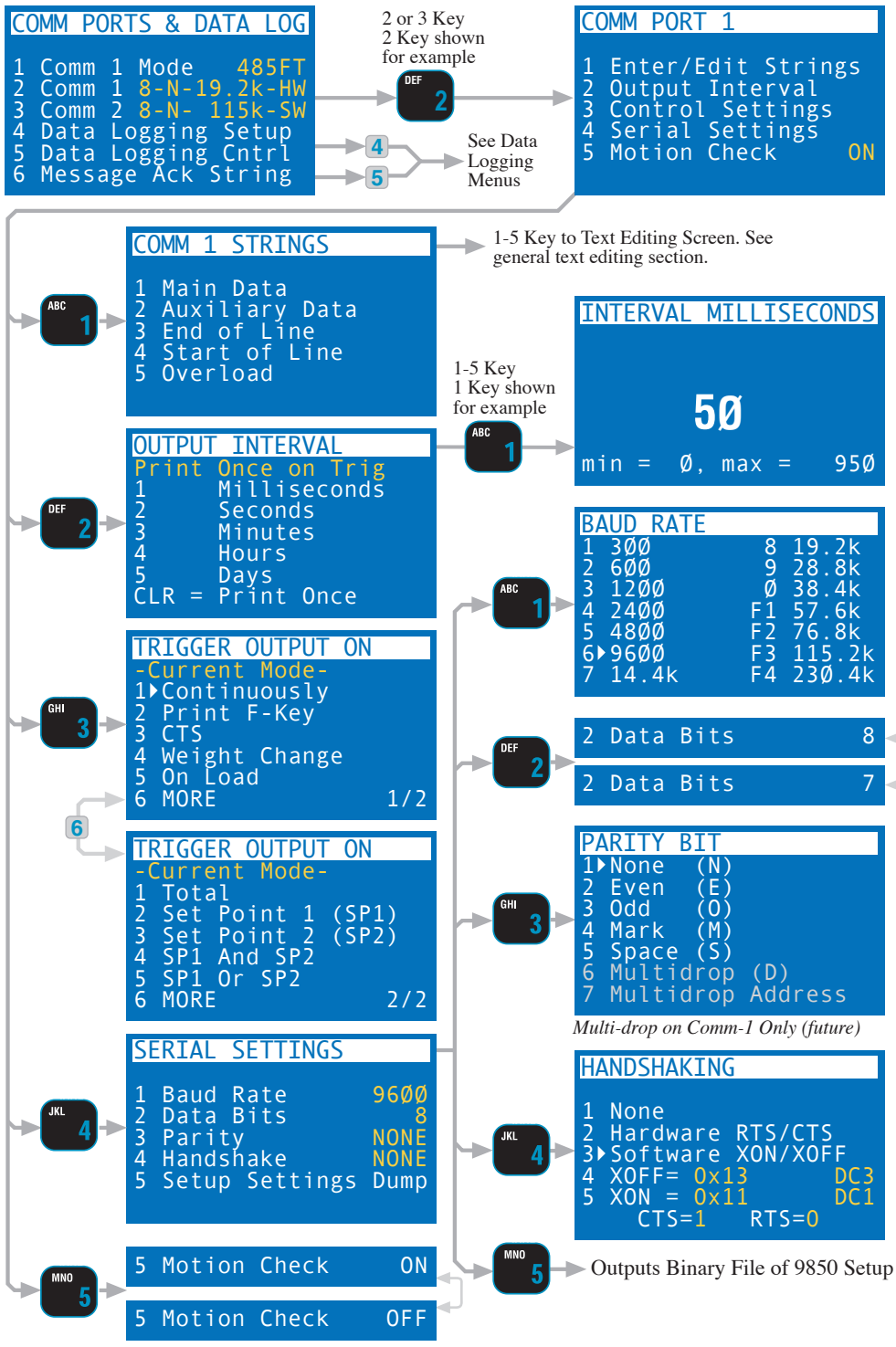
COMM PORTS & DATA LOGGING



DISPLAY FUNCTION KEYS

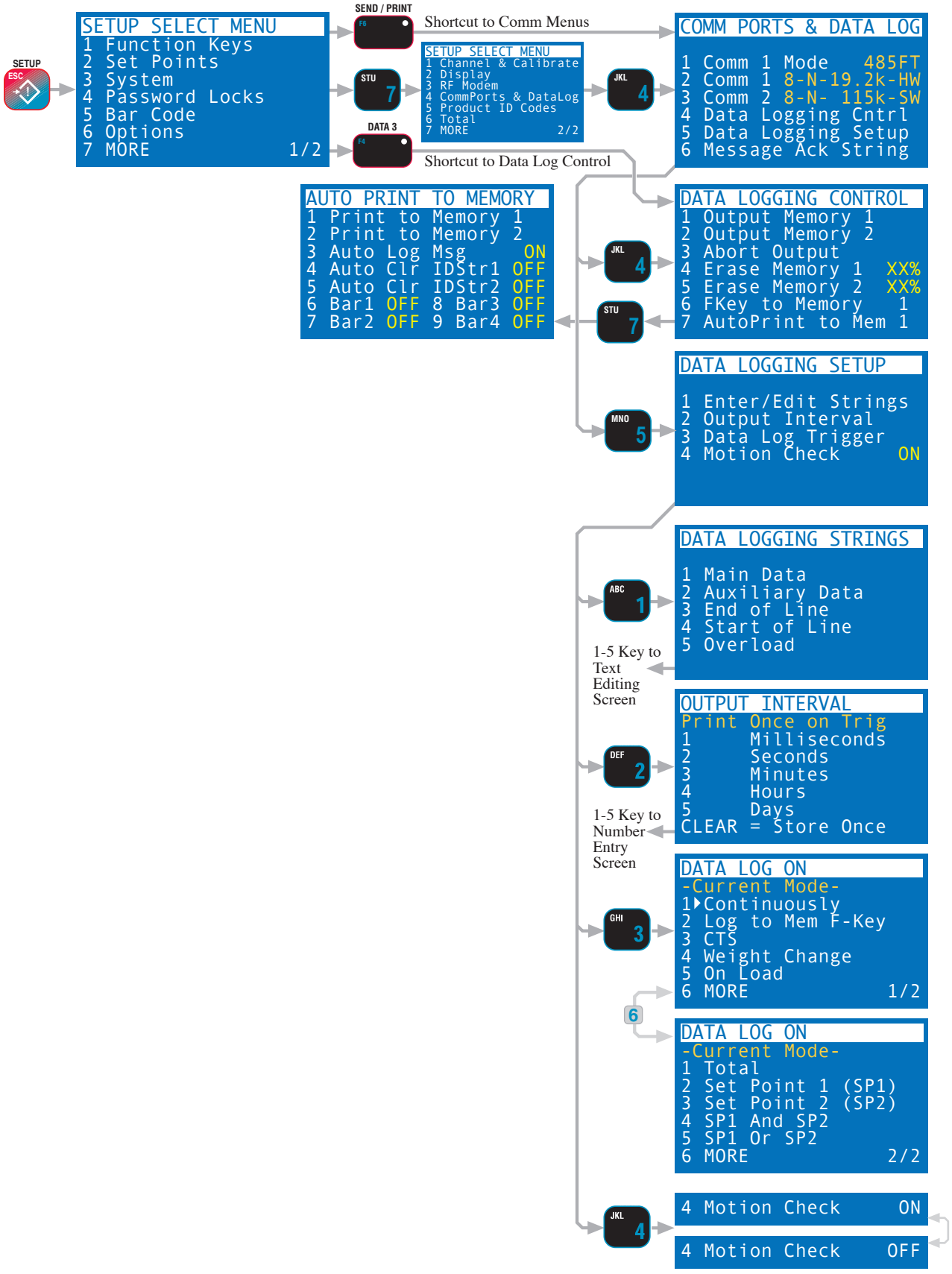


COMM PORTS SETUP & STRINGS

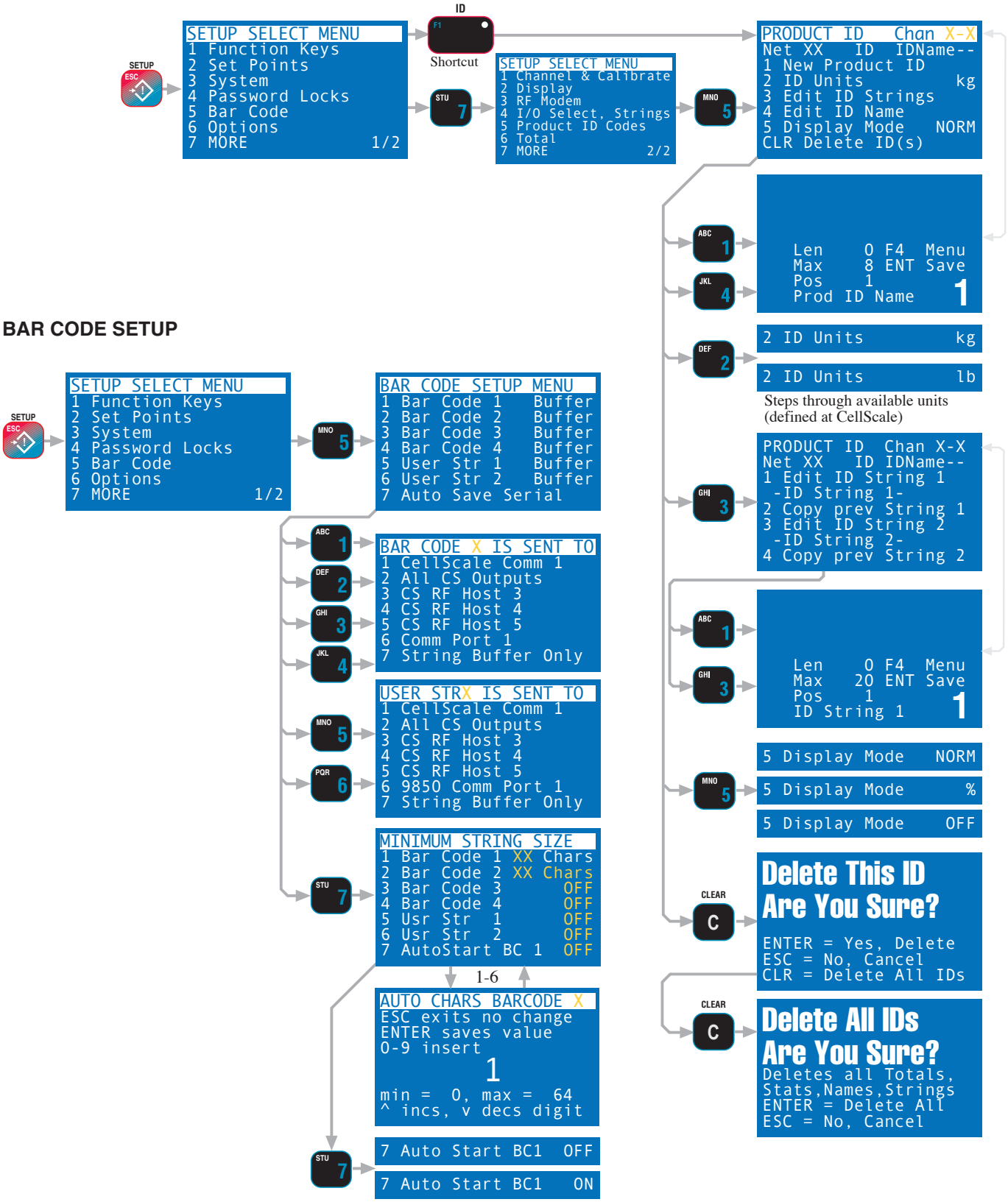


Go to Index

DATA LOGGING SETUP & STRINGS



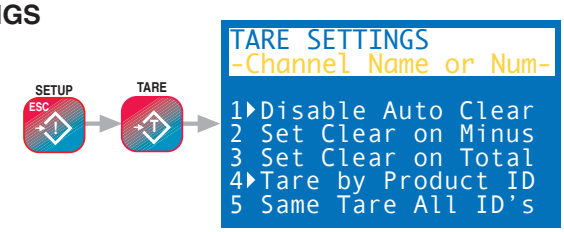
PRODUCT ID CODES



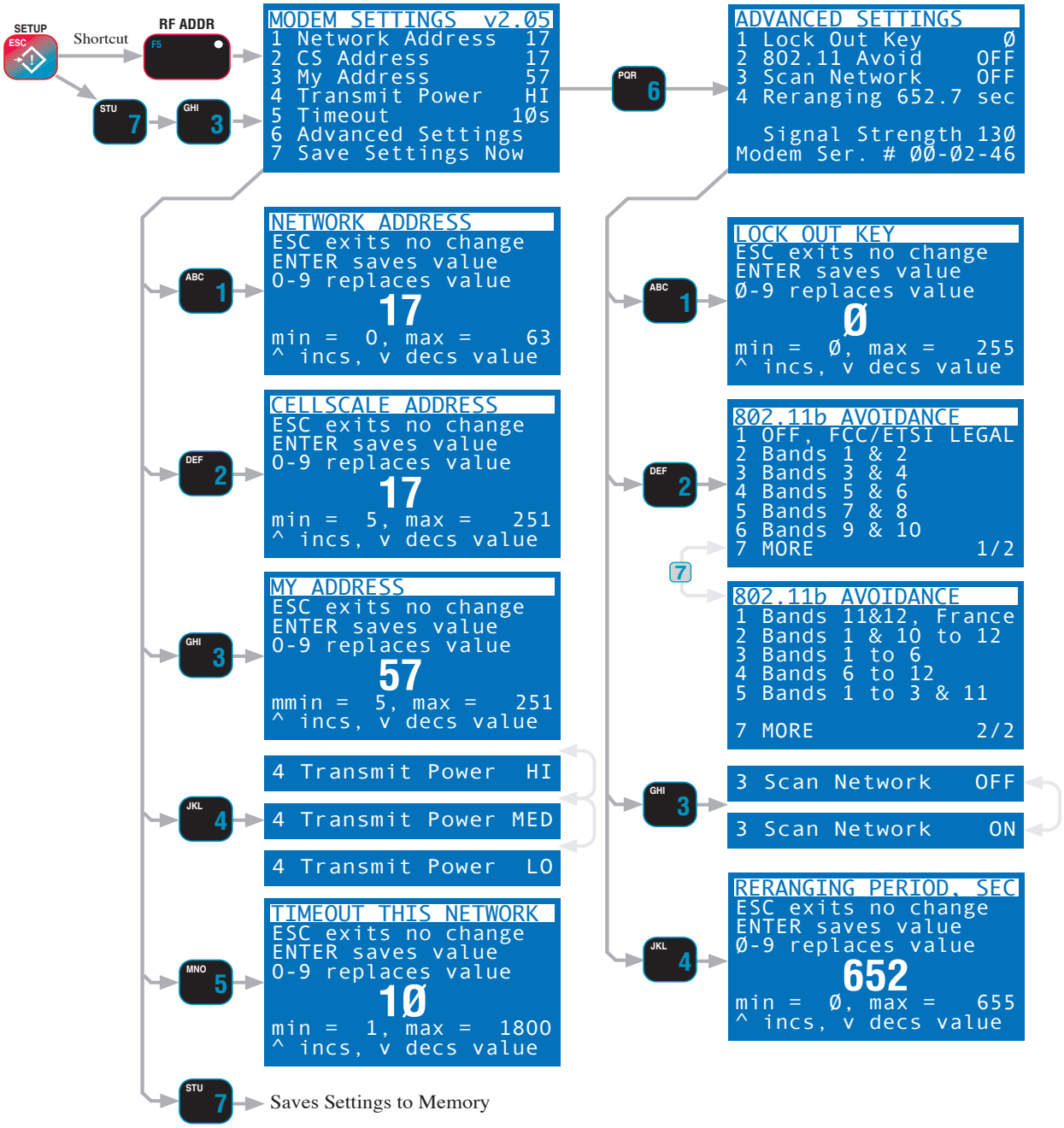
BAR CODE SETUP

Go to Index

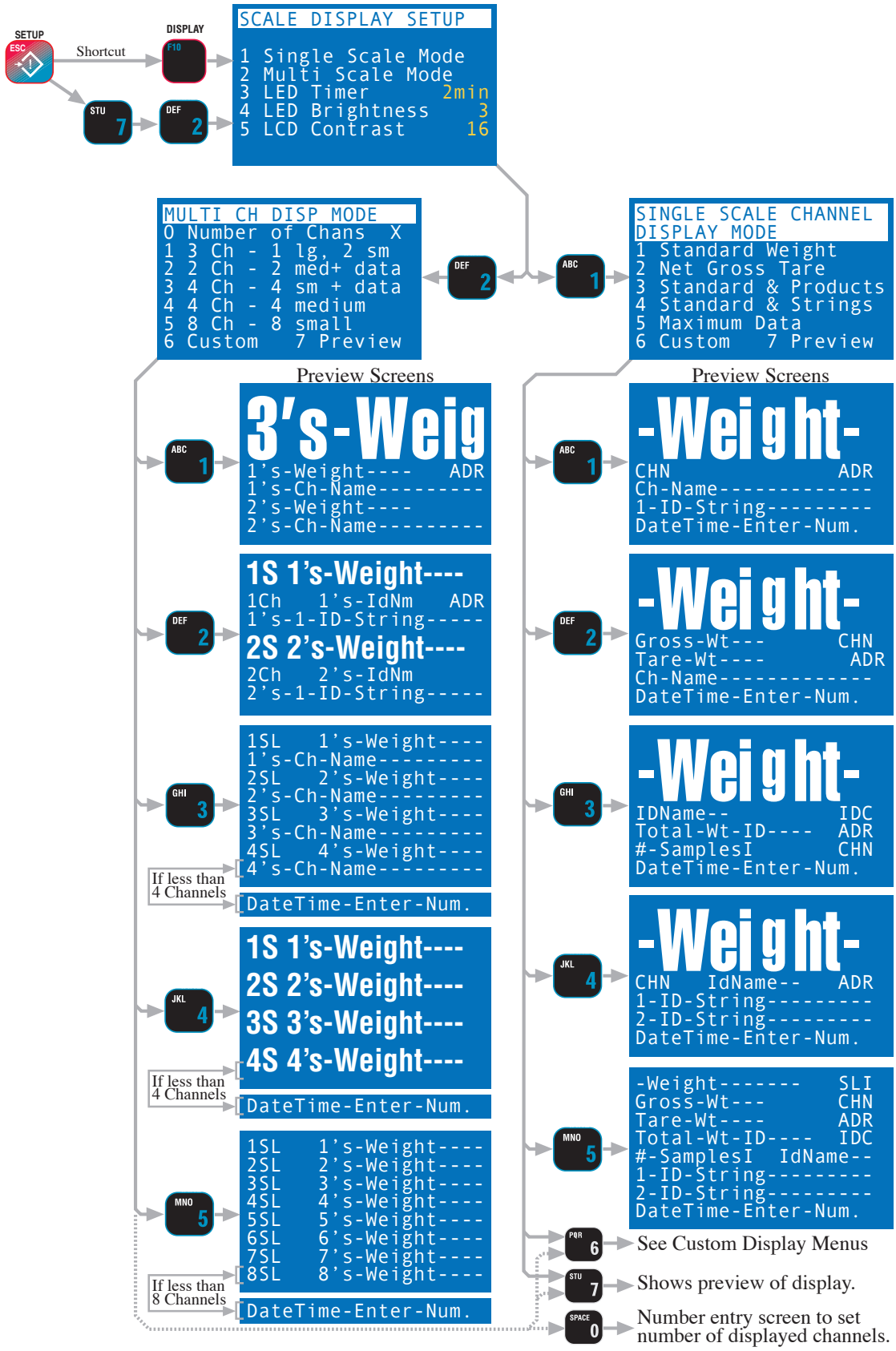
TARE SETTINGS



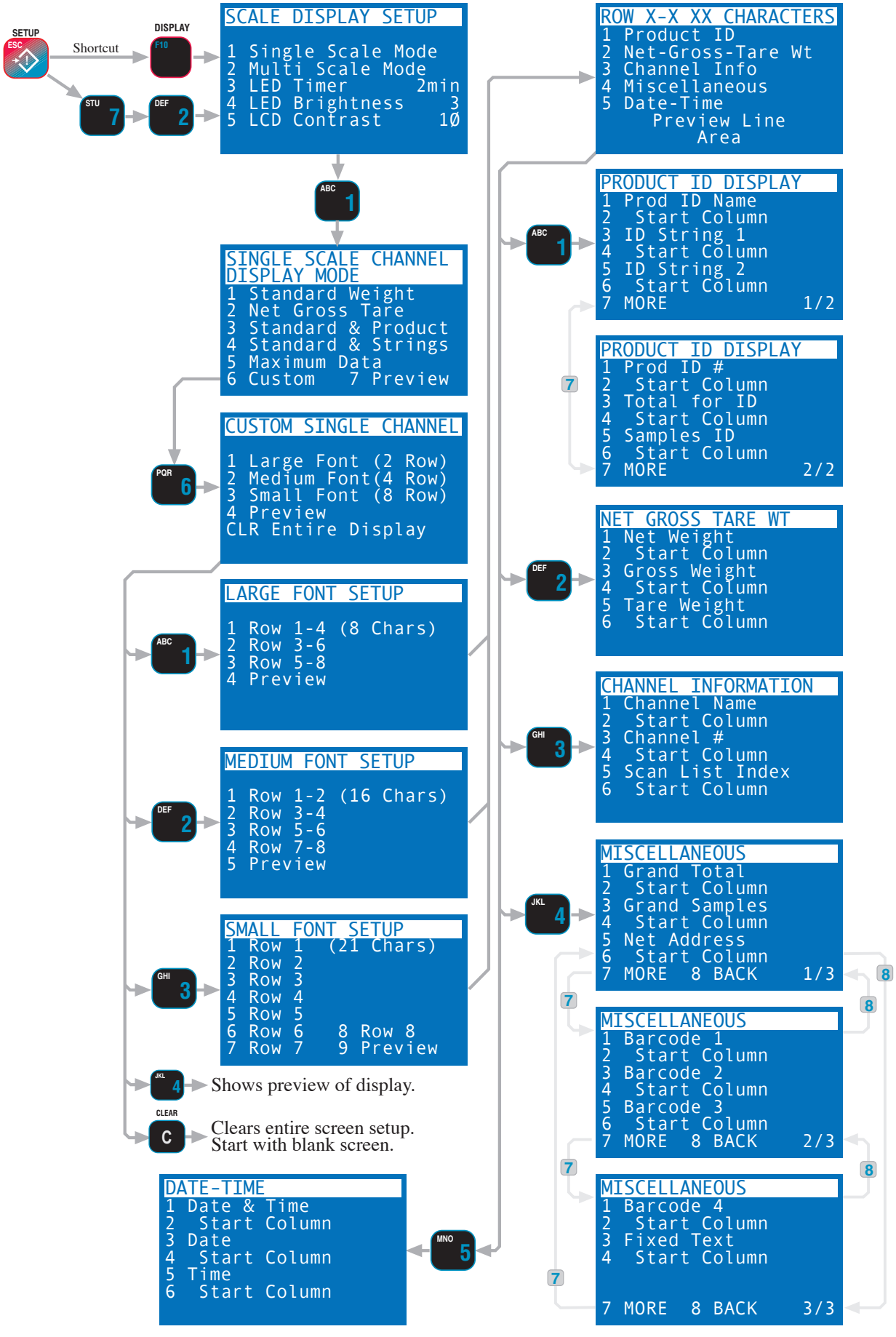
RF MODEM SETTINGS



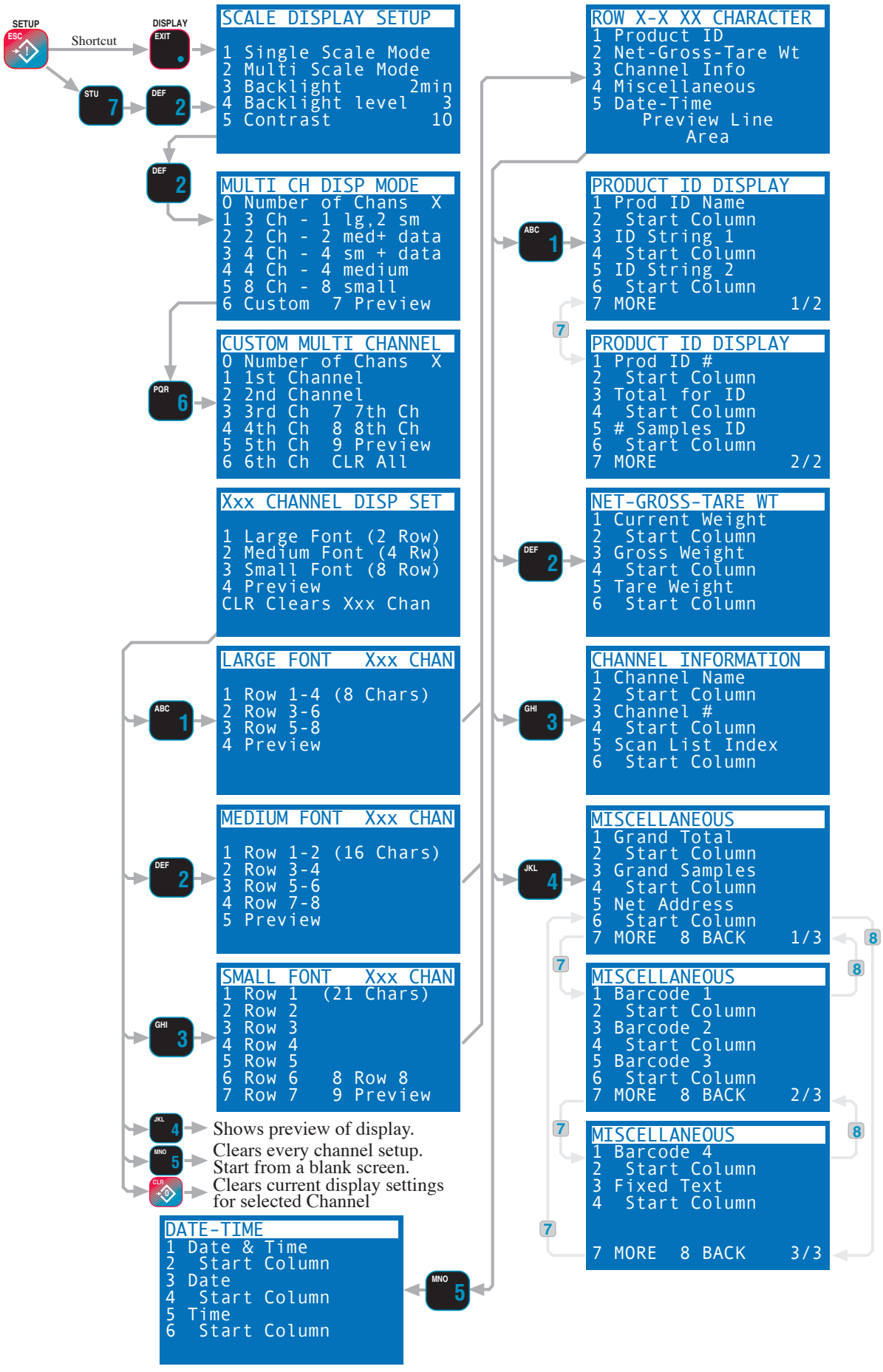
SCALE DISPLAY SETUP



SCALE SINGLE CHANNEL CUSTOM DISPLAY SETUP

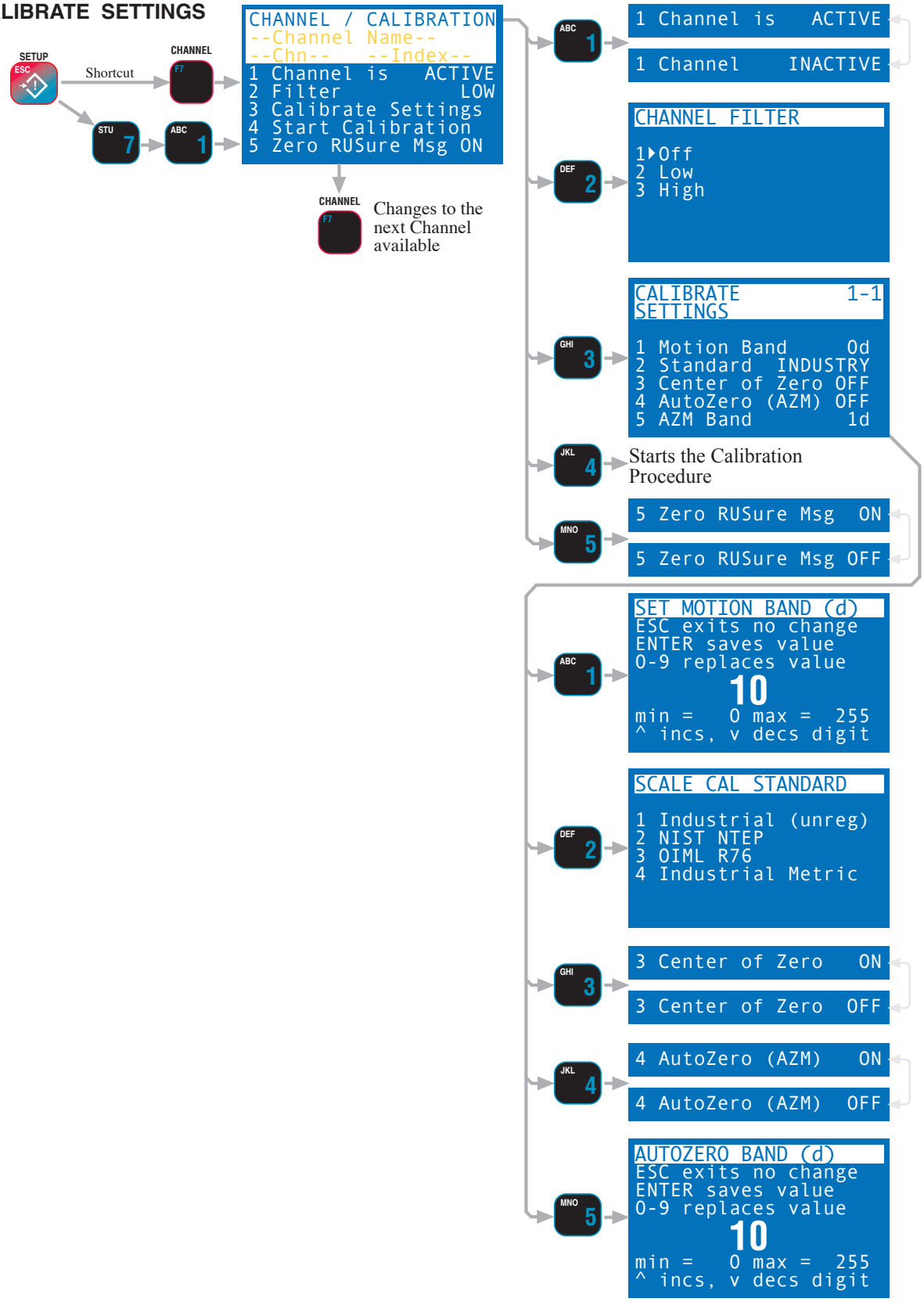


SCALE MULTI-CHANNEL CUSTOM DISPLAY SETUP

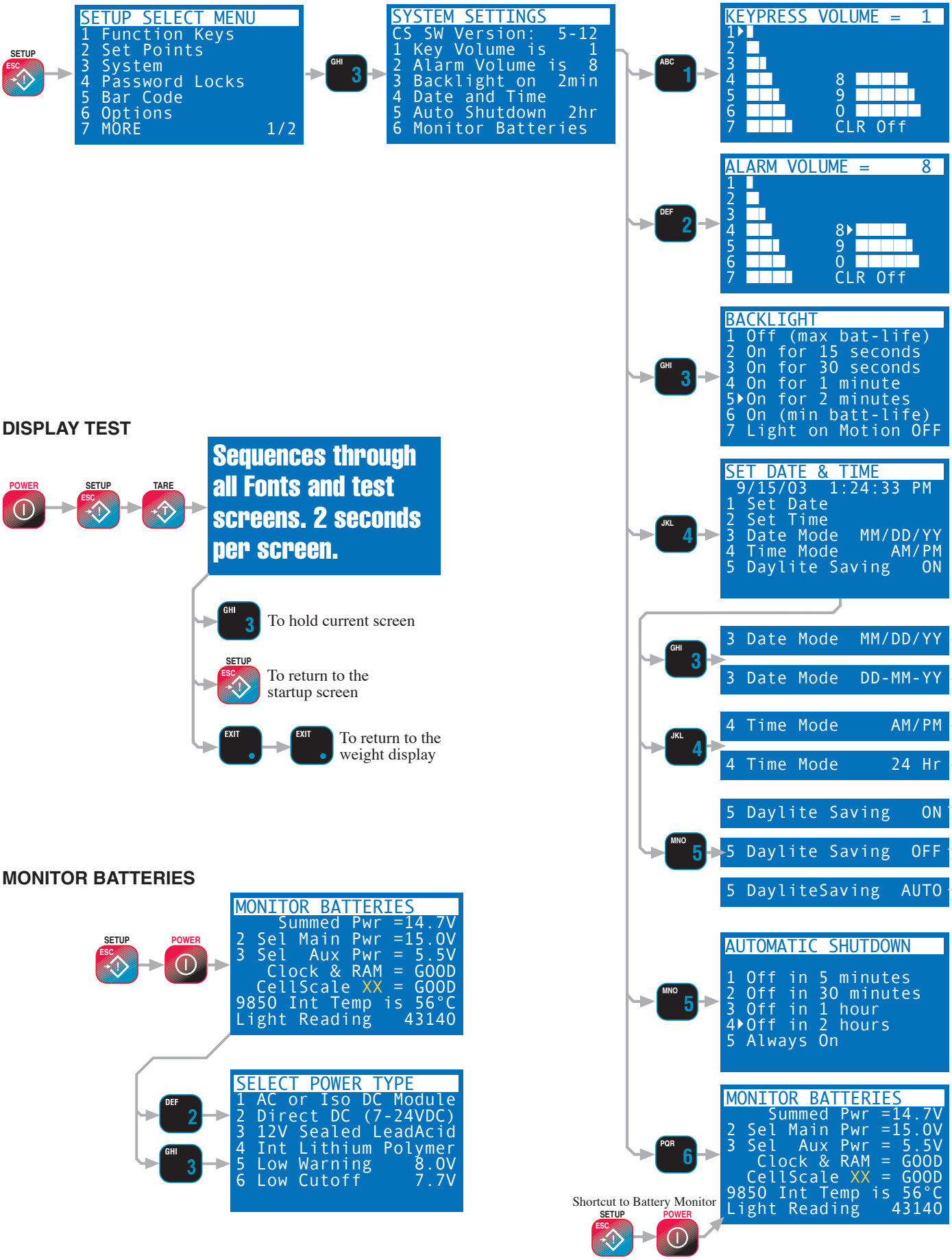


Go to Index

CHANNEL / CALIBRATE SETTINGS



SYSTEM SETTINGS

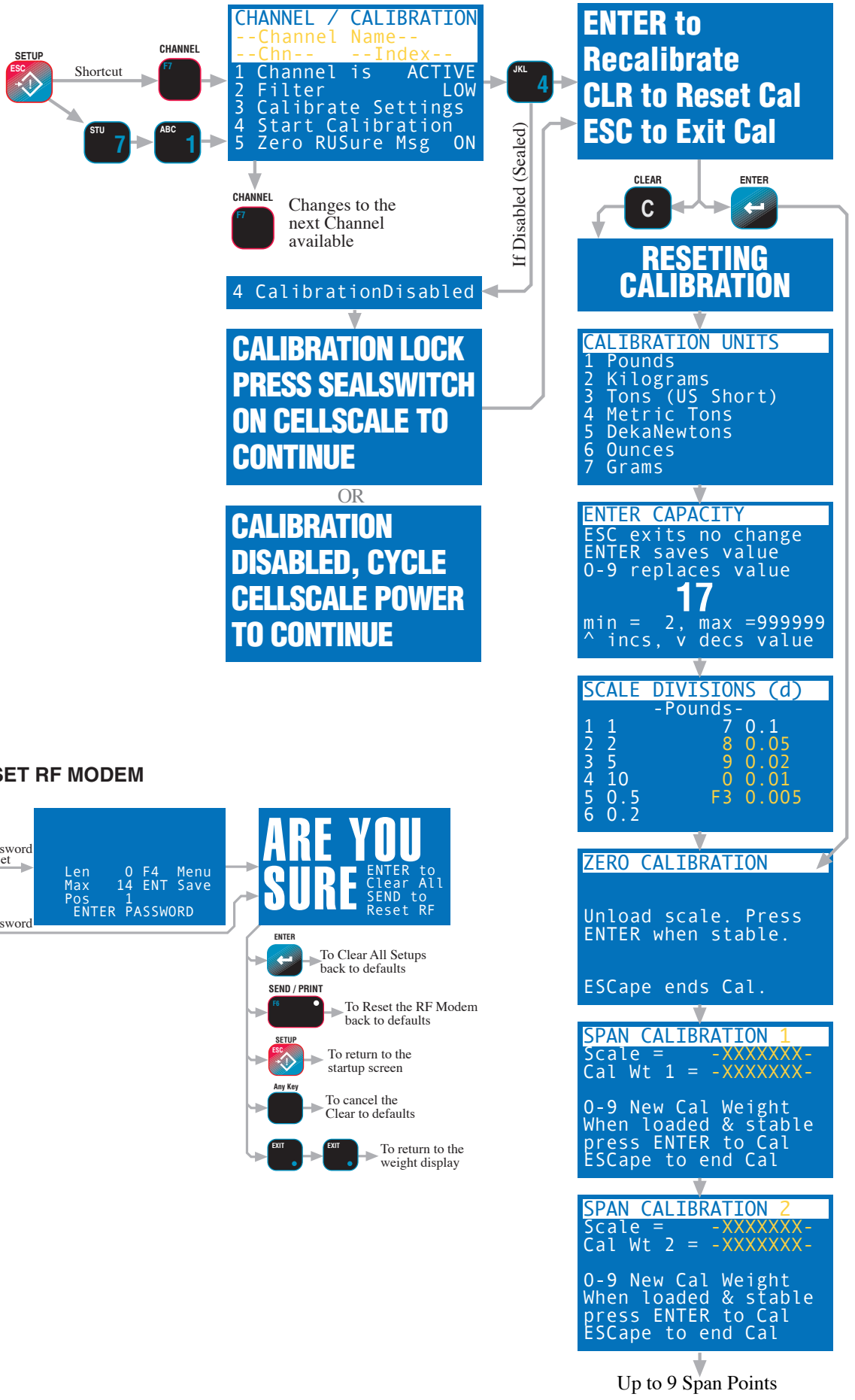


DISPLAY TEST

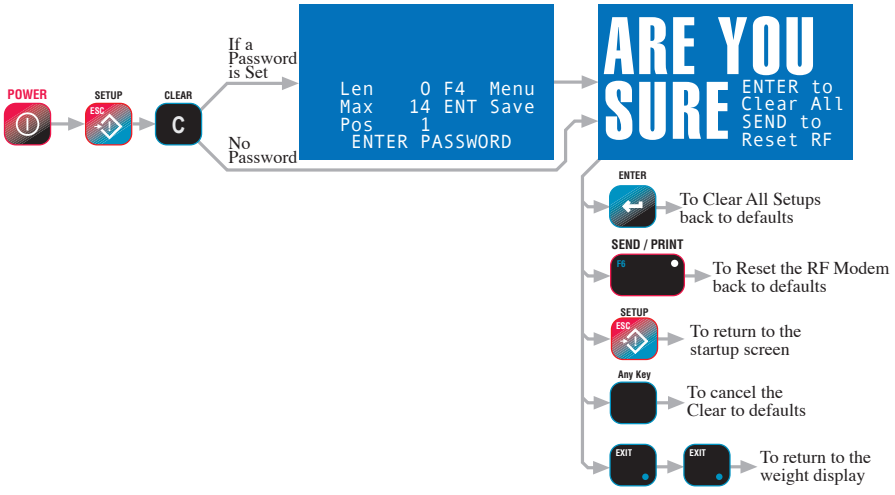
MONITOR BATTERIES

Go to Index

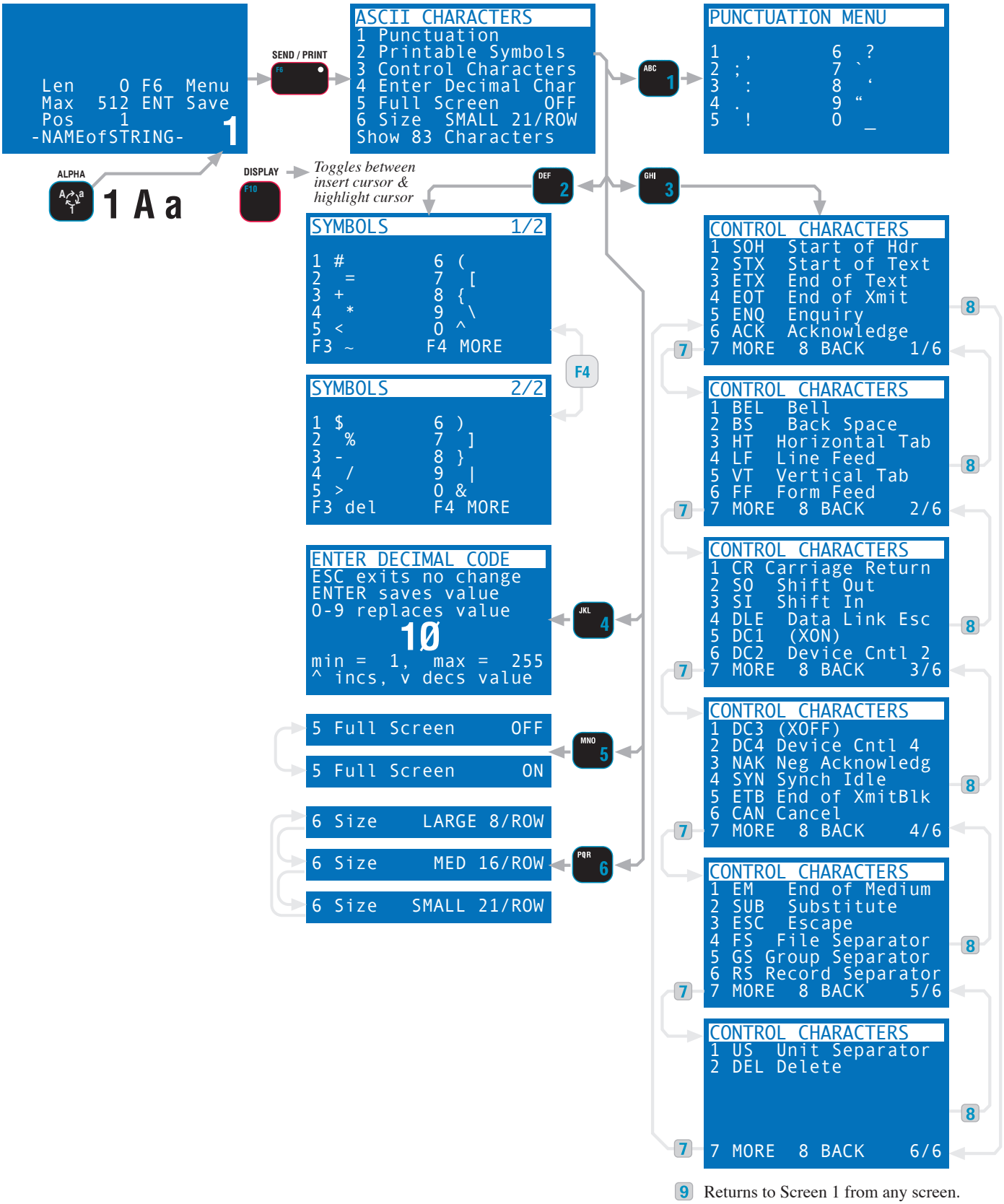
CALIBRATION



RESET ALL OR RESET RF MODEM

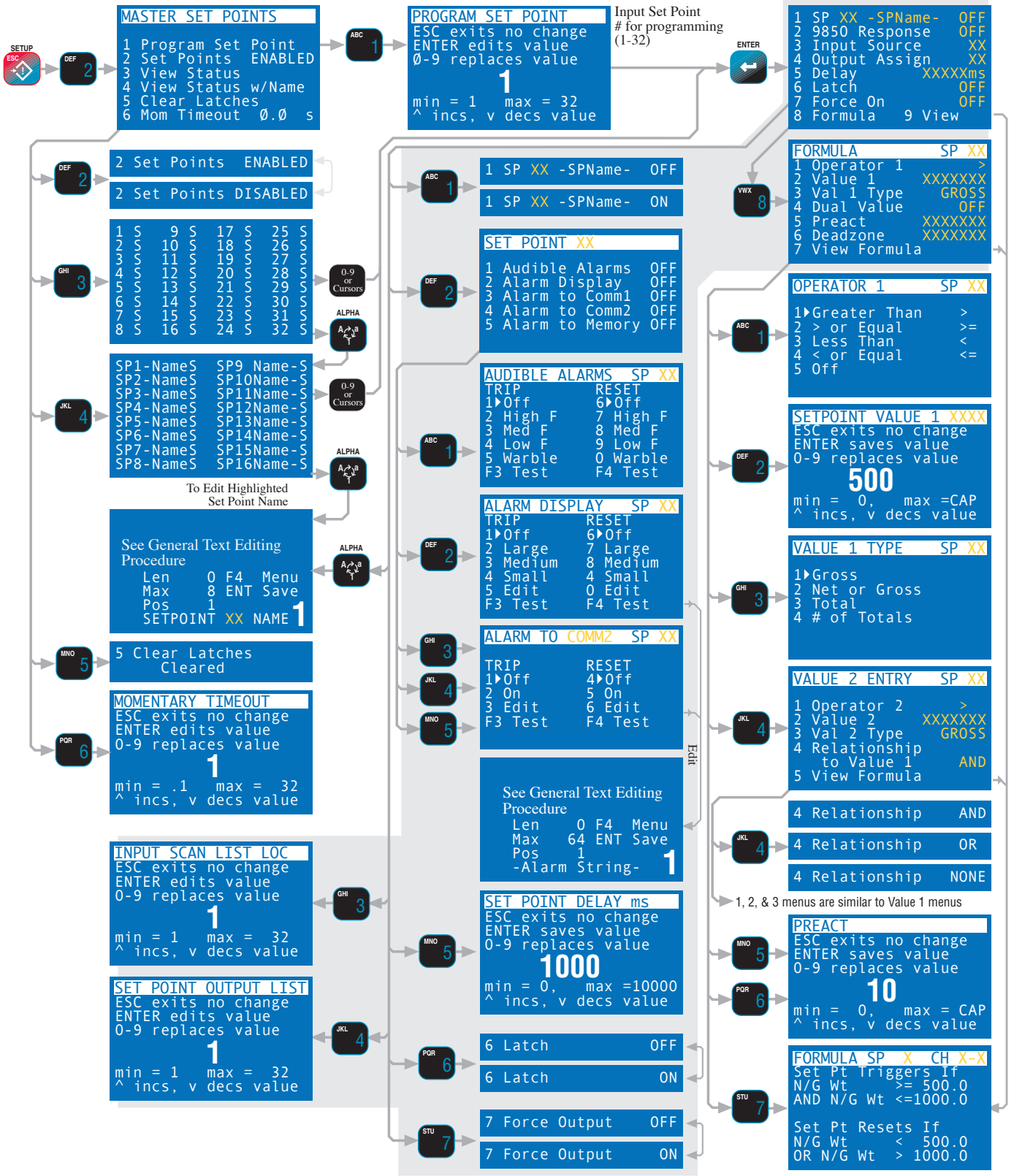


GENERAL TEXT ENTRY



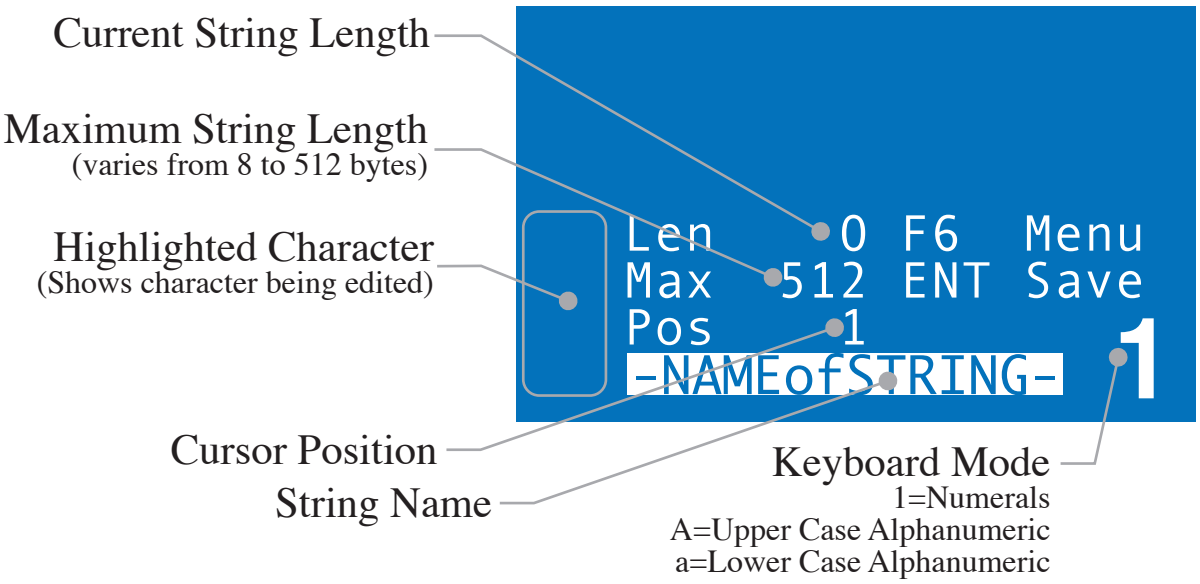
9 Returns to Screen 1 from any screen.

SET POINTS


MASTER SET POINTS
1 Program Set Point
2 Set Points ENABLED
3 View Status
4 View Status w/Name
5 Clear Latches
6 Mom Timeout Ø.Ø s
PROGRAM SET POINT
ESC exits no change
ENTER edits value
Ø-9 replaces value
1
min = 1 max = 32
^ incs, v decs value
Input Set Point # for programming (1-32)
1 SP XX -SPName- OFF
2 9850 Response OFF
3 Input Source XX
4 Output Assign XX
5 Delay XXXXXms
6 Latch OFF
7 Force On OFF
8 Formula 9 View
2 Set Points ENABLED
2 Set Points DISABLED
1 SP XX -SPName- OFF
1 SP XX -SPName- ON
SET POINT XX
1 Audible Alarms OFF
2 Alarm Display OFF
3 Alarm to Comm1 OFF
4 Alarm to Comm2 OFF
5 Alarm to Memory OFF
AUDIBLE ALARMS SP XX
TRIP RESET
1▸Off 6▸Off
2 High F 7 High F
3 Med F 8 Med F
4 Low F 9 Low F
5 Warble 0 Warble
F3 Test F4 Test
ALARM DISPLAY SP XX
TRIP RESET
1▸Off 6▸Off
2 Large 7 Large
3 Medium 8 Medium
4 Small 4 Small
5 Edit 0 Edit
F3 Test F4 Test
ALARM TO COMM2 SP XX
TRIP RESET
1▸Off 4▸Off
2 On 5 On
3 Edit 6 Edit
F3 Test F4 Test
1 S 9 S 17 S 25 S
2 S 10 S 18 S 26 S
3 S 11 S 19 S 27 S
4 S 12 S 20 S 28 S
5 S 13 S 21 S 29 S
6 S 14 S 22 S 30 S
7 S 15 S 23 S 31 S
8 S 16 S 24 S 32 S
SP1-NameS SP9 Name-S
SP2-NameS SP10Name-S
SP3-NameS SP11Name-S
SP4-NameS SP12Name-S
SP5-NameS SP13Name-S
SP6-NameS SP14Name-S
SP7-NameS SP15Name-S
SP8-NameS SP16Name-S
To Edit Highlighted Set Point Name
See General Text Editing Procedure
Len 0 F4 Menu
Max 8 ENT Save
Pos 1
SETPOINT XX NAME 1
5 Clear Latches Cleared
MOMENTARY TIMEOUT
ESC exits no change
ENTER edits value
0-9 replaces value
1
min = .1 max = 32
^ incs, v decs value
See General Text Editing Procedure
Len 0 F4 Menu
Max 64 ENT Save
Pos 1
-Alarm String- 1
Edit
INPUT SCAN LIST LOC
ESC exits no change
ENTER edits value
0-9 replaces value
1
min = 1 max = 32
^ incs, v decs value
SET POINT OUTPUT LIST
ESC exits no change
ENTER edits value
0-9 replaces value
1
min = 1 max = 32
^ incs, v decs value
SET POINT DELAY ms
ESC exits no change
ENTER saves value
0-9 replaces value
1000
min = 0, max =10000
^ incs, v decs value
6 Latch OFF
6 Latch ON
7 Force Output OFF
7 Force Output ON
FORMULA SP XX
1 Operator 1 >
2 Value 1 XXXXXXX
3 Val 1 Type GROSS
4 Dual Value OFF
5 Preact XXXXXXX
6 Deadzone XXXXXXX
7 View Formula
OPERATOR 1 SP XX
1▸Greater Than >
2 > or Equal >=
3 Less Than <
4 < or Equal <=
5 Off
SETPOINT VALUE 1 XXXX
ESC exits no change
ENTER saves value
0-9 replaces value
500
min = 0, max =CAP
^ incs, v decs value
VALUE 1 TYPE SP XX
1▸Gross
2 Net or Gross
3 Total
4 # of Totals
VALUE 2 ENTRY SP XX
1 Operator 2 >
2 Value 2 XXXXXXX
3 Val 2 Type GROSS
4 Relationship to Value 1 AND
5 View Formula
4 Relationship AND
4 Relationship OR
4 Relationship NONE
1, 2, & 3 menus are similar to Value 1 menus
PREACT
ESC exits no change
ENTER saves value
0-9 replaces value
10
min = 0, max = CAP
^ incs, v decs value
FORMULA SP X CH X-X
Set Pt Triggers If
N/G Wt >= 500.0
AND N/G Wt <=1000.0
Set Pt Resets If
N/G Wt < 500.0
OR N/G Wt > 1000.0

APPENDIX B – ASCII CHART

DEC	HEX	CHAR	DEC	HEX	CHAR	DEC	HEX	CHAR	DEC	HEX	CHAR
0	00	^@ NUL	32	20	SPC	64	40	@	96	60	`
1	01	^A SOH	33	21	!	65	41	A	97	61	a
2	02	^B STX	34	22	“	66	42	B	98	62	b
3	03	^C ETX	35	23	#	67	43	C	99	63	c
4	04	^D EOT	36	24	$	68	44	D	100	64	d
5	05	^E ENQ	37	25	%	69	45	E	101	65	e
6	06	^F ACK	38	26	&	70	46	F	102	66	f
7	07	^G BEL	39	27	‘	71	47	G	103	67	g
8	08	^H BS	40	28	(	72	48	H	104	68	h
9	09	^I HT	41	29	)	73	49	I	105	69	i
10	0A	^J LF	42	2A	*	74	4A	J	106	6A	j
11	0B	^K VT	43	2B	+	75	4B	K	107	6B	k
12	0C	^K FF	44	2C	,	76	4C	L	108	6C	l
13	0D	^M CR	45	2D	-	77	4D	M	109	6D	m
14	0E	^N SO	46	2E	.	78	4E	N	110	6E	n
15	0F	^O SI	47	2F	/	79	4F	O	111	6F	o
16	10	^P DLE	48	30	0	80	50	P	112	70	p
17	11	^Q DC1	49	31	1	81	51	Q	113	71	q
18	12	^R DC2	50	32	2	82	52	R	114	72	r
19	13	^S DC3	51	33	3	83	53	S	115	73	s
20	14	^T DC4	52	34	4	84	54	T	116	74	t
21	15	^U NAK	53	35	5	85	55	U	117	75	u
22	16	^V SYN	54	36	6	86	56	V	118	76	v
23	17	^W ETB	55	37	7	87	57	W	119	77	w
24	18	^X CAN	56	38	8	88	58	X	120	78	x
25	19	^Y EM	57	39	9	89	59	Y	121	79	y
26	1A	^Z SUB	58	3A	:	90	5A	Z	122	7A	z
27	1B	^ [ESC	59	3B	;	91	5B	[	123	7B	{
28	1C	^ \ FS	60	3C	<	92	5C	\	124	7C	l
29	1D	^ [GS	61	3D	=	93	5D	]	125	7D	}
30	1E	^ ^ RS	62	3E	>	94	5E	^	126	7E	~
31	1F	^ _ US	63	3F	?	95	5F	_	127	7F	DEL



Alternate Key Characters for Text Entry

	Numeric "1"	Alpha Key "a" or "A"			
		1	2	3	4
EXIT	. (dp)	.	,	;	:
F1	+ (plus)	?	!	&	#
F2	- (minus or dash)	-	'	"	/
F3	* (multiply or asterisk)	HT	CR	LF	FF
F4	/ (divide or backslash)	SOH	STX	ETX	ESC
F5	% (per cent)	DC1	DC2	DC3	DC4
F7	(space)	SO	SI	BEL	DEL
F8	= (equals)	=	~	(	)
F9	^ (caret)	^	$	_	\

APPENDIX C – SPECIFICATIONS

Housing

Rugged milled aluminum, O-ring gasketed, NEMA 4, IP65 with standard antenna; NEMA 6, IP67 with optional long range antenna

Weight

2.8kg (5.0lb)

Temperature

Operating / Storage (Internal AC/DC Power):

-20°C to +70°C (-4°F to 158°F)

Operating / Storage (DC Power):

-20°C to +85°C (-4°F to 185°F)

Approvals (pending)

NTEP, OIML, CE, Factory Mutual

Accuracy

See the host CellScale device specifications. The 9850 is a digital display device only. Accuracy is dependent on the measuring source.

Power Input

Internal AC/DC Power Supply: 85-265 VAC,47-440Hz/130-300 VDC. Includes a separate, independent 7-25 VDC power input and remote switches (requires optional power/switch interface cable).

Option: Internal Isolated DC/DC Converter in two ranges: 9-36VDC, or 18-72VDC

Radio Link

Frequency Hopping Spread Spectrum @ 2.4 GHz providing 64 networks of scales and peripheral devices. Functions in the ISM band, license free. 10mW (low power), 63mW (medium power) or 250mW (high power) average output

Radio Link Effective Range

Typically 150m (500ft) indoors, 300m (1000ft) outdoors with standard antennas. The MSI-9850 operating range increases if Long Range Antennas are applied

Antenna

1/2 wave standard antenna. High gain antennas available for range extension.

RFI/EMI Shielding

Exceeds NIST HB44 and CE Standards

Keypad

33 keys – 12 key alphanumeric, 4 cursor keys, 7 control keys and 10 user programmable keys. Password protected lock features

Weight Display

- 6 digit, 30mm (1.2in) high numeric weight LED's
- 4 alphanumeric 12.7mm (0.5in) high data LED's
- 6 LED function select annunciators
- 10 backlit LED annunciators
- Low battery LED indicator
- Automatic brightness control

Information Display

- 36mm (1.4in) x 67mm (2.6in) backlit LCD; capable of 8 lines, 21 characters each. 64 x 128 Full Graphics Dot Matrix.
- Backlight selectable On, Off or Automatic

Standard Connectors

Comm 1, RS-232/485: Turck compatible pico connector, 4m (13ft) adapter cable to IBM compatible DE-9 connector included.

Comm 2, RS-232: Turck compatible Pico connector

Set Points Output, 6-P Male Turck

Aux Power and External Switches, 6-P Male

Bar Code Interface

The 9850 can directly read industry standard Bar Code scanners and append the bar code data to weight, date, and time data generated by the CellScale. Pass thru data can be sent directly to host computers via MSI RF modems. 5Vdc @ 500mA is available for powering Bar Code Readers.

THE MSI LIMITED WARRANTY

MEASUREMENT SYSTEMS INTERNATIONAL, INC., WARRANTS load sensing elements and meters against defects in workmanship and materials for a period of one year from date of purchase and warrants electrical cables and batteries against the same defects for a period of ninety (90) days from date of purchase.

Any device which proves defective during the warranty period will be replaced or repaired at no charge; provided that the defective device is returned to the Company freight pre-paid.

In no event shall the Company be liable for the cost of any repairs or alterations made by others except those repairs or alterations made with its specific written consent, nor shall the Company be liable for any damages or delays whether caused by defective workmanship, materials or otherwise.

The Company shall not be liable for any personal injury or property damage resulting from the handling, possession or use of the equipment by the customer.

The warranty set forth herein is exclusive and is expressly in lieu of all other warranties, express or implied, including without limitation any implied warranties of merchantability or fitness, or of any other obligations or liability on the part of the Company.

The liability of the Company under this warranty is limited solely to repairing or replacing its products during the warranty periods; and the final judgment and disposition of all claims will be made by MEASUREMENT SYSTEMS INTERNATIONAL, INC.

MADE IN THE USA

©2006 by Measurement Systems International
Printed in U.S.A.
PUB.319-04-06

Measurement Systems
INTERNATIONAL
14240 Interurban Avenue South, STE 200
Seattle, Washington, 98168-4661 U.S.A.
Phone: 206-433-0199 • FAX: 206-244-8470
Internet: www.msiscales.com • E-mail: info@msiscales.com